

# Bravo MRI-3000

## Quick Start Guide

### Bravo MRI-3000 Analyzer

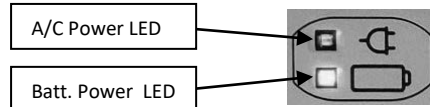
This model is a dual port VNA, supporting Complex Impedance Measurements (S11 and S21) as well as SWR and Return Loss.

### General

Frequency range 100kHz to 450MHz, user customizable color LCD, powered by 8 "AA" batteries, has both Broadband and Frequency Specific Calibration Processes. There is a minimum of 50 memory slots available for saving test results or setups(calibrations), and works with our PC Vision™ software.

### Power

The MRI-3000 uses 8AA cells of any type. Fresh alkalines will give 4 to 7 hours of continuous operation, depending on the frequencies in use. Performance from rechargables will vary depending on their state of charge and capacity.



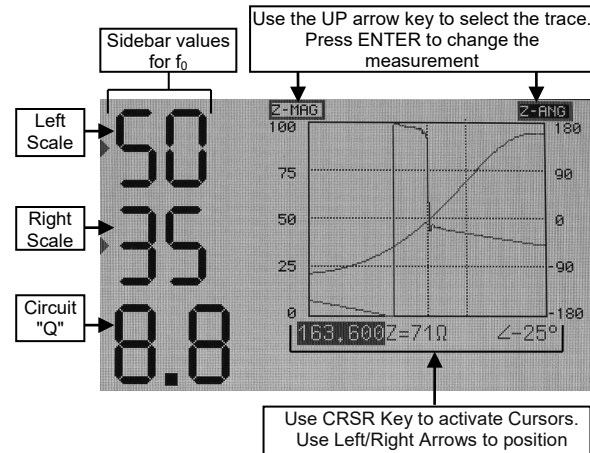
The A/C Power LED will be lit whenever the unit running on A/C power. The Battery Power LED is lit whenever the instrument is running on batteries.

### ⚠ SEE MANUAL

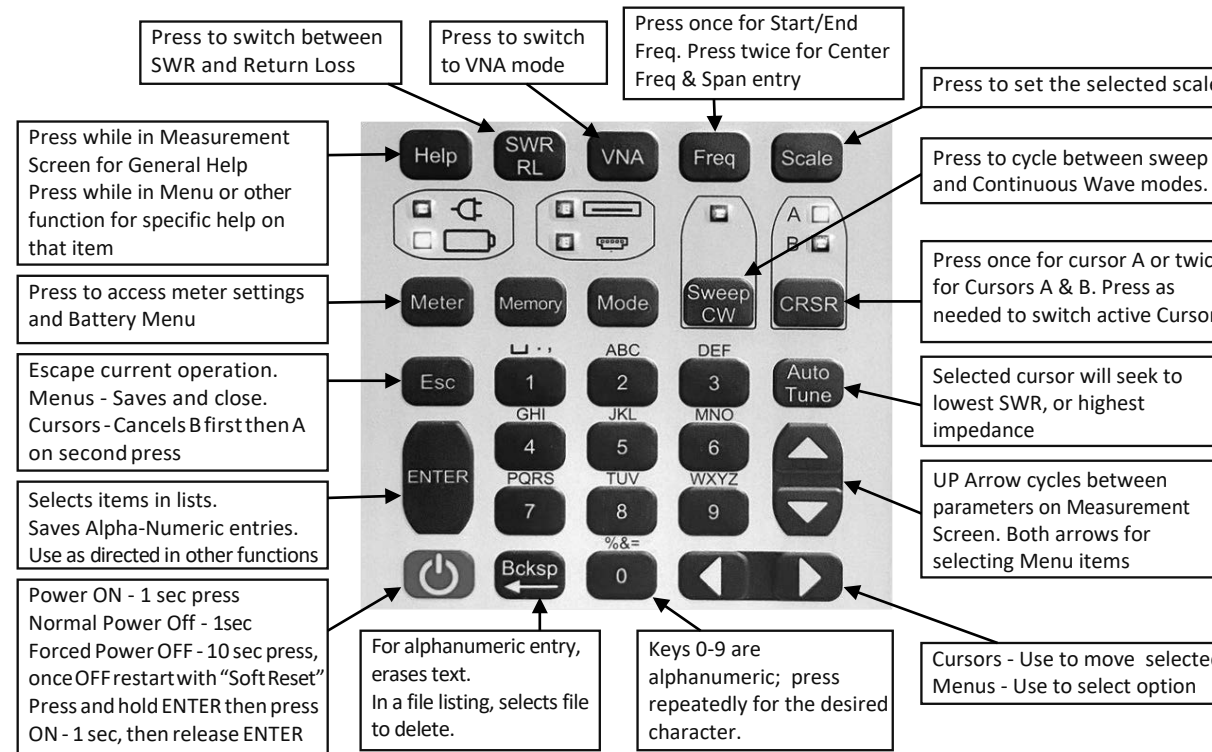
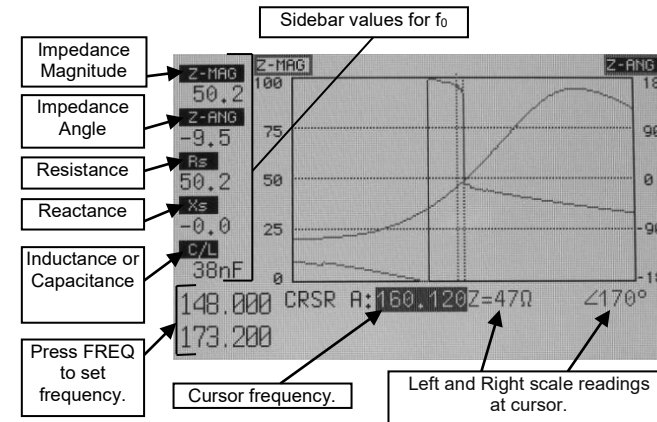
Although the Bravo MRI 3000 is a rugged instrument, care should be taken to avoid exposing it to excessive external RF or a Magnetic Field. Do not connect the Bravo MRI to an active transmitter. The Bravo MRI Should Not be allowed to get closer than 3 feet (1 meter) with a 1.5T Coil, and 5 feet (1.5 meter) with a 3T Coil.

Due to the strong magnetic fields involved with MRI servicing, the use of batteries is not recommended. Both the Bravo MRI unit and the MRI unit under test could be more susceptible to damage if batteries were installed. For convenience we provide a 20 ft long DC extension cord to use with the Ac adapter plug. If you must use batteries follow operating precautions instruction and keep the analyzer a min of 3 feet (1 meter) away from the magnet.

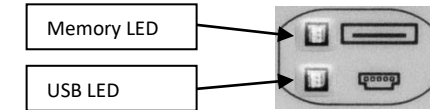
## VNA Screen (narrow)



## VNA Screen (wide)



## Other Keypad Functions



### Memory and USB Port LEDs:

Memory LED ON indicates writing to or recalling data from the Analyzer's memory. USBLED is on whenever the Analyzer is connected to your PC.

**Memory** – Press to Save or Recall test results or instrument settings.

**Mode** – For selecting: S<sub>11</sub> or S<sub>21</sub> VNA operation, Calibration Mode, and other settable options.

### About Calibration Modes

There are two types of calibrations: "Broadband Calibration" and "Frequency-Specific Calibration."

### Broadband Calibration

This method calibrates the instrument over its entire frequency range. The calibration data is stored and can be used for any range of frequencies. If this capability is needed, refer to the *Broadband Calibration Process* section in the Operating Manual.

### Frequency-Specific Calibration

This method is more accurate than broadband, but must be done each time the frequency is changed:

**Step 1** Press Mode key and select CALIBRATIONS, Use left/right arrow keys to select FREQ SPECIFIC option. Press ESC key to save and exit

**Step 2** From any measurement screen, press the FREQ Key. Press once for Start-End Frequency entry or twice for Center Frequency-Span entry.

**Step 3** Enter the desired frequencies

**Step 4** Press ENTER key, to begin the Frequency-Specific Calibration process.

When prompted for OPEN, attach test lead and/or adapter (if any) that will be used with all measurements, (Use of OPEN terminator is optional, but gives better results above 180MHz) and press ENTER.

### Frequency Specific Calibration (Cont.)

**Step 5** When prompted, attach the short, then 50  $\Omega$  terminators at the end of the test lead or at N connector. Press ENTER after each terminator is attached.

**Step 6** At the end of the calibration process, the instrument is ready for use.

**Step 7 (optional)** This frequency-specific calibration can be saved to the instrument's memory for future recall: Press MEMORY Key and select SAVE SETTINGS and press ENTER.

**Step 8 (optional)** Enter the name you wish to save and press ENTER to save the settings

### VNA Functions

#### **S<sub>11</sub> (R<sub>s</sub>, X<sub>s</sub>, |Z|) Measurements**

1. Press the VNA Key
2. Connect the test lead and/or adapter, if they are to be removed from the measurements.
3. Either select Broadband Calibration or perform the "Frequency Specific Calibration" (instructions on this guide's Front Right panel).
4. When calibration is complete connect the antenna or other device to be tested (aka DUT).
5. Use the UP arrow to select the left or right scales.
6. With a scale selected, <ENTER> to select the desired measurement for that side: Z-Mag (|S<sub>11</sub>| in  $\Omega$ ), Z-Ang (Impedance Angle), R<sub>s</sub>, X<sub>s</sub>.
7. Press Scale key to adjust the VNA scale for the best plot presentation.
8. Press CRSR to select Cursor A or A & B with  $\Delta$  reading. Use Left/Right Arrow keys to adjust Cursor positions.

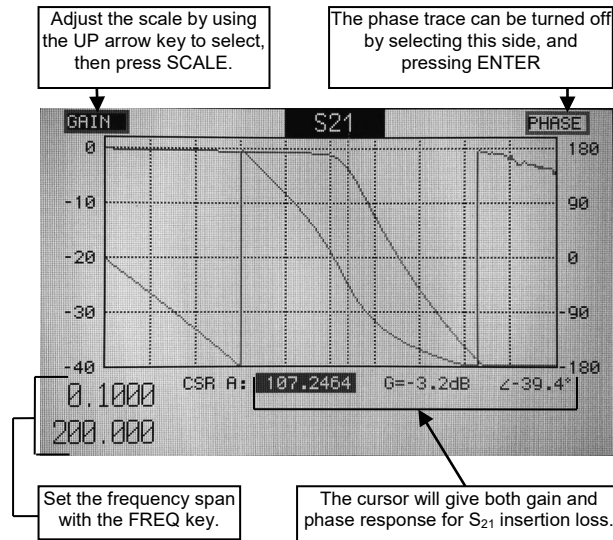
#### Points to Remember:

- a. If Broadband Calibration was used, the frequency band can be adjusted without recalibration.
- b. If Frequency Specific Calibration was used you will need to disconnect the DUT from the test

lead and/or adapter, or N connector, press Freq key, select new frequency range and perform the Frequency Specific Calibration with the new frequency range.

- c. (Optional) To save the plot press the MEMORY key and use alpha numeric keys to enter a name, then press ENTER to save.

### S<sub>21</sub> (Two-Port) Measurement:



### Standard S<sub>21</sub> Measurement Procedure:

#### From Mode Menu select S21

1. Connect the test lead and/or adapter, if they are to be removed from the measurements.
2. Either select Broadband Calibration or perform the "Frequency Specific Calibration" (instructions on this guide's Front Right panel).
3. Once the Open-Short-Load part of the calibration is completed (assuming you're using frequency-specific calibrations), attach all of the cabling that will be used between the S<sub>11</sub> & S<sub>21</sub> ports and press <ENTER> to calibrate the THROUGH. This will compensate for any losses in the test leads. The magnitude should now show a FLAT trace at 0dB, and a FLAT phase trace at close to 0°.

4. Attach the test leads to your DUT, and adjust the scales to best view the traces. Depending on what type of device you're measuring, you should get a result similar to the above photograph. If you don't need the PHASE trace, use the UP arrow to select the PHASE scale, and press <ENTER> to turn it off.
5. Press the Cursor key to select Cursor A or A & B with  $\Delta$  reading. Use Left/Right Arrow keys to adjust Cursor positions.

### SWR/RL Measurement Process

#### **SWR or Return Loss Measuring**

1. Connect the test lead and/or adapter, if they are to be removed from the measurements.
2. Press the SWR/RL key to select desired measurement.
3. Either select Broadband Calibration or perform the "Frequency Specific Calibration" (instructions on this guide's Front Right panel).
4. When calibration is complete connect the antenna or other device to be tested.
5. Use the Scale key to adjust the scale for the best plot presentation.
6. Press the Cursor key to select Cursor A or A & B with  $\Delta$  reading. Use the Autotune for the cursor to seek to the lowest SWR or RL reading. Or use Left/Right Arrow keys to adjust Cursor positions manually as desired.
7. If Broadband Calibration was used, the frequency band can be adjusted without recalibration.
8. If Frequency Specific Calibration is used you will need to disconnect the DUT from the test lead and/ or adapter, or N connector, press Freq key, select new frequency range and perform the Frequency Specific Calibration with the new frequency range.

The user may switch between SWR/R and VNA (single port) operation without re-calibration. Use the Scale key to cycle the scale for the best plot presentation.

9. (Optional) To save the plot press the MEMORY key, select SAVE TRACE, and use alpha numeric keys to enter a name, then press ENTER to save.

### In Case of Difficulty:

**Need Help** - If your MRI-3000 does not appear to be performing correctly or responding to key commands try a Soft Reset:

**Step 1** Turn the Analyzer OFF. If a 1 second press of the ON/OFF key does not respond, press and hold the ON/ OFF key for 10 seconds then release to force a shutdown.

**Step 2** Press and hold the ENTER key

**Step 3** Press ON/OFF to power up the Analyzer

**Step 4** A second later, release ENTER key

**Step 5** At the prompt, press ENTER again to reset

**NOTE:** Default "Factory Settings" will be restored and firmware reset to correct any issues. Be advised that while any saved settings or traces will be preserved, any *unsaved* data will be lost.

If you are still having an issue, please contact our Technical Support at 800-258-7805 US & Canada or +1-760-931-8979 M-F 800am-4:30pm US Pacific Time, or Email: techsupport@aeatechnology.com



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