CAMPBELL SCIENTIFIC

CS110FV

In-Field Verifier
for the CS110 Electric Field Meter

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Info Link

IMPORTANT NOTE: *This Quick Deploy Guide is meant to be a general reference to give the installer an overview of the steps required to make this system operational. The Owner's Manual is the definitive source for detailed installation instructions and information.*

1 ⚠ Caution!

- CAUTION: While the CS110FV In-Field Verifier is designed for field work, it is a calibration/verification tool and as such should be treated relatively gently. Place the Verifier on the back seat instead of in the bed of a pickup when driving on rugged 4-wheel drive roads. When shipping or transporting on an airplane, remove the alkaline D cells, and pack it in a cushioned carton or case for shipment as checked baggage.

- CAUTION: Refrain from touching the inside surfaces of the Verifier test cover. Oily fingerprints hold charge and can affect the verification. Test cover cleaning instructions are found in Section 8, Maintenance (p. 8) of the CS110FV Product Manual.

2 Installing the Verifier

1. Open the Verifier case. Unplug the power connector, remove the alkaline battery pack, and install the 8 alkaline D cell batteries. Then, reinstall the battery pack and power connector.

2. Remove the test cover and its cable from the case. Install the test cover over the CS110 stator, making sure the holes align with the two screws on the stator. Hold the other end of the test cover so the stop on the cover maintains contact with the rim of the stator. Tighten the thumb screws to hold it in place.

3. To ground the unit, loosen one of the six screws that secure the CS110 lid. Slide the ground lug under the screw head and tighten. Connect the Verifier cable's plastic connector to the CS110 **RS-232** port. Connect the cable's metal connector to the connector in the top right corner of the Verifier.
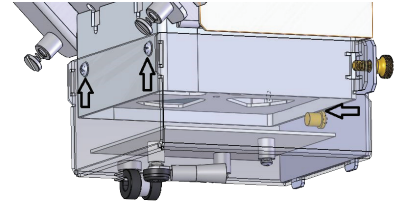
3 Setting Up the Verifier

To set up the Verifier, you will need the following information:

- Serial number (from 1001 to 5001) – This is found on the sticker on the CS110 and the CS110 calibration certificate.
- Original **MPARALLEL PLATE** (from 79.99 to 100) – This is found on the sticker on the CS110 and the CS110 calibration certificate.
- **Csite** (from 0.01 to 10.01, default = 0.1) – This is found in the CS110 program *Constant Table*.
- **PakBus Address** (from 1 to 3998, default = 1) – This is found in the CS110 settings.
- RS-232 baud rate (default = 115200, SG000 option = 2400)
- Electric field variable name (default = **EFM_Efield_v_m** or **EFM_Efield**) – This is the name of the *Public Table* variable that holds the one-second electric field value in the CS110.

1. Turn on the CS110 and make sure it is shuttering every second. If it is not shuttering every second, you can load the default shipping program, named "CS110 Shipping Program 20080515.CR1", or any other program with that effect.

2. Use the switch to turn on the Verifier.

3. On the Verifier display, select **Enter Setup Values**. Press **Enter**, and enter the following setup values and settings:

- Serial number (**CS110 SN**)
- Original MPARALLEL PLATE (**CS110 MMP**)
- Csite value (**CS110 Csite**)
- PakBus Address (**PakBus Addr**)
- RS-232 **Baud Rate**
- Electric field variable name (**Efield Var**)
- Enable or disable the Verifier GPS sensor (**GPS T=-1, F=0**). The default is *False*.
- If the GPS is enabled, enter the UTC offset in hours (**UTC OffsetHr**), from −*12* to +*12*).

```
Enter Setup Values:
CS110 SN          1030
CS110 MPP      85.3800
CS110 Csite    0.10000
PakBus Addr          1
Baud Rate       115200
Efield Var     E_Field
GPS T=-1 F=0         0
UTC OffsetHr        -1
ApplyChanges     False
                Hit Esc
```

Then, set **ApplyChanges** to *TRUE* to apply changes.

After installing the Verifier and setting these values, the green **Test Ready** LED should turn on, and you can proceed to Running the Verification Process.

If the Test Ready LED does not turn on, go to **Efield GPS Battery** in the main menu and check the following:

- If the Verifier is getting the one-second electric field data from the CS110, a small electric field reading will be displayed when the test cover is on. A −*99999* could indicate an incorrect PakBus address, baud rate, or electric field variable name, or it could indicate a cable or connector issue.
- If the GPS is enabled and a satellite is found, the latitude, longitude and number of satellites will be displayed. If the GPS hasn't locked on to a satellite, the GPS will display −*99999*. It can take 3-4 minutes for the GPS to lock on to a satellite.
- If the Verifier battery is low (< 9.6 Vdc), it will display -*99999* or the unit will not power up (no/bad display screens). Replace the batteries.

Press **ESC** to exit to the main menu.

4 Running the Verification Process

1. Select **Start Verify or Abort**, and then set **Start_Verify** to **TRUE** to start the verification process. The **Test In Progress** LED will turn on and remain on until the process is complete. Press **ESC** to exit to the main menu.
2. Select **View Verify Progress** to watch the verification progress. You will see each step as it is completed, including the following:
   - Voltage applied by the charge plate
   - Voltage measured by the CS110
3. When the verification process finishes, the **Test In Progress** LED will turn off and the **Test Ready** LED will turn on.
4. Press **ESC** to exit to the main menu.

5 Viewing the Verification Results

After the verification process is complete, select **View Verify Results**. The following values are given:

- CS110 serial number (**CS110 SN**)
- CS110 original MPARALLEL PLATE (**CS110origMPP**)
- Verified MPARALLEL PLATE (**Verified MPP**)
- MPARALLEL PLATE percent change (**MPP % Change**) (should be <5%)
- **Verify R2** (should be very close to 1.0)
- **Verify Ofset**
- **Verify Zero** – This is the CS110 electric field measurement when the

charge plate voltage is zero. A clean CS110 should have a **Verify Zero** value of < 6 V/m when the **CS110 Csite** factor is set to 0.1 (default).

Press **Esc** to exit to the main menu. The verification results are stored in the Verifier memory data table named *Fit*. You can retrieve these results from the Verifier using Campbell Scientific's *Device Configuration Utility* or *LoggerNet* software, available at *www.campbellsci.com.*

Turn the Verifier off after use.

6 Using the Keyboard

The 16 keys default to ▲,▼,◄,►, or to the function printed directly on each key. To enter numbers, first press **Num Lock**. **Num Lock** stays set until pressed again. Above all keys, except **Num Lock** and **Shift**, are characters printed in blue. To enter one of these characters, press **Shift** one to three times to select the position of the character as shown above the key, then press the key. For example, to enter *Y*, press **Shift Shift Shift PgDn**.

To insert a space (*Spc*), press **Shift** once, then press **BkSpc**.

To change to lower or upper case (*Cap*), press **Shift** twice rapidly, then press **BkSpc**. To insert a character not printed on the keyboard, enter **Ins**, scroll down to *Character*, press **Enter**, then press▲,▼,◄,►to scroll to the desired character in the list that is presented, then press **Enter**.