LCT-601

NFPA 99 Leakage Current Tester

Instruction Manual

COMPLIANCE WEST *USA*

Dear Customer:

Congratulations! Compliance West USA is proud to present you with your LCT-601. This tester is designed to quickly allow testing for Leakage Current in accordance with the requirements of NFPA 99, Sections 8.4.1.3 for Installed Equipment, and NFPA 99, Section 10.2.13.1 for Manufacturer's Tests also a set up for the UL 60601-1 Figure 16. The operating instructions are included in the Manual, so please retain this information for future use.

Thank you for your trust and confidence.

Rev. 1.3 Sep 29, 2010

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Section 1

Introduction

The LCT-601 is designed to facilitate connections as noted in NFPA 99 so tests by manufacturers and users can be made in a fast and repeatable, safe way. Operation Instructions are broken up so manufacturers and end users can go directly to their battery of tests.

This Section contains a Checkout Procedure which can be used to check proper switch operation.

Section 2 describes use of the LCT-601 by Manufacturers, to verify compliance with the requirements of NFPA 99, Section 10-2.13.

Section 3 describes use of the LCT-601 for those requirements for Installed Equipment, both cord connected and permanently connected, in accordance with NFPA 99, Section 8.4.1.3.

Section 5 contains annual calibration instructions which can also be used for impromptu checks of proper operation of the LCT-601.

Checkout Procedure

In order to verify proper operation of the switches on the LCT-601, this procedure may be used on a periodic basis. In order to facilitate recordkeeping, the procedure is presented on the next page for easier copying if desired.

Checkout/Calibration Procedure Rev. 1.3
Compliance West USA LCT-601

Date: _____ Serial Number: _____

Checkout Procedure: can be done periodically to verify correct switch operation
Note: The wide parallel slot is the neutral. Switches are numbered 1-4 from the top down.

1. Switches 1-4 in the left position. Measuring from plug to receptacle on the cords:
   a. Neutral to Neutral: 0-0.5 ohms: _____
   b. Hot to Hot: 0-0.5 ohms: _____
   c. Hot to Neutral: open: □
   d. Neutral to Hot: open: □
   e. Ground to Ground: 0-0.5 ohms: _____
   f. Leakage Banana Jack to Leakage Banana Jack: 10 kohm ± 5%: _____
2. Switches 1, 2 and 3 in the left position. Switch 4 in right (Reverse Polarity) position. Measuring from plug to receptacle on the cords:
   a. Neutral to Neutral: open: □
   b. Hot to Hot: open: □
   c. Hot to Neutral: 0-0.5 ohms: _____
   d. Neutral to Hot: 0-0.5 ohms: _____
   e. Ground to Ground: 0-0.5 ohms: _____
3. Switches 1, 2 and 4 in left position. Switch 3 in right (Neutral Open) position.
   a. Neutral to Neutral: open: □
   b. Hot to Hot: 0-0.5 ohms: _____
   c. Hot to Neutral: open: □
   d. Neutral to Hot: open: □
   e. Ground to Ground: 0-0.5 ohms: _____
4. Switches 1, 3 and 4 in left position: Switch 2 in right (Earth - Chassis open) position.
   a) Neutral to Neutral: 0-0.5 ohms: _____
   b) Hot to Hot: 0-0.5 ohms: _____
   c) Neutral to Hot: open: □
   d) Hot to Neutral: open: □
   e) Ground to Ground: 1kohm ± 10% (shunted with 15nF): _____
   f) Leakage Banana Jack to Leakage Banana Jack: 11 kohm ± 5%: _____

Section 2

LCT-601 for Manufacturers: NFPA 99, Section 10.2.13: Manufacturer's Tests for Safety of Patient-Care-Related Electrical Appliances

This section describes how to set up and use the LCT-601 to aid in the testing to NFPA 99, Section 10.2.13. Exact setup instructions are included for each test. These instructions are generic in nature and must be checked for accuracy in actual use, and may not reflect NFPA interpretations.

Paragraph 10.2.13.2: Grounding Circuit Continuity Test

This test verifies that the grounding lead in grounded equipment is properly connected to the appliance.

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail. It is not necessary to connect the LCT-601 to line power to conduct this test.
2. Set the MEAS. POINT switch (top switch) to the CHASSIS MEAS. POINT (left) position.
3. Set the EARTH switch (second switch from the top) to the EARTH-CHASSIS CONNECTED (left) position.
4. Using a calibrated resistance meter, connect one lead to the GREEN banana jack on the LCT-601. Connect the other lead to exposed dead metal or the chassis of the EUT.
5. Flex the cord at its connection to its attachment plug cap and note the reading on the resistance meter.
6. Flex the cord at its connection to the EUT and note the reading on the meter.
7. If the resistance of both tests is less than 0.15 ohm, the result is a PASS. If the resistance of either test is 0.15 ohm or greater, the result is a FAIL.
8. See Test Setup in Fig. 1 and Table 1.

Figure 1 Grounding Circuit Continuity Test

Table 1 Grounding Circuit Continuity Test

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	N/C
RED LEAKAGE Jack	N/C
GREEN LEAKAGE Jack	To resistance meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	CHASSIS
EARTH Switch	CONNECTED
NEUTRAL Switch	EITHER POSITION
POLARITY Switch	EITHER POSITION
EUT Power Switch	EITHER POSITION
EUT Chassis or Metal	To resistance meter
PASS Result:	<0.15 ohm

Paragraph 10.2.13.4: Leakage Current from Appliance to Ground

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the FLOATING MEAS POINT (right) position.
4. Set the EARTH switch (second switch from the top) to the EARTH-CHASSIS OPEN (right) position.
5. Set the NEUTRAL switch (third switch from the top) to the NEUTRAL CONNECTED position.
6. Regarding the POLARITY switch; the test is to be conducted with the POLARITY switch in both positions.
7. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Set it to read ~300mV for cord-connected products, or ~5V for permanently connected products.
8. Connect a lead between the BLACK FLOATING MEAS POINT banana plug on the LCT-601 and exposed grounded metal on the EUT.
9. If the EUT does not have exposed metal, connect the probe to a 10x20cm metal foil piece placed in contact with the exposed surface of the EUT.
10. Regarding the power switch of the EUT, the test is to be conducted with the EUT power switch in both the ON and OFF positions.
11. Read the current meter for all four conditions above. A passing result is <300uA (<300mV on the meter connected to the LCT-601) for cord-connected products in the patient care vicinity and < 5mA (<5V on the meter connected to the LCT-601) for permanently connected products in the patient care facility.
12. See Figure 2 and Table 2 for a Test Setup synopsis. This section is based on NFPA 99 Fig. 10.2.13.4.1, see below. Please note the EUT in Figure 2 displayed a failing result.

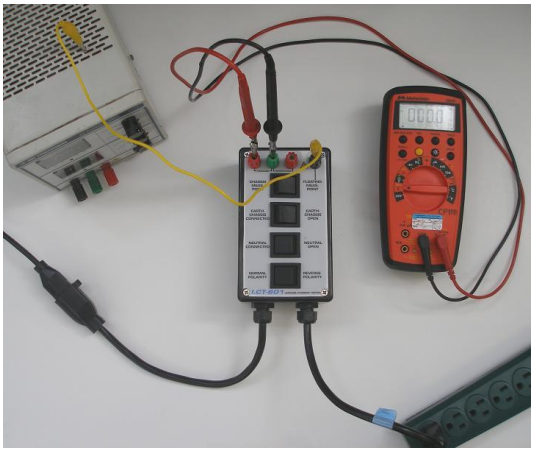

Figure 2 Leakage Current from Appliance to Ground

Table 2 Leakage Current from Appliance to Ground

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE Jack	To voltage meter
BLACK FLOATING MEAS POINT jack	To EUT chassis
GREEN LEAKAGE Jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	FLOATING
EARTH Switch	OPEN
NEUTRAL Switch	CONNECTED
POLARITY Switch	TEST IN BOTH POSITIONS
EUT Power Switch	TEST IN BOTH POSITIONS
PASS Result:	<300uA cord; <5mA permanent

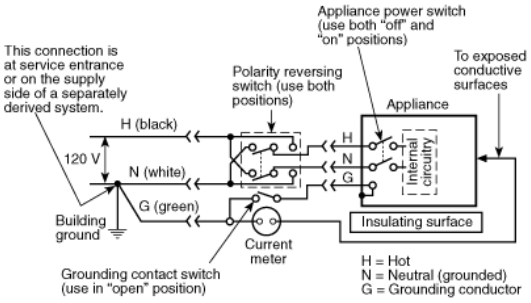

FIGURE 10.2.13.4.1 Test Circuit for Measuring Leakage Current from Exposed Conductive Surfaces.

Paragraph 10.2.13.5.1: Leakage Current from Patient Connected Leads to Ground (Non-isolated)

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the FLOATING MEAS POINT (right) position.
4. Regarding the EARTH switch (second switch from the top); the test is to be conducted with the EARTH switch in both positions.
5. Set the NEUTRAL switch (third switch from the top) to the NEUTRAL CONNECTED position.
6. Regarding the POLARITY switch; the test is to be conducted with the POLARITY switch in both positions.
7. Regarding the power switch of the EUT, the test is to be conducted with the EUT power switch in both the ON and OFF positions.
8. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Set it to read ~100mV.
9. Connect the BLACK FLOATING MEAS POINT banana plug of the LCT-601 to each patient-connected lead in turn and conduct measurements for all eight test conditions. Each patient-connected lead is to be energized by properly switching the EUT.
10. Connect all patient-connected leads together, connect them to the BLACK FLOATING MEAS POINT banana plug of the LCT-601 and conduct measurements for all eight test conditions. For this test, switch the EUT to the output condition that results in the highest leakage output.
11. Read the current meter for the eight conditions noted above and for each patient-connected output, and for all patient-connected outputs together. A passing result is <100uA (<100mV on the meter connected to the LCT-601) for any condition.
12. See Figure 3 and Table 3 for a Test Setup synopsis. This section is based on NFPA 99 Fig. 10.2.13.5.1.4, see below.

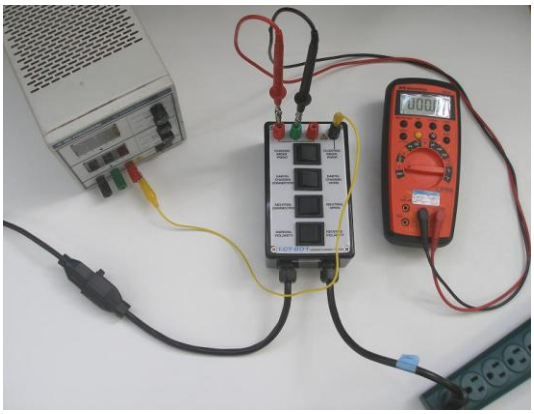

Figure 3 Non-isolated Patient Leads

Table 3 Non-isolated Patient Leads

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE Jack	To voltage meter
BLACK FLOATING MEAS POINT jack	To EUT nonisolated patient connections
GREEN LEAKAGE Jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	FLOATING
EARTH Switch	TEST IN BOTH POSITIONS
NEUTRAL Switch	CONNECTED
POLARITY Switch	TEST IN BOTH POSITIONS
EUT Power Switch	TEST IN BOTH POSITIONS
PASS Result:	<100uA

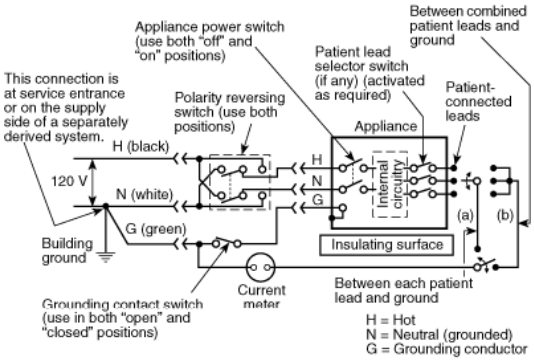

FIGURE 10.2.13.5.1.4 Test Circuit for Measuring Leakage Current Between Patient Leads and Ground (Nonisolated).

Paragraph 10.2.13.5.2: Leakage Current from Patient Connected Leads to Ground (Isolated)

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the FLOATING MEAS POINT (Right) position.
4. Regarding the EARTH switch (second switch from the top); the test is to be conducted with the EARTH switch in both positions.
5. Set the NEUTRAL switch (third switch from the top) to the NEUTRAL CONNECTED position.
6. Regarding the POLARITY switch; the test is to be conducted with the POLARITY switch in both positions.
7. Regarding the power switch of the EUT, the test is to be conducted with the EUT power switch in both the ON and OFF positions.
8. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Set it to read ~50mV.
9. Connect the BLACK FLOATING MEAS POINT banana plug of the LCT-601 to each patient-connected lead in turn and conduct measurements for all eight test conditions. Each patient-connected lead is to be energized by properly switching the EUT.
10. Connect all patient-connected leads together, connect them to the RED LEAKAGE banana plug of the LCT-601 and conduct measurements for all eight test conditions. For this test, switch the EUT to the output condition that results in the highest leakage output.
11. Read the current meter for the eight conditions noted above and for each patient-connected output, and for all patient-connected outputs together. A passing result is <10uA (<10mV on the meter connected to the LCT-601) with the GROUND switch in the CONNECTED position, and <50uA (<50mV on the meter connected to the LCT-601) with the GROUND switch in the OPEN position, for any condition.
12. See Figure 4 and Table 4 for a Test Setup synopsis. This section is based on NFPA 99 Fig. 10.2.13.5.2.3, see below.

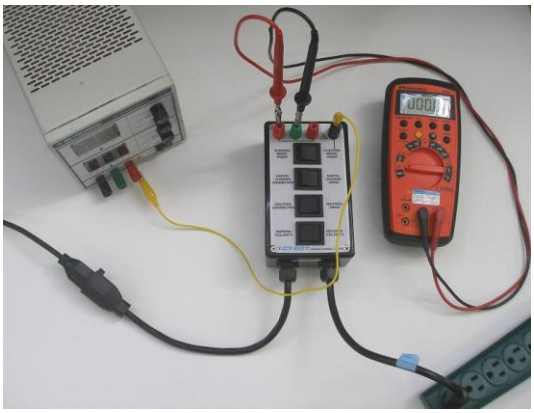

Figure 4 Isolated Patient Leads

Table 4 Isolated Patient Leads

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE Jack	To voltage meter
BLACK FLOATING MEAS POINT jack	To EUT isolated patient connections
GREEN LEAKAGE Jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	FLOATING
EARTH Switch	TEST IN BOTH POSITIONS
NEUTRAL Switch	CONNECTED
POLARITY Switch	TEST IN BOTH POSITIONS
EUT Power Switch	TEST IN BOTH POSITIONS
PASS Result:	<10uA ground connected <50uA ground open

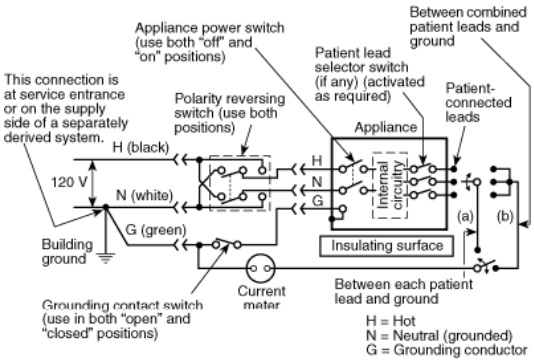

FIGURE 10.2.13.5.2.3 Test Circuit for Measuring Leakage Current Between Patient Leads and Ground (Isolated

Section 3

LCT-601 for End Users: NFPA 99, Section 8.4.1.3:

This section describes how to set up and use the LCT-601 to aid in the testing to NFPA 99, Section 8.4.1.3: Testing Requirements-Fixed and Portable. Exact setup instructions are included for each test. These instructions are generic in nature and must be checked for accuracy in actual use, and may not reflect NFPA interpretations.

Paragraph 8.4.1.3.2: Grounding Circuit Continuity Test

This test verifies that the grounding lead in grounded equipment is properly connected to the appliance.

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail. It is not necessary to connect the LCT-601 to line power to conduct this test.
2. Set the MEAS. POINT switch (top switch) to the CHASSIS MEAS. POINT (left) position.
3. Set the EARTH switch (second switch from the top) to the EARTH-CHASSIS CONNECTED (left) position.
4. Using a calibrated resistance meter, connect one lead to the GREEN banana jack on the LCT-601. Connect the other lead to exposed dead metal or the chassis of the EUT.
5. Flex the cord at its connection to its attachment plug cap and note the reading on the resistance meter.
6. Flex the cord at its connection to the EUT and note the reading on the meter.
7. If the resistance of both tests is less than 0.5 ohm, the result is a PASS. If the resistance of either test is 0.5 ohm or greater, the result is a FAIL.
8. See Test Setup in Fig. 5 and Table 5.

Figure 5 Resistance

Table 5 Resistance

Jack/Switch	**Position**
FEMALE Cordset	To EUT
MALE Cordset	N/C
RED LEAKAGE Jack	N/C
GREEN LEAKAGE Jack	To resistance meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	CHASSIS
EARTH Switch	CONNECTED
NEUTRAL Switch	EITHER POSITION
POLARITY Switch	EITHER POSITION
EUT Power Switch	EITHER POSITION
EUT Chassis or Metal	To resistance meter
PASS Result:	<0.5 ohm

Paragraph 8.4.1.3.4: Leakage Current - Fixed Equipment

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the FLOATING MEAS POINT (right) position.
4. Set the EARTH switch (second switch from the top) to the EARTH-CHASSIS OPEN (right) position.
5. Set the NEUTRAL switch (third switch from the top) to the NEUTRAL CONNECTED position.
6. Set the polarity switch (bottom switch) to the NORMAL position.
7. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Set it to read ~5V for permanently connected products.
8. Connect a lead between the BLACK FLOATING MEAS POINT banana plug on the LCT-601 and exposed grounded metal on the EUT.
9. Regarding the power switch of the EUT, the test is to be conducted with the EUT power switch in both the ON and OFF positions.
10. Read the current meter for both conditions above. A passing result is < 5mA (<5V on the meter connected to the LCT-601) for permanently connected products in the patient care facility.
11. See Figure 6 and Table 6 for a Test Setup synopsis. This section is based on NFPA 99 Fig. 8.4.1.3.5.5, see below.

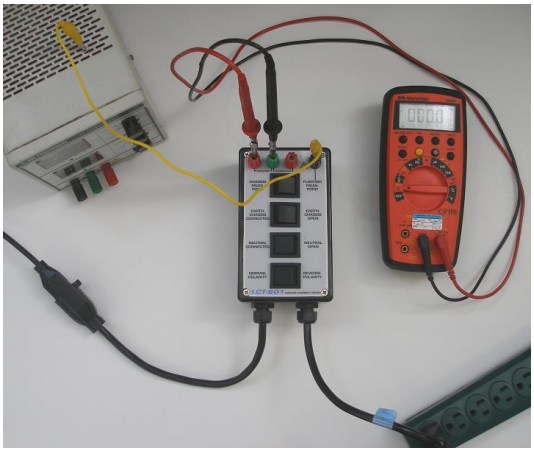

Figure 6 Chassis Leakage Current - Fixed Equipment

Table 6 Chassis Leakage Current - Fixed Equipment

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE Jack	To voltage meter
BLACK FLOATING MEAS POINT jack	To EUT chassis
GREEN LEAKAGE Jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	FLOATING
EARTH Switch	OPEN
NEUTRAL Switch	CONNECTED
POLARITY Switch	NORMAL
EUT Power Switch	TEST IN BOTH POSITIONS
PASS Result:	<5mA

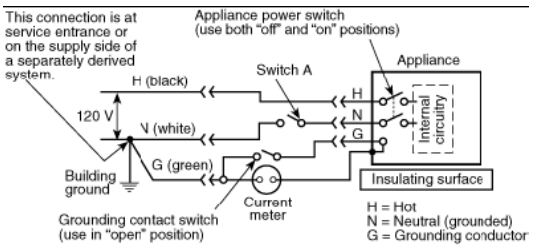

FIGURE 8.4.1.3.5.5 Test Circuit for Measuring Chassis Leakage Current.

Paragraph 8.4.1.3.5: Leakage Current - Portable Equipment

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the FLOATING MEAS POINT (right) position.
4. Set the EARTH switch (second switch from the top) to the EARTH-CHASSIS OPEN (right) position.
5. Set the NEUTRAL switch (third switch from the top) to the NEUTRAL CONNECTED position.
6. Set the polarity switch (bottom switch) to the NORMAL position.
7. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Set it to read ~300mV for portable products.
8. Connect a lead between the BLACK FLOATING MEAS POINT banana plug on the LCT-601 and exposed grounded metal on the EUT.
9. Regarding the power switch of the EUT, the test is to be conducted with the EUT power switch in both the ON and OFF positions.
10. Read the current meter for both conditions above. A passing result is < 300uA (<300mV on the meter connected to the LCT-601) for cord connected products. Higher leakage currents are allowed under special conditions; see NFPA 99 Para. 8.4.1.3.5.2 for further details.
11. See Figure 7 and Table 7 for a Test Setup synopsis. This section is based on NFPA 99 Fig. 8.4.1.3.5.5, see below.

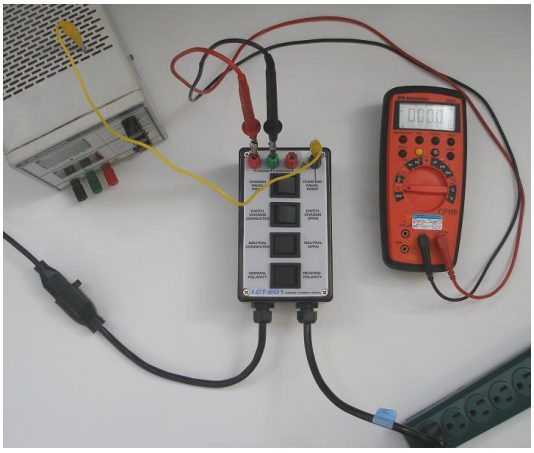

Figure 7 Chassis Leakage Current - Fixed Equipment

Table 7 Chassis Leakage Current - Fixed Equipment

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE jack	To voltage meter
BLACK FLOATING MEAS POINT jack	To EUT chassis
GREEN LEAKAGE jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	CHASSIS
EARTH Switch	OPEN
NEUTRAL Switch	CONNECTED
POLARITY Switch	NORMAL
EUT Power Switch	TEST IN BOTH POSITIONS
PASS Result:	<300uA or see Para. 8.4.1.3.5.2

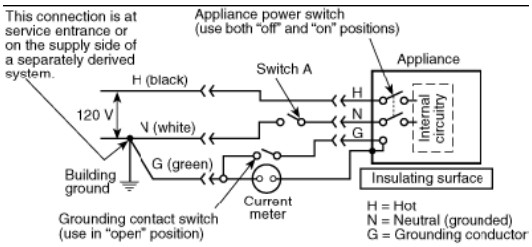

FIGURE 8.4.1.3.5.5 Test Circuit for Measuring Chassis Leakage Current.

Paragraph 8.4.1.3.6.1: Portable Equipment Lead to Ground – Nonisolated Input Test

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the FLOATING MEAS POINT (right) position.
4. Regarding the EARTH switch (second switch from the top); the test is to be conducted with the EARTH switch in both positions.
5. Set the NEUTRAL switch (third switch from the top) to the NEUTRAL CONNECTED position.
6. Set the POLARITY switch to the NORMAL position.
7. Set the power switch of the EUT to the ON position.
8. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Set it to read ~100mV.
9. Connect all patient-connected leads together, connect them to the BLACK FLOATING MEAS POINT banana plug of the LCT-601 and conduct measurements for both test conditions. For this test, switch the EUT to the output condition that results in the highest leakage output.
10. Read the current meter for both conditions noted above. A passing result is <100uA (<100mV on the meter connected to the LCT-601) for any condition.
11. See Figure 8 and Table 8 for a Test Setup synopsis. This section is based on NFPA 99 Fig. 8.4.1.3.6.1, see below.

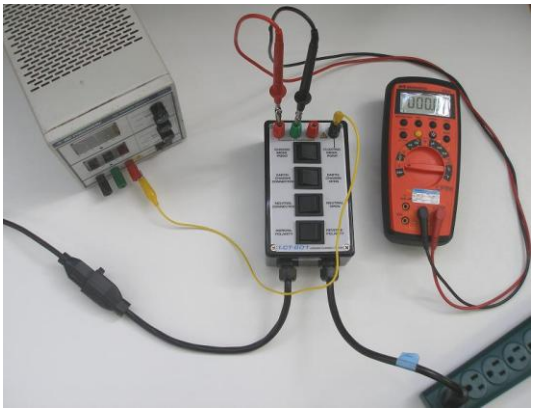

Figure 8 Nonisolated Lead Leakage Test

Table 8 Nonisolated Lead Leakage Test

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE Jack	To voltage meter
BLACK FLOATING MEAS POINT jack	To all nonisolated patient connections on the EUT connected together
GREEN LEAKAGE Jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	CHASSIS
EARTH Switch	TEST IN BOTH POSITIONS
NEUTRAL Switch	CONNECTED
POLARITY Switch	NORMAL
EUT Power Switch	ON
PASS Result:	<100uA

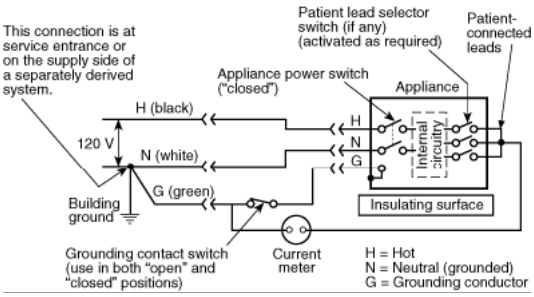

FIGURE 8.4.1.3.6.1 Test Circuit for Measuring Leakage Current Between Patient Leads and Ground — Nonisolated.

Paragraph 8.4.1.3.6.2: Portable Equipment Lead to Ground – Isolated Input Test

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the FLOATING MEAS POINT (right) position.
4. Regarding the EARTH switch (second switch from the top); the test is to be conducted with the EARTH switch in both positions.
5. Set the NEUTRAL switch (third switch from the top) to the NEUTRAL CONNECTED position.
6. Set the POLARITY switch to the NORMAL position.
7. Set the power switch of the EUT to the ON position.
8. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Set it to read ~10mV.
9. Connect the BLACK FLOATING MEAS POINT banana plug of the LCT-601 to each patient-connected lead in turn and conduct measurements for both test conditions. Each patient-connected lead is to be energized by properly switching the EUT.
10. Read the current meter for the eight conditions noted above and for each patient-connected output. A passing result is <10uA (<10mV on the meter connected to the LCT-601) with the GROUND switch in the CONNECTED position, and <50uA (<50mV on the meter connected to the LCT-601) with the GROUND switch in the OPEN position, for any condition.
11. See Figure 9 and Table 9 for a Test Setup synopsis. This section is based on NFPA 99 Fig. 10.2.13.5.2.3, see below.

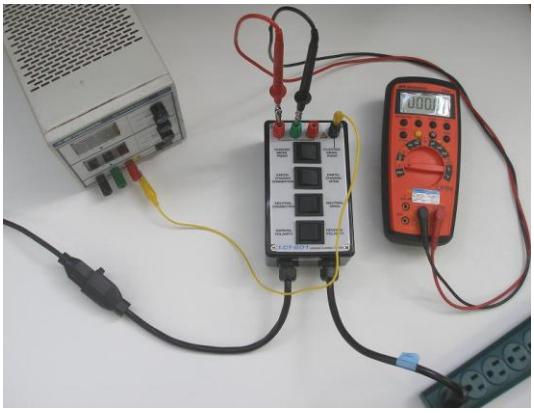

Figure 9 Leakage Test - Isolated

Table 9 Leakage Test - Isolated

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE Jack	To voltage meter
BLACK FLOATING MEAS POINT jack	To EUT isolated patient connections each in turn
GREEN LEAKAGE Jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	FLOATING
EARTH Switch	TEST IN BOTH POSITIONS
NEUTRAL Switch	CONNECTED
POLARITY Switch	NORMAL
EUT Power Switch	ON
PASS Result:	<10uA ground connected <50uA ground open

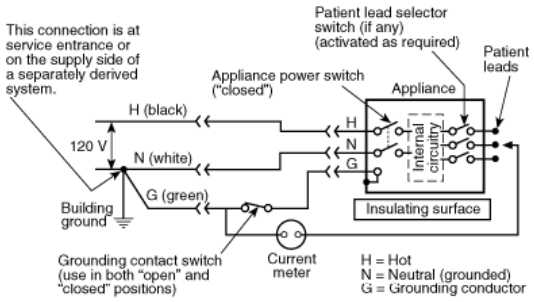

FIGURE 8.4.1.3.6.2 Test Circuit for Measuring Leakage Current Between Patient Leads and Ground — Isolated.

Paragraph 8.4.2.2.1.1: Leakage Current for Facility Owned Appliances - Portable Equipment

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the FLOATING MEAS POINT (Right) position.
4. Set the EARTH switch (second switch from the top) to the EARTH-CHASSIS OPEN (right) position.
5. Set the NEUTRAL switch (third switch from the top) to the NEUTRAL CONNECTED position for three-wire (grounded) appliances and double-insulated appliances; and the NEUTRAL OPEN position for two wire appliances that are not double-insulated.
6. Set the polarity switch (bottom switch) to the NORMAL position.
7. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Set it to read ~500mV for portable products.
8. Connect a lead between the RED LEAKAGE banana plug on the LCT-601 and exposed grounded metal on the EUT.
9. Regarding the power switch of the EUT, the test is to be conducted with the EUT power switch in both the ON and OFF positions.
10. Read the current meter for both conditions above. A passing result is < 500uA (<500mV on the meter connected to the LCT-601).
11. See Figure 10 and Table 10 for a Test Setup synopsis. This section is based on NFPA 99 Fig. 8.4.1.3.5.5, see below.

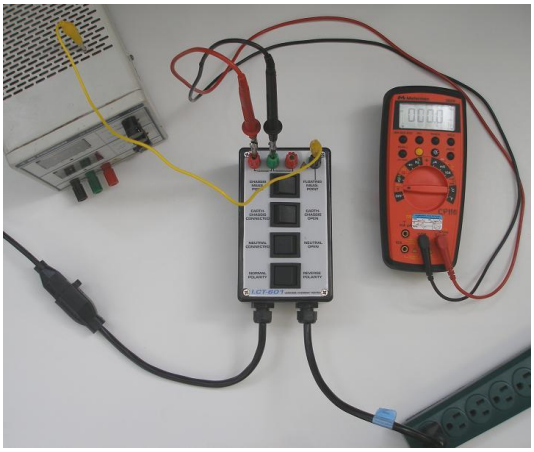

Figure 10 Leakage Test for Facility Owned Portable Equipment

Table 10 Leakage Test for Facility Owned Portable Equipment

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE Jack	To voltage meter
BLACK FLOATING MEAS POINT Jack	To EUT chassis
GREEN LEAKAGE Jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	FLOATING
EARTH Switch	OPEN
NEUTRAL Switch	CONNECTED; OPEN for two-wire non-double-insulated only.
POLARITY Switch	NORMAL
EUT Power Switch	TEST IN BOTH POSITIONS
PASS Result:	<500uA or see Para. 8.4.1.3.5.2

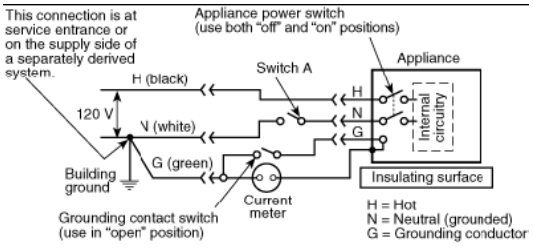

FIGURE 8.4.1.3.5.5 Test Circuit for Measuring Chassis Leakage Current.

Section 5

LCT-601 for UL 60601-1, Figure 16:

1. Connect the LCT-601 to the EUT using the female attachment plug cap pigtail.
2. Connect the LCT-601 to mains power using the male attachment plug cap pigtail.
3. Set the MEAS POINT Switch to the CHASSIS MEAS POINT (left) position.
4. Set the EARTH switch (second switch from the top) to the EARTH-CHASSIS OPEN (right) position.
5. Set the NEUTRAL switch (third switch from the top) test in both positions.
6. Set the polarity switch (bottom switch) test in both position.
7. Connect a calibrated voltage meter across the RED and GREEN LEAKAGE banana plugs on the LCT-601. Voltage display equals (1000 x Leakage current) in Volts ac.
8. Test with the Equipment Functional Earth grounded and ungrounded and the applied parts open and grounded
9. Regarding the power switch of the EUT, the test is to be conducted with the EUT power switch in both the ON and OFF positions.
10. Read the current meter for all possible combinations mentioned above.
11. See Figure 11 and Table 11 for a Test Setup synopsis.

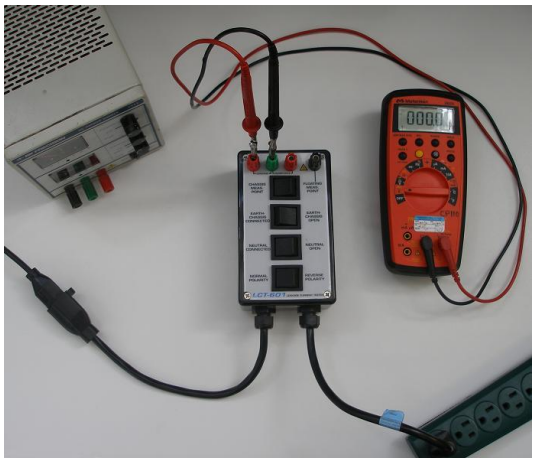

Figure 11 Earth Leakage current

Table 11 Earth Leakage current

Jack/Switch	Position
FEMALE Cordset	To EUT
MALE Cordset	To Mains Power
RED LEAKAGE Jack	To voltage meter
GREEN LEAKAGE Jack	To voltage meter
RED RESISTANCE jack	N/C
MEAS. POINT Switch	CHASSIS
EARTH Switch	OPEN
NEUTRAL Switch	TEST IN BOTH POSITIONS
POLARITY Switch	TEST IN BOTH POSITIONS
EUT Power Switch	TEST ON and OFF

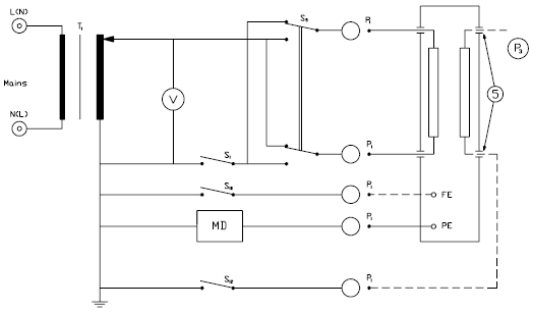

Figure 16 Measuring circuit for the Earth Leakage current of class I equipment.

Section 6

Technical Assistance

For Technical Assistance
Phone: (800) 748-6224

Technical Assistance is available from Compliance West USA between the hours of 8:30 AM and 4:00 PM Pacific Time.

Compliance West USA
2120 Jimmy Durante Blvd., Suite 118
Del Mar, CA 92014

Phone: (858) 481-6454
FAX: (858) 481-8527

info@compwest.com

Section 7

Calibration Instructions

Annual Maintenance Check of internal component values

1. Remove the LCT-601 from the case with four screws.
2. Locate the group of jumpers and remove all jumpers.
3. Using a capacitance meter, measure the capacitance from 1 - 1 and verify 15 nF ± 5%. Replace if outside this tolerance.:_____
4. Using an ohmmeter, measure the resistance from 2 - 2 and adjust the potentiometer to achieve a value of 10kohm ± 1%: _____
5. Using an ohmmeter, measure the resistance from 3 - 3 and adjust the potentiometer to achieve a value of 1kohm ± 1%: _____
6. Replace jumpers and put the LCT-601 back in its case: □