Manual Supplement

Manual Title:	BT521 Users	Supplement Issue:	**3**
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This supplement contains information necessary to ensure the accuracy of the above manual.

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Change #1

On page 1-3, remove item 5 from the **Standard Equipment** table.

On page 1-4, remove item 5 from the **Standard Equipment** figure.

On page 4-6, following Figure 4-3, add:

Note

Probe tips are not covered under Warranty.

On page 4-7, remove *Use the Probe Light* section and figure.

On page 7-7, remove item 4 and add item 22, in the **Parts and Accessories** table.

㉒	BT-500 Probe-Tip, Replacement Probe tips with covers	4561297	10

Change #2, 93

On page 4-3, under *Set Emissivity Value*, replace the first paragraph and add the following table:

Set Emissivity Value

Emissivity describes the energy-emitting characteristics of materials. Most organic materials and painted or oxidized surfaces have an emissivity of approximately 0.95, which is the default setting for the Product. Battery posts or terminals may require a different emissivity setting. See emissivity table on page 4-3 if a different emissivity is needed.

| Material	Emissivity
Aluminum foil	0.03
Aluminum, anodized	0.90
Copper, polished	0.04
Copper, oxidized	0.87
Stainless steel, polished	0.16
Stainless steel, oxidized	0.80
Lead, oxidized	0.63
Lead, oxidized, Gray	0.28
Plastics, opaque any color	0.95

Change #3, 124

On pages 3-7, 3-8, 3-9, 3-10, and 3-11, replace with:

Make Measurements

Test Battery Internal Resistance and Voltage or Strap Resistance

The Product can simultaneously test the internal resistance and voltage of a battery.
This helps you to understand the overall state of the battery health. The Product can also test strap resistance since upward changes could be caused by corrosion or loose connections.

To test battery internal resistance and voltage or strap resistance, turn the rotary switch to mΩ. See Figure 3-1.

Internal Resistance and Voltage
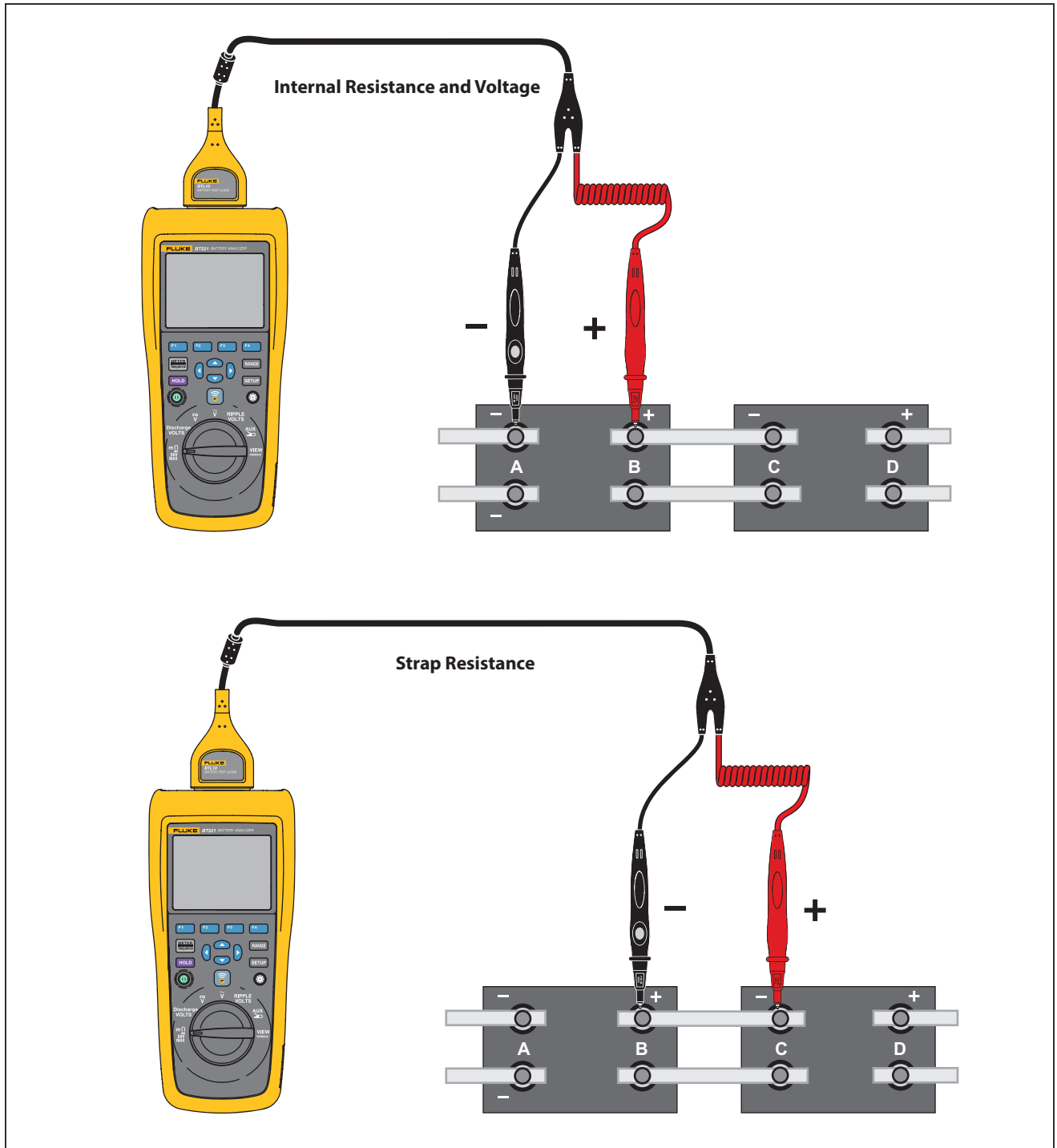
Strap Resistance

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Figure 3-1. Test Battery Internal Resistance and Voltage or Strap Resistance

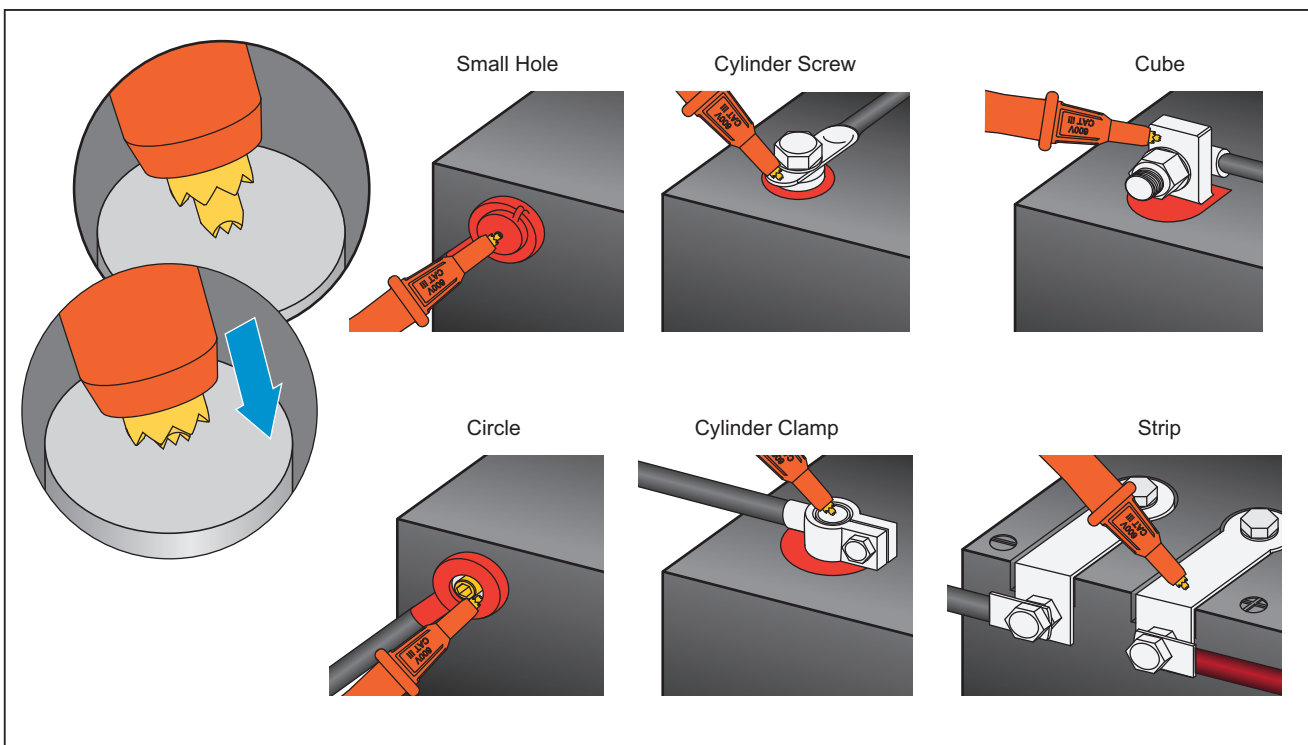*Battery Test Probes*

To connect test probes to the battery pole:

1. Use the inner tip of the test probe to touch the target surface.
2. Push the test lead to set-back the inner tip, until both the inner tip and the outer tip are fully connected to the target surface. This will ensure a proper 4-wire connection to the battery terminal.

Note

Stable and correct readings are shown only when both the inner tip and the outer tip of the test probe are fully connected to the battery posts. To get more accurate battery internal resistance reading, do not connect the test probes to screws. See Figure 3-2.

Examine for open fuse before mΩ measurement by connecting the outer tips of both probes. If the mΩ reading changes from OL to dashes and then backs to OL, the fuse is good. If mΩ reading remains as OL, the fuse is open and needs a replacement.

In this function, the voltage between the positive and negative poles of a battery must be < 60 V. A voltage >60 V causes the fuse to open.
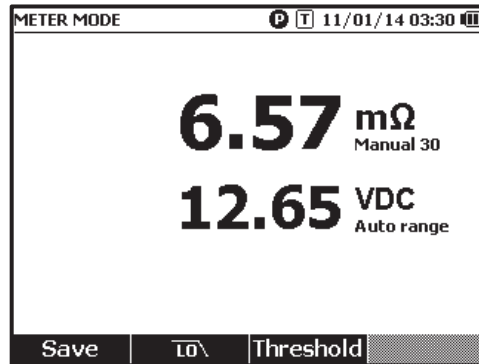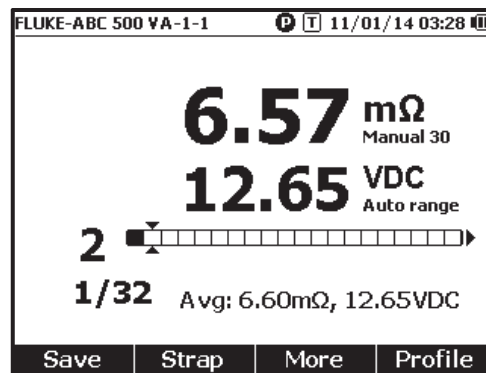

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Figure 3-2 Connect Test Probe to Battery

View Test Readings on the Screen

This is a typical display of battery test in Meter mode.

This is a typical display of battery test in Sequence mode:

Battery number: Indicates the number of the battery that has been tested.

Progress bar: The progress bar is generated according to the total number of batteries in the profile. Each cell corresponds to one battery. An empty cell indicates the corresponding battery is not tested yet. A full cell indicates the corresponding battery has been tested and the readings have been saved. A cross mark in a full cell indicates that the threshold function is enabled.

Cursors: Use ▷ and ◁ to move the cursors. The number of the currently tested battery changes accordingly. When the cursors are positioned on a full cell, the corresponding reading of that battery will be shown under the progress bar.

Average readings: After two or more sets of test readings are saved, the Product shows the average readings, including average resistance and average voltage.

Tip: If the test readings of a battery are significantly different from the average readings, it could indicate the battery health has been compromised.

Measure Strap resistance in sequence mode

A strap string is created right behind battery string automatically in the same profile. The strap number equals to battery number. Push the **Strap** softkey to switch to strap string test. The display shows to indicate strap string. Push **Battery** softkey to switch back to battery string test.
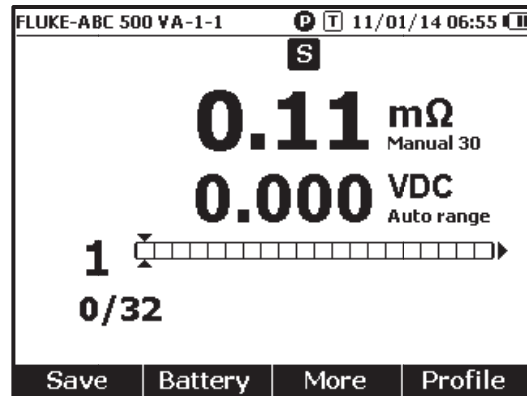
Set Measurement Range

Battery resistance or Strap resistance only has manual ranges. The default range for battery resistance or Strap resistance measurement is 30 mΩ. You can push RANGE to cycle through different ranges in this sequence: 30 mΩ > 300 mΩ > 3000 mΩ > 3 mΩ. The battery voltage measurement is in auto ranging mode, and the range cannot be changed.

Save Battery Test Readings

In Meter mode, push the **Save** softkey to save the current resistance, voltage and time.
All saved data is stored in chronological order. In Sequence mode, push the **Save** softkey to save the current resistance and voltage readings. The current serial number increases by 1. The test progress bar moves to the right by one cell.

Note

If the test lead does not connect to battery or the test lead is not installed, the Save function is invalid.

Erase Test Readings

To erase the test readings for a certain battery in Sequence mode:

1. Use ◀ and ▶ to point the cursors to the cell that corresponds to the correct battery.
2. Push the **Erase** softkey.
     The pointed cell becomes empty. Push the **Save** softkey to save new test readings for this battery.

Activate Low-Pass Filter for Resistance Measurement

Excessive high level of ac ripple voltage can have a negative impact on the battery resistance measurement. Use the built-in low pass filter to stabilize or reduce the impact of ac ripple on resistance measurements.

To activate the low-pass filter for battery resistance measurement, in Meter mode, push **LO** softkey, in Sequence mode, push the **More** softkey and push **LO** softkey. The display shows the **LO** icon.
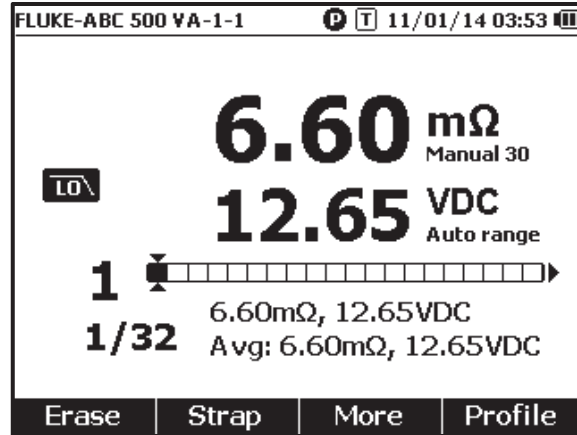
Set Measurement Thresholds

The Product lets you define upper and lower measurement thresholds or tolerance ranges. These defined threshold values are then compared to the measured values to automatically identify and prompt the user with a **PASS**, **FAIL** or **WARN** indicator of battery out of tolerance conditions.

The threshold function is disabled by default. You can set up to 10 set of thresholds and select one threshold as needed.

To set and select measurement thresholds:

1. On the measurement screen, push the **More** softkey and **Threshold** softkey to open the Select Threshold menu.
2. Use ◀ and ▶ to select one threshold set out of ten.
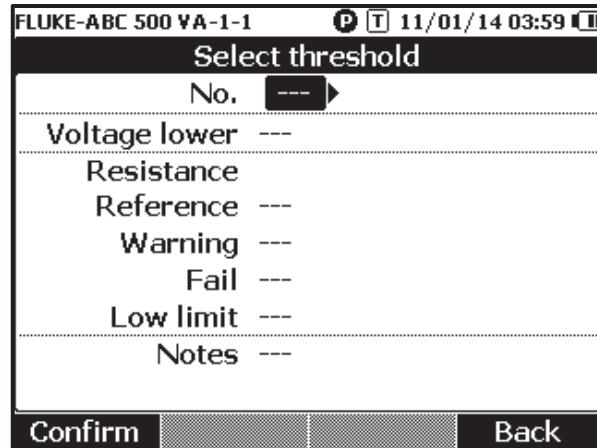
3. Use ◀ and L to highlight the value to be edited among **Voltage lower**, **Reference**, **Warning**, **Fail**, **Low limit**, and **Notes**.
4. Edit the selected field.

    a. Use the **–** and **+** softkeys to change the values for **Warning** and **Fail**.

    b. For other fields, push the **Edit** softkey, use the arrow keys to edit the value, and then push the **Confirm** softkey to save the value.

5. Once all threshold values are correct, push the **Confirm** softkey on the save the threshold set. The threshold set is applied and the **T-X** (X stands for value of **No**.) icon and the corresponding PASS/WARN/FAIL indication shows on the display.

To disable measurement thresholds:

1. On the measurement screen, push the **Threshold** softkey to open the Select Threshold menu.
    The value of **No.** is already highlighted.
2. Use ◀ to set **No.** to **---**.
3. Push the **Confirm** softkey.
    The **T-X** icon no longer shows on the display.