

RIGOL

Calibration Guide

DP1116A Programmable Linear DC Power Supply

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RIGOL Technologies, Inc.**

Guaranty and Declaration

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Contact Us

If you have any problem or requirement when using our products or this manual, please contact **RIGOL**.

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Chapter 1 Calibration Notices

Calibration Interval

A 90-day or 1-year calibration interval is recommended. If you require relatively higher measurement precision, please calibrate DP1116A regularly.

Recommended Calibration

No matter which calibration interval you choose, it is recommended that you perform overall calibration at the calibration interval to ensure that the instrument will remain within specifications for the next calibration.

Calibration Safety

To perform calibration, you need to input the correct password. The password is used to prevent accidental or unauthorized calibration of the instrument.

Press **Utility** → **Calibrate** and input the correct password to enter the main calibration interface.

The password is "666666" when the instrument leaves factory. The password is stored in the non-volatile memory and will not change at power-off.

You can modify the password. After entering the main calibration interface as shown in **Figure 3-3**, press **Password** to input the old password and new password respectively according to the prompts.

If all the voltage or current calibration points are calibrated and **Save** is performed, you need not to calibrate the items already calibrated in the next calibration.

If you want to reset the calibration values to defaults, please enter the main calibration interface as shown in **Figure 3-3** and press **Default** → **OK**.



CAUTION

If the calibration is stopped when the instrument is writing the new calibration constants into the Flash, you may lose all the calibration constants and you need to perform the calibration again.

To Acquire Calibration Service

Manual calibration by users is not recommended. If calibration is required, please contact **RIGOL** customer service department or the local distributor.

Chapter 2 Test Devices and Notices

Recommended Test Devices

It is recommended that you use the test devices listed in the table below or other test devices with the same performance and specifications for calibration.

Device	Performance Requirement	Recommended
Digital Multimeter	6 ½ digit	RIGOL DM3068
Test Lead	Connect the output terminals of DP1116A and the input terminals of the multimeter	
Short Circuiter	Used to short-circuit the (+) and (-) terminals of the output channel, the red (+) and (S+) terminals as well as the black (-) and (S-) terminals of DP1116A	

Test Notices

Follow the suggestions below during the test to ensure better effect.

- 1) Make sure the environment temperature is constant (within 18°C to 28°C). Ideally, the calibration should be done under 23°C ± 1°C.
- 2) Make sure the environment relative humidity is less than 80%.
- 3) Make sure the instrument has been warmed up for one hour before the calibration.
- 4) The cable used for the test should be as short as possible. The cable impedance should be as required.

Chapter 3 Calibration Process

Calibration Items 1 (Common Mode)

No.	Item
1	16V/10A scale voltage calibration
2	16V/10A scale current calibration
3	16V/10A scale overvoltage protection calibration
4	16V/10A scale overcurrent protection calibration
5	32V/5A scale voltage calibration
6	32V/5A scale current calibration
7	32V/5A scale overvoltage protection calibration
8	32V/5A scale overcurrent protection calibration

Note: as the calibration methods of the two scales are the same, 16V/10A channel is taken as an example to introduce the calibration methods in common mode.

Step 1: Select a Scale and Enter the Main Calibration Interface

Step 2: Perform Voltage Calibration

Step 3: Perform Current Calibration

Step 4: Perform Overvoltage Protection Calibration

Step 5: Perform Overcurrent Protection Calibration

Step 1: Select a Scale and Enter the Main Calibration Interface

- 1) Press **16V/10A** at the front panel (make sure that the output switch **On/Off** is off) as shown in the figure below.

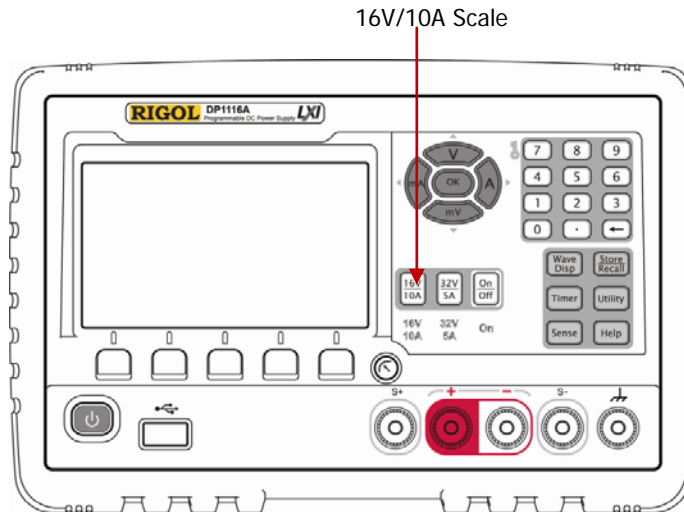


Figure 3-1 DP1116A Front Panel

- 2) Press **Utility** → **Calibrate** and the prompt message "Please input password:" is displayed; input the calibration password of the instrument as shown in the figure below.

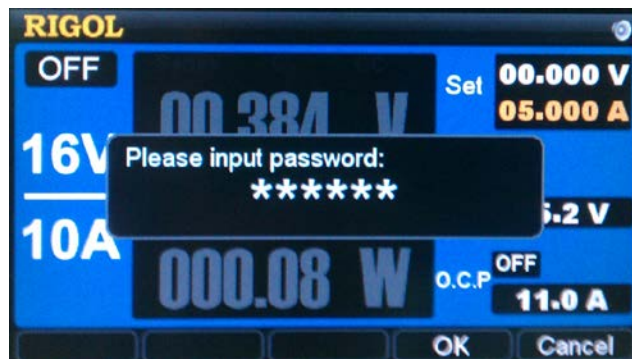


Figure 3-2 Input the Password

- 3) Press **OK** to enter the main calibration interface as shown in the figure below.

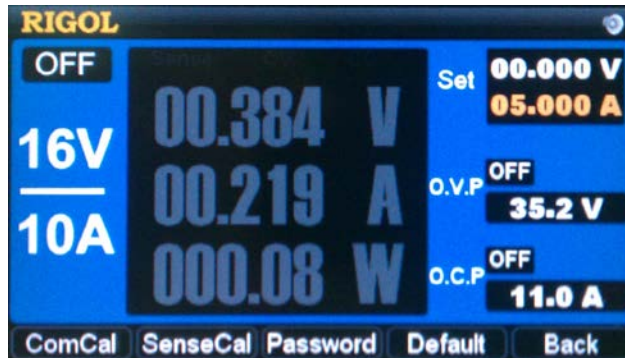


Figure 3-3 Main Calibration Interface

- 4) In the main calibration interface, press **ComCal** to enter the 16V/10A scale main calibration interface in common mode as shown in the figure below.

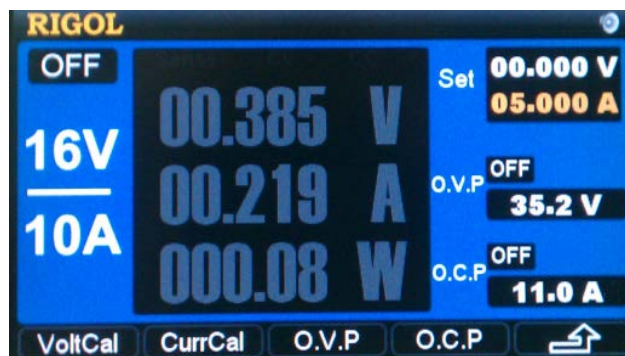


Figure 3-4 Main Calibration Interface in Common Mode

Step 2: Perform Voltage Calibration

- 1) Connect the channel output terminals (the red (+) and black (-) terminals) at the front panel with the DC voltage input terminals of the multimeter using test leads. Set the multimeter to DC voltage test. Press **VoltCal** to enter the common voltage calibration interface as shown in the figure below.

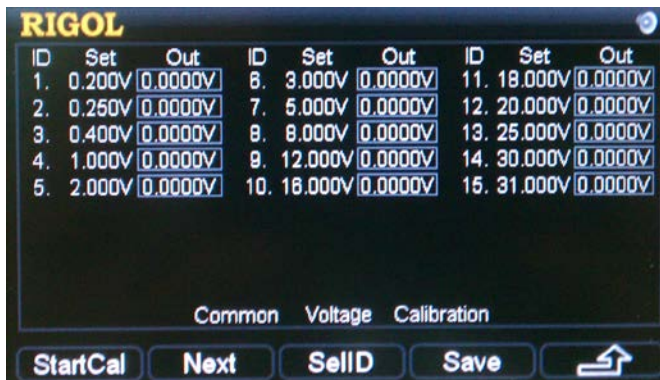
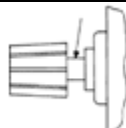


Figure 3-5 Common Voltage Calibration Interface

Tip
For the calibration connection, in order to avoid measurement error caused by the output terminal, please connect the test lead to the position pointed out by the arrow in the figure at right.



- 2) Press **StartCal** and read the measurement value from the multimeter; then, input the measurement data into DP1116A using the numeric keyboard at the front panel as shown in the figure below.




Figure 3-6 Input the Measurement Data

- 3) Press **Next** and read the measurement value from the multimeter; then, input the measurement value into DP1116A using the numeric keyboard at the front panel.

- 4) Repeat the above step 3) until all the measurement values are input; then, press **Save** and the voltage calibration is finished.

If you need to re-calibrate a certain calibration point, press **SelID** to input the ID of the calibration point to be re-calibrated.

After the voltage calibration is finished, press  to return to the main calibration interface in common mode.

Tip


When the calibration data input contains large error, the prompt message "Failed to calibrate owing to the large error!" will be displayed. At this point, please make sure that whether the error is due to the measurement problem of the multimeter. If not, the power supply can not pass the calibration and should be returned back to factory for maintenance.

Step 3: Perform Current Calibration

- 1) Connect the channel output terminals (the red (+) and black (-) terminals) at the front panel with the DC current input terminals of the multimeter using test leads. Set the multimeter to DC current test. Press **CurrCal** in the **Main Calibration Interface in Common Mode** to enter the current calibration interface.
- 2) For the detailed calibration steps, refer to “**Step 2: Perform Voltage Calibration**”.

Tip

If you are using **RIGOL DM3068** as the calibration device, please select the **A** test scale when measuring current.

After the current calibration is finished, press  to return to the main calibration interface in common mode.

Step 4: Perform Overvoltage Protection Calibration

Make sure that no load is connected (no test lead is connected) to DP1116A before performing overvoltage protection calibration. Then, press **O.V.P** in the **Main Calibration Interface in Common Mode**; the instrument starts the calibration and the prompt message “Calibrating.....” is displayed. When the calibration is finished, the prompt message “Calibration completed!” will be displayed.

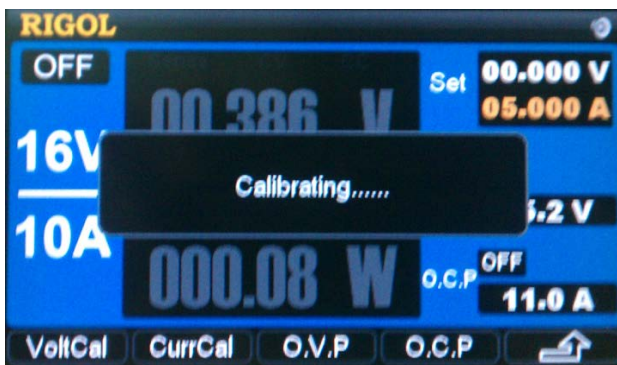




Figure 3-7 Common Overvoltage Protection Calibration

After the overvoltage protection calibration is finished, press  to return to the main calibration interface.

Step 5: Perform Overcurrent Protection Calibration

Short-circuit the (+) and (-) terminals of the output channel (here, a short circuiter is used) before performing overcurrent protection calibration. Then, press **O.C.P** in the **Main Calibration Interface in Common Mode**; the instrument starts the calibration and the prompt message "Calibrating....." is displayed. When the calibration is finished, the prompt message "Calibration completed!" will be displayed.

After the overcurrent protection calibration is finished, press  to return to the main calibration interface.

Calibration Items 2 (Sense Mode)

No.	Item
1	16V/10A scale voltage calibration
2	16V/10A scale overvoltage protection calibration
3	32V/5A scale voltage calibration
4	32V/5A scale overvoltage protection calibration

Note: in sense mode, you can only perform voltage calibration and overvoltage protection calibration. In the following part, the 16V/10A scale is taken as an example to introduce the calibration methods in sense mode.

Step 1: Select a Scale and Enter the Main Calibration Interface in Sense Mode

Step 2: Perform Voltage Calibration

Step 3: Perform Overvoltage Protection Calibration

Step 1: Select a Scale and Enter the Main Calibration Interface in Sense Mode

Select a scale and enter the main calibration interface (make sure that the output switch **On/Off** is off); then, press **Sense** to enter the main calibration interface in sense mode as shown in the figure below. For the detailed operation steps, refer to **Step 1: Select a Scale and Enter the Main Calibration Interface** in “Calibration Items 1 (Common Mode)”.



Figure 3-8 Main Calibration Interface in Sense Mode

Step 2: Perform Voltage Calibration

- 1) Short-circuit the red (+) and (S+) terminals as well as the black (-) and (S-) terminals at the front panel using short circuiter. Connect any of the red (+) terminal and any of the black (-) terminal at the front panel with the DC voltage input terminals of the multimeter using test leads. Set the multimeter to DC voltage test.
- 2) In the sense calibration interface, press **VoltCal** to enter the sense voltage calibration interface as shown in the figure below.



Figure 3-9 Sense Voltage Calibration Interface

- 3) Press **StartCal** and read the measurement value from the multimeter; then, input the measurement data into DP1116A using the numeric keyboard at the front panel as shown in the figure below.




Figure 3-10 Input the Measurement Data

- 4) Press **Next** and read the measurement value from the multimeter; then, input the measurement value into DP1116A using the numeric keyboard at the front panel.

- 5) Repeat the above step 4) until all the measurement values are input; then, press **Save** and the voltage calibration is finished.

If you need to re-calibrate a certain calibration point, press **SelID** to input the ID of the calibration point to be re-calibrated.

After the voltage calibration is finished, press  to return to the main calibration interface in sense mode.

Step 3: Perform Overvoltage Protection Calibration

Short-circuit the red (+) and (S+) terminals as well as the black (-) and (S-) terminals at the front panel using short circuiter before executing overvoltage protection calibration. Then, press **O.V.P** in the sense calibration interface; the instrument starts the calibration and the prompt message "Calibrating....." is displayed. When the calibration is finished, the prompt message "Calibration completed!" will be displayed

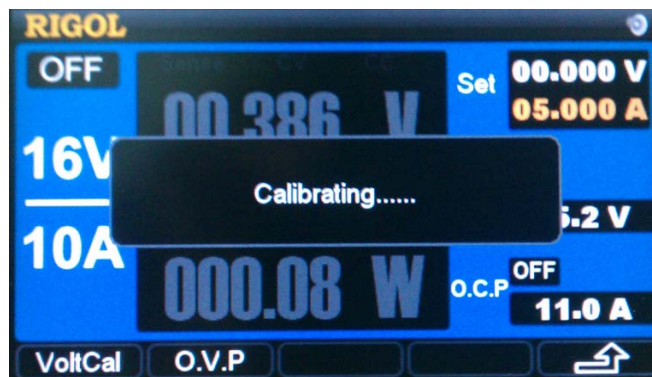



Figure 3-11 Sense Overvoltage Protection Calibration

After the overvoltage protection calibration is finished, press  to return to the main calibration interface or press **Utility** to exit the calibration.