How to make a sampling measurement with continuous source

This material shows how to perform a sampling measurement through an example of sourcing the current to LED and measuring the voltage.

Figure 1 illustrates the connection and condition supposed in the example of measuring LED using the B2901/02/11/12A.

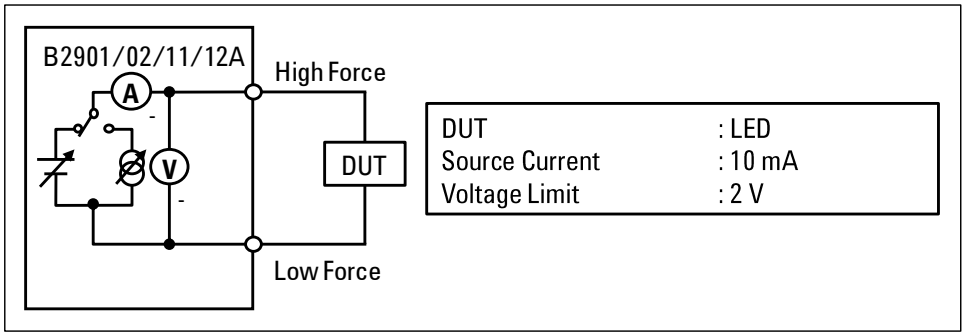


Figure 1. Connection and condition supposed in the example

Figure 2 shows the timing chart for the sampling measurement with continuous source with the front panel operation. In this case, the specified source value is sourced immediately after turning on On/Off. Then, when you press Trigger, the instrument will make a sampling measurement. Sweep parameters will be used in the example in order to source the continuous current. Besides, if it is necessary, you can specify any measurement trigger delay time which is the wait time after each internal trigger and before making a measurement. The measurement time consists of Measurement Speed and some overhead time. Measurement Speed is the parameter specified by the user. Overhead time includes the time to change the measurement range, etc.

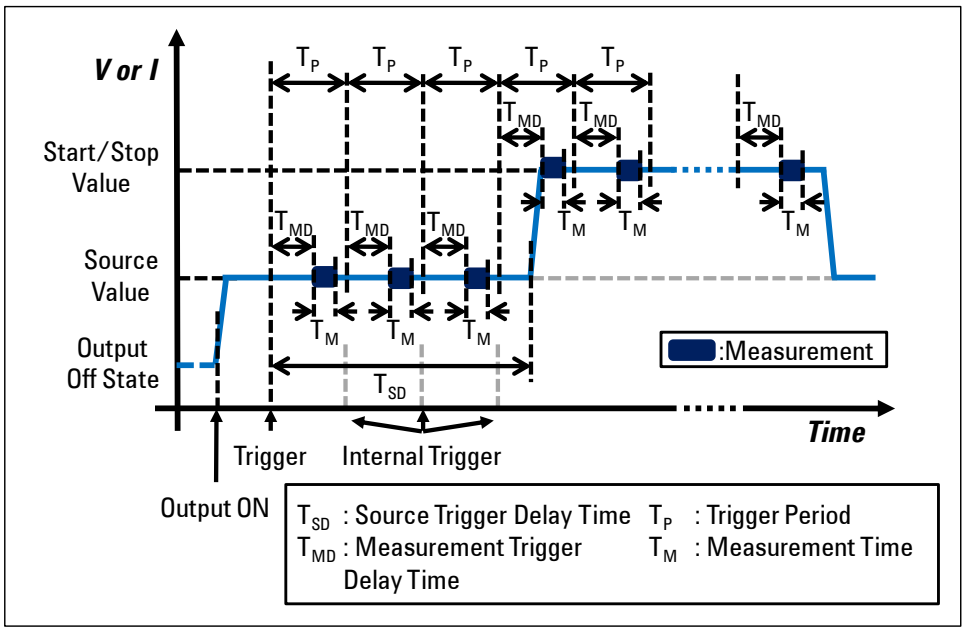
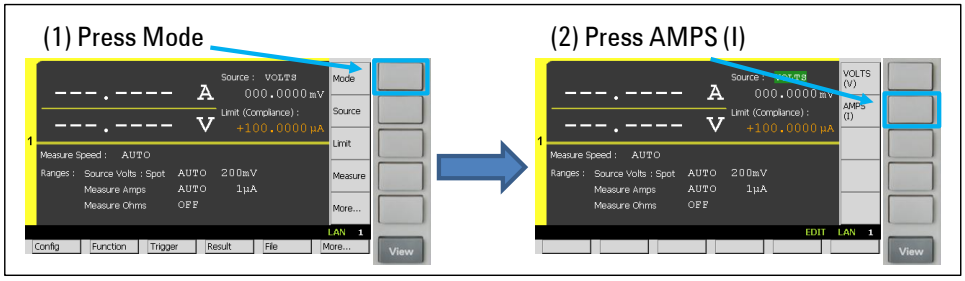


Figure 2. Timing chart for the sampling measurement with continuous source

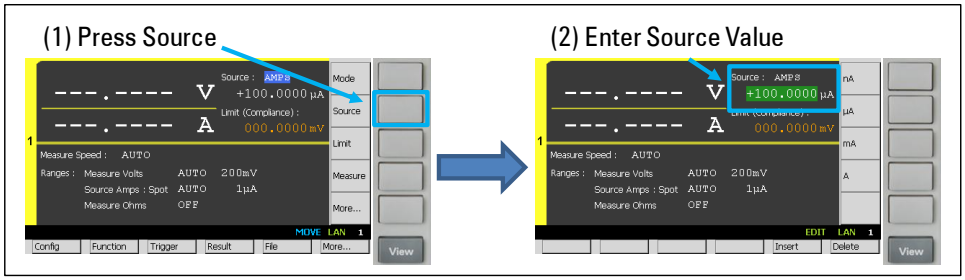
Performing a sampling measurement

Step 1. Press View repeatedly until Single View for Channel 1 is shown in the display.

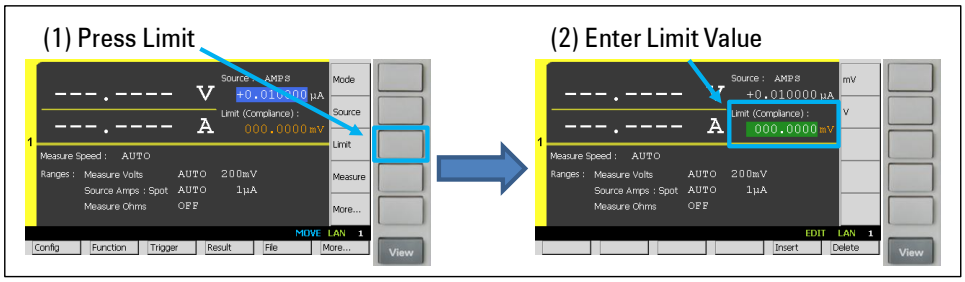
Step 2. Press Mode to edit the source function, and then select AMPS (I) to set the source function to the current source.



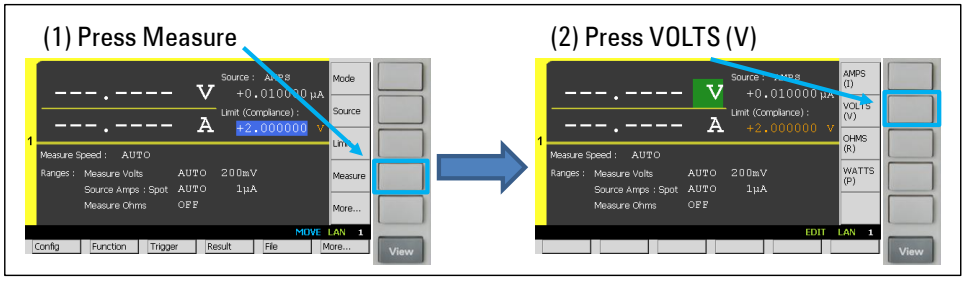
Step 3. Press Source to edit the source value, and then enter 10 nA to set the source value to 10 nA.



Step 4. Press Limit to edit the limit value, and then enter 2 V to set the limit value to 2 V.



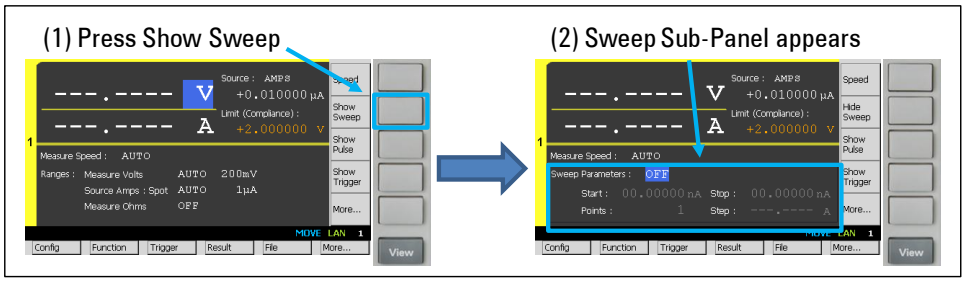
Step 5. Press Measure to configure the measurement parameter, and then select VOLTS (V) to set the measurement parameter to the voltage.



Step 6. Press 

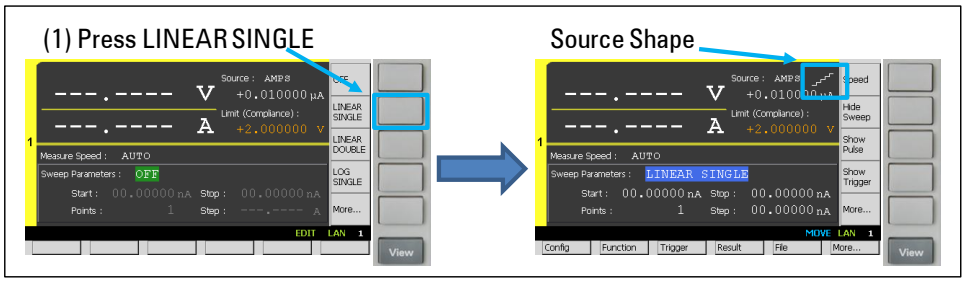
to change the keys shown in Assist keys, and then press 

to show Sweep Sub-Panel.

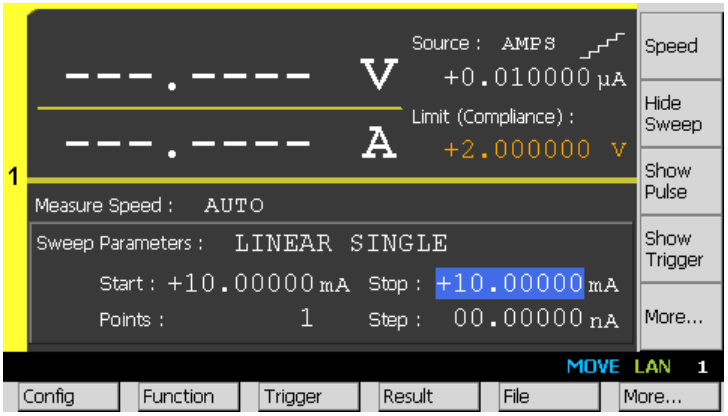


Step 7. Press 
, then press 

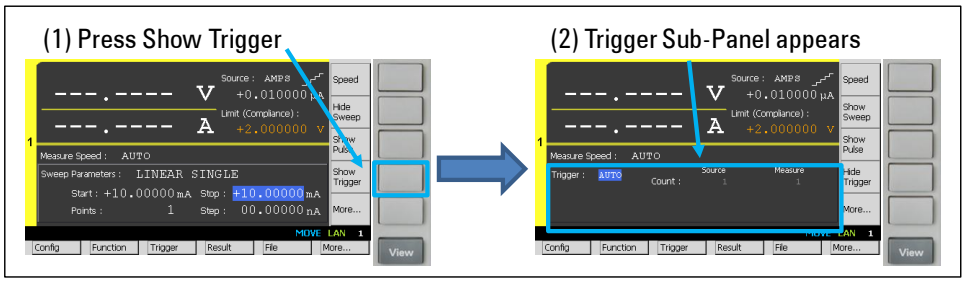
to turn on Single Linear Sweep Mode. After turning on Single Linear Sweep Mode, you can see Source Shape which shows the single linear sweep mode.



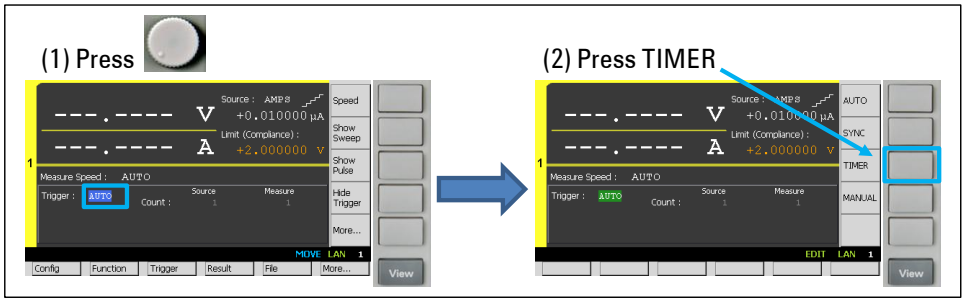
Step 8. Rotate 
to select Channel 1 Sweep Parameters and set them up as below. Start and Stop values should be the same, which define the continuous source value.
(Start: 10 mA, Stop: 10 mA, Points: 1, Step: 0 A)



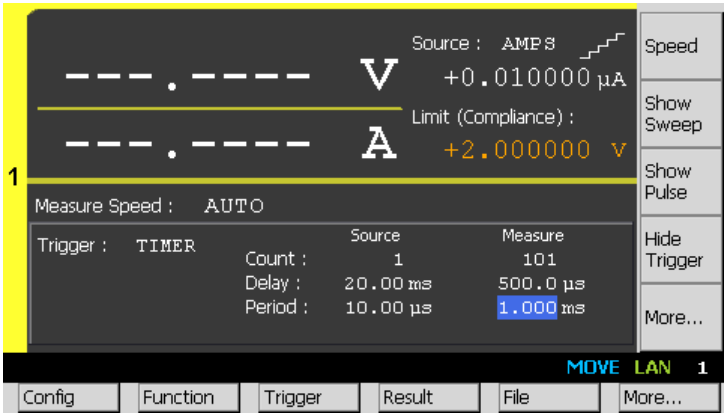
Step 9. Press Show Trigger to show Trigger Sub-Panel.



Step 10. Press  to edit the trigger type, and then select TIMER to set the trigger type to TIMER.



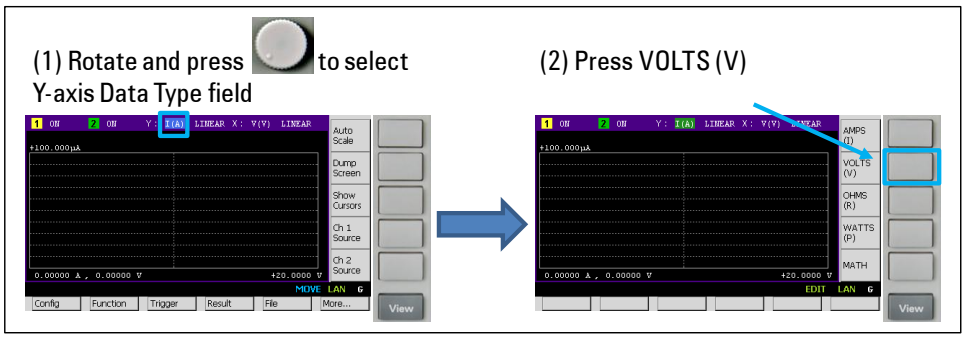
Step 11. Rotate  to select Channel 1 Trigger Parameters and set them up as below. Measurement Trigger Count defines the number of sampling and Measurement Trigger Period defines the interval of sampling. (Source Trigger Count: 1, Measurement Trigger Count: 101, Source Trigger Delay: 20 ms, Measurement Trigger Delay Time: 500 us, Measurement Trigger Period: 1 ms)



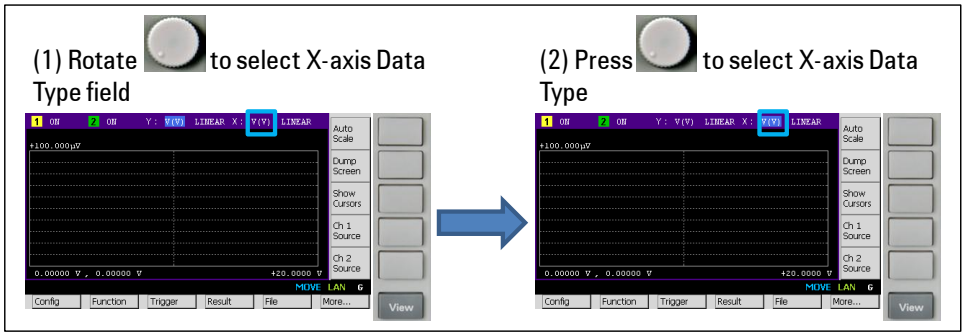
Now you've configured 1 ms measurement trigger period for a sampling measurement. The measurement will be performed every 1 ms periodically. However, please note that FIXED current measurement range operation will be used to control the trigger period strictly. The measurement range is selected by Limit value. In this example, 2 V measurement range will be used. If using AUTO measurement range operation is prior to controlling the trigger period strictly, you may specify MANUAL trigger type with AUTO source and measurement trigger source by the steps shown later.

Step 12. Press View repeatedly until Graph View is shown in the display.

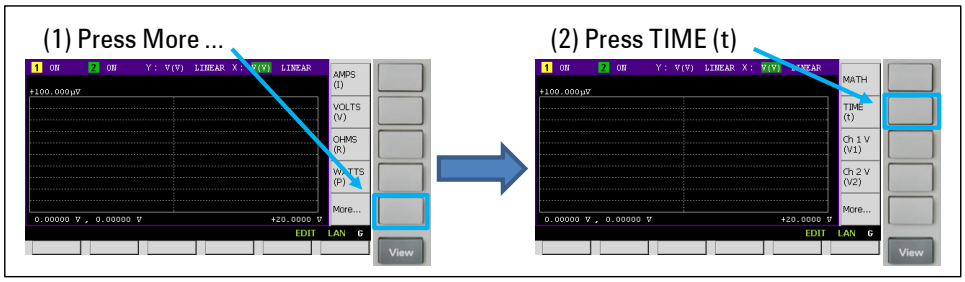
Step 13. Rotate and press  to edit the Y-axis data type, and then select VOLTS (V) to set the Y-axis data type to the voltage.



Step 14. Rotate and press  to edit the X-axis data type



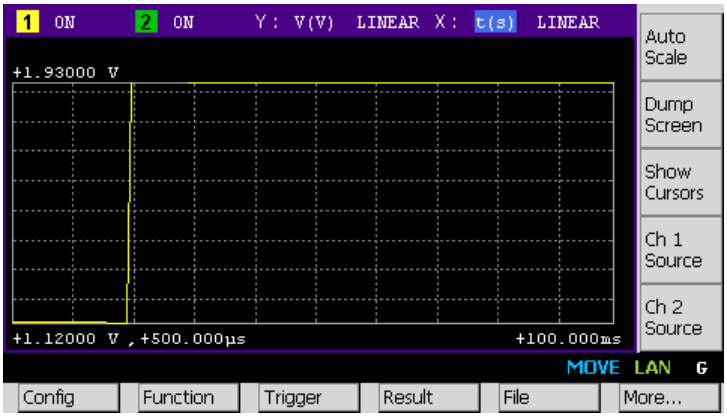
Step 15. Press More..., and then select TIME (t) to set the X-axis data type to the time.



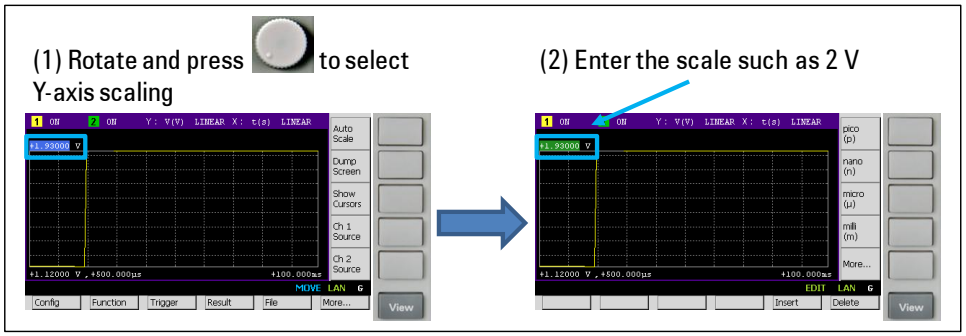
Step 16. Press On/Off to source the current, and then press Trigger to perform a measurement. (The status information will show ARM during the measurement.)

Step 17. Press 

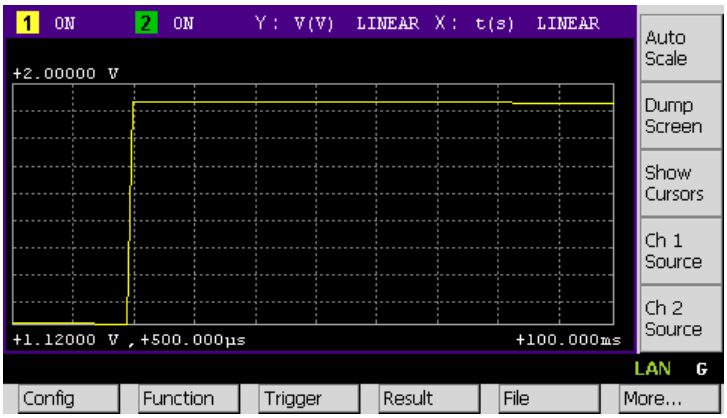
to adjust the scale of the graph after finishing the measurement.



Step 18. Rotate and press 
to edit the Y-axis scaling, and then enter 2 V to adjust the graph scale.



Now you can see the measurement result on the GUI of the B2901/02/11/12A as bellow.



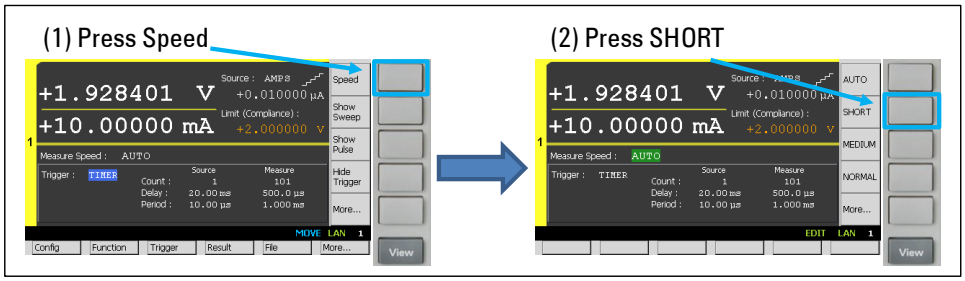
Configuring the measurement speed

In the default setting, the instrument selects the appropriate measurement speed and range automatically to get the fine accuracy. However, you can also specify these parameters on the GUI of the B2901/02/11/12A to meet a variety of the requirement to the measurement conditions.

For example, let's try to change the measurement speed to SHORT to make a measurement more quickly. If you select SHORT, the aperture time is set to 0.01 PLC. Here, PLC stands for power line cycle and the specified number of power line cycles is used per a measurement.

Step 1. Press View repeatedly until Single View for Channel 1 is shown in the display.

Step 2. Press Speed to edit the measurement speed, and then select SHORT to set the measurement speed to SHORT. (If you can't see Speed in Assist keys, press More... to change the keys shown in Assist keys.)

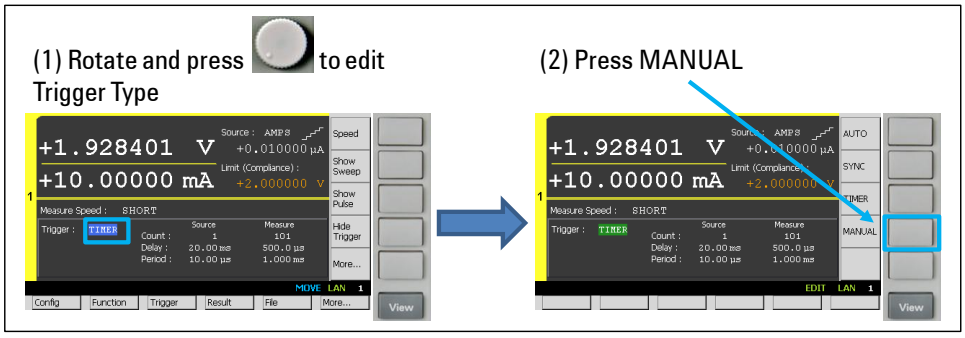


Configuring to use AUTO measurement range operation

If you'd like to use AUTO measurement range operation during the sampling measurement, take the following steps.

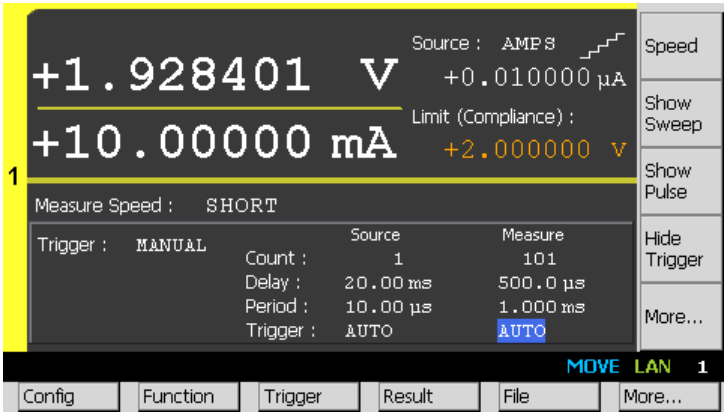
Step 1. Press View repeatedly until Single View for Channel 1 is shown in the display.

Step 2. Rotate and press to edit the trigger type, and then select MANUAL to set the trigger type to MANUAL.

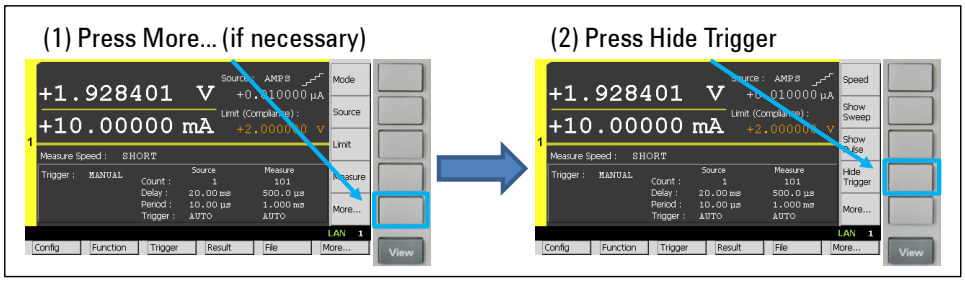


Step 3. Rotate to select Channel 1 Trigger Parameters and set them up as below.

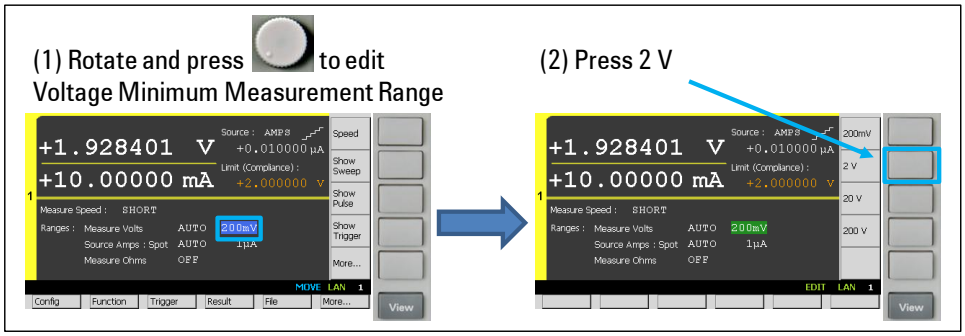
(Source Trigger Source: AUTO, Measurement Trigger Source: AUTO)



Step 4. Press Hide Trigger to show Range Sub-Panel. (If you can't see Hide Trigger in Assist keys, press More... to change the keys shown in Assist keys.)



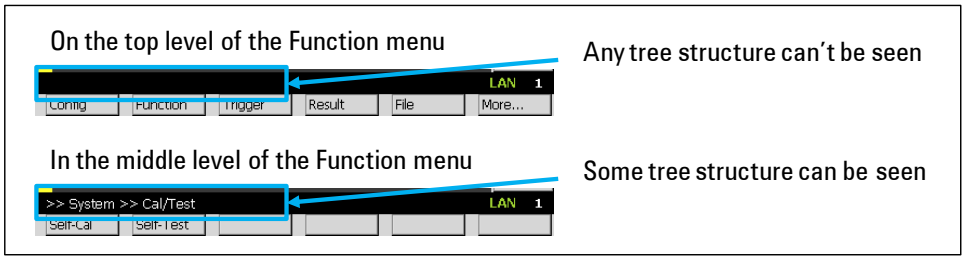
Step 5. Rotate and press  to edit the voltage minimum measurement range, and then select 2 V to set to 2 V for example.



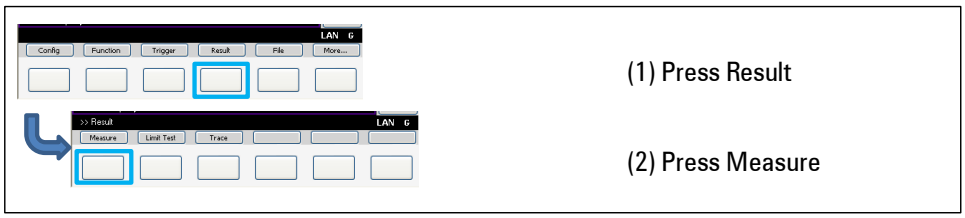
Viewing the list of measurement results

The measurement results including the measurement time stamp can be referred by the following steps.

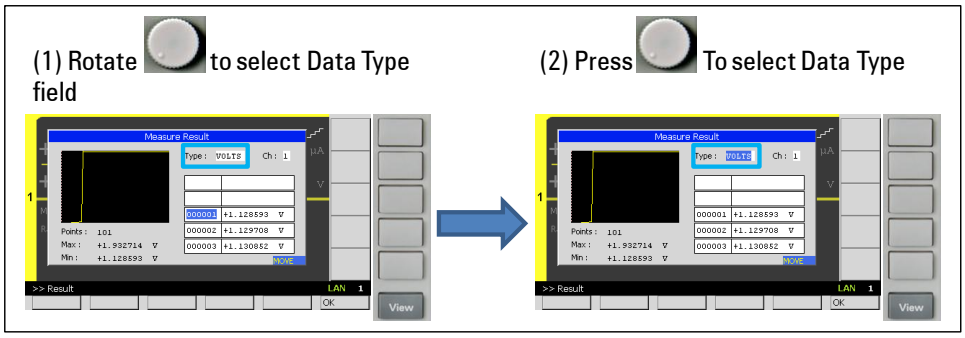
Step 1. If you aren't on the top of the Function menu, press Cancel Local repeatedly to return to the top level.



Step 2. If you'd like to see the list of the measurement result, press Result, then press Measure to open Measure Result dialogue.



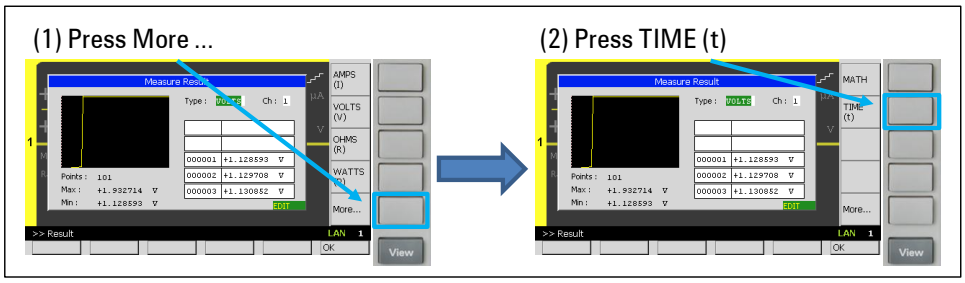
Step 3. Rotate and press  to select Data Type field.



Step 4. Press 

to change the keys shown in Assist keys, and then press 

to select Time as the data type.



Step 5. Rotate and press  to select Data field. Then rotate  to scroll the data list.