A DIVISION OF IKONIX USA

Operation & Service Manual

Model 6330

Item 99-10522-01, Ver, 1.17

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CE

DECLARATION OF CONFORMITY

Manufacturer: Slaughter Company, Inc.

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

Product Name: AC/DC Hipot with IR, Ground Bond, Functional Run and Line Leakage Testers

Model Number: 6330

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: EN61326-1:2006(EN55011:1998/A2:2002 Class A, EN 61000-3-2 :2006, EN61000-3-3:1995/A1:2001/A2:2005,
EN61000-4-2:1995/A2:2000, EN61000-4-3:2002, EN61000-4-4:2004, EN61000-4-5:1995/A1:2000, EN61000-4-6:2003,
EN61000-4-8:1993/A1:2000, EN61000-4-11:2004)

Supplementary Information

The product herewith complies with the requirements of the ***Low Voltage Directive 2014/35/EU****, the* ***EMC Directive 2014/30/EU*** *and the* ***RoHS Directive 2011/65/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 included.*

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Last two digits of the year the CE mark was first affixed: 08

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

Joseph Guerriero, President
Slaughter Company, Inc.
Lake Forest, Illinois USA
July 20, 2017, 2017

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. Instruments purchased and used in North America only, may have their warranty extended in one year increments to a maximum of **(3) years** provided they are returned to Slaughter Company at least **annually** for calibration and inspection. The annual calibration and inspection must be performed annually every year following receipt of the instrument. Any instrument not calibrated and inspected annually will not be eligible for extended warranty status. This extended warranty is non-transferable and is offered only to the original purchaser. 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 REQUIRED FOR HIGH VOLTAGE TESTING!

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.

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 POSSIBLY CAUSE DAMAGE TO EQUIPMENT OR PERMANENT LOSS OF DATA.

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.

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1 (800) 504-0055
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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 **HIGH VOLTAGE 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 VOLTAGE TEST IN PROGRESS - UNAUTHORIZED PERSONNEL KEEP AWAY."**

Power

Dielectric Voltage-Withstand 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, 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.

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.

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

TEST OPERATOR

Qualifications
This instrument 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.

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 Hipot testing job. Allowing unauthorized personnel in the area during a test should also be dealt with as a serious offense.

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

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

TEST PROCEDURES

NEVER PERFORM A HIPOT TEST ON ENERGIZED CIRCUITRY OR EQUIPMENT!

If the instrument 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 item under test is a sample of insulating material tested with electrodes, a component tested with the high voltage test lead, or a cord-connected device with a two or three-prong plug.

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

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

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

When testing with DC, always discharge the capacitance of the item under test and anything the high voltage may have contacted--such as test fixtures--before handling it or disconnecting the test leads.

HOT STICK probes can be used to discharge any capacitance in the item under test as a further safety precaution. A hot stick is a non-conducting rod about two feet long with a metal probe at the end which is connected to a wire. To discharge the device under test, two hot sticks are required. First connect both probe wires to a good earth ground. Then touch one probe tip to the same place the return lead was connected. While holding the first probe in place, touch the second probe tip to the same place where the high voltage lead was connected.

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 high voltage first.
- Properly discharge any item tested with DC before touching connections.

GLOSSARY OF TERMS

(as used in this manual)

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

Breakdown: The failure of insulation to effectively prevent the flow of current, sometimes evident by arcing. If voltage is gradually raised, breakdown will begin suddenly at a certain voltage level. Current flow is not directly proportional to voltage. Once breakdown current has flown, especially for a period of time, a repeated application of voltage will often show breakdown beginning at a lower voltage than initially.

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 which 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 which flows in one direction only. The source of direct current is said to be polarized and has one terminal which is always at a higher potential than the other.

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.

Leakage: AC or DC current flow through insulation and over its surfaces, and AC current flow through a capacitance. Current flow is directly proportional to voltage. The insulation and/or capacitance is thought of as a constant impedance, unless breakdown occurs.

Measuring Device (MD): A resistive and capacitive network used to simulate the impedance of the human body during Line Leakage testing.

Resistance: That property of a substance which 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 current flow required to cause an indication of unacceptable performance during a dielectric voltage-withstand 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 bypass 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.

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 stray current flow remains within specified limits during the time the component is tested, the device is assumed to be safe under normal conditions.

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 line testing because the basic design of the product is evaluated. Design tests are usually performed on only a few samples of the product. Production line tests are performed on 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.

Advantages and Disadvantages of AC Testing and DC Testing....
Please check with the Compliance Agency you are working with to see which of the two types of voltages you are authorized to use. In some cases, a Compliance Agency will allow either AC or DC testing. However, in other cases the Compliance Agency only allows for an AC test. If you are unsure which specification you must comply with, please contact our **SALES DEPARTMENT at 1-800-504-0055.**

AC testing characteristics

Most items that are Hipot tested have some amount of distributed capacitance. An AC voltage cannot charge this capacitance so it continually reads the reactive current that flows when an AC voltage is applied to a capacitive load.

AC testing advantages

1. AC testing is generally more accepted by safety agencies than DC testing. The main reason for this is that most items being Hipot tested will operate at AC voltages. AC Hipot testing offers the advantage of stressing the insulation alternately in both polarities, which more closely simulates stresses the product will normally see.

2. Since AC testing cannot charge a capacitive load the current reading remains consistent from the initial application of the voltage, to the end of the test. There is no need to gradually bring up the voltage since no stabilization is required to monitor the current reading. Unless the product is sensitive to a sudden application of voltage, the operator can immediately apply full voltage and read current without any wait time.

3. Since AC voltage cannot charge a load there is no need to discharge the item under test after the test.

AC testing disadvantages

1. Again, since AC cannot charge the item under test, reactive current is constantly flowing. In many cases, the reactive component of the current can be much greater than the real component due to actual leakage. This can make it very difficult to detect products that have excessively high leakage current.

2. The Hipot has supply reactive and leakage current continuously. This may require a current output that is actually much higher than is really required to monitor leakage current, and in most cases is usually much higher than would be needed with a DC tester. This can present increased safety risks as operators are exposed to higher currents.

DC testing characteristics

During DC Hipot testing the item under test is charged. The capacitance that causes reactive current in AC testing will now result in charging current, which exponentially drops to zero during DC testing.

DC testing advantages

1. Once the item under test is fully charged the only current flowing is the true leakage current. The DC Hipot tester clearly displays only the true leakage of the product under test.

2. Since the charging current only needs to be applied momentarily, the output power requirements of the DC Hipot tester can typically be much less than what would be required in an AC tester.

DC testing disadvantages

1. Unless the item being tested has virtually no capacitance, it is necessary to raise the voltage gradually from zero to the full test voltage. The more capacitive the item the more slowly the voltage must be raised. This is important since most DC Hipots have failure shut-off circuitry, which will indicate a failure almost immediately if the total current reaches the leakage threshold during the initial charging of the product under test.

2. Since a DC Hipot does charge the item under test, it becomes necessary to discharge the item after the test.

3. A DC Hipot test only charges the insulation in one polarity. This becomes a concern when testing products that will be used with AC voltages. As such, some safety agencies do not accept DC testing as an alternative to AC testing.

4. When performing AC Hipot tests, the product under test is actually tested with peak voltages that the Hipot meter does not display. This is not the case with DC testing since a sine wave is not generated when testing with a DC voltage. In order to compensate for this fact, most safety agencies require that the equivalent DC test be performed at a higher voltage than the AC test. The multiplying factor is somewhat inconsistent between agencies, which can cause confusion.

The Insulation Resistance Test....

Some dielectric analyzers today come with a built-in insulation resistance tester. Typically, the IR function provides test voltages from 500 to 1,000 volts DC and measures resistance from kilohms to gigohms. BABT, TÜV, and VDE are agencies that may, under certain conditions, require an IR test on the product before a Hipot test is

performed. IR testing typically is not done on the production line, but as a performance design test.

The IR test is very similar to the Hipot test. Instead of the go/no go indication that you get with a Hipot test, the IR test indicates an insulation value, usually in Megohms. Typically the higher the IR value, the better the condition of the insulation. The measured value represents the equivalent resistance of all the insulation between the two test points, and any component resistance which might also be connected between the two points. The connections to perform the IR test are the same as the Hipot test.

Although the IR test can predict insulation condition, it does not replace the need to perform a Dielectric Withstand test.

TYPES OF FAILURES DETECTABLE ONLY WITH A HIPOT TEST

- Weak Insulating Materials
- Pinholes in Insulation
- Inadequate Spacing of Components
- Pinched Insulation

Why Perform a Ground Bond Test….
Ground Bond testing is done to ensure that a low resistance path exists between the safety ground pin of a three-wire line cord and exposed metal of the device under test. Ideally, if a live wire inside the item under test became 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, is the result of the line voltage breakers' high current characteristics. Safety grounding circuits must withstand the line voltage breaker's 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 ensures that the line breaker will open before the grounding circuit wires fail.

The Line Leakage Test….
The Line Leakage test measures the amount of leakage current that is produced while a product is running. The test is unique in that it is performed while the DUT is running, thus an external power supply is required to perform the test properly. Usually the user needs to supply the voltage source to power the DUT.

Line Leakage tests use impedance models called measuring devices (MD's) to measure how much leakage current is being produced by a DUT under several conditions: normal, reversed input polarity, open neutral, and open ground. Performing a Line Leakage test gives manufacturers the opportunity to know how much leakage current a user will be subjected to under a variety of different circumstances.

Line Leakage testing is commonly performed as a design/type test during new product development. Configuration "G-L" represents an earth leakage test which measures the leakage current from the DUT's protective earth ground back to the system neutral.

Why Perform a Functional Run Test….

Functional Run testing, although not considered to be an electrical safety test, is worthwhile to perform for a variety of reasons. The Functional Run test is primarily used to determine if a DUT runs properly after it has been subjected to a battery of electrical safety tests. Usually the test monitors various parameters including: input voltage, input current, input power, and input power factor. Test operators can use the information gained from the Functional Run test to determine if a DUT is operating properly before the unit is shipped to a customer. This is beneficial since there is no electrical safety test that can conclude if a product will power up and operate properly.

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

MODEL 6330 FUNCTIONAL SPECIFICATIONS

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

INPUT		
Voltage	115 / 230V selectable, ± 10 % variation	
Frequency	50 / 60 Hz ± 5%	
Fuse	6.3 A slow blow 250V AC	
DIELECTRIC WITHSTAND TEST MODE		
Output Rating	3.5 kV @ 30 mA AC 4.0 kV @ 5 mA DC	
Voltage Setting	Range: 0.00 – 3.50 kV AC 0.00 – 4.00 kV DC Resolution: 0.01 kV Accuracy: ± (2 % of setting + 5 V)	
Voltage Display	Range: 0.00 – 3.50 kV AC 0.00 – 4.00 kV DC Resolution: 0.01 kV Accuracy: ± (2 % of reading + 10 V)	
Current Display	Range: 0.00 – 30.00 mA AC 0.00 – 5.00 mA DC Resolution: 0.01 mA Accuracy: ± (2 % of reading + 0.02 mA)	
HI and LO-Limit	Range: 0.00 – 30.00 mA AC Resolution: 0.01 mA Accuracy: ± (2 % of setting + 0.02 mA) Range: 0.00 – 5.00 mA DC Resolution: 0.01 mA Accuracy: ± (2 % of setting + 0.02 mA)	
Failure Detector	Audible and Visual	
DC Output Ripple	≤ 5% Ripple RMS at 6 KV DC @ 5 mA, resistive load	
Discharge Time	≤ 200 ms	
Maximum Capacitive Load in DC Mode	1 uF < 1 kV 0.75 uF < 2 kV 0.5 uF < 3 kV	0.08 uF < 4.0kV
AC Output Waveform	Sine Wave, Crest Factor = 1.3 – 1.5	
AC Output Frequency	Range: 60 or 50 Hz, User Selectable Accuracy: ± 0.1 %	
Output Regulation	± (1 % of setting + 5 V) from no load to full load	
Dwell Timer	Range: 0, 0.2 – 999.9 sec (0 = Continuous) Resolution: 0.1 sec Accuracy: ± (0.1 % + 0.05 sec)	
Ramp Timer	Range: 0.1 – 999.9 sec Resolution: 0.1 sec Accuracy: ± (0.1 % + 0.05 sec)	
INSULATION RESISTANCE TEST MODE		
Output Voltage	Range: 100 – 1000 V DC Resolution: 1 V Accuracy: ± (2 % of reading + 5 V)	

Voltage Display	Range:	0 – 1000 V		
	Resolution:	1 V		
	Accuracy:	± (2 % of reading + 2 counts)		
Resistance Display	Range:	1 - 1000 MΩ (4 Digit, Auto Ranging)		
	Resolution:		500VDC	1000VDC
		MΩ	MΩ	MΩ
		0.01	1.00 - 40.00	1.00 - 80.00
		0.1	35.0 - 999.9	75.0 - 999.9
	Accuracy:	± (3% of reading + 2 counts) at test voltage > 500V		
		± (7% of reading + 2 counts) at test voltage ≤ 500V		
HI and LO-Limit	Range:	1 – 1000 MΩ		
	HI-Limit:	0 = OFF		
	Accuracy:	Same as Resistance Display Accuracy.		
Delay Timer	Range:	0, 0.5 – 999.9 sec (0 = Continuous)		
	Resolution:	0.1 sec		
	Accuracy:	± (0.1 % + 0.05 sec)		
GROUND BOND TEST MODE				
Output Voltage	Range:	6 V AC, Fixed		
Output Frequency	Range:	60 or 50 Hz, User Selectable		
	Accuracy:	± 0.1 %		
Output Current	Range:	3.0 – 30.0 A AC		
	Resolution:	0.1 A		
	Accuracy:	± (2 % of setting + 0.02 A)		
Current Display	Range:	0.0 – 30.0 A AC		
	Resolution:	0.1 A		
	Accuracy:	± (3 % of reading + 0.1 A)		
HI and LO-Limit	Range:	0 – 510 mΩ for 3.0 - 10.0 A 0 – 200 mΩ for 10.1 - 25.0 A 0 – 150 mΩ for 25.1 - 30.0 A		
	Resolution:	1 mΩ		
	Accuracy:	± (2 % of setting + 2 mΩ)		
Dwell Timer	Range:	0, 0.5 – 999.9 sec (0 = Continuous)		
	Resolution:	0.1 sec		
	Accuracy:	± (0.1 % + 0.05 sec)		
Dwell Timer	Range:	0, 0.5 – 999.9 sec (0 = Continuous)		
	Resolution:	0.1 sec		
	Accuracy:	± (0.1 % + 0.05 sec)		
Milliohm Offset	Range:	0 – 100 mΩ		
	Resolution:	1 mΩ		
	Accuracy:	± (2 % of setting + 2 mΩ)		
FUNCTIONAL RUN TEST MODE				
DUT POWER				

AC Voltage	0 - 277.0 V, Single phase unbalanced, 0 - 30.0 A maximum		
Current	30 A maximum continuous		
Power Rating	8400 W maximum		
DUT Protection	Short Circuit current 50 A < 3 s, Inrush Current 180 A Response time 10 us.		
SETTINGS			
	Range	**Resolution**	**Accuracy**
HI and LO Limit AC Voltage, V	0.0 - 277.0	0.1	± (1.5% of setting + 0.2 V), 60.0-277 V
HI and LO Limit AC Current, A	0.0 - 30.0	0.1	± (2% of setting + 2 counts)
HI and LO Limit AC Power, W	0 - 8400	1	± (5% of setting + 6 counts)
HI and LO Limit Power Factor	0.000 - 1.000	0.001	W/VA, calculated and displayed to three significant digits
HI and LO Limit Leakage Current	0.00 - 10.00, Hi-Limit 0=OFF	0.01	± (2% of setting + 2 counts)
Delay Time, second	0.2 - 999.9	0.1	± (0.1% + 0.05 sec)
Dwell Time, second	0, 0.1 - 999.9 (0=continuous)		
MEASUREMENT			
	Range	**Resolution**	**Accuracy**
Voltage, Vac	0.0 - 277.0	0.1	± (1.5% of reading + 2 counts), 60.0~277 V
Current, Aac	0.0 - 30.0	0.1	± (2% of reading + 2 counts)
Power, Watts	0 - 8400	1	± (5% of reading + 6 counts)
Power, Factor	0.000 - 1.000	0.001	W/VA, calculated and displayed to three significant digits
Leakage Current, mA	0.00 - 10.00	0.01	± (2% of reading + 2 counts)
MD Circuit	Leakage Current measuring resistance = 2K Ω±1%		
Timer, second	0.0 - 999.9	0.1	± (0.1% of reading + 0.05 sec)
LINE LEAKAGE			
DUT			
DUT Input Power Rating	0 - 277.0 V, Single phase unbalanced, 30 A maximum		
Current	30 A maximum continuous		
DUT Protection	Short Circuit current 50 A < 3 s , Inrush Current 180 A Response time 10 us.		
SETTINGS			
HI and LO Limit, uA	Range 0-6000 uA, Resolution 1 uA, Hi-Limit 0=OFF		
Delay Time, second	Range 0, 1.0-999.9 (0=continuous), Resolution 0.1 s.		
Compliance Standards	A UL544NP, UL484, UL923, UL471, UL867, UL697		

	B IEC60990 Fig4 U2, IEC 60950-1, IEC60335-1, IEC60598-1, IEC60065, IEC61010
	C UL2601-1, IEC60601-1
	X External MD(1K Ohm)
	F Frequency check, External MD(1K Ohm)
Line Condition	NEUTRAL, REVERSE, GROUND
Probe	G - L
CURRENT MEASURMENT	
Frequency Range	DC to 1MHz
Leakage Current Range (RMS)	0uA - 6000uA
Resolution	1uA
Accuracy	DC, 15KHz to 100KHz ±(2% of reading + 3µA) >100KHz to 1MHz ±5% of reading(100uA-6000uA)
LINE VOLTAGE MEASUREMENT	
Range	0.0-277.0 VAC
Resolution	0.1 V
Accuracy	± (1.5% of reading +0.2 V), 60.0-277.0 V
External MD	Basic measuring element 1K Ω
MD A - C,X components	Accuracy: Resistance ± 1% Capacitance ± 5%
MD Voltage Limit	Maximum 30 V peak or 30 VDC
GENERAL SPECIFICATIONS	
Safety Agency Listing	CE, cTUVus, RoHS2
PLC Remote Control	Input: Test, Reset, Interlock, Recall Memory 1 - 6 Output: Pass, Fail, Test-in-Process
Memory	20 memories, 10 steps per memory All steps are linkable Single step mode
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 (1.8 m) power cable terminated in a three-prong grounding plug.
Mechanical	Tilt up front feet. 430 mm(W)×133 mm(H)×500 mm(D)/ 22Kg
Environmental	Operating Temperature : 32° - 104°F (0° - 40°C) Relative Humidity: 0 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.

Why use the term "Counts"?
Slaughter 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.

KEY FEATURES & BENEFITS OF MODEL 6330

1. Tamper proof front panel controls.
This makes it possible to limit user access to the setup screens so that only authorized personnel can change test parameters.

2. Multiple Test Memories.
The 6330 provides twenty test memories with ten steps per memory. This is beneficial for manufacturers testing multiple products on one production line.

3. Low-current sense.
The low current sense feature monitors the minimum level of current flow, thus ensuring that the DUT is properly connected and that the Hipot test is being performed.

4. Simple Menu Control.
All parameters for the setups can be adjusted through a simple menu driven program. The easy to follow setup screens ensure that the operator correctly sets up all test parameters.

5. Electronic dwell settings.
The electronic dwell control helps keep test results consistent by ensuring that the test duration is the same for each product tested.

6. Electronic ramping.
Electronic ramping provides a gradual and timed method to increase output voltage to the DUT, minimizing any damage from quickly over-applying high voltage to sensitive DUTs.

7. Front panel LCD.
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. Failure indications are clearly displayed.

8. No load setup of trip current and output voltage.
This provides the operator with an easy and safe way to set trip currents and output voltages since parameters are set without the high voltage present.

9. Storage of test program.
The 6330 powers up with the same parameters that were used during the last test to avoid operator set up errors.

10. Output voltage fine adjustment.
To make the 6330 usable in all types of applications, the operator can manually bring the voltage up or down in 10 volt increments by simply pressing the up and down arrow keys. This makes it very easy to adjust the output voltage even while the instrument is in the dwell mode so you can analyze test results at different voltages.

11. Software calibration control.
The 6330 is calibrated through the front panel keypad. All calibration information is stored in non-volatile memory. This allows the instrument to be completely calibrated without removing any covers and exposing the technician to hazardous voltages.

12. Current monitoring.
The LCD display allows monitoring of current down to 10 microamps AC and 10 microamps DC. This allows the 6330 to be used even when test requirements only allow a very low level of acceptable leakage current.

13. 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.

14. PLC remote inputs and outputs.
The standard 9- pin interfaces provide outputs for Pass, Fail, and Test in Process. Inputs include Test, Reset, Interlock, and Memory Recall. This gives the user all the basic remotes required to configure the instrument through simple PLC relay control.

15. Flashing high voltage indicator.
A flashing LED located directly over the high voltage terminal clearly indicates when high voltage is active to provide maximum operator safety.

16. Single Step Test Mode.
In this mode, the 6330 can be configured to perform each test individually as a single step. This provides the manufacturers flexibility in configuring their testing procedure.

17. Insulation Resistance and Ground Bond Test Modes.
This allows the operator to perform an Insulation Resistance or Ground Bond tests with the Dielectric Withstand (Hipot) test, thus eliminating the need for a separate pieces of test equipment when IR and Ground Bond testing is required.

18. Continuous Duty Cycle Ratings.
An advantage over other instruments in its class, the 6330 does not have any requirement to be shut down during the day even when used at full output.

19. Milliohm Offset Capability.
This feature minimizes the effect of test lead or test fixture resistance.

20. Adjustable Output Current and Milliohm Trip Currents.
The 6330 is versatile enough to meet a wide variety of safety agency specifications.

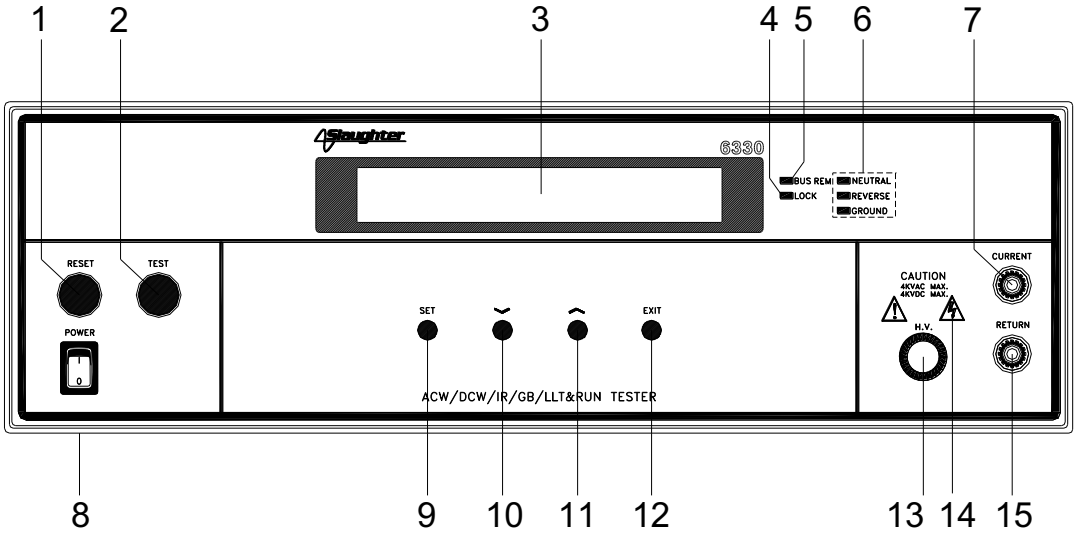
21. Key Lockout.
When enabled, Key Lockout disables all front panel keys except TEST and RESET.

22. Memory Lock

Memory Lock is a sub-function of Key Lockout. When enabled, the operator will only have access to the TEST and RESET keys. When disabled, the operator will be able to toggle between memory locations but not alter them.

23. Fail Stop ON/OFF Mode.
This allows the 6330 to be configured to continue testing after detecting a failure. All pass/fail results are displayed at the completion of the test cycle.

FRONT PANEL CONTROLS



1. **RESET BUTTON:** This is a momentary contact switch used to reset the instrument. 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 voltage 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. **LOCK:** This LED indicates that the Lock feature has been enabled.

5. **BUS REMOTE INDICATOR:** N/A

6. **FAULT CONDITION INDICATORS:** These LED's indicate that the Neutral, Reverse, and Ground Line Conditions have been activated during a Line Leakage test.

7. **CURRENT OUTPUT TERMINAL:** This terminal is used for the connection of the detachable 5-foot (1.52 m) red high current test lead. This terminal is always used when performing a Ground Bond test.

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

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

10. **DOWN ARROW (∨)**: Use this key to decrease the numeric values in the setup mode. This key is also used to toggle ON/OFF functions. Also may be used to decrease output voltage during a test in 10-volt increments.

11. **UP ARROW (∧):** Use this key to increase the numeric values in the setup mode. This key is also used to toggle ON/OFF functions. Also may be used to increase output voltage during a test in 10-volt increments.

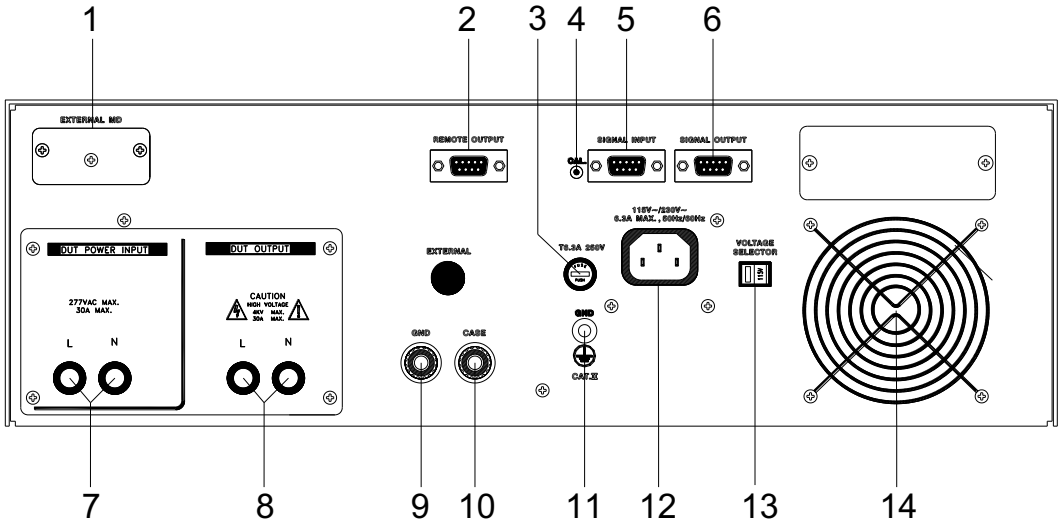
12. **EXIT KEY:** Use this key when you desire to enter the test mode to initiate a test. Also the key uses to enter the System menu parameters and to exit from the System menu.

13. **HIGH VOLTAGE OUTPUT TERMINAL:** For the connection of the detachable 6-foot (1.8 m) red high voltage test lead. The silicone rubber insulation is flexible for easy handling and is rated at 30KVDC. The terminal is recessed for safety when this lead is not being used.

14. **HIGH VOLTAGE ARROW (LED INDICATOR):** This indicator flashes to warn the operator that high voltage is present at the high voltage output terminal.

15. **RETURN OUTPUT TERMINAL:** For the connection of the detachable 5 foot (1.52 m) black return test lead. This terminal is always used when performing a test.

REAR PANEL CONTROLS



1. **EXTERNAL MD:** Provides an access port for a custom measuring device. The port may be activated during Line Leakage testing from the instrument's menu system. The operator must supply the appropriate measuring device as none is provided.

2. **POWER CONTROL:** N/A

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

4. **CALIBRATION ENABLE KEY:** To enter the calibration mode press this key while the instrument is being powered ON.

5. **SIGNAL INPUT:** 9 pin D subminiature male connector for remote control of TEST, RESET, AND INTERLOCK functions as well as remote memory tests selection.

6. **SIGNAL OUTPUT:** 9 pin D subminiature female connector for monitoring PASS, FAIL, and PROCESSING output relay signals.

7. **DUT POWER INPUT:** Provides the line and neutral connections for an input power source to be used during Functional Run and Line Leakage testing. This input requires connection to a U.S. style single phase unbalanced power supply.

8. **DUT POWER OUTPUT:** Provides the line and neutral connections from the 6330 to the DUT during Functional Run and Line Leakage testing. Provides the high voltage connections to the DUT during ACW, DCW and IR testing if the DUT OUTPUT and DUT-HV parameters are turned ON. Please refer to the **Adapter Box Connection** section for details on connecting the adapter box between the instrument and the device under test.
9. **GND CONNECTION:** This terminal is wired in parallel with the Current Output terminal during a Ground Bond test and may be used in place of the front panel

connection. During a Line Leakage test this connection provides a connection to one side of the measuring device (MD). Please refer to the **Instrument Connections** section for details on connecting the instrument and the device under test.

10. **CASE CONNECTION:** This terminal is wired in parallel with the Return terminal during a Ground Bond test and may be used in place of the front panel connection. During a Line Leakage test this connection provides a connection to one side of the measuring device (MD). During ACW, DCW or IR testing this terminal provides the return connection. Please refer to the **Instrument Connections** section for details on connecting the instrument and the device under test.

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

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

13. **VOLTAGE SELECT 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.

14. **THERMAL FAN:** To cool the instrument.

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 RMA (return materials 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

6330 Compliance Tester	6330 Hipot, Continuity, Ground Bond, IR, Run and Line Leakage
102-055-913	High Voltage Lead (6ft.)
125-013-001	Input Power Cable (6ft.)
99-10457-01	Cable Assembly High Current Return Lead
99-10468-01	High Current Output Lead
99-10009-01	High Current Clip with 6 ft Lead
99-10008-01	Ground Return Clip with 6 ft Lead
99-10469-01	LLT DUT Input Cable LINE
99-10470-01	LLT DUT Input Cable NEUTRAL
99-10471-01	LLT DUT HV Output Cable LINE
99-10472-01	LLT DUT HV Output Cable NEUTRAL
99-10040-01	Interlock
99-10467-01	Adaptor Box
99-10106-01	Fuse
99-10573-01	RS-232 Cable Assembly

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

Only accessories which meet the manufacturer's specification shall be used.

Preparation for Use

Power Requirements and Line Voltage Selection

This instrument requires a power source of either 115 volts AC ± 10%, 47-63 Hz single phase or 230 volts AC ±10%, 47-63 Hz 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

For operation at 115 Volts AC and 230 Volts AC use a 6.3 A slow blow fuse.

Power Cable

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 instruments 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 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)

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 6330.

QUICK START

This Quick Start Guide assumes the operator has some familiarity with Hipot 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

Input Voltage: **115 or 230 volts AC country specific (rear panel switch selectable)**

System parameters:

- **PLC Remote:** **OFF**
- **Single Step:** **OFF**
- **Fail Stop:** **ON**
- **Lock:** **OFF**
- **Memory Lock:** **ON**
- **Alarm Volume:** **5**
- **DUT HV-SET:** **ON**

Test Parameters:

- **Memory Position:** **1**
- **Step Position:** **1**
- **Test Mode:** **AC**
- **Voltage:** **1.24 kV**
- **HI-Limit:** **10.00 mA**
- **LO-Limit:** **0.00 mA**
- **Ramp:** **0.1 s**
- **Dwell:** **1.0 s**
- **Freq.:** **60 Hz**
- **Connect:** **OFF**
- **DUT OUTPUT:** **ON**

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

WARNING

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.

CAUTION

c). Check to be sure 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, pcb's and other critical components. In addition, you will see the Slaughter Company name, Model Number, and current software version briefly appear on the LCD readout and then clear itself.

SLAUGHTER
6330 Ver: 1.00

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

ACW Set		1.0s
1-1	1.24kV	10.00mA

These abbreviated parameters stand for the following:

1 - 1: Indicates the memory and step location of the current settings.
Set: This is the parameter settings review screen
1.0s: The dwell timer is set to a test duration of 1 second.
1.24kVAC: The test voltage is set to 1,240 volts AC.
10.00mA: The high leakage current trip point is set to 10 milliamps.

If you wish to not use any one of these parameters you must change your parameters. Please refer to the Operation Instructions section in this manual for further details.

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 voltage output lead.

f). Please check your connections to be sure they are making good contact and that the test station or area is clear of debris and other personnel.

WARNING 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 test 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 VOLTAGE.

When HIGH VOLTAGE is present, a RED flashing indicator located above the HV receptacle will remain flashing until the HIGH VOLTAGE is OFF. If the device under test PASSED the test then no audible alarm will sound. You will hear a brief BEEP to let you know the item was successfully tested and it PASSED. In the case of a FAIL condition, 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.

OPERATION INSTRUCTIONS FOR MODEL 6330

POWER UP

Check to be sure 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

Be sure that the safety ground on the power line cord is not defeated and that you are connecting to a grounded power source. 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 instrument's critical components. In addition the display will show the following message, with the actual model number and software version number:

SLAUGHTER
6330 Ver: 1.00

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.

SETUP PROCEDURE

1. Memory configuration

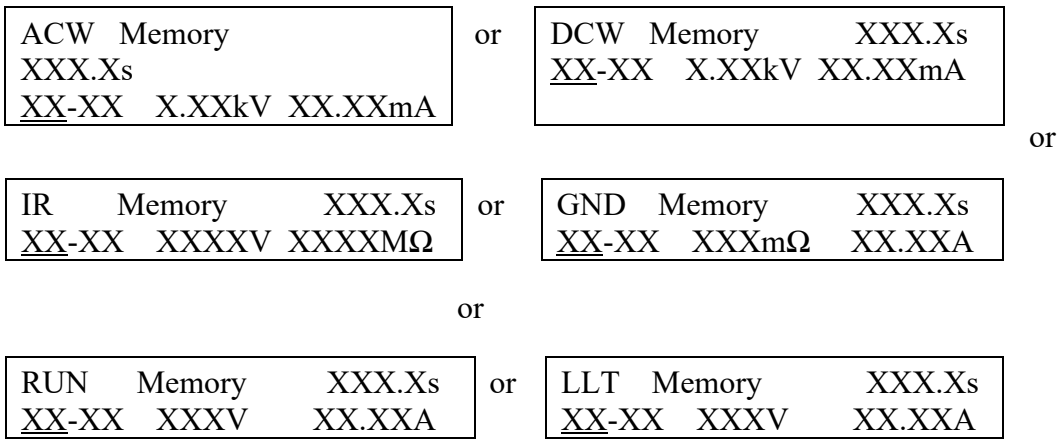
The model 6330 is equipped with 20 memory programs numbered 1 through 20. Each memory location contains 10 separate steps that can be connected sequentially to the next consecutive step. Only one test can be selected for each step.

Memory 1-10	Step 1-10
	AC
	DC
	IR
	GND
	RUN
	LLT

To recall a memory program press the SET key, then press the Up (∧) or Down (∨) arrow keys until the specific memory you wish to recall is displayed. Please see procedures below for details. Pressing the EXIT key will activate selected memory position. To start a test, press the TEST button.

2. To select the Memory location

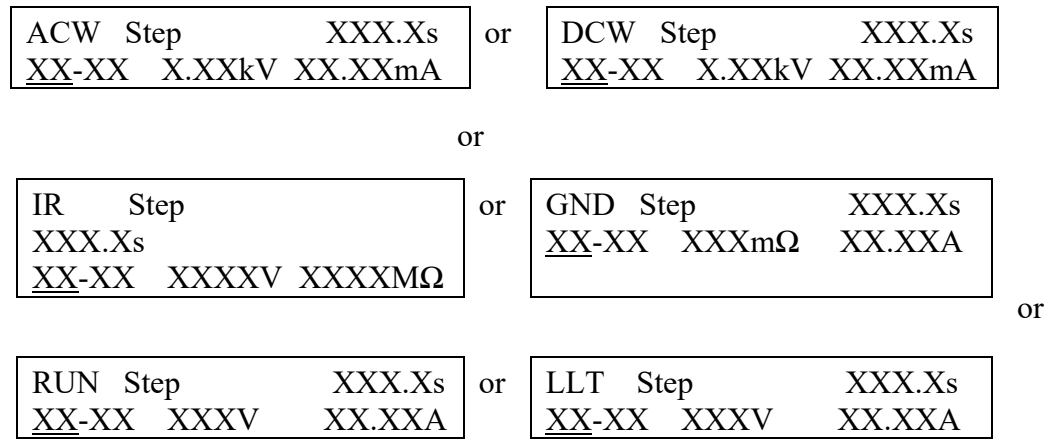
Press the SET key once. The blinking underscore symbol appears directly under digit that represents memory location. The blinking cursor indicates that the parameter is being edited. The display shows:



Use the Up (∧) or Down (∨) arrow keys to select memory locations 1 through 10. 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 data such as test function and parameters of that function, as outlined in the below procedures, press the EXIT key to store any changes and return to the test mode.

3. To select the Step location

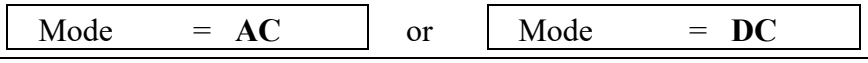
Press the SET key twice. The blinking underscore symbol appears directly under digit that represents step location. The blinking cursor indicates that the parameter is being edited. The display shows:

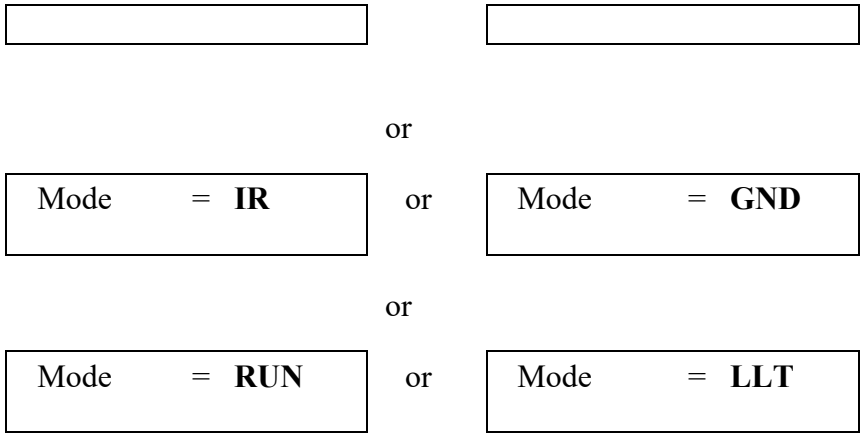


Use the Up (∧) or Down (∨) arrow keys to select step locations 1 through 20, then press the EXIT key to store the current setting and return to the test mode, or press the SET key to advance to the next parameter.

4. To set the test type

To change the Test type on the model 6330, please press the SET key three times until the display shows:



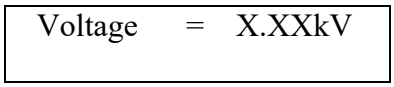


Press the Up (∧) or Down (∨) arrow keys to toggle the test selection between AC, DC, IR, GND, RUN, and LLT modes; then press the EXIT key to store the setting and return to the selected test mode or press the SET key if the parameters of the selected test need to be changed.

5. AC and DC dielectric withstand test modes setting (ACW/DCW)

5.1. To set the Output Voltage

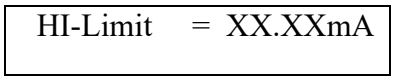
Press the SET key until the display shows:



Use the Up (∧) or Down (∨) arrow keys to enter the desired test voltage, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The maximum voltage which may be entered is 3.50kV AC or 4.00kV DC. Any attempt to set the value outside these limits will cause the instrument to signal an ERROR by producing two short beeps. Pressing the Down (∨) arrow key when Voltage = 0.00kV also will cause the instrument to signal an ERROR by producing two short beeps.

5.2. To set the High Leakage Current Limit

Press the SET key until the display shows:



Use the Up (∧) or Down (∨) arrow keys to enter the leakage current high limit setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is in milliamperes with 20.00mA AC and 5.00mA DC as the maximum setting and with 0.00mA AC and DC as minimum setting. The High Leakage Current Limit will act as the high “trip point” for the Hipot test. If the measured leakage current exceeds the value, the test will fail. Any attempt to set the value above this limit will cause the instrument to signal an ERROR by producing two short beeps.

5.3. To set the Low Leakage Current Limit

Press the SET key until the display shows:

LO-Limit = XX.XXmA

Use the Up (∧) or Down (∨) arrow keys to enter the leakage current low limit setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is milliamperes with 30.00mA AC and 5.00mA DC as the maximum setting and with 0.00mA AC and DC as the minimum setting. The Low Leakage Current Limit will act as the low "trip point" for the Hipot test. If the measured leakage current does not exceed this value, the test will fail. Any attempt to set the value below this limit will cause the instrument to signal an ERROR by producing two short beeps.

5.4. To set the Ramp time
Press the SET key until the display shows:

Ramp = XXX.Xs

Use the Up (∧) or Down (∨) arrow keys to enter the ramp time setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The minimum ramp time setting is 0.1 seconds, the maximum ramp time setting is 999.9 seconds. Any attempt to set the values outside these limits will cause the instrument to signal an ERROR by producing two short beeps.

5.5. To set the Dwell time
Press the SET key until the display shows:

Dwell = XXX.Xs

Use the Up (∧) or Down (∨) arrow keys to enter the desired dwell time, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If the dwell time is set to 0.0s, the instrument will operate in a continuous ON mode when the TEST button is pressed. The instrument will stop when the DUT (Device Under Test) goes into failure or the RESET button is pressed. The actual minimum dwell time setting is 0.2 seconds. The maximum dwell time setting is 999.9 seconds. Any attempt to set the value more than 999.9s or less than 0.0s will cause the instrument to indicate an ERROR by producing two short beeps.

5.6. To set the Frequency 50/60 Hz (For AC mode only)
Please press the SET key until the display shows:

Freq. = 60Hz

or

Freq. = 50Hz

Press the Up (∧) or Down (∨) arrow keys to toggle the frequency setting to 50 or 60 Hertz, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode.

5.7. To set the DUT OUTPUT ON

Press the SET key until the display shows:

DUT Output = OFF	or	DUT Output = ON

Press the Up (∧) or Down (∨) arrow keys to toggle the DUT OUTPUT mode to ON or OFF, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the first parameter. If DUT OUTPUT is set to ON the Output Power connections will become live during testing. These terminals may be used to apply high voltage to the DUT from the rear panel. If DUT OUTPUT is set to OFF voltage and current will only be present on the front panel connections.

5.8. To set the Connect mode ON/OFF

Press the SET key until the display shows:

Connect = OFF	or	Connect = ON

Press the Up (∧) or Down (∨) arrow keys to toggle the connect mode to ON or OFF, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the first parameter. If Connect is set to ON the next step in the sequence will be executed. If Connect is set to OFF the test sequence will stop at this step. If step 10 is set to ON the test process will be connected to the first step of the next memory. Step 10 of the memory 20 does not have Connect ON/OFF option.

6. IR insulation resistance test mode setting

6.1. To set the Output Voltage

Press the SET key until the display shows:

Voltage = XXXXV

Use the Up (∧) or Down (∨) arrow keys to enter the desired test voltage, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The maximum voltage which may be entered is 1000 Volts DC and the minimum voltage is 100Volts DC. Any attempt to set the value above this limit will cause the instrument to indicate an ERROR by producing two short beeps.

6.2. To set the High Resistance Limit

Press the SET key until the display shows:

HI-Limit = XXXXMΩ

Use the Up (∧) or Down (∨) arrow keys to enter the desired resistance high limit setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is in Megohms with 0MΩ - 1000MΩ range of setting. Any attempt to set the value above this limit will cause the instrument to indicate an ERROR by producing two short beeps. A measured value above

the High Limit setting will result in a failure condition at the end of the Delay time setting. A setting of 0MΩ disables the high limit feature.

6.3. To set the Low Resistance Limit
Press the SET key until the display shows:

LO-Limit = XXXXMΩ

Use the Up (∧) or Down (∨) arrow keys to enter the desired resistance low limit setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is in Megohms with 1MΩ - 1000MΩ range of setting. Any attempt to set the value below this limit will cause the instrument to indicate an ERROR by producing two short beeps. A measured value below the Low Limit setting will result in a failure condition at the end of the Delay time setting.

6.4. To set the Delay time
Press the SET key until the display shows:

Delay = XXX.Xs

Use the Up (∧) or Down (∨) arrow keys to enter the desired delay time, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If the delay time is set to 0.0s, the instrument will operate in a continuous ON mode when the TEST button is pressed. The test will stop only when the RESET button is pressed or an OFL condition is detected. The actual minimum delay time setting is 0.5 seconds. The maximum delay time setting is 999.9 seconds. Any attempt to set the value more than 999.9s or less than 0.0s will cause the instrument to indicate an ERROR by producing two short beeps.

Note: The Delay timer in the IR mode differs from the Dwell timer in the Hipot mode. A judgment is not made until the Delay time has elapsed. In the Hipot mode a Pass / Fail judgment is made a soon as the leakage limits are exceeded. Therefore, when the Delay time is set to zero Pass and Fail judgment or indications will not be made.

6.5. To set the DUT OUTPUT ON
Press the SET key until the display shows:

DUT Output = OFF	or	DUT Output = ON

Press the Up (∧) or Down (∨) arrow keys to toggle the DUT OUTPUT mode to ON or OFF, then press the SET key to advance to the first parameter or press the EXIT key to store the setting and return to the test mode. If DUT OUTPUT is set to ON the Output Power connections will become live during testing. These terminals may be used to apply high voltage to the DUT from the rear panel. If DUT OUTPUT is set to OFF voltage and current will only be present on the front panel connections.

6.6. To set the Connect mode ON/OFF

Press the SET key until the display shows:

Connect = OFF	or	Connect = ON

Press the Up (∧) or Down (∨) arrow keys to toggle the connect mode to ON or OFF, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If Connect is set to ON the next step in the sequence will be executed. If Connect is set to OFF the test sequence will stop at this step. If step 10 is set to ON the test process will be connected to the first step of the next memory. Step 10 of the memory 20 does not have Connect ON/OFF option.

7. GND Bond test mode setting

7.1. To set the Output Current

Press the SET key until the display shows:

Current = XX.XA

Use the Up (∧) or Down (∨) arrow keys to enter the desired output current setting, then press the SET key to advance to the next parameter or press the EXIT key to store the current setting and return to the test mode. The unit of measure is in amperes with 3A – 30A range of setting. Any attempt to set the value outside these limits will cause the instrument to indicate an ERROR message by producing two short beeps.

7.2. To set the High or Low Limits

Press the SET key until the display shows:

HI-Limit = XXXmΩ	or	LO-Limit = XXXmΩ

Use the Up (∧) or Down (∨) arrow keys to enter the desired value of the High or Low Limits resistance trip point then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is in milliohms with a range of 0mΩ - 510mΩ at a current of 3.0A – 10.0A, 0mΩ - 200mΩ at current of 10.1A – 25.0A, and 0mΩ – 150mΩ at current of 25.1A – 30.0A. Any attempt to set the value outside this limits will cause the instrument to indicate an ERROR message by producing two short beeps.

7.3. To set the Dwell time

Press the SET key until the display shows:

Dwell = XXX.Xs

Use the Up (∧) or Down (∨) arrow keys to enter the desired dwell time, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If the dwell time is set to 0.0s, the instrument will operate in a

continuous ON mode when the TEST button is pressed. It will stop when the RESET button is pressed or the DUT goes into failure. The actual minimum dwell time setting is 0.5 seconds. The maximum dwell time setting is 999.9 seconds. Any attempt to set the value more than 999.9s or less than 0.0s will cause the instrument to indicate and ERROR by producing two short beeps.

7.4. To set the Offset

Press the SET key until the display shows:

Offset = XXXmΩ TEST to Auto Set

Use the Up (∧) or Down (∨) arrow keys to adjust the setting of the offset manually, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. To set the Offset automatically, press the TEST button when the test leads or test fixture is connected across the instrument Return and Current outputs. The instrument 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 of 0mΩ - 100mΩ. Any attempt to set the value outside these limits will cause the instrument to indicate and ERROR by producing two short beeps.

7.5. To set the Frequency

Press the SET key until the display shows:

Freq. = 60Hz	or	Freq. = 50Hz

Press the Up (∧) or Down (∨) arrow keys to toggle the frequency setting to 50 or 60 Hertz, then press the SET key to advance to the next parameter or press the EXIT key to store the frequency setting and return to the test mode.

7.6. To set the Connect mode ON/OFF

Press the SET key until the display shows:

Connect = OFF	or	Connect = ON

Press the Up (∧) or Down (∨) arrow keys to toggle the connect mode to ON or OFF, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If Connect is set to ON the next step in the sequence will be executed. If Connect is set to OFF the test sequence will stop at this step. If step 10 is set to ON the test process will be connected to the first step of the next memory. Step 10 of the memory 20 does not have Connect ON/OFF option.

8. Functional Run test mode setting

8.1. To set the HI and LO Limits (Voltage)

Press the SET key until the display shows:

Volt-HI = XXX V	or	Volt-LO = XXX V

Use the Up (∧) or Down (∨) arrow keys to enter the desired value of the High or Low Limits voltage trip point then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is 0 – 277 VAC. Any attempt to set the value outside these limits will cause the instrument to indicate an ERROR by producing two short beeps.

8.2. To set the HI and LO Limits (Current)
Press the SET key until the display shows:

Amp-HI = XXX A	or	Amp-LO = XXX A

Use the Up (∧) or Down (∨) arrow keys to enter the desired value of the High or Low Limits resistance trip point then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is 0 – 30 amps. Any attempt to set the value outside these limits will cause the instrument to indicate and ERROR by producing two short beeps.

8.3. To set the HI and LO Limits (Power)
Press the SET key until the display shows:

Power-HI = XXX W	or	Power-LO = XXX W

Use the Up (∧) or Down (∨) arrow keys to enter the desired value of the High or Low Limits resistance trip point then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is 0 – 8400 W. Any attempt to set the value outside these limits will cause the instrument to indicate an ERROR by producing two short beeps.

8.4. To set the HI and LO Limits (Power Factor)
Press the SET key until the display shows:

PF-HI = X.XXX	or	PF-LO = X.XXX

Use the Up (∧) or Down (∨) arrow keys to enter the desired value of the High or Low Limits resistance trip point then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. Power factor may be set from 0 – 1. Power factor is indication of how resistive or reactive the DUT is. A power factor of 1 corresponds to a purely resistive DUT whereas a power factor of 0 corresponds to a purely reactive DUT. Any attempt to set the value outside these limits will cause the instrument to indicate an ERROR by producing two short beeps.

8.5. To set the HI and LO Limits (Leakage Current)
Press the SET key until the display shows:

Leakage-HI = XX.XXmA	or	Leakage-LO = XX.XXmA

Use the Up (∧) or Down (∨) arrow keys to enter the desired value of the High or Low Limits resistance trip point then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is 0 – 10.00 mA. Any attempt to set the value outside these limits will cause the instrument to indicate an ERROR by producing two short beeps.

8.6. To set the Delay time
Press the SET key until the display shows:

Delay = XXX.Xs

Use the Up (∧) or Down (∨) arrow keys to enter the desired delay time, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If the delay time is set to 0.0s, the instrument will operate in a continuous ON mode when the TEST button is pressed. The test will stop only when the RESET button is pressed or the OFL detected. The actual minimum delay time setting is 0.5 seconds. The maximum delay time setting is 999.9 seconds. Any attempt to set the value more than 999.9s or less than 0.0s will cause the instrument to indicate an ERROR by producing two short beeps.

Note: The Delay timer in the Functional Run test mode differs from the Dwell timer in the Hipot mode. A judgment is not made until the Delay time has elapsed. Therefore, when the Delay time is set to zero Pass and Fail judgment or indications will not be made.

8.7. To set the Dwell time
Press the SET key until the display shows:

Dwell = XXX.Xs

Use the Up (∧) or Down (∨) arrow keys to enter the desired dwell time, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If the dwell time is set to 0.0s, the instrument will operate in a continuous ON mode when the TEST button is pressed. It will stop when the RESET button is pressed or the DUT goes into failure. The actual minimum dwell time setting is 0.5 seconds. The maximum dwell time setting is 999.9 seconds. Any attempt to set the value more than 999.9s or less than 0.0s will cause the instrument to indicate an ERROR by producing two short beeps.

8.8. To set the Connect mode ON/OFF
Press the SET key until the display shows:

Connect = OFF	or	Connect = ON

Press the Up (∧) or Down (∨) arrow keys to toggle the connect mode to ON or OFF, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If Connect is set to ON the next step in the sequence will be executed. If Connect is set to OFF the test sequence will stop at this step. If step 10 is set to ON the test process will be connected to the first step of the next memory. Step 10 of the memory 20 does not have Connect ON/OFF option.

9. Line Leakage test mode setting

9.1. To set the HI and LO Limits (Voltage)

Press the SET key until the display shows:

Volt-HI = XXX V	or	Volt-LO = XXX V

Please use the Up (∧) or Down (∨) arrow keys to enter the desired value of the High or Low Limits voltage trip point then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is 0 – 277 VAC. Any attempt to set the value outside these limits will cause the instrument to indicate an ERROR by producing two short beeps.

9.2. To set the HI and LO Limits (Leakage Current)

Press the SET key until the display shows:

Leakage-HI = XXXXuA	or	Leakage-LO = XXXXuA

Please use the Up (∧) or Down (∨) arrow keys to enter the desired value of the High or Low Limits resistance trip point then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The unit of measure is 0 – 10.00 mA. Any attempt to set the value outside these limits will cause the instrument to indicate and ERROR by producing two short beeps.

9.3. To set the Line Condition

Press the SET key until the display shows:

Line = 1

Use the Up (∧) or Down (∨) arrow keys to select the desired Line Condition. The available Line Conditions for the Line Leakage test are as follows:

Line	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Neutral	OPEN	OPEN	OPEN	OPEN	CLOSE	CLOSE	CLOSE	CLOSE
Reverse	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Ground	OPEN	OPEN	CLOSE	CLOSE	OPEN	OPEN	CLOSE	CLOSE

As the Line Condition is set, the corresponding LED's on the front panel will illuminate. These LED's will signify which Line Condition is active for the test step. Press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode.

9.4. To set the Measuring Device (MD)

Press the SET key until display shows:

MD = A

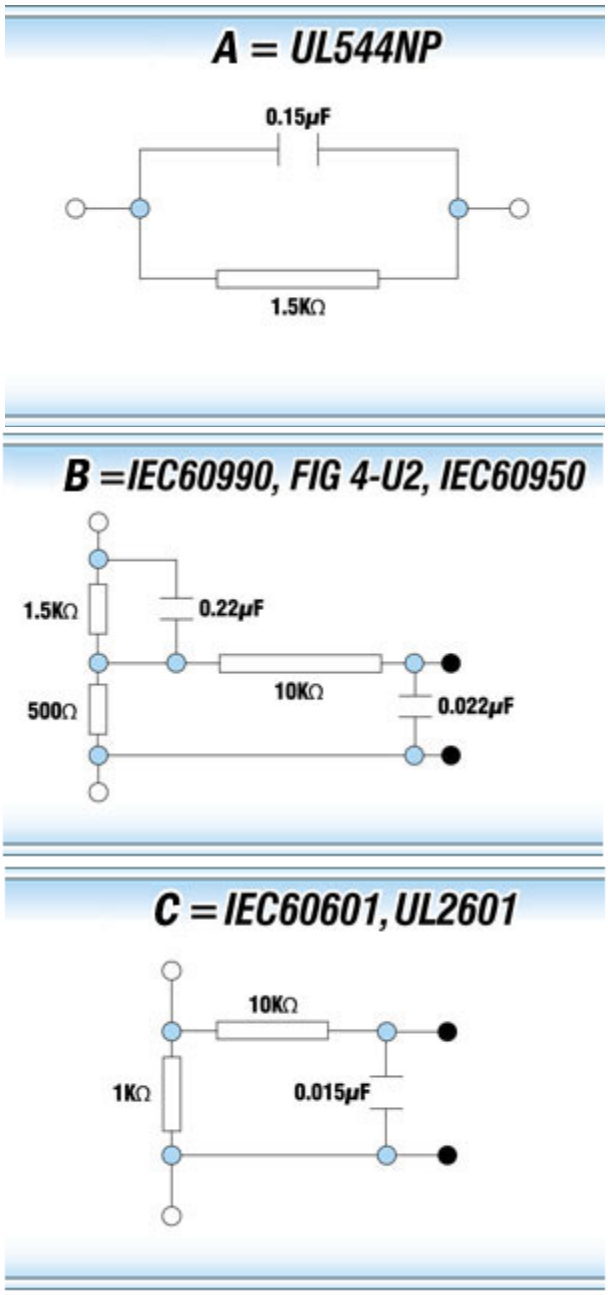
Use the Up (∧) or Down (∨) arrow keys to select the desired Measuring Device. The available measuring devices are as follows:

Cross Reference Letter	Agency Specification	Application
A	UL544NP, UL484, UL923, UL471, UL867, UL697	Non-Patient Medical Equipment
B	IEC60990 Fig4 U2, IEC 60950-1, IEC60335-1, IEC60598-1, IEC60065, IEC61010	IT Equipment, Household Appliances, Luminaries, Laboratory Equipment
C	UL2601-1, IEC60601-1	Medical Equipment
External	User configurable	User configurable
Frequency Check	The Line Leakage test can be configured to verify the bandwidth of the leakage current "voltmeter."	The selection is intended to be used for meter verification only and has no application for normal testing.

Press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode.

Circuit Diagrams

The following diagrams show the equivalent circuit of the measuring devices. Leakage current readings are generated by measuring the voltage drop across these networks and dividing by the equivalent DC resistance. The voltmeter is placed across the entire network of the measuring device A. The voltmeter is placed across the points indicated by the solid black dots on measuring devices B and C. The points are specified by the agencies that require a particular measuring device to meet their specification.



9.5. To set the Delay time

Press the SET key until the display shows:

Delay = XXX.Xs

Use the Up (∧) or Down (∨) arrow keys to enter the desired delay time, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If the delay time is set to 0.0s, the instrument will operate in a continuous ON mode when the TEST button is pressed. The test will stop only when the RESET button is pressed or the OFL detected. The actual minimum delay time setting is 0.5 seconds. The maximum delay time setting is 999.9 seconds. Any attempt to set the

value more than 999.9s or less than 0.0s will cause the instrument to indicate an ERROR by producing two short beeps.

Note: The Delay timer in the Line Leakage mode differs from the Dwell timer in the Hipot mode. A judgment is not made until the Delay time has elapsed. Therefore, when the Delay time is set to zero Pass and Fail judgment or indications will not be made.

9.6. To set the Connect mode ON/OFF
Press the SET key until the display shows:

Connect = OFF	or	Connect = ON

Press the Up (∧) or Down (∨) arrow keys to toggle the connect mode to ON or OFF, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. If Connect is set to ON the next step in the sequence will be executed. If Connect is set to OFF the test sequence will stop at this step. If step 10 is set to ON the test process will be connected to the first step of the next memory. Step 10 of the memory 20 does not have Connect ON/OFF option.

10. System Menu Parameters Setting
10.1. To set the PLC Remote ON/OFF
Press EXIT key once. The display shows:

PLC Remote = OFF	or	PLC Remote = ON

Use the Up (∧) or Down (∨) arrow keys to change the PLC Remote setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. When the PLC Remote is turned ON the front panel TEST button is disabled and a test may only be started through the rear panel I/O. If you attempt to start a test from the front panel TEST button when the PLC Remote function is turned ON the instrument will produce two short beeps and the following pop-up message will be displayed:

PLC Remote ON

Message will disappear after a few seconds or it can be cleared with the RESET button.

10.2. To set the Single Step ON/OFF
Press EXIT key once then press the SET key until the display shows:

Single Step = OFF	or	Single Step = ON

Use the Up (∧) or Down (∨) arrow keys to change the Single Step setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode.

This function is used to temporarily override the automatic connection feature. When the Single Step function is ON the instrument will pause after each step is completed, even though the step Connect function is set to ON. To continue the test sequence, press the TEST button. Each time the TEST button is pressed the next connected step will execute. If you press the RESET button before completing all connected steps, it will return the instrument to the original starting step. If a step fails and you wish to continue to the next step, do not press the RESET button, press the TEST button.

10.3. To set the Fail Stop ON/OFF

Press EXIT key once then press the SET key until the display shows:

Fail Stop = OFF	or	Fail Stop = ON

Use the Up (∧) or Down (∨) arrow keys to change the Fail Stop setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode.

Fail Stop is a function that will stop a sequence of tests if a failure occurs. If this function is turned OFF, the sequence of tests will continue to the end of the sequence regardless of whether or not a failure has occurred. If the Fail Stop is ON and a failure occurs during the test sequence, the red RESET button will light and a short alarm will sound but the sequence will continue to the end. At the end of the test sequence, the red RESET button will light and alarm will sound indicating failure during the sequence. Pressing the RESET button will silence the alarm and reset the instrument.

10.4. Key Lock or Memory Lock setting

The model 6330 is equipped with two different levels of lockout selection. 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.

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 SET/Up-Down arrows for memory selection
ON	ON	TEST and RESET

To set the key Lock ON please press EXIT key once and then press the SET key until the display shows:

Lock = OFF

Use the Up (∧) or Down (∨) arrow keys to change the Lock setting to ON, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. Once the EXIT key pressed key Lock function is activated.

Deactivation of the key Lock function is possible only from a power OFF state. Please turn the POWER switch to the OFF position then press and hold the SET key and turn the power ON. Then system menu (EXIT key) will be unlocked. Now you can press EXIT key once and then press the SET key until the display shows:

Lock = ON

Use the Up (∧) or Down (∨) arrow keys to change the Lock setting to OFF, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the unlocked test mode.

Memory Lock function can be toggled when system unlocked or through the power OFF state described above. Please press EXIT key once then press the SET key until the display shows:

Memory Lock = OFF	or	Memory Lock = ON

Use the Up (∧) or Down (∨) arrow keys to change the Memory Lock setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode.

10.5. Alarm Volume

Press EXIT key once then press the SET key until the display shows:

Alarm Volume = 5

Use the Up (∧) or Down (∨) arrow keys to change the Alarm Volume setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode. The Alarm Volume may be set from 0-9, with 0 corresponding to OFF, 9 corresponding to the instrument alarm's maximum volume setting. If you attempt to increase or decrease the Alarm Volume outside of the limits will cause the instrument to indicate an ERROR by producing two short beeps.

10.6. DUT-HV Set setting

Press EXIT key once then press the SET key until the display shows:

DUT-HV Setting = OFF	or	DUT-HV Setting = ON

Use the Up (∧) or Down (∨) arrow keys to change the DUT-HV setting, then press the SET key to advance to the next parameter or press the EXIT key to store the setting and return to the test mode.

The DUT-HV Set setting will enable or disable the DUT Output relay when an AC or DC Hipot test or an Insulation Resistance test is performed. This is a global parameter and must be enabled for high voltage to be present at the rear panel terminals during the test. There is also a DUT OUTPUT ON setting in each test's parameter menu that must be enabled.

OPERATING PROCEDURES

Instrument Connections
If the instruments 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. Connect the return lead to the test fixture or the DUT first, followed by the high voltage 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.

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

Display
Follow the previously stated setup procedures to set the desired parameters. The display will show the Dielectric Withstand test settings, the Insulation Resistance test settings, the Ground Bond test settings, the Functional Run test settings or the Line Leakage test settings depending on what has been selected.

The underscore character may be displayed after the step number, i.e. X – X_. This indicates that there is another configured test step that will execute after the displayed setup has completed. To view the next test setup please press the SET key twice then press the Up arrow key. To return to the previous test please press the Down arrow key and then EXIT key to return to the test mode.

1. AC or DC Dielectric Withstand Test Mode
1.1. To initiate a test, press the TEST button on the front panel. The red High Voltage Arrow indicator will flash and the display will immediately show:

ACW Set	XXX.Xs	then	ACW Dwell	XXX.Xs
XX-XX X.XXkV	XX.XXmA		XX-XX X.XXkV	XX.XXmA

or

DCW Set	XXX.Xs	then	DCW Dwell	XXX.Xs
XX-XX X.XXkV	XX.XXmA		XX-XX X.XXkV	XX.XXmA

The instrument will continue to output the desired voltage for the duration of the selected Ramp and Dwell times.

1.2. If the DUT has passed the test, the green TEST button will illuminate and a short audible beep tone will activate. The display will show:

ACW Pass	XXX.Xs	or	DCW Pass	XXX.Xs
XX-XX X.XXkV	XX.XXmA		XX-XX X.XXkV	XX.XXmA

The instrument is ready to perform another test.

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

ACW Abort XXX.Xs XX-XX X.XXkV XX.XXmA	or	DCW Abort XXX.Xs XX-XX X.XXkV XX.XXmA

Please press the TEST button to initiate another test.

1.4. If the leakage current exceeds the high limit setting, but does not exceed the metering range, the red RESET button will illuminate and an alarm will activate. The display will show:

ACW HI-Limit XXX.Xs XX-XX X.XXkV XX.XXmA	or	DCW HI-Limit XXX.Xs XX-XX X.XXkV XX.XXmA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

1.5. If the leakage current does not exceed the low limit setting, the red RESET button will illuminate and an alarm will activate. The display will indicate:

ACW LO-Limit XXX.Xs XX-XX X.XXkV XX.XXmA	or	DCW LO-Limit XXX.Xs XX-XX X.XXkV XX.XXmA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

1.6. If there is a short circuit in the DUT during the test, the red RESET button will illuminate and an alarm will activate. The display will show:

ACW OFL XXX.Xs XX-XX X.XXkV >30.0mA	or	DCW OFL XXX.Xs XX-XX X.XXkV >5.00mA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

2. Insulation Resistance Test Mode

2.1. To initiate a test press the TEST button on the front panel. The red High Voltage Arrow indicator will flash and the display will immediately show:

IR Set XXX.Xs XX-XX XXXXV XXXXMΩ	then	IR Delay XXX.Xs XX-XX XXXXV XXXXMΩ

2.2. If the DUT has passed the test, the green TEST button will illuminate and a short audible beep will be activated. The display will show:

IR Pass XXX.Xs XX-XX XXXXV XXXXMΩ

The instrument is ready to perform another test.

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

IR Abort XXX.Xs XX-XX XXXXV XXXXMΩ

Press the TEST button to initiate another test.

2.4. If the insulation resistance exceeds the high limit setting, the red RESET button will illuminate and an alarm will activate. The display will show:

IR HI-Limit XXX.Xs XX-XX XXXXV XXXXMΩ

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

2.5. If the insulation resistance does not exceed the low limit setting and is within the metering range the red RESET button will illuminate and an alarm will activate. The display will show:

IR LO-Limit XXX.Xs XX-XX XXXXV XXXXMΩ

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

3. Ground Bond Test Mode

3.1. To initiate a test press the TEST button on the front panel. The instrument will continue to output the desired current for the duration of the selected dwell time. The display will indicate:

GND Set XXX.Xs XX-XX XX.XA XXXmΩ	then	GND Dwell XXX.Xs XX-XX XX.XA XXXmΩ

3.2. If the DUT has passed the test, the green TEST button will illuminate and a short audible beep will be activate. The display will indicate:

GND Pass XXX.Xs XX-XX XX.XA XXXmΩ

The instrument is ready to perform another test.

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

GND Abort XXX.Xs XX-XX XX.XA XXXmΩ

Please press the TEST button to initiate another test

3.4. If the resistance exceeds the metering range, the red RESET button will illuminate and the alarm will be activate. The display will show:

If current 3.0 – 10.0A	X – X HI-Lmt XXX.Xs XX.XA GND >510mΩ
If current 10.1 – 25.0A	X – X HI-Lmt XXX.Xs XX.XA GND >200mΩ
If current 25.1 – 30.0A	X – X HI-Lmt XXX.Xs XX.XA GND >150mΩ

To stop the alarm, press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test. The display will show:

GND Set		XXX.Xs
XX-XX	XX.XA	XXXmΩ

3.5. If the resistance exceeds the high limit trip setting but does not exceed the metering range, the red RESET button will illuminate and the alarm will be activated. The display will show:

GND Hi-Limit		XXX.Xs
XX-XX	XX.XA	XXXmΩ

To stop the alarm, press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

3.6. If the resistance does not exceed the low limit setting, the red RESET button will illuminate and the alarm will be activated. The display will show:

GND LO-Limit		XXX.Xs
XX-XX	XX.XA	XXXmΩ

To stop the alarm, press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

4. Functional Run test mode

4.1. To initiate a test, press the TEST button on the front panel. The display will immediately show:

RUN Set		XXX.Xs
XX-XX	XX.XV	XX.XA

then

RUN Delay		XXX.Xs
XX-XX	XX.XV	XX.XA

The instrument will continue to output the desired voltage for the duration of the selected Delay and Dwell times. Use the Up (∧) or Down (∨) arrow keys to bring up an alternate display screen while the test is running. The alternate display screen will show:

RUN Dwell	X.XX mA
XX.XX	XW
X.XXXPF	

4.2. If the DUT has passed the test, the green TEST button will illuminate and a short audible beep will activate. The display will show:

RUN Pass	XXX.Xs
XX-XX XX.XV	XX.XA

Use the Up (∧) or Down (∨) arrow keys to bring up an alternate display screen after the test has completed. The alternate display will show:

RUN Pass	X.XX mA
XX-XX XW	X.XXXPF

The instrument is ready to perform another test.

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

RUN Abort	XXX.Xs
XX-XX XX.XV	XX.XA

Please press the TEST button to initiate another test.

4.4. If the DUT input voltage exceeds the high limit setting or does not exceed the low limit setting, the red RESET button will illuminate and an alarm will activate. The display will show:

RUN Volt-HI XXX.Xs XX-XX XX.XV XX.XA	or	RUN Volt-LO XXX.Xs XX-XX XX.XV XX.XA

To stop the alarm, press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

4.5. If the DUT input current exceeds the high limit setting or does not exceed the low limit setting, the red RESET button will illuminate and an alarm will activate. The display will show:

RUN Amp-HI XXX.Xs XX-XX XX.XV XX.XA	or	RUN Amp-LO XXX.Xs XX-XX XX.XV XX.XA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

4.6. If the DUT input power exceeds the high limit setting or does not exceed the low limit setting, the red RESET button will illuminate and an alarm will activate. The display will show:

RUN Power-HI XXX.Xs XX-XX XX.XV XX.XA	or	RUN Power-LO XXX.Xs XX-XX XX.XV XX.XA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

4.7. If the DUT input power factor (PF) exceeds the high limit setting or does not exceed the low limit setting, the red RESET button will illuminate and an alarm will activate. The display will show:

RUN PF-HI XXX.Xs XXX-X XX.XV XX.XA	or	RUN PF-LO XXX.Xs XX-XX XX.XV XX.XA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

4.8. If the leakage current exceeds the high limit setting, but does not exceed the metering range, or does not exceed the low limit setting, the red RESET button will illuminate and an alarm will activate. The display will show:

RUN Leakage-HI XXX.Xs XX-XX XX.XV XX.XA	or	RUN Leakage-LO XXX.Xs XX-XX XX.XV XX.XA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

4.9. If there is a short circuit in the DUT causing excessive line current during the test, the red RESET button will illuminate and an alarm will activate. The display will show:

RUN Line-OC XXX.Xs XX-XX XX.XV XX.XA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

4.10. If there is a short circuit in the DUT causing excessive leakage current during the test, the red RESET button will illuminate and an alarm will activate. The display will show:

RUN Leak-OC XXX.Xs XX-XX XX.XV XX.XA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

5. Line Leakage test mode

5.1. To initiate a test, press the TEST button on the front panel. The display will immediately show:

LLT Set XXX.Xs XX-XX XXX.XV XXXXuA	then	LLT Delay XXX.Xs XX-XX XXX.XV XXXXuA

The instrument will continue to output the desired voltage for the duration of the selected Delay time.

5.2. If the DUT has passed the test, the green TEST button will illuminate and a short audible beep will activate. The display will show:

LLT Pass XXX.Xs XX-XX XXX.XV XXXXuA

The instrument is ready to perform another test.

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

LLT Abort XXX.Xs XX-XX XXX.XV XXXXuA

Please press the TEST button to initiate another test.

5.4. If the DUT input voltage exceeds the high limit setting or does not exceed the low limit setting, the red RESET button will illuminate and an alarm will activate. The display will show:

LLT Volt-HI XXX.Xs	or	LLT Volt-LO XXX.Xs

XX-XX XX.XV XXXXuA	XX-XX XX.XV XXXXuA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

5.5. If the DUT leakage current exceeds the high limit setting or does not exceed the low limit setting, the red RESET button will illuminate and an alarm will activate. The display will show:

LLT Leakage-HI XXX.Xs XX-XX XX.XV XXXXuA	or	LLT Leakage-LO XXX.Xs XX-XX XX.XV XXXXuA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

5.6. If there is a short circuit in the DUT during the test, the red RESET button will illuminate and an alarm will activate. The display will show:

LLT Line-OC XXX.Xs XX-XX XX.XV XXXXuA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

5.7. If there is a short circuit in the DUT during the test, the red RESET button will illuminate and an alarm will activate. The display will show:

LLT Leak-OC XXX.Xs XX-XX XX.XV XXXXuA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

5.8. If the DUT Input Voltage is wired incorrectly the red RESET button will illuminate and an alarm will activate. The display will show:

LLT Neutral-V XXX.Xs XX-XX XX.XV XXXXuA

To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The instrument 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 test.

6. Reviewing Test Result in multi-step tests

The test results from the memories that have been executed can be reviewed by pressing the Up (∧) or Down (∨) arrow keys. Successive key presses will continue advancing to the next result. The results of the last step in the process will be followed by the first step. 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.

7. Output Error

This message appears on the display if the instrument's output reading does not match the setting. When the instrument has an output problem and the TEST button is pressed, the Output Error screen will appear as follows:

OUTPUT ERROR! EXIT to continue

The RESET button is not active in this situation. Only the EXIT key will allow you to return to the test mode. When the EXIT key is pressed the instrument will continue with its normal failure indication process. The failure light and alarm can be cleared by pressing the RESET button. If Output Error occurs please call the Slaughter Company Customer Support Center at 1-800-504-0055 for assistance.

8. Fatal Error

If the instrument has a Fatal Error failure then the following screen will appear:

FATAL ERROR 900X Call 18005040055

None of the buttons and keys will be active in this situation. This type of failure permanently locks the instrument in the Fatal Error mode and requires that the instrument be serviced by the Slaughter Company. The customer should contact the Slaughter Company Customer Support Center at 1-800-504-0055 to receive further instruction.

The following Fatal Error identification numbers will represent the type of the failure that has occurred:

FATAL ERROR 9001 will appear on the display, if the instrument has a recognizable internal component failure.

FATAL ERROR 9002 will appear on the display, if the instrument's System data or the Model/Option data are corrupted and do not match the setting.

FATAL ERROR 9003 will appear on the display, if the instrument's Calibration data is corrupted.

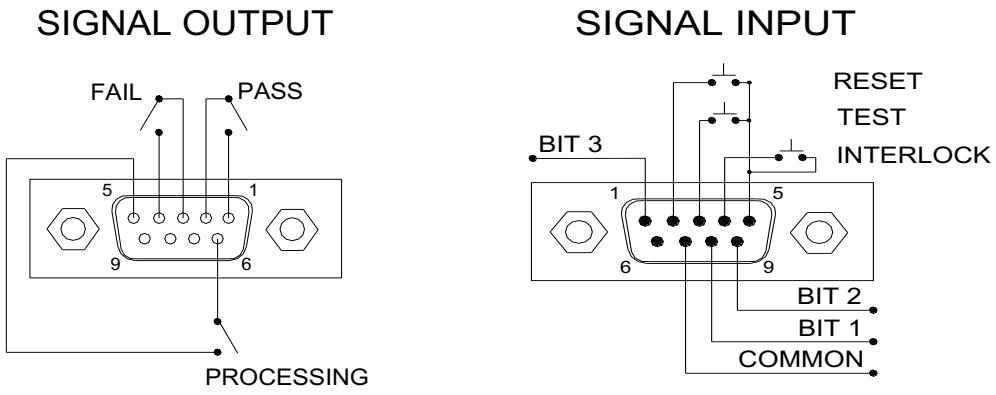
FATAL ERROR 9004 will appear on the display, if the instrument has an internal data transfer error.

CONNECTION OF 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 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 output signals to remotely monitor PASS, FAIL, and PROCESSING conditions. These signals are provided by three normally open internal relays that switch on to indicate the current condition of the tester. 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). 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.

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 activated.

SIGNAL INPUTS OF REMOTE I/O and PROGRAMMED TESTS
The model 6330 remote connector enables remote operation of the TEST, RESET, and REMOTE INTERLOCK functions, and allows the operator to select one of 6 preprogrammed tests.

When the PLC Remote mode is ON, the instrument will respond to simple switch or relay contacts closures. A normally open momentary switch can then be wired across pins 3 and 5 to allow remote operation of the TEST function. When the PLC Remote function is ON the TEST button on the front panel will be disabled to prevent a test from being activated through this button. If you attempt to start a test from the front panel TEST button and the PLC Remote function is turned “ON”, a pop-up message will be displayed. The pop-up message will appear as follows

PLC Remote ON

A normally open momentary switch can also 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 voltage can be shut down from either location.

The Remote Test Select function gives the user the capability to quickly change parameters and initiate a test remotely. Six pre-programmed tests can be accessed by connecting pins 1, 8, and 9 to the common pin 7, in different combinations. The memory select bits should be set simultaneously and remain set for a minimum of 20ms to guarantee that the correct memory will be selected. However, the memory select bits may be set in sequential manner, provided that the time delay between each bit is less than 4ms. When the desired bit pattern has been established it should remain set for a minimum of 20ms to guarantee that the correct memory will be selected. The **Remote Tests Select Truth Table** (binary) shows the different combinations of momentary switch (relay) closures, and which memory programs that will be selected as the result. It may be necessary to "OR" the momentary switches (relay contacts) to prevent incorrect program selection due to timing errors.

Remote Tests Select Truth Table

BIT 3	BIT 2	BIT 1	TEST #
0	**0**	**1**	01
0	**1**	**0**	02

0	**1**	**1**	03
1	**0**	**0**	04
1	**0**	**1**	05
1	**1**	**0**	06

Where: **1** = Momentary Contact closure between BIT and COMMON
0 = NO Contact closure between BIT and COMMON

Activating test program functions through the remote connector selects the memory and starts the test that is pre-programmed into that memory.

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

REMOTE INTERLOCK

The model 6330 is equipped with a featured referred to as “Remote Interlock”. Remote Interlock is a feature that utilizes a set of closed contacts to enable the instruments output. In other words, if the Interlock contacts open, the output of the instrument will be disabled. Remote Interlock could also be referred to as a remote system lockout, utilizing “Fail When Open” logic. If the Interlock contacts are open and the TEST button is pushed, a pop-up message will be displayed on the screen for few seconds. The message will appear as follows:

Interlock Open

If the Interlock contacts are opened during a test, the pop-up message will be displayed and the test will abort.

The hardware and software have been configured to provide the interlock connections on pins 4 and 5 of the Remote Interface, Signal Input port. This reset scheme is designed for use with an external safety interlock device that utilizes a "Fail-When-Open" configuration on its output interface The instrument 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 instrument will not perform tests.

INSTRUMENT CONNECTIONS

The Slaughter 6330 comes with test leads to perform all necessary safety tests. The following test leads are included with the instrument:

Part Number	Description
99-10467-01	Adapter Box
99-10457-01	LLT CASE LEAD
99-10468-01	LLT GROUND LEAD
99-10009-01	GND BND OUTPUT
99-10008-01	RETURN LEAD
99-10469-01	LLT INPUT LINE
99-10470-01	LLT INPUT NEUTRAL
99-10471-01	LLT OUTPUT LINE
99-10472-01	LLT OUTPUT NEUTRAL
102-055-913	High Voltage Cable

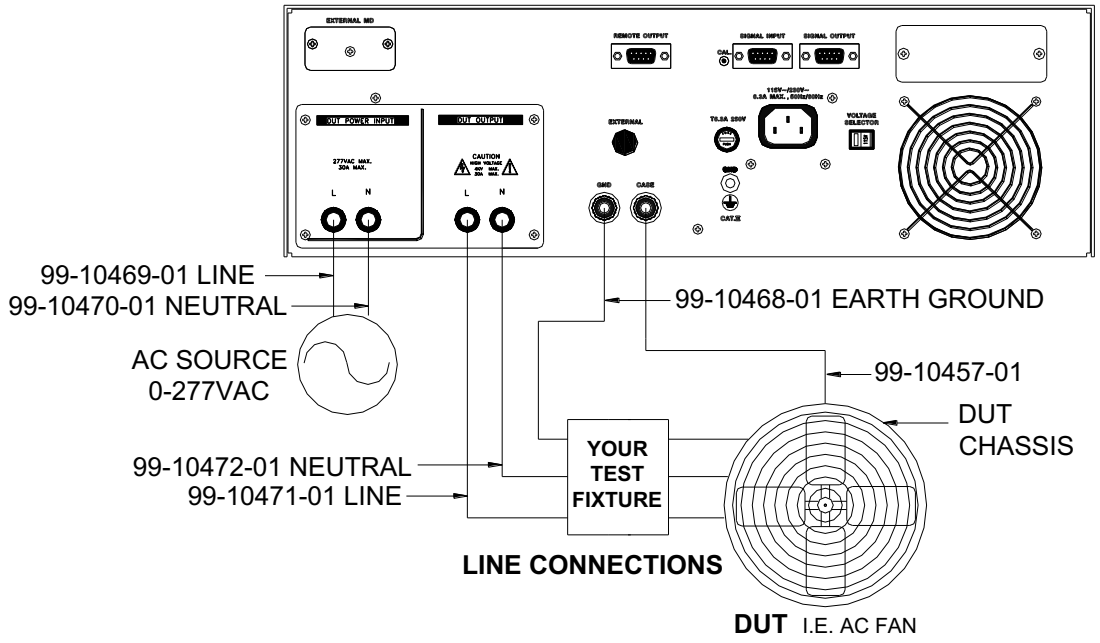
Functional Run/Line Leakage stand-alone test lead connections
In order to perform a Line Leakage and/or Functional Run test, an external power supply must be used to provide power to the device under test.

CAUTION The power supply must be an unbalanced, single phase 0-277 VAC supply. Using a balanced supply may cause damage to the instrument or operator.

Provided with the instrument are two 10 AWG input power leads (terminated on one end) that may be connected to the 6330's DUT Power In screw-mount terminals (line and neutral). These leads are left un-terminated at the other end and should be connected to the outputs of the power supply. The 10 AWG input power leads may be used for applications in which the DUT requires more than 20 Amps of input current.

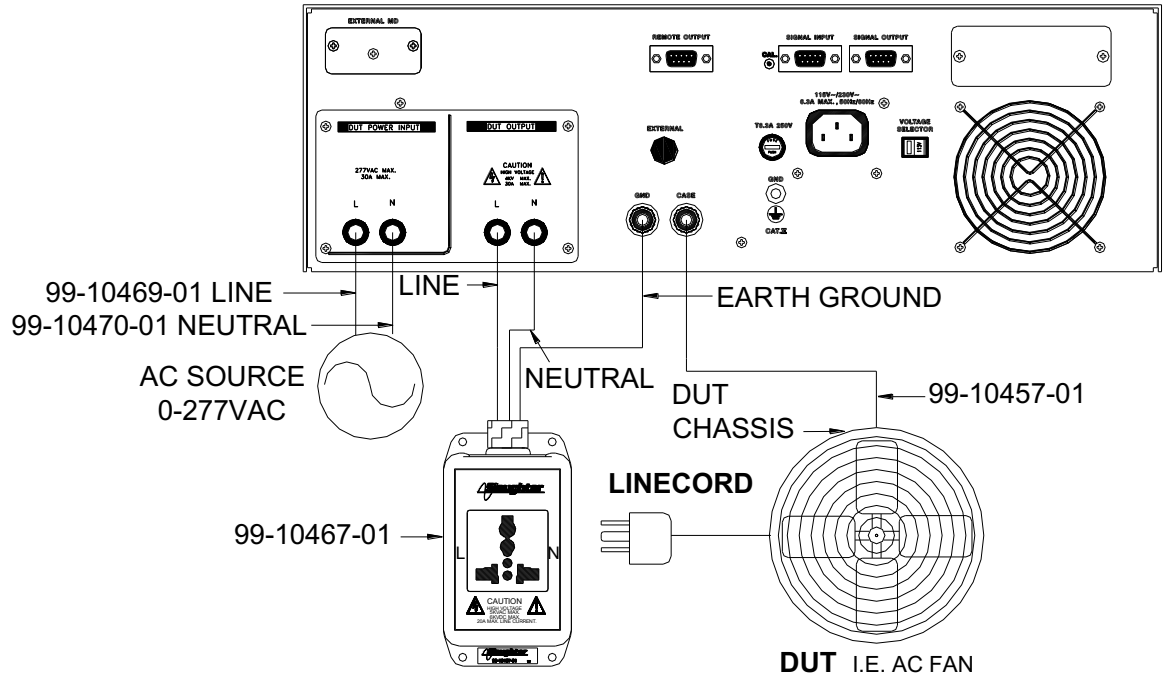
Provided with the instrument are two 10 AWG output power leads (terminated on one end) that may be used to connect to the 6330's DUT Power Out screw-mount terminals (line and neutral). These leads are left un-terminated at the other end and should be connected to the device under test for applications that require more than 20 Amps of input current

The following diagram shows how to connect the stand alone test leads to the 6330 and to the device under test:



Adapter Box connections

In addition to the stand-alone test leads, the instrument also comes with an adapter box. The adapter box allows the user an easy way to connect an item that is terminated in a three-prong line cord. Note: the adapter box may only be connected to the rear panel of the 6330. The following diagram shows how to connect the adapter box to the 6330 and to the device under test.



CAUTION

The adapter box (P/N 99-10467-01) may be used to perform Hipot, Ground Bond, Insulation Resistance, Functional Run, and Line Leakage tests. The adapter box is rated for a maximum of 20 Amps of input current. If current levels greater than 20 Amps are needed for either the Functional Run test or the Line Leakage test, the stand alone test leads must be used.

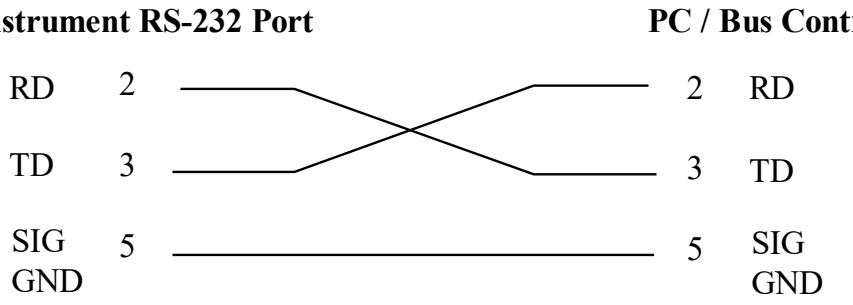
Bus Remote Interface: RS-232

This section provides information on the proper use and configuration of bus remote interface. The RS-232 remote interface is standard on all 6330 models.

RS-232 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 RS-232 cabling should be configured as follows for a 9-pin serial port interface:



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. The controller should be configured to ignore the handshaking lines DTR (pin 4), DSR (pin 6), CTS (pin 8) and RTS (pin 7). If the port cannot be configured through software to ignore the lines then the handshake lines should be jumpered together in two different sets. Pins 4 and 6 jumpered together and pins 7 and 8 jumpered together at the controller end of the cable.

When sending command over the RS232 bus, the instrument 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 instrument. If there is an error with the command string that is sent, the instrument 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 instrument, it will automatically send the data back to the controller input buffer. The controller input buffer will accumulate data being sent from the instrument including the ACK and NAK response strings, until it has been read by the controller.

RS-232 Interface Command List

The RS-232 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 6330. 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 instrument. 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.

File Editing Commands and Companion Queries
The following commands are used to create or modify Test Setup Files.

Command	**Description**	**Value**
FL <*file number*> FL?	File Load	*file number* = 1-20
SS <*step number*> SS?	Step Select	*step number* = 1-10
SAA	Step Add ACW test	
SAD	Step Add DCW test	
SAI	Step Add IR test	
SAG	Step Add GND test	
SAR	Step Add RUN test	
SAL	Step Add LLT test	

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

SS *<step number>*
Selects the active selected step to load into RAM. The step must first be selected before any specific parameters can be edited.

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.

	ACW	DCW	IR
1	Voltage	Voltage	Voltage
2	Max Limit	Max Limit	Max Limit
3	Min Limit	Min Limit	Min Limit
4	Ramp Up	Ramp Up	Delay
5	Dwell	Dwell	DUT Output (ON/OFF)
6	Frequency	DUT Output (ON/OFF)	Connect (ON/OFF)
7	DUT Output (ON/OFF)	Connect (ON/OFF)	
8	Connect (ON/OFF)		

	GND	RUN	LLT
1	Current	Voltage-HI	Voltage-HI
2	HI-Limit	Voltage-LO	Voltage-LO
3	LO-Limit	Amp-HI	Leakage-HI
4	Dwell	Amp-LO	Leakage-LO
5	Offset	Power-HI	Delay Time
6	Frequency	Power-LO	Line (Neutral,Polarity,Ground)
7	Connect (ON/OFF)	PF-HI	Meas. Device *(UL544NP/UL484/UL923,UL471,UL867,UL697,IEC60990 Fig4 U2,IEC60950-1,IEC60335-1,IEC60598-1,IEC60065,IEC61010,UL2601-1,IEC60601-1,External)*
8		PF-LO	Delay Time
9		Leakage-HI	Connect
10		Leakage-LO	
11		Delay	
12		Dwell	
13		Connect (ON/OFF)	

Test Parameter Editing Commands

These commands are used to modify the test parameter within each step. 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	Test Types	Value
ECC {1|0} ECC?	Edit Step Connect	ALL	1= On, 0=Off

Command	Name	Test Types	Value
EC < *value* > EC?	Edit Current	GND	3.00 - 30.00A
ECH < *value* > ECH?	Edit Current-HI	RUN	0.00 - 30.00A
ECL < *value* > ECL?	Edit Current-Lo	RUN	0.00 - 30.00A
EDE < *value* > EDE?	Edit Delay	IR RUN LLT	0.0, 0.5 - 999.9s 0.2 – 999.9s 0.0, 1.0 – 999.9s 0.0 = Continuous
EDO {1|0} EDO?	Edit DUT-Output Voltage	ACW DCW IR	1= On, 0=Off
EDW < *value* > EDW?	Edit Dwell	ACW DCW GND RUN	0.0, 0.2 – 999.9s 0.0, 0.2 – 999.9s 0.0, 0.5 – 999.9s 0.0, 0.1 – 999.9s 0.0 = Continuous
EF {1|0} EF?	Edit Frequency	ACW GND	1=60Hz, 0=50Hz
EH < *value* > EH?	Edit HI-Limit	ACW DCW IR GND	0.0 – 30.00mA 0.0 – 5.00mA 0 - 1000MΩ 0 - 150mΩ
ELH < *value* > ELH?	Edit Leakage-HI	RUN LLT	0.000 - 10.00mA 0.0 - 6000uA
ELL < *value* > ELL?	Edit Leakage-LO	RUN LLT	0.000 - 10.00mA 0.0 - 6000uA
EL < *value* > EL?	Edit LO-Limit	ACW DCW IR GND	0.0 – 30.00mA 0.0 – 5.00mA 0 - 1000MΩ 0 - 150mΩ

Command	Name	Test Types	Value
ELINE {1|2|3|4|5|6|7|8} ELINE?	Edit Line Fault Condition	LLT	1=Open Neutral, Normal Polarity, Open Ground 2=Open Neutral, Reverse Polarity, Open Ground 3=Open Neutral, Normal Polarity, Closed Ground 4=Open Neutral, Reverse Polarity, Closed Ground 5=Closed Neutral, Normal Polarity, Open Ground 6=Closed Neutral, Reverse Polarity, Open Ground 7=Closed Neutral, Normal Polarity, Closed Ground 8=Closed Neutral, Reverse Polarity, Closed Ground
EM {0|1|2|3|4} EM?	Edit Meas-Device	LLT	0=MD-A 1=MD-B 2=MD-C 3=External 4=Frequency Check
EO < *value* > EO?	Edit Offset	GND	0 - 100mΩ
EP < *value* > EP?	Edit Probe Config.	LLT	0=Ground to Line 1=Ground to Neutral
EPFH < *value* > EPFH?	Edit PF-HI	RUN	0.000 - 1.000
EPFL < *value* > EPFL?	Edit PF-LO	RUN	0.000 - 1.000
EPOH < *value* > EPOH?	Edit Power-HI	RUN	0 - 8400W
EPOL < *value* > EPOL?	Edit Power-LO	RUN	0 - 8400W
ERU < *value*> ERU?	Edit Ramp-Up	ACW DCW	0.1 - 999.9s
EV <*value*> EV?	Edit Voltage	ACW DCW IR	1 – 3.5kV 1 – 4.0kV 100 - 1000V
EVH < *value* > EVH?	Edit Voltage-Hi	RUN LLT	0.0 - 277.0V
EVL < *value* > EVL?	Edit Voltage-Lo	RUN LLT	0.0 - 277.0V

System Parameter Editing Commands and Companion Queries

These commands are used to modify the system parameters for the instrument. These

commands require a parameter value to be included with the command.

Command	Name	Value
SDH{1|0} SDH?	DUT HV Setup ON/OFF	1=On, 0=Off
SPR {1|0} SPR?	PLC Remote ON/OFF	1=On, 0=Off
SSI {1|0} SSI?	Single Step ON/OFF	1=On, 0=Off
SF {1|0} SF?	Fail Stop ON/OFF	1=On, 0=Off
SAL <*value*> SAL?	Alarm Level	1-9
SL {1|0} SL?	System Lock	1=On, 0=Off
SML {1|0} SML?	System Memory Lock	1=On, 0=Off

Query Commands
These query commands will retrieve data from the instrument. 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 <*step number*>?	Result Data Query	1-3
RR?	Read Reset Query	1=Open, 0=Closed
RI?	Read Interlock Query	1=Open, 0=Closed
LS?	List Step Parameters	
LS <*step number*>?	List Step Parameters by step number	*step number* = 1-10

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 step number, test type, test status, and metering. The syntax for this command response is {memory - step, test type, status, meter 1, meter 2, meter 3}. Each meter will contain both the value and the units.

RD <step number>?
Read the results for an individual step. The step number is the actual step number that has been saved within the file, not the order of which the steps were executed. For example if the test was executed starting from step 3 and ending with step 5 then the first step test results will be found in location 3 not in location 1. Each parameter is separated by commas and includes step number, test type, test status, and metering. The syntax for this command response is {memory - step, test type, status, meter 1, meter 2, meter 3}. Each meter will contain both the value and the units.

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

RI?
Read the remote Interlock input signal. When the remote Interlock has be activated by opening the contacts the query will return a value of 1 to indicate the instrument 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; ***<step, test, p1, p2, p3…>*** Where <*step*> is the step number, <*test*> is the test type and <*p1,p2*> etc., indicates the parameters of the test.

LS <*step number*>?
Lists all the Parameters for the individual step indicated by *step number* = 1-30.
The response will be formatted as follows; ***<step, test, p1, p2, p3…>*** Where <*step*> is the step number, <*test*> is the test type and <*p1,p2*> etc., indicates the parameters of the test.

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 instrument 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 6330
*TST?	Self-Test Query	00H=OK 01H=TEST EEPROM ERROR
*CLS	Clear Status Command	Clear Standard Event Status Register Clear Service Request Register
*OPC	Operation Complete Command	When TEST command ok setting ESR BIT0 =1
*OPC?	Operation Complete Query	1 = TEST completed ok 0 = TEST in process
*WAI	Wait-to-Continue Command	
*PSC {1|0}	Power-on Status Clear Command	1 = Power-on clear enable registers 0 = Power-on load previous enable registers
*PSC?	Power-on Status Clear Query	
*ESR?	Standard Event Status Register Query	0 - 255
*ESE <*value*>	Standard Event Status Enable Command	*value* = 0 - 255
*ESE?	Standard Event Status Enable Query	0 - 255

*STB?	Read Status Byte Query	BIT 0, 01H,(1) Operation Complete BIT 1,02H,(2) Not Used BIT 2,04H,(4) Query Error BIT 3,08H,(8) Device Error BIT 4,10H,(16) Execution Error BIT 5,20H,(32) Command Error BIT 6,40H,(64) Not Used BIT 7,80H,(128) PROMPT
*SRE <*value*>	Service Request Enable Command	*value* = 0 - 255
*SRE?	Service Request Enable Query	0 - 255

***IDN?**
Read the instrument identification string. Company =SLA.

***RST**
Reset the instrument 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 instrument 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 successfully.

***OPC?**
Returns an ASCII "1" after the command is executed.

***WAI**
After the command is executed, it prevents the instrument 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.

MODEL 6330 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 instrument, you will find a label that contains the option code.

For example, your options code would appear as follows:
fitted with option 01 ..... OPT: 01
fitted with option 01 and 02 ..... OPT: 0102

6330 Options

Option List

Code	Description
01	Rack Mount Kit

OPTIONS

Option 01 Rack Mount Kit

The optional rack mount kit allows for mounting the 6330 to a standard 19” rack. The instrument will take 3U’s of rack space. The rack mount kit includes:

Component	Qty.	Description
99-10458-01	2	Handle Rack Mount 3U
99-10459-01	2	Bracket Rack Mount 3U
99-10448-01	4	Screw M4x12mm Phillips

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 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 and calibration checks or verification can only be made while operation in Test mode.

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

A Standard AC Voltmeter with 4,000 Volts range
A Standard AC Voltmeter with 6 Volts range
A Standard DC Voltmeter with 4,000 Volts range
A Standard DC Voltmeter with 1,000 Volts range
A Standard AC Ammeter with 30 A range
A Standard AC Milliammeter with 30 mA range
A Standard DC Milliammeter with 5 mA range
A Standard Resistor 100 kΩ/20Watt/1500VAC
A Standard Resistor 1 MΩ/0.25Watt/300VDC
A Standard Resistor 50 MΩ/0.25Watt/1000VDC
Adjustable AC power supply 0-277VAC, 8.4kVA
Low impedance adjustable load 7Ω – 30Ω , 8400 W
Adjustable DC power supply 0-8VDC

Calibration Initialization
To enter the calibration mode the instrument 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:

01. AC 4000V

To calibrate AC voltage please follow procedure on next paragraph, to calibrate other parameters use Up (∧) or Down (∨) arrow keys to scroll to the desired calibration point, then follow procedure on relative paragraph below.

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

1. To calibrate AC Voltage
Please connect a standard 4000V AC Voltmeter to the HV and RETURN connectors. Then press the TEST button on the front panel. The instrument will provide around 4000VAC on the output connectors and the display will show:

Voltage = XXXXV

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard AC Voltmeter into the instrument. Then press SET key to store the voltage setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

2. To calibrate DC Voltage
Please connect a standard 4000V DC Voltmeter to the HV and RETURN connectors. Press the Up (∧) or Down (∨) arrow keys until the display shows:

02. DC 4000V

Then press the TEST button on the front panel. The instrument will provide around 4000VDC on the output connectors and the display will show:

Voltage = XXXXV

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard DC Voltmeter into the instrument. Then press SET key to store the voltage setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

3. To calibrate IR Voltage
Please connect a standard 1000V DC Voltmeter to the HV and RETURN connectors. Press the Up (∧) or Down (∨) arrow keys until the display shows:

03. IR 1000V

Then press the TEST button on the front panel. The instrument will provide around 1000VDC on the output connectors and the display will show:

Voltage = XXXXV

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard DC Voltmeter into the instrument. Then press SET key to store the voltage setting and to advance to the next calibration point or press the RESET button to return to the

calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

4. To calibrate AC Current

Please connect a 100 kΩ resistor in series with the standard 30mA AC Milliammeter and connect these across the HV and RETURN connectors of the instrument.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

04. AC 30.00mA Load = 100kΩ

Then press the TEST button on the front panel. The instrument will provide around 1000VAC on the output connectors and the display will show:

Current XX.XXmA

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard AC Milliammeter into the instrument. Then press SET key to store the current setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

5. To calibrate DC Current

Please connect a 100 kΩ resistor in series with the standard 5mA DC Milliammeter and connect these across the HV and RETURN connectors of the instrument.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

05. DC 5.00mA Load = 100kΩ

Then press the TEST button on the front panel. The instrument will provide around 500VDC on the output connectors and the display will show:

Current X.XXmA

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard DC Milliammeter into the instrument. Then press SET key to store the current setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

6. To calibrate Insulation Resistance low range

Please connect a 100kΩ standard resistor across the HV and RETURN connectors.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

06. IR 0.99MΩ Load = 100kΩ

Then press the TEST button on the front panel. The instrument will execute automatic calibration process. The process does not require data entry. The instrument will provide around 300VDC on the output connectors and the display will show:

Automatic

The instrument will output one short “beep” and advance to the next calibration point when the automatic process is completed successfully, otherwise the instrument will output two short “beeps” and will not advance to the next calibration point.

7. To calibrate Insulation Resistance mid range 1
When previous calibration point was completed successfully display will show:

07. IR 9.99MΩ Load = 1MΩ

Please connect a 1MΩ standard resistor across the HV and RETURN connectors.
Then press the TEST button on the front panel. The instrument will execute automatic calibration process. The process does not require data entry. The instrument will provide around 300VDC on the output connectors and the display will show:

Automatic

The instrument will output one short “beep” and advance to the next calibration point when the automatic process is completed successfully, otherwise the instrument will output two short “beeps” and will not advance to the next calibration point.

8. To calibrate Insulation Resistance mid range 2
When previous calibration point was completed successfully display will show:

08. IR 99.99MΩ Load = 50MΩ

Please connect a 50MΩ standard resistor across the HV and RETURN connectors.
Then press the TEST button on the front panel. The instrument will execute automatic calibration process. The process does not require data entry. The instrument will provide around 1000VDC on the output connectors and the display will show:

Automatic

The instrument will output one short “beep” and advance to the next calibration point when the automatic process is completed successfully, otherwise the instrument will output two short “beeps” and will not advance to the next calibration point.

9. To calibrate Insulation Resistance high range

When previous calibration point was completed successfully display will show:

09. IR	999.9MΩ
Load =	50MΩ

The 50MΩ standard resistor should be connected across the HV and RETURN connectors of the instrument.

Then press the TEST button on the front panel. The instrument will execute automatic calibration process. The process does not require data entry. The instrument will provide around 150VDC on the output connectors and the display will show:

Automatic

The instrument will output one short “beep” and advance to the next calibration point when the automatic process is completed successfully, otherwise the instrument will output two short “beeps” and will not advance to the next calibration point.

10. To calibrate Ground Bond test voltage

Please connect a standard 6V AC Voltmeter across the CURRENT and RETURN connectors of the instrument.

Press the Up (∧) or Down (∨) arrow keys until the display shows:

10. GND	6.00V

Then press the TEST button on the front panel. The instrument will generate an output of about 6 VAC and the display will show:

Voltage =	X.XXV

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard AC Voltmeter into the instrument. Then press SET key to store the voltage setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

11. To calibrate Ground Bond test current

Please connect the standard 30A AC Ammeter across the CURRENT and RETURN connectors of the instrument.

Press the Up (∧) or Down (∨) arrow keys until the display shows:

11. GND	30.0A

Then press the TEST button on the front panel. The display will show:

Current = XX.XA

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard AC Ammeter into the instrument. Then press SET key to store the current setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

12. To calibrate Functional Run test voltage

Step 1
Please disconnect all meters from the instrument.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

12. RUN 277.0V Step 1: No Power Input

Then press the TEST button on the front panel. Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

Step 2
Please connect the standard 0-277VAC power supply to the DUT I/P inputs of the instrument. Connect the standard AC voltmeter to the DUT outputs.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

12. RUN Voltage Step 2: ACV 250V Input

Then press the TEST button on the front panel. The display will show:

Automatic

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard AC voltmeter into the instrument. Then press SET key to store the current setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

13. To calibrate the Functional Run test current

Please connect a 30A resistor in series with the standard 30AAC ammeter and connect these across the DUT Output Power Line and Neutral terminals.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

13. RUN 30.0A L=30Amp,V=120-277VAC

Then press the TEST button on the front panel and the display will show:

Current = XX.XA

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard AC ammeter into the instrument. Then press SET key to store the current setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode

14. To calibrate the Functional Run test power

Please connect a 10Ω resistor in series with the standard power meter's current inputs. Connect the power meter's voltage inputs to the DUT Output Line and Neutral terminals of the instrument. Connect the AC power supply to the DUT I/P connectors of the instrument and set the voltage for 225VAC.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

14. RUN 8400W L=10Ω, V=220VAC

Then press the TEST button on the front panel and the display will show:

Power = XXXXW

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the power meter into the instrument. Then press SET key to store the current setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode

15. To calibrate the Functional Run test leakage current

Please connect a standard Milliammeter to the DUT Power Outputs Line and Ground terminals. Connect the AC power supply to the DUT I/P of the instrument and set the voltage to 18VAC.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

15. RUN 10.0mA DUT I/P=18VAC

Then press the TEST button on the front panel and the display will show:

Current = X.XXmA

Press the Up (∧) or Down (∨) arrow keys to enter the reading of the standard AC Milliammeter into the instrument. Then press SET key to store the current setting and to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode

16. To calibrate the Line Leakage test offset
Please disconnect all meters from the instrument.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

16. LLT Offset

Then press the TEST button on the front panel and the display will show:

Automatic

Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

17. To calibrate the Line Leakage test x1
Please connect a standard voltmeter and DC power supply in parallel to the DUT Input terminals. Place the power supply's positive output (+) to the instrument's Neutral terminal. Place the power supply's negative output (-) to the instrument's Ground terminal. Set the DC power supply to 8VDC.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

17. LLT X1 N/G Input 8.000VDC

Then press the TEST button on the front panel and the display will show:

Voltage = X.XXXV

Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

18. To calibrate the Line Leakage test x4

Please connect a standard voltmeter and DC power supply in parallel to the DUT Input terminals. Place the power supply's positive output (+) to the instrument's Neutral terminal. Place the power supply's negative output (-) to the instrument's Ground terminal. Set the DC power supply to 2VDC.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

18. LLT X2 N/G Input 2.000VDC

Then press the TEST button on the front panel and the display will show:

Voltage = X.XXXV

Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

19. To calibrate the Line Leakage test x16

Please connect a standard voltmeter and DC power supply in parallel to the DUT Input terminals. Place the power supply's positive output (+) to the instrument's Neutral terminal. Place the power supply's negative output (-) to the instrument's Ground terminal. Set the DC power supply to 0.5VDC.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

19. LLT X16 N/G Input 0.500VDC

Then press the TEST button on the front panel and the display will show:

Voltage = X.XXXV

Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

20. To calibrate the Line Leakage MDA

Please connect a standard current meter and DC power supply in series with the DUT Power Input terminals. Place the power supply's positive output (+) to the instrument's Neutral terminal. Place the power supply's negative output (-) to the instrument's Ground terminal. Set the power supply to 2.2VDC.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

20. LLT MDA N/G Input 2.200VDC

Then press the TEST button on the front panel and the display will show:

Current = XXXXuA

Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

21. To calibrate the Line Leakage MDB

Please connect a standard current meter and DC power supply in series with the DUT Power Input terminals. Place the power supply's positive output (+) to the instrument's Neutral terminal. Place the power supply's negative output (-) to the instrument's Ground terminal. Set the power supply to 2.2VDC.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

21. LLT MDB N/G Input 2.200VDC

Then press the TEST button on the front panel and the display will show:

Current = XXXXuA

Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

22. To calibrate the Line Leakage MDC

Please connect a standard current meter and DC power supply in series with the DUT Power Input terminals. Place the power supply's positive output (+) to the instrument's Neutral terminal. Place the power supply's negative output (-) to the instrument's Ground terminal. Set the power supply to 2.2VDC.
Press the Up (∧) or Down (∨) arrow keys until the display shows:

22. LLT MDC N/G Input 2.200VDC

Then press the TEST button on the front panel and the display will show:

Current = XXXXuA

Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

23. To calibrate the Line Leakage MDX

Please connect a standard current meter and DC power supply in series with the DUT Power Input terminals. Place the power supply's positive output (+) to the instrument's Neutral terminal. Place the power supply's negative output (-) to the instrument's Ground terminal. Set the power supply to 2.2VDC.

Press the Up (∧) or Down (∨) arrow keys until the display shows:

23. LLT MDX N/G Input 2.200VDC

Then press the TEST button on the front panel and the display will show:

Current = XXXXuA

Then press SET key to advance to the next calibration point or press the RESET button to return to the calibration menu without changing the calibration setting. Press the EXIT key to exit from the calibration mode and to return to the test mode.

24. Exit Calibration Mode

When all calibration parameters are completed successfully the display will show:

Calibration complete

Please press the EXIT key to exit from the calibration mode and to return to the test mode.

Replacement Parts List
Model 6330

Rev: G 10/10/2014 ECO 5598-4, ECO5732

Part Number	Qty.	Ref. Designator	Description
Supplied Accessories			
99-10460-01	1	OPTIONAL	3U Rack Mount Hardware
99-10106-01	1	-	Fuse 6.3A 250V Slow-Blow 20mm
102-055-913	1	-	High Voltage Cable
125-013-001	1	-	Cable Input Cord set USA
99-10040-01	1	-	Interlock Connector
99-10467-01	1	-	Adapter Box
99-10457-01	1	LLT CASE LEAD	Cable Assembly High Current Lead
99-10468-01	1	LLT GROUND LEAD	Cable Assembly Ground Lead
99-10009-01	1	GND BND OUTPUT	Cable Assembly High Current Output
99-10008-01	1	RETURN LEAD	Cable Assembly High Current Return
99-10469-01	1	LLT INPUT LINE	LLT DUT Input cable LINE
99-10470-01	1	LLT INPUT NEUTRAL	LLT DUT Input cable NEUTRAL
99-10471-01	1	LLT OUTPUT LINE	LLT DUT HV Output Cable Line
99-10472-01	1	LLT OUTPUT NEUTRAL	LLT DUT HV Output Cable Neutral
99-10573-01	1	-	RS232 Cable
Panel Components			
99-10018-01	2	-	High Voltage Connector
99-10312-01	1	-	Power Switch 2P 15A/250V
99-10016-01	1	-	Earth Connector
330-113-001	1	TEST	Test Switch Green Lighted
330-113-002	1	RESET	Reset Switch Red Lighted
99-10046-01	1	-	HV Indicator LED
175-946-013	1	-	Feet Kit w/o Rubber Inserts
175-974-002	4	-	Rubber Insert for Feet
99-10618-01	1	-	20 x 2 LCD Display
99-10673-01	2	-	Binding Post 30 Amp Red
99-10674-01	2	-	Binding Post 30 Amp Black (Return)
99-10671-01	1	TEST/PASS	Replacement Bulb
99-10672-01	1	RESET/FAIL	Replacement Bulb
PCB Assemblies			
99-10222-01	1	CKB-06	Keypad Board
99-10321-01	1	AMP4320	Amplifier Board
99-10322-01	1	HV4320	High Voltage Control Board
99-10530-01	1	RY4320	HV AC/DC Switch Board
99-10325-01	1	PWR7500	Input Voltage Select Board

99-10475-01	1	CON7500	Main Control Board
99-10476-01	1	CON7128	LLT Control Board
99-10477-01	1	MD7500	Measuring Device Board
99-10478-01	1	SW7128	LLT Switching Board
99-10583-01	1	RS232	RS232 Interface Board
Part Number	**Qty.**	**Ref. Designator**	**Description**
Internal Components			
99-10681-01	3	IC2, IC24 CON4320 IC52 CON7128	IC SM89516AC25J PLCC
99-10344-01	1	IC 40	IC ATF16V8B 20Pin PLCC
99-10345-01	1	IC 39 CON4320	IC 29C020 EEPROM
99-10496-01	1	T1	Input Transformer
99-10497-01	1	T2	High Voltage Output Transformer