



IKONIX USA

LVB-2 INSTRUCTION SHEET

Leakage Current Verification Box

DECLARATION OF CONFORMITY

Manufacturer: Associated Research, Inc.

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

Product Name: LLT Verification Box

Model Number: LVB-2

Conforms to the following Standards:

Safety: EN 61010-1:2010

EMC: EN 61326-1:2013

Supplementary Information

The product herewith complies with the requirements of the Low Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU.

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



Joseph Guerriero
President
Associated Research, Inc.
Lake Forest, Illinois USA
March 13, 2020

LVB-2 Technical Specifications

| INPUT | | CONNECTOR TERMINAL | |
|--|---|----------------------------|-------------------------|
| VOLTAGE | 277V MAC through LLT Tester | L, N, GND | AC Socket |
| PROBE | L, N, GND, PH, PL | PH, PL | Alden Connector |
| PROBE CONFIGURATION | | PROBE CONFIGURATION SWITCH | |
| GND - LINE | | ON/OFF by 10A power switch | |
| PROBE HI - LINE | | ON/OFF by 10A power switch | |
| PROBE HI - PROBE LO | | ON/OFF by 10A power switch | |
| Note: Only one switch can be CLOSED at a time | | | |
| RESISTOR RANGE SPECIFICATION | | | RESISTOR RANGE SWITCH |
| 7.5KΩ | 300VAC / 20W / 2% +/- 100PPM | | Select by Rotary Switch |
| 15KΩ | 300VAC / 10W / 2% +/- 100PPM | | |
| 30KΩ | 300VAC / 5W / 2% +/- 100PPM | | |
| 150KΩ | 300VAC / 2W / 2% +/- 100PPM | | |
| 350KΩ | 300VAC / 0.5W / 2% +/- 100PPM | | |
| 1.47MΩ | 300VAC / 0.25W / 2% +/- 100PPM | | |
| 2.97MΩ | 300VAC / 0.25W / 2% +/- 100PPM | | |
| 6.37MΩ | 300VAC / 0.25W / 2% +/- 100PPM | | |
| GENERAL | | | |
| TEST POINTS | TEST CONDITION | SPECIFICATION | |
| PASS 15k Ω | 1. LLT: 132VAC, 10,000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% | |
| FAIL 7.5k Ω | 1. LLT: 132VAC, 10,000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% | |
| PASS 30k Ω | 1. LLT: 132VAC, 6000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% | |
| FAIL 15k Ω | 1. LLT: 132VAC, 6000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% | |
| PASS 150k Ω | 1. LLT: 132VAC, 2000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% | |

GENERAL CONTINUED

| TEST POINTS | TEST CONDITION | SPECIFICATION |
|-------------|---|---------------|
| FAIL 30kΩ | 1. LLT: 132VAC, 2000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| PASS 350kΩ | 1. LLT: 132VAC, 500uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 150kΩ | 1. LLT: 132VAC, 500uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| PASS 1.47MΩ | 1. LLT: 132VAC, 100uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 350kΩ | 1. LLT: 132VAC, 100uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| PASS 2.97MΩ | 1. LLT: 132VAC, 30uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 1.47MΩ | 1. LLT: 132VAC, 30uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| PASS 30kΩ | 1. LLT: 264VAC, 10,000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 15kΩ | 1. LLT: 264VAC, 10,000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| PASS 150kΩ | 1. LLT: 264VAC, 6000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 30kΩ | 1. LLT: 264VAC, 6000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| PASS 350kΩ | 1. LLT: 264VAC, 2000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 150kΩ | 1. LLT: 264VAC, 2000uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| PASS 1.47MΩ | 1. LLT: 264VAC, 500uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 350kΩ | 1. LLT: 264VAC, 500uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |

GENERAL CONTINUED

| TEST POINTS | TEST CONDITION | SPECIFICATION |
|-------------------------------|--|---------------|
| PASS 2.97M Ω | 1. LLT: 264VAC, 100uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 1.47M Ω | 1. LLT: 264VAC, 100uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| PASS 6.37M Ω | 1. LLT: 264VAC, 30uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| FAIL 2.97M Ω | 1. LLT: 264VAC, 30uA High Limit 2. Maximum Voltage 277VAC 3. Ground = Open, Neutral = Closed, Reverse = Off | 2% |
| SAFETY | CE | |
| ENVIRONMENT | 0° - 40° C | |
| DIMENSIONS (W X H X D) | 186mm x 75 x 146 | |
| WEIGHT | 1.3 lbs. | |
| STANDARD ACCESSORIES | | |
| POWER CORD (10A) | x1 | |

MAINTENANCE:

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 damage plastic parts or lettering.

ENTRETIEN:

Pour éviter les chocs électriques ne pas enlever le couvercle de l'instrument. Il n'y a aucune pièce réparable par l'utilisateur. L'entretien de routine ou le nettoyage des pièces internes ne sont pas nécessaires. Tout nettoyage externe doit être fait avec un chiffon sec ou légèrement humide. Éviter l'utilisation de produits de nettoyage ou des produits chimiques pour éviter d'effacer les lettres ou d'abîmer les pièces en plastique.

OPERATING ENVIRONMENT:

This instrument may be operated in environments with the following limits:

- Indoor Use Only
- Altitude: 2000 m
- Temperature: 0°C to 40°C
- Humidity: Maximum 80% RH at 31°C decreasing to 50% RH at 40°C
- Pollution Degree: 2

Symbols Explanation:

Please refer to the instruction manual for specific warning or caution information to avoid personal injury or damage to the product.

S'il vous plaît se référer au manuel d'instructions de mise en garde ou information sur la prudence pour éviter des blessures ou des dommages au produit



To indicate hazardous voltages may be present.

Avertissement des tensions dangereuses qui peuvent être présentes



Note: pay close attention to the maximum voltage and duty cycle limitations of each resistor. Applying voltages that are higher than the recommended maximum setting or duty cycles greater than indicated can cause damage to the LVB-2.

Note: attention à la tension maximale et les limites du cycle de travail de chaque résistance. L'application de tensions plus élevées que le réglage maximum recommandé ou cycles de travail supérieures à celles indiquées peut causer des dommages à la LVB-2

**WARNING**

The LVB-2 works with test 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.

Les tensions et les courants qui peuvent causer des chocs électriques dangereux ou fatal. Pour éviter les blessures accidentelles ou la mort, ces procédures de sécurité doivent être strictement observées lors de la manipulation et l'utilisation de l'instrument de test



Not rated for measurements within MEASUREMENT CATEGORIES II, III, or IV

N'est pas classé pour les catégories de surtension II, III ou IV



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

NE TOUCHEZ PAS LORS DE L'ESSAI OU APRÈS UN DYSFONCTIONNEMENT DU PRODUIT.

CAUTION: Never connect LVB-2 to any mains circuit directly

ATTENTION: Ne jamais connecter directement le LVB-2 à un circuit d'alimentation.

General Information

The LVB-2 is a load box used for the following applications:

- Verifying that the failure detectors for a leakage current test sequence of your Ikonix USA electrical safety testing instrument are functioning properly.
- Verifying failure limit thresholds for a leakage current test.
- Verifying the three probe configurations of the instrument (G-L, PH-L and PH-PL) are functioning properly.



The LVB-2 consists of loads based on the 132V/264V test voltages and failure limits listed in the IEC60601-1 test standard for different types of leakage tests.

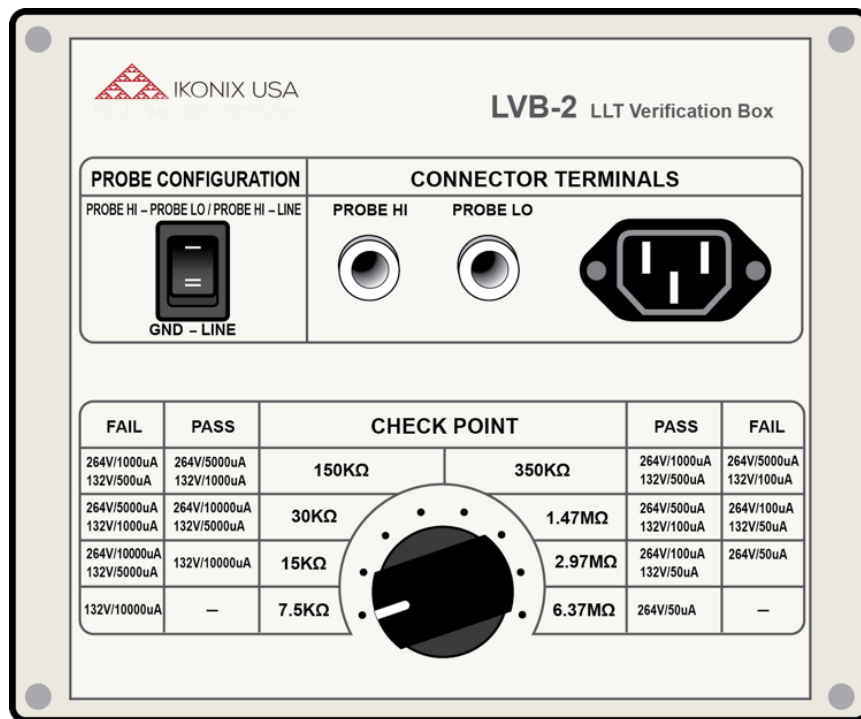
Note: The LVB-2 is not intended to comply with any specific safety agency standard.

Note: The trip setting may vary up to 10% of the set value based on the combined tolerances of the instrument and the components used in the LVB-2.

Using the LVB-2

The LVB-2 can be used with the following Ikonix USA instrument models:

| | Model | Capability |
|---|-------------------|--|
|  | OMNIA 2 8206 | GB/GC, ACW, DCW, IR, RUN, LLT |
| | OMNIA 2 8207 | GB/GC, ACW, DCW, IR, RUN, LLT, Built-in 500VA AC Source |
| | OMNIA 2 8256 | GB/GC, ACW(500VA), DCW, IR, RUN, LLT |
| | OMNIA 2 8257 | GB/GC, ACW(500VA), DCW, IR, RUN, LLT, Built-in 500VA AC Source |
| | LINECHECK II 620L | LLT, RUN |
|  | SCI 6330 | GB, ACW, DCW, IR, RUN, LLT |



The LVB-2 load box consists of resistors designed to induce a **PASS** or **FAIL** condition:

- The **Check Point** knob position determines which resistor is set in the LVB-2
- Each check point has a **PASS** and **FAIL** condition.
- For a list of all **PASS** and **FAIL** condition test settings, refer to the LVB-2 Technical Specifications table.
- There is no **PASS** condition for the 7.5kΩ check point.
- There is no **FAIL** condition for the 6.37MΩ check point

The **Probe Configuration** switch can be set to two different positions depending on the verification type.

Figure 2 shows the two different settings of the switch. This setting should match with the Probe Configuration setting on the Leakage Current test instrument.

An example of the Probe Configuration setting on the instrument is shown in **Figure 3** along with the corresponding leakage test type. On the test instrument the Probe Configuration is programmed depending on the type of leakage test needed to be performed.

Figure 2 – Probe Configuration Switch Positions

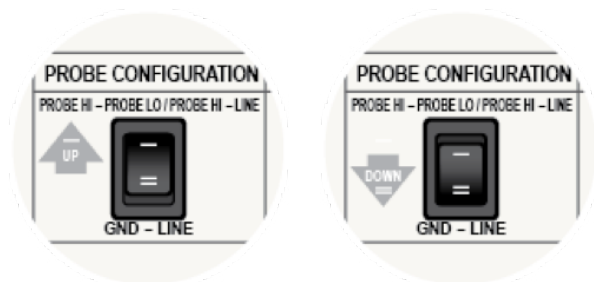
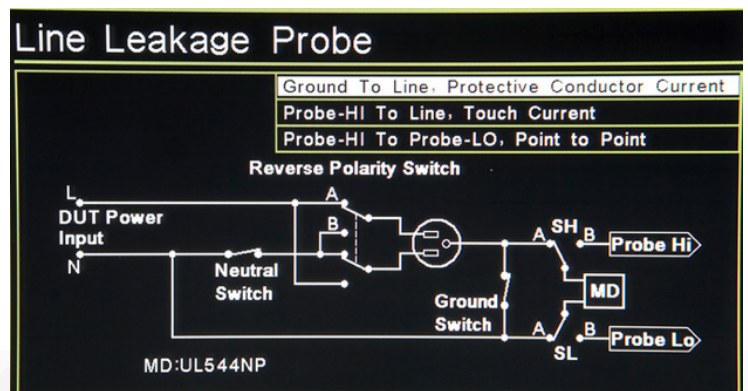
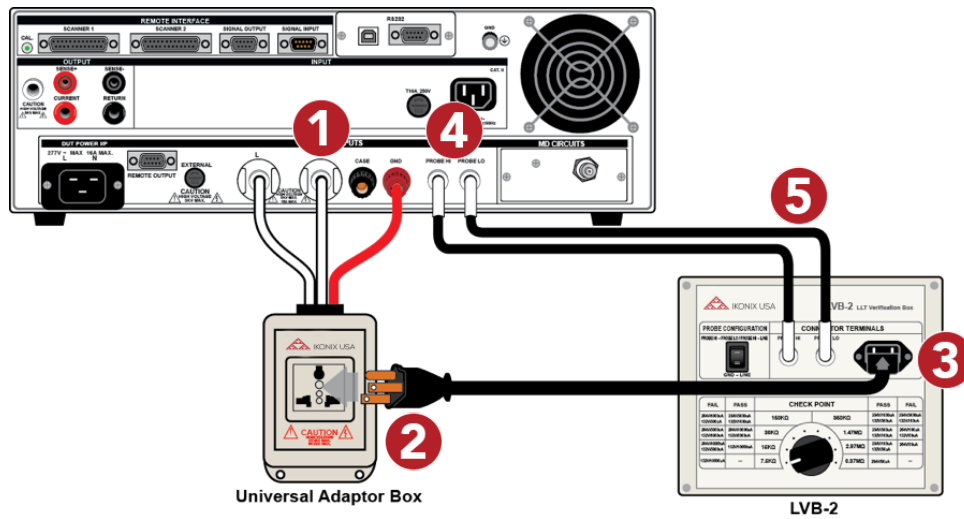


Figure 3 - Instrument Probe Configuration Setup



Instrument Connections

The diagram below shows all the connections needed to be made between the instrument and the LVB-2:



1. DUT Output connections - Line, Neutral and Ground of the DUT outputs connect to the DUT adapter box.
2. DUT Adapter box – DUT adapter box for connection of Line, Neutral and Ground to the LVB-2 connector terminal.
3. L, N and G connections – This is the socket for the standard IEC320 connector. The line cord from the DUT adapter box connects these ports for making the Line, Neutral and Ground connections to the LVB-2 box.
4. Probe connections (Instrument) – Probe Hi and Probe Lo ports on the instrument.
5. Probe connections (LVB-2) – Probe Hi and Probe Lo connections on the LVB-2.

Test Setup

To setup a test, connect the DUT outputs (L, N and G) of the leakage instrument to the line cord connector on the LVB-2. The two probe connections will also need to be made between the instrument and the LVB-2 for the verification of additional leakage test types. Program a test sequence based on the parameters listed on the test box for each load type. Select the appropriate Probe Configuration on the LVB-2 using the Probe Configuration switch.

Refer to the specifications table and use the rotary switch to select the appropriate Check Point by rotating it clockwise or counter-clockwise:

| FAIL | PASS | CHECK POINT | | PASS | FAIL |
|-----------------------------|---------------------------|-------------|--------|---------------------------|--------------------------|
| 264V/1000uA 132V/500uA | 264V/500uA 132V/100uA | 150KΩ | 350KΩ | 264V/1000uA 132V/500uA | 264V/500uA 132V/100uA |
| 264V/500uA 132V/1000uA | 264V/1000uA 132V/500uA | 30KΩ | 1.47MΩ | 264V/500uA 132V/100uA | 264V/100uA 132V/50uA |
| 264V/10000uA 132V/5000uA | 132V/10000uA | 15KΩ | 2.97MΩ | 264V/100uA 132V/50uA | 264V/50uA |
| 132V/10000uA | - | 7.5KΩ | 6.37MΩ | 264V/50uA | - |

Ensure that the settings on your electrical safety tester are less than or equal to the maximum recommended voltage, current and duty cycle settings of the LVB-2. For each Check Point a PASS test and a FAIL test will be needed to be programmed into the leakage test instrument for the pass/fail verification. When all connections have been made and the appropriate test programmed in the instrument, press the TEST button to begin the test. With the correct settings entered into the leakage test instrument, the leakage test instrument should record a failure for the FAIL settings and a pass for the PASS settings.



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