CF-4700 FFT Comparator
Comparator Setting Operation
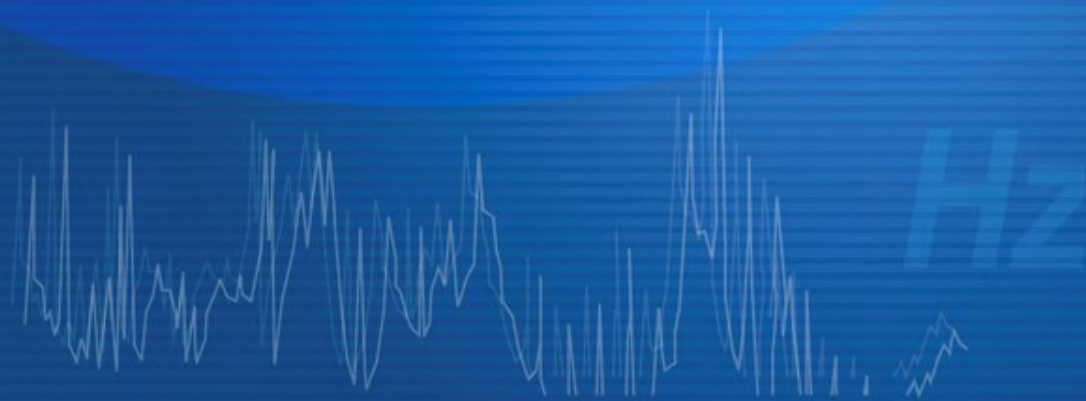
－Contents－

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Overview of the Comparator Function

CF-4700 is a pass/fail judgment equipment used on production lines that is highly effective in quality check by analyzing sound or vibration from products or parts.

●Block comparator function：
This function is for the pass/fail judgment from the level of frequency signal.

●Shape comparator function：
This function is for pass/fail judgment by waveform shape.

●Tracking function＆Shape comparator：
This function is for pass/fail judgment by level according to the rotation speed fluctuation.

1. Block comparator

Block comparator is the function that makes judgments by checking whether the peak value or level of a target signal satisfies specific conditions in the block (area) within a specified frequency and level range.

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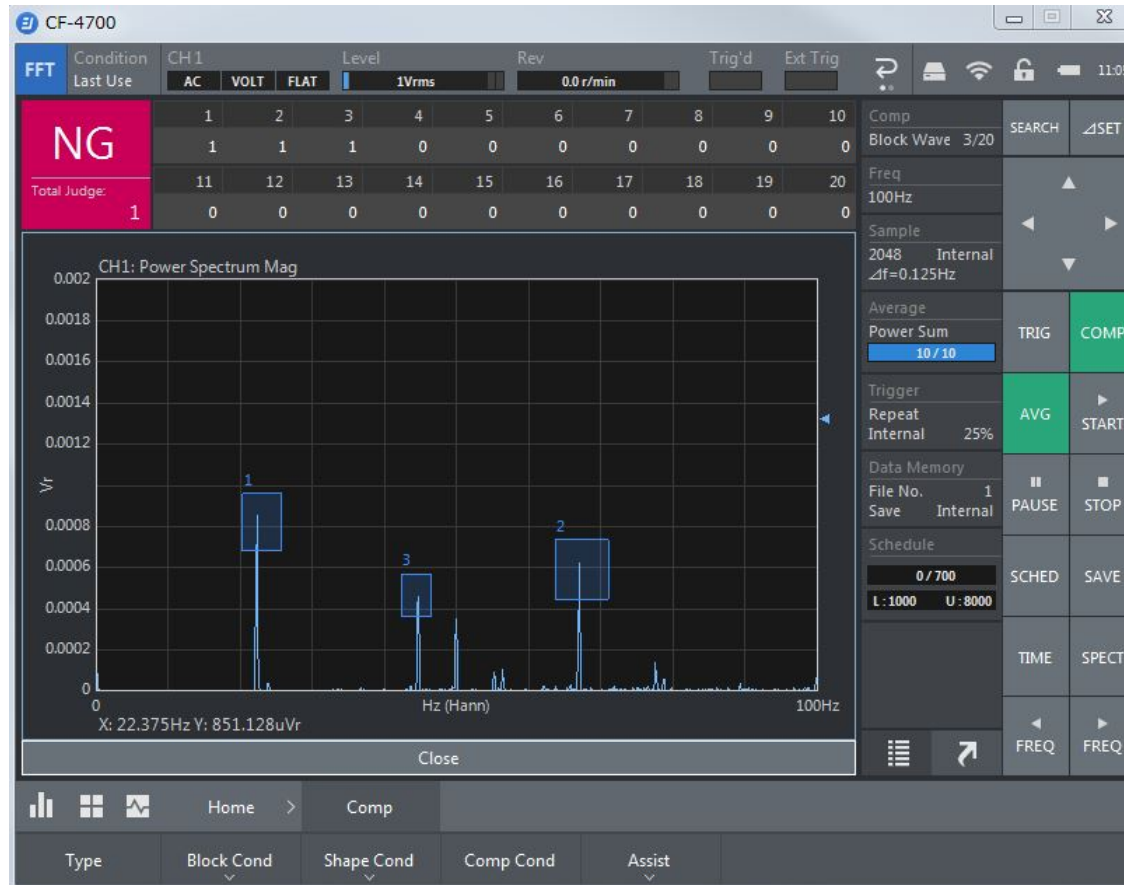
1-1 Block comparator setting method

1. Connect the sensor and main unit (CF-4700).

2. When you use the CCLD type sensor, the power is supplied directly from the main unit. In this case, please turn the CCLD ON.

『Home』 → 『Input』 → 『Input Cond』

Turn ON the CCLD.

Touch here to display setting screen.
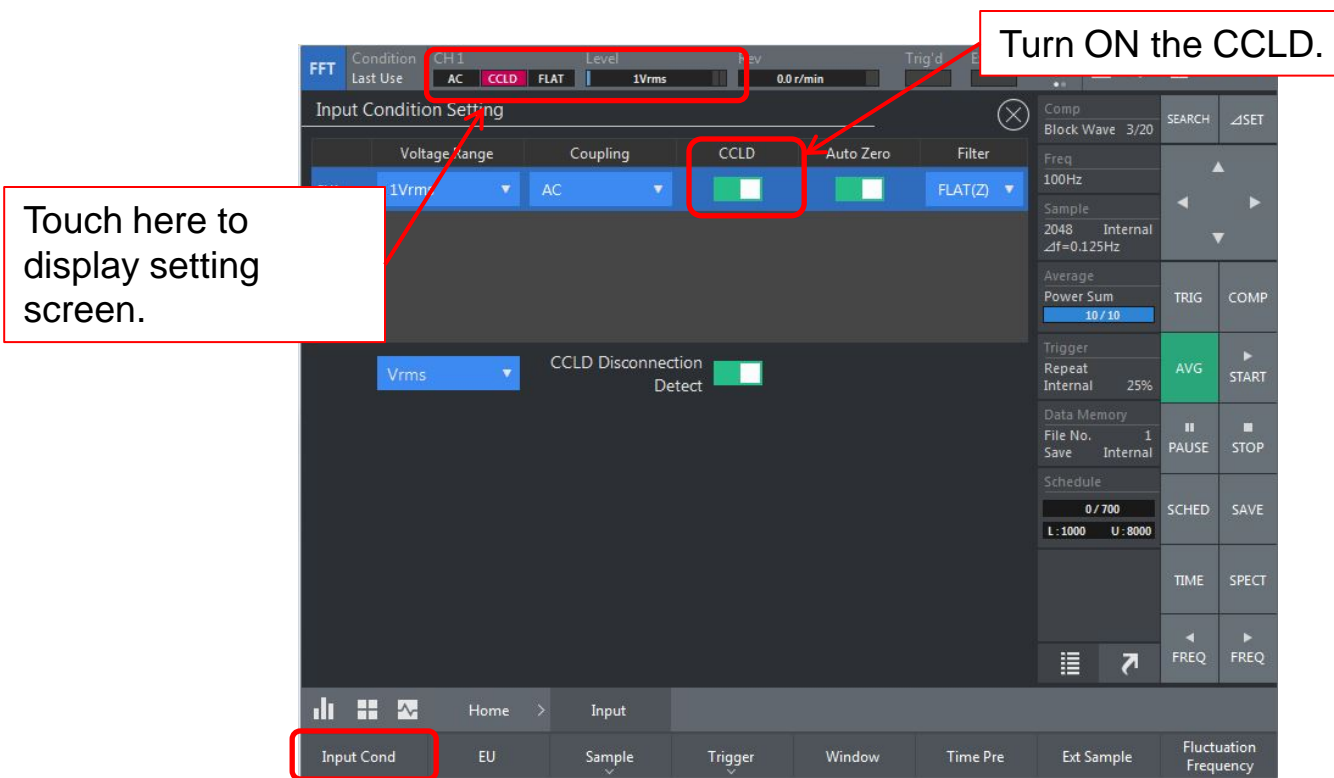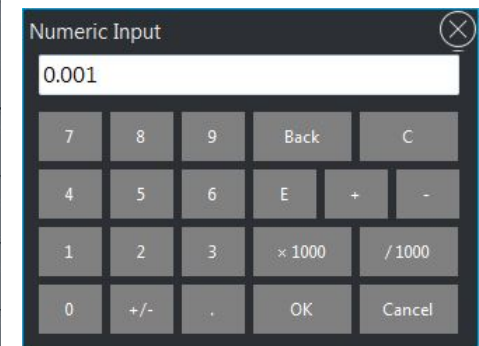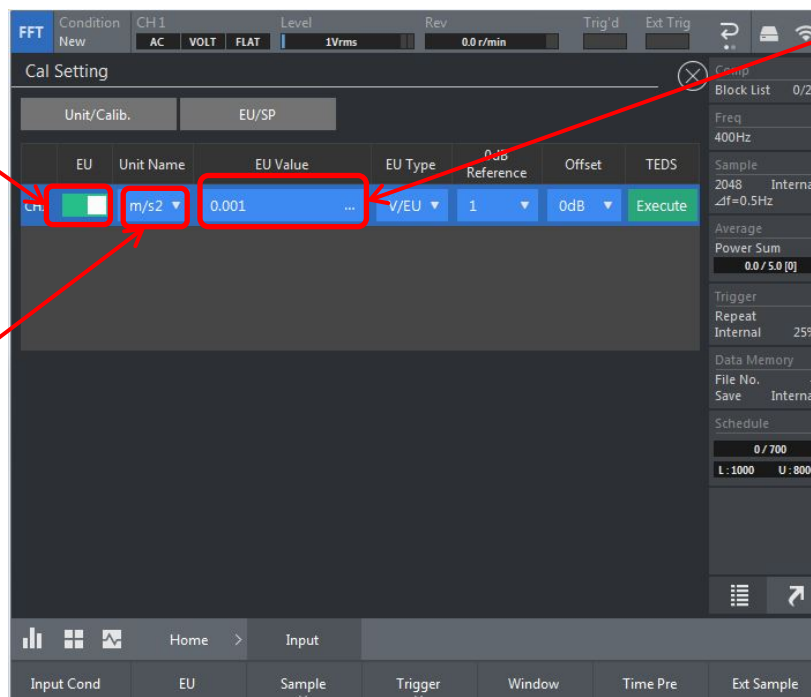
1-2 Y-axis engineering unit setting

1. When you use the accelerometer (1 mV/m/s2), input the calibration value.

『Home』 → 『Input』 → 『EU』

Activate the button.

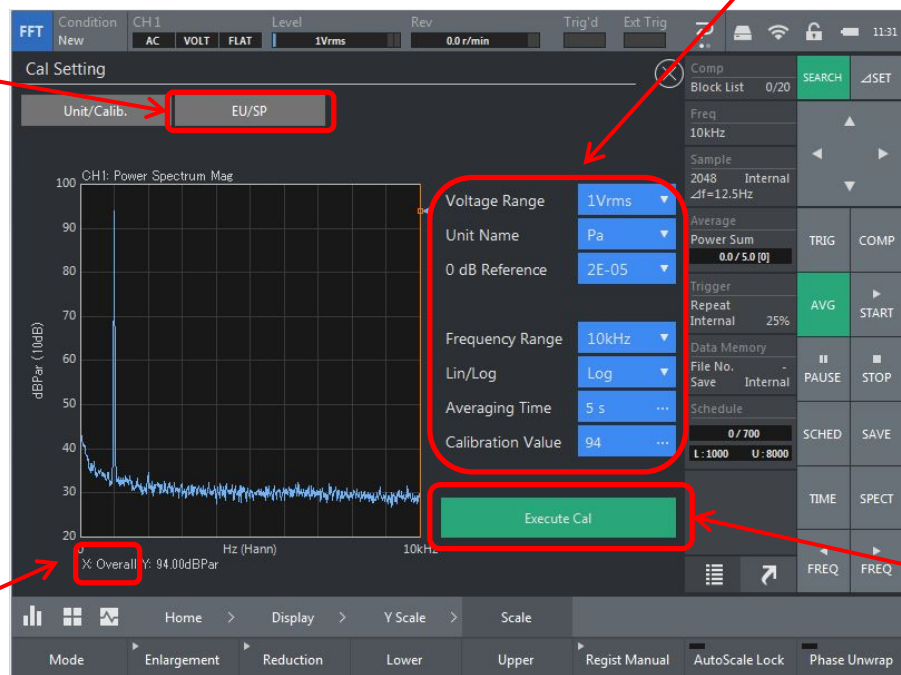Input 0.001 by using the palette.

Select or input the unit name.

2. When you calibrate the microphone by the sound calibrator, switch the screen to EU/SP, and perform calibration after measuring the standard signal.

『Home』 → 『Input』 → 『EU』

Touch EU/SP to switch the screen.

Set the unit name to perform measurement (average).

Select the cursor to the overall value.

Perform calibration after averaging.

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1-3 Y-axis scale adjustment

● **Select Lin/Log**

『Home』 → 『Display』 → 『Y Scale』 → 『Lin/Log』

● **Arbitrary select of Y-axis scale**

『Home』 → 『Display』 → 『Y Scale』 → 『Scale』 → 『Mode』

Select 『Manual』, and select lower limit value 『Lower』
or select upper limit value 『Upper』

● **Y-axis scale, etc.**：
The Y-axis scale can be selected arbitrary by double clicking the screen, and those values are fixed.
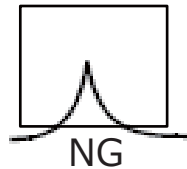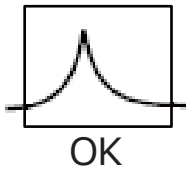
1-4 Block comparator judging method

Block setting

Upper limit level

Lower limit level

Lower limit frequency value
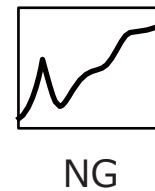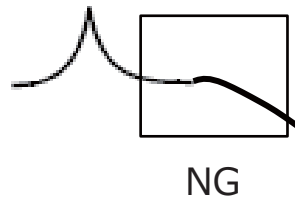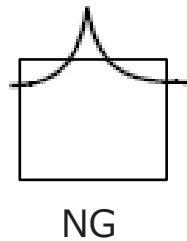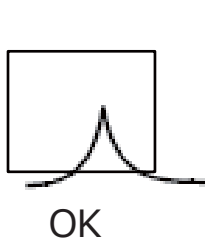
Upper limit frequency value
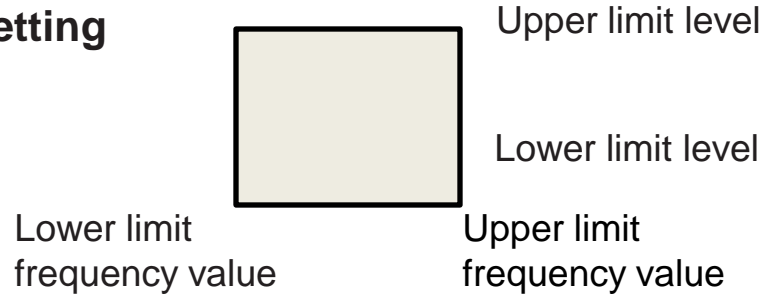
① LEVEL

The result is judged to be OK (pass) if the waveform does not exceed the specified block, and NG (fail) if it exceeds the specified block.
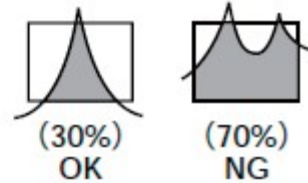
OK

NG

② PK.MAX (Peak max)

The result is judged to be OK if the waveform peak does not exceed the specified block and it is largest in the block, if not, it is judged to be NG.

OK

NG

NG

NG

③ AREA (Occupation area)

It judges by the occupation area of the waveform in the specified block.

AREA UP LEVEL ：50%

AREA LOW LEVEL ：20%

(30%)
OK

(70%)
NG

④ P.O (Partial overall)

It judges by the partial overall value within the specified block.

Upper limit ：90dB

Lower limit ：80dB

(84dB)
OK

(94dB)
NG

(74dB)
NG
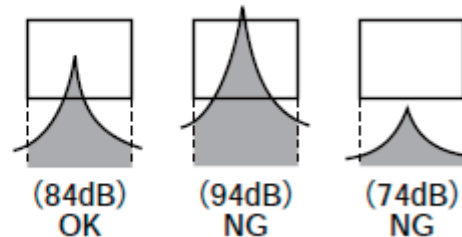
⑤ PK.LEVEL (Peak level)

The result is judged to be OK if the max. value of waveform does not exceed the frequency range of upper or lower level of specified block, if not, it is judged to be NG.

OK   OK   NG   OK   NG
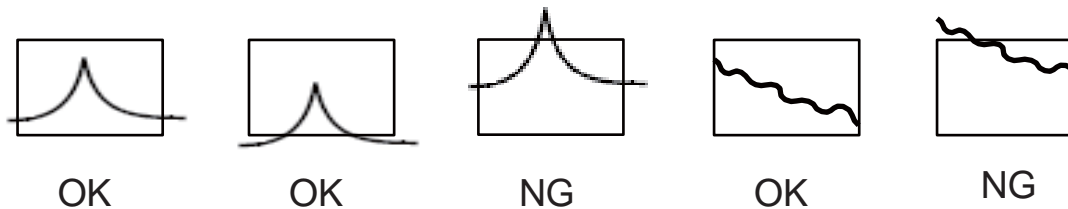
1-5 Judgment method setting (Select LEVEL)

1. Select Block Comparator from Graph Type：
   『Home』 → 『Comp』 → 『Type』 → 『Block Comp』

2. Select P.O. from the Judgment Method：
   『 』 → 『Block Setting』
   Select Graph View to switch the display to the Judge method setting screen.
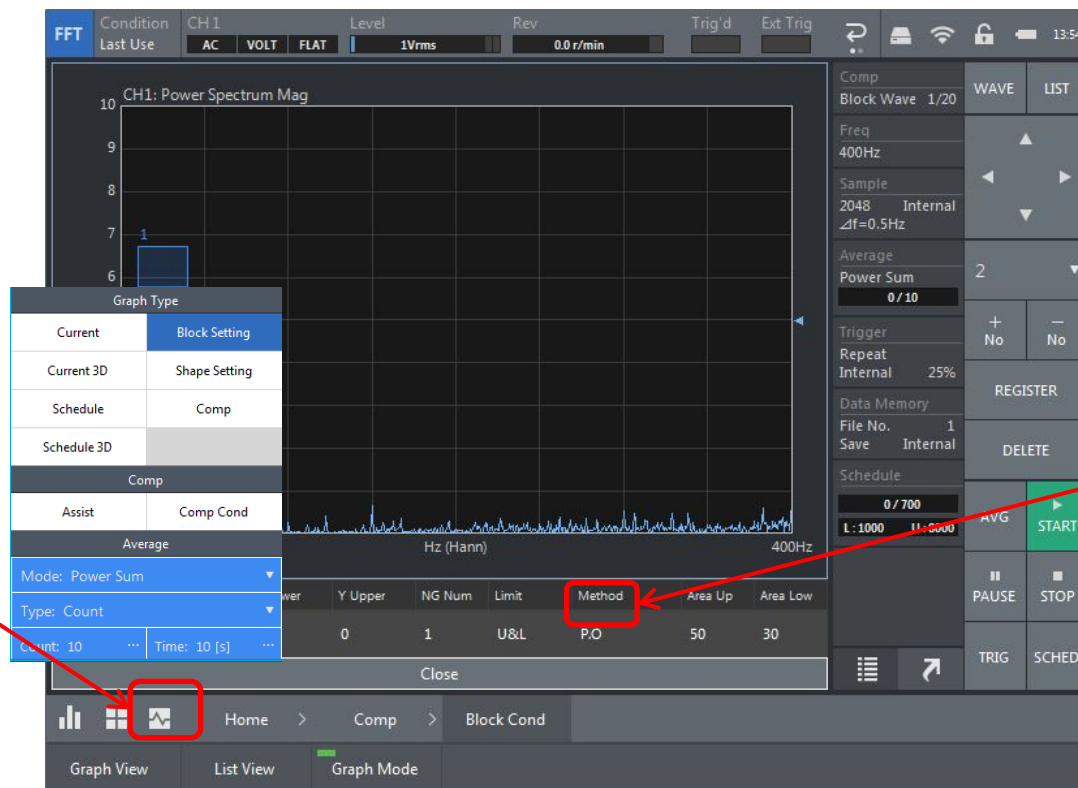
Select Block Setting.

Select P.O.

3. Set the judgment block：
Create block by dragging the stylus pen.
After creating the block, touch [REGISTER] for registration.
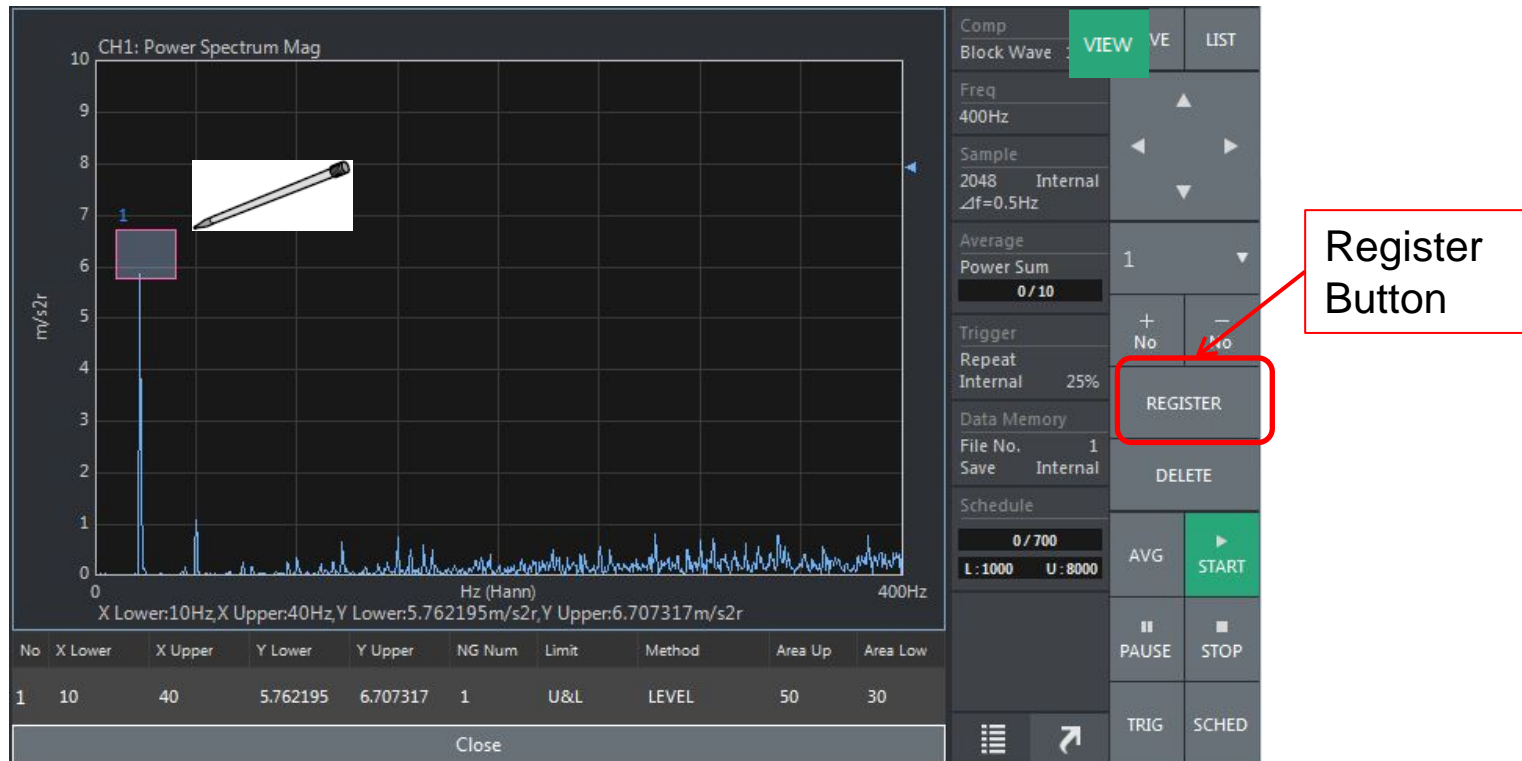
Register Button

● When you want to create multiple blocks, maximum 20 blocks can be registered. The register number is updated when you touch REGISTER button after creating block.

- The judgment area (block) can be set not only on the graph but also on the list.
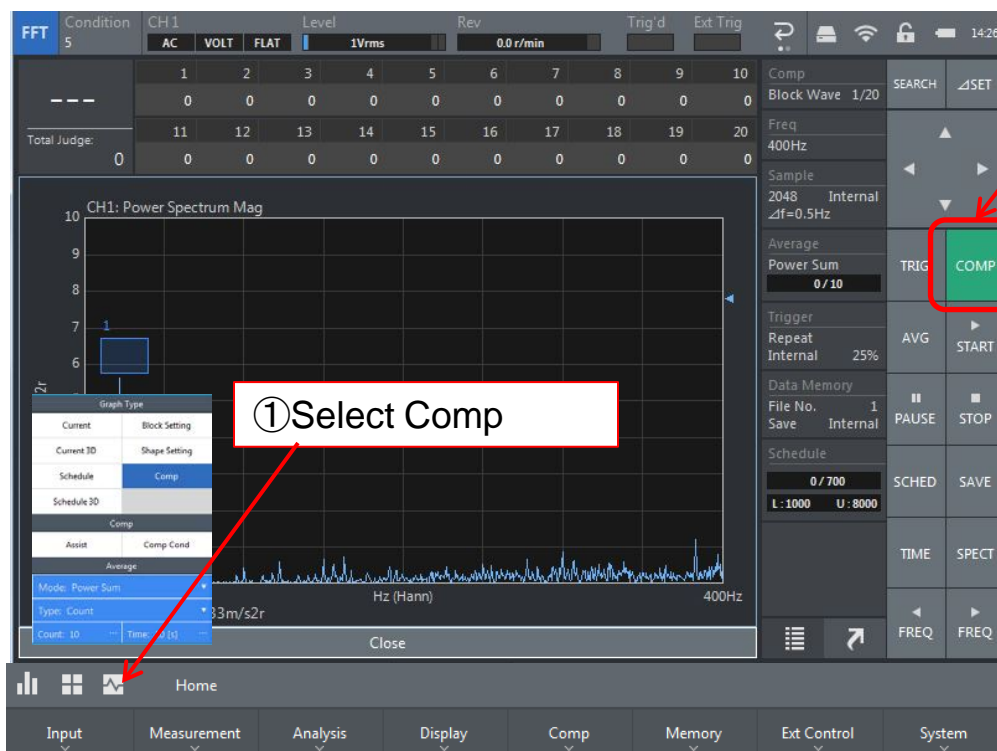
Create the block by directly inputting the numerical value of the specified section.

Touch **LIST** to display the list.

NG NUM — Input the count number (1 or larger) of NG

COMP LIMIT — Set if the levels of upper/lower, upper and lower areas are validated or not.

COMP METHOD — Select judgment method from 6 types

X LOWER — Set the lower limit frequency value of the area.

X UPPER — Set the upper limit frequency value of the area.

Y LOWER — Set the lower limit level of the area.

Y UPPER — Set the upper limit level of the area.

1-6 Executing the judgment

1. To judge while displaying the measurement screen, turn [Graph Mode] ON.

2. In this manual, set as follows: NG Num: 1/ Limit: U&L/ Method: P.O.
   Judgment is operated by the partial overall value within the selected block, if it judges NG at least once, NG is kept displayed.

①Select Comp

②Comparator function is validated when the COMP is turned ON.
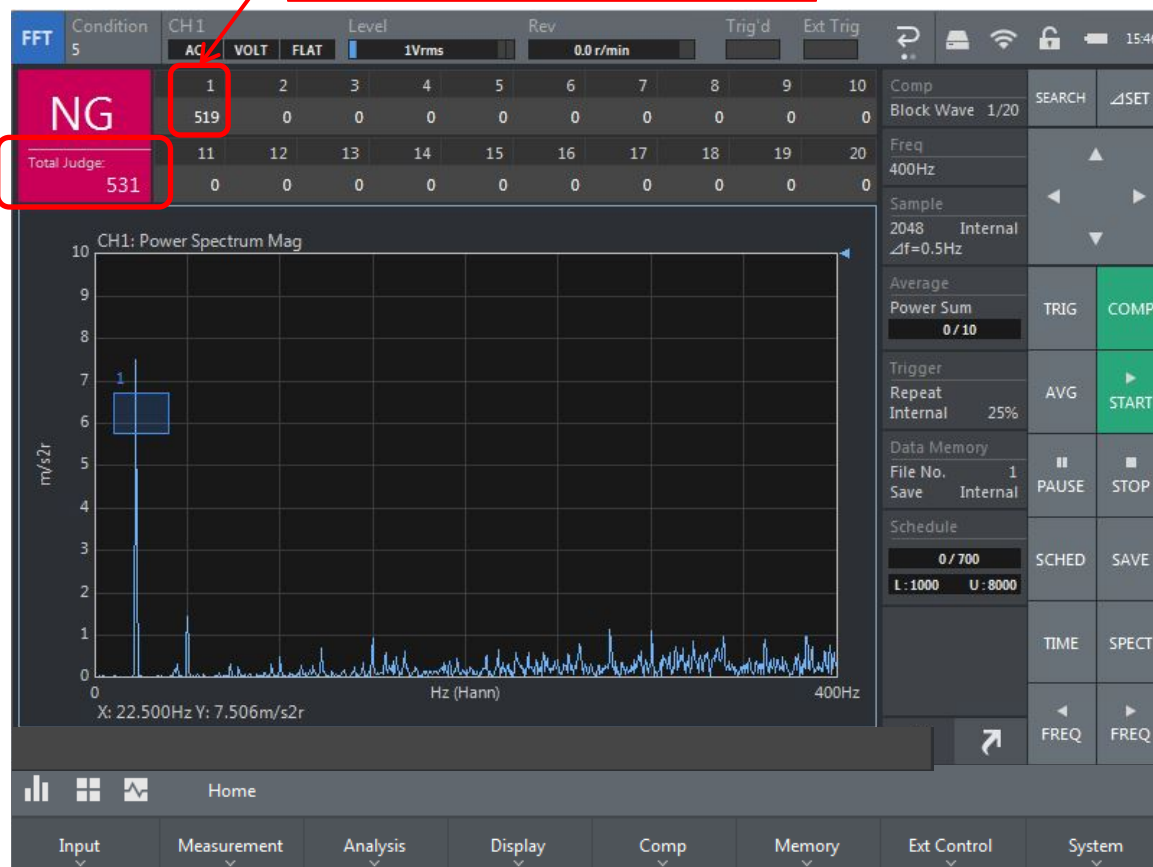
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＜Judgment result example＞

In this manual, the result is judged to be OK if the peak does not exceeds the block range, and NG if it exceeds the block range. When it judges NG at least once, NG is kept displayed.
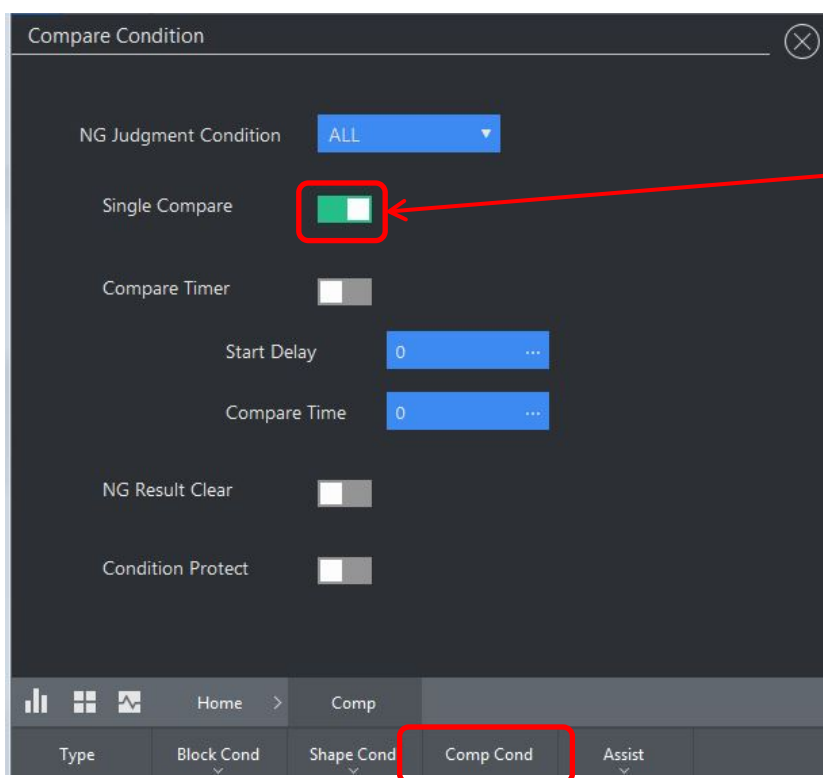
Number of blocks:
No1 519 times NG judgment

Number of judgment

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1-7 Setting of judgment condition (select single mode)

Single mode: Judges every time the [COMP] button is touched.

1. Select [Single Compare] from the judgment method:
   『Home』 → 『Comp』 → 『Comp Cond』 → 『Single Compare』

Validates the Single Compare. One judgment is performed every time [COMP] button is touched. When it turns OFF, continuous judgment mode is selected.

Once the judgment is performed, [COMP] button is turned OFF. Judgment is performed when touch [COMP] button again.

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2. Set the Compare Condition:
   『Home』 → 『Comp』 → 『Comp Cond』

   ● Compare Timer：Set the start time and compare time of judgment.
   ● Start Delay：Set the waiting time until the judgment is performed after touching the [Comp] button.
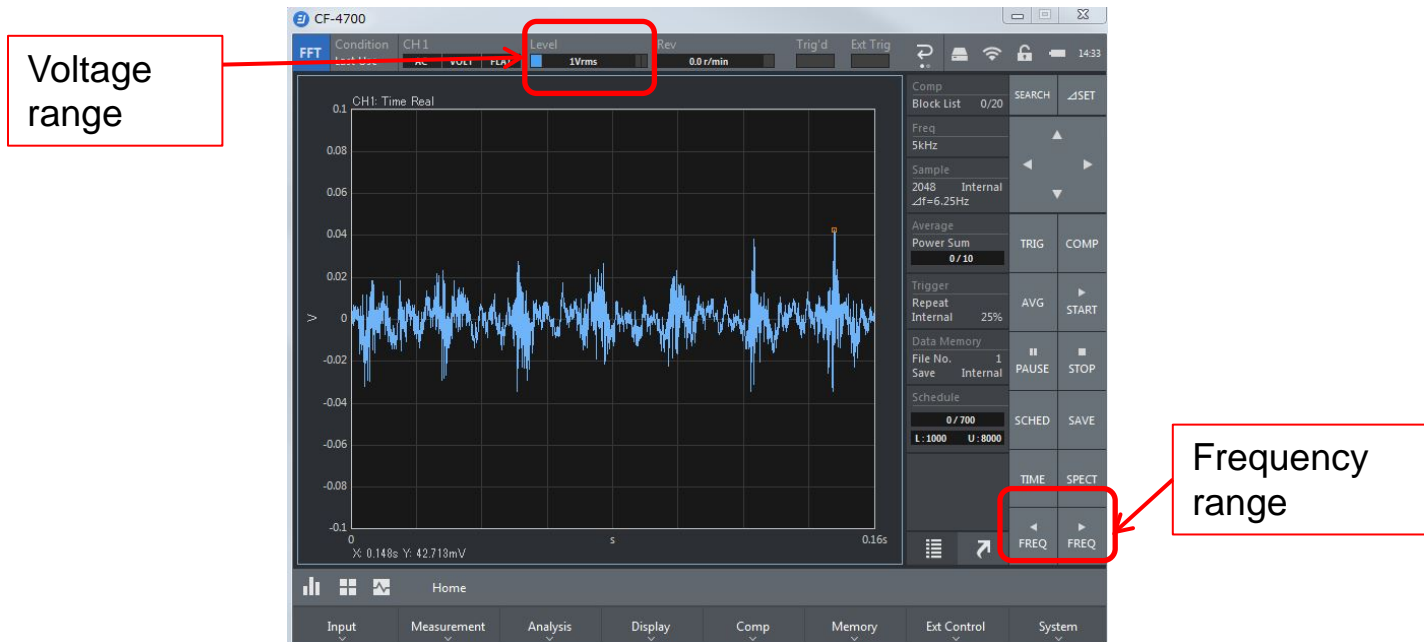   ● Compare Time: Set the time of operating the judgment.
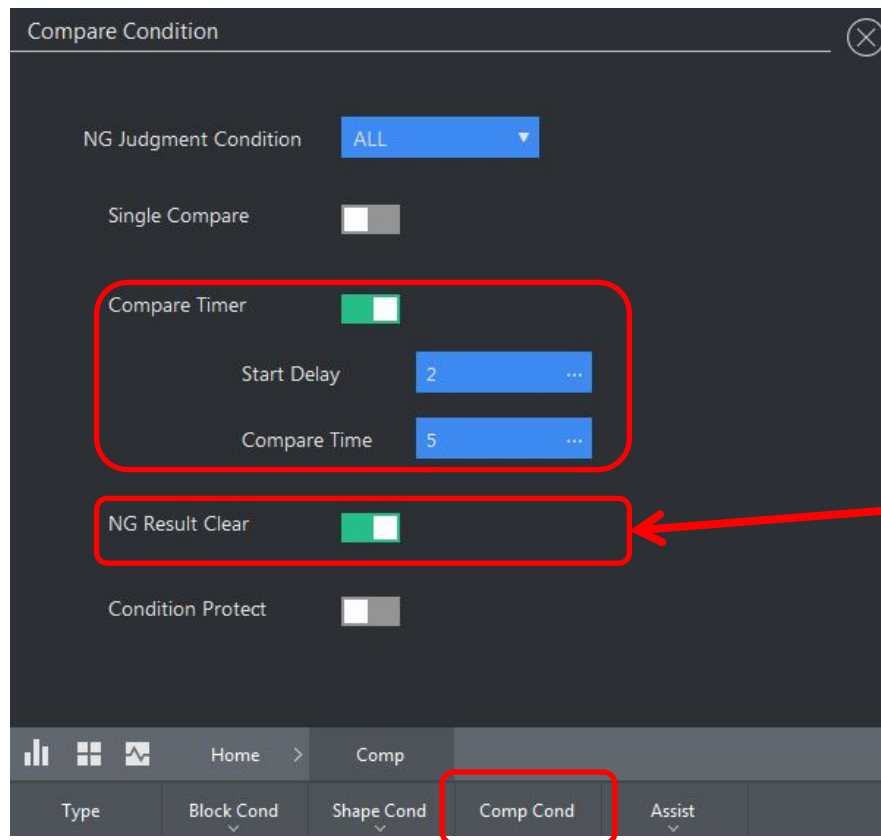
Activate the NG Result Clear. It automatically cleared the judgment results when next measurement is started.

2. Shape comparator (Time-axis waveform)

2-1 Time waveform display

Set the voltage range, frequency range to display the time waveform.

Voltage range

Frequency range

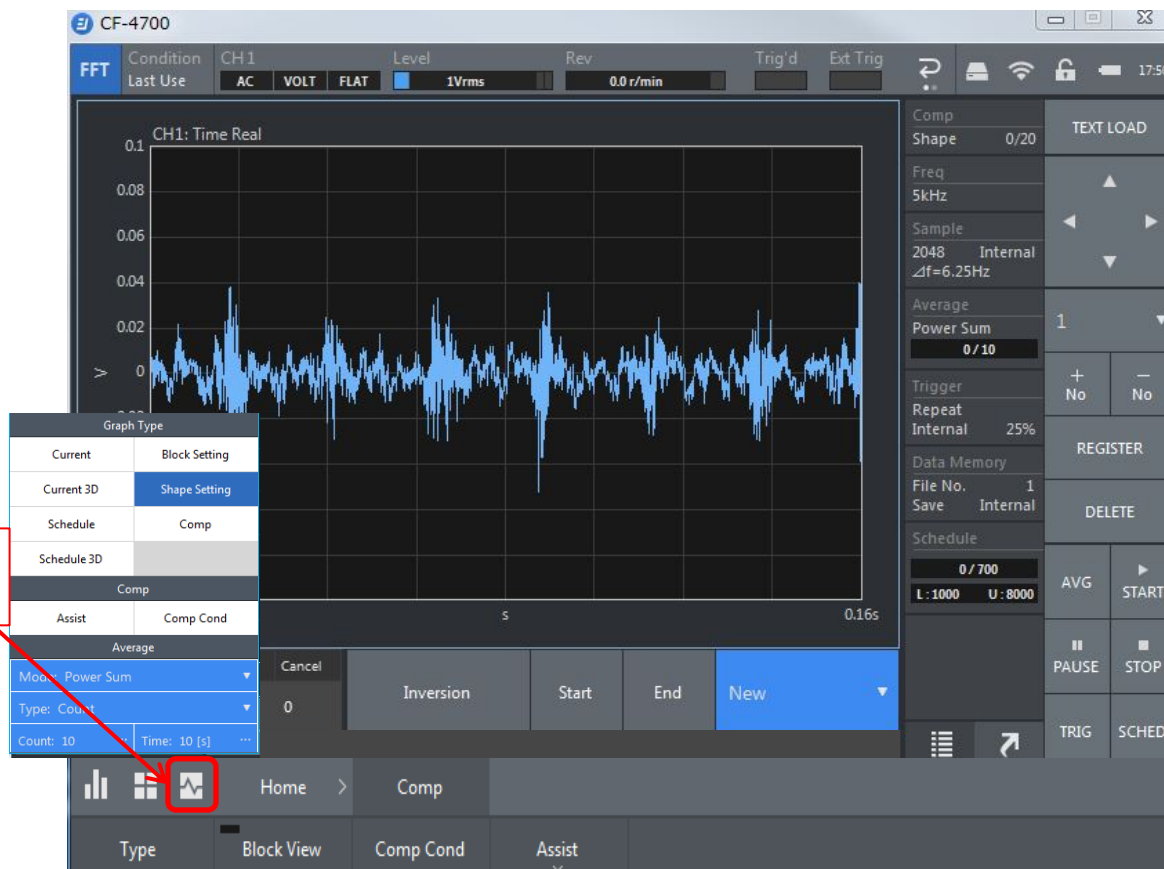## 2-2 Shape comparator setting method

Set the mode to shape mode.
Select 『Home』 → 『Comp』 → 『Type』 in this order to select 『Shape Comp』.

2-3 Condition setting

1. Select 『 』 → 『Shape Setting』.

Select Shape Setting.

In this manual, top and bottom judgment criteria is set to the time waveform graph.

2. Select 『Home』 → 『Comp』 → 『Shape Cond』 in this order to select 『Graph View』.

The point you touch first will be the starting point of a judgment line, at which the shape comparator editing cursor (rectangle) appears. Next, when you touch any point on the screen, a line appears on the graph from the starting point to the point you touch. When you finish drawing a judgment line, touch [REGISTER] button for registration.

It is easy to draw a straight line by using the [Start] and [End] buttons. When the [Start] button is touched, the point is moved to left end and drew a straight line. When the [End] is touched, the point is moved to right end and drew a straight line.

Limit OVER：When amplitude is in + side of judgment line, it judges NG.
　　　 UNDER: When amplitude is in – side of judgment line, it judges NG.

Upper figure: example of setting the judgment reference in upper and lower limit.

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3. Select 『 』→『Shape Setting』 in this order to select 『Inversion』.
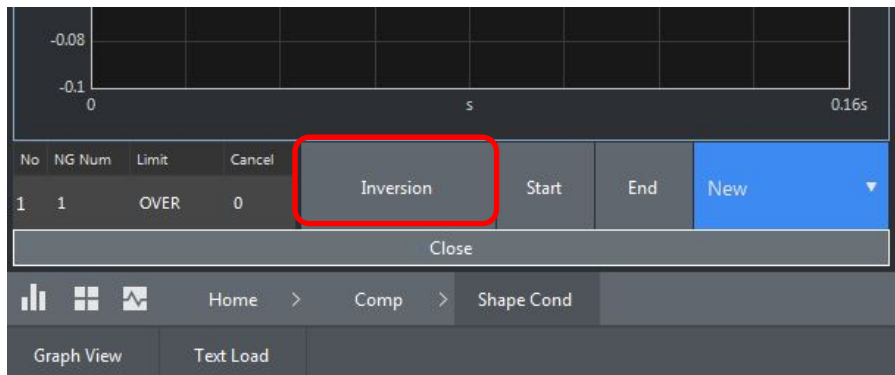
When the soft key [Inversion] is touched, the time waveform judgment line of plus side is inversion displayed to minus side. The judgment line can be set top and bottom of the time waveform.

Prepare the two types of judgment references:

① Blue line: Judgment of plus side.
    When the waveform is exceeded the upper line, it judges as NG. Set the Limit to OVER.

② Red line: Judgment of minus side.
    When the waveform is lower the lower line, it judges as NG. Set the Limit to OVER.
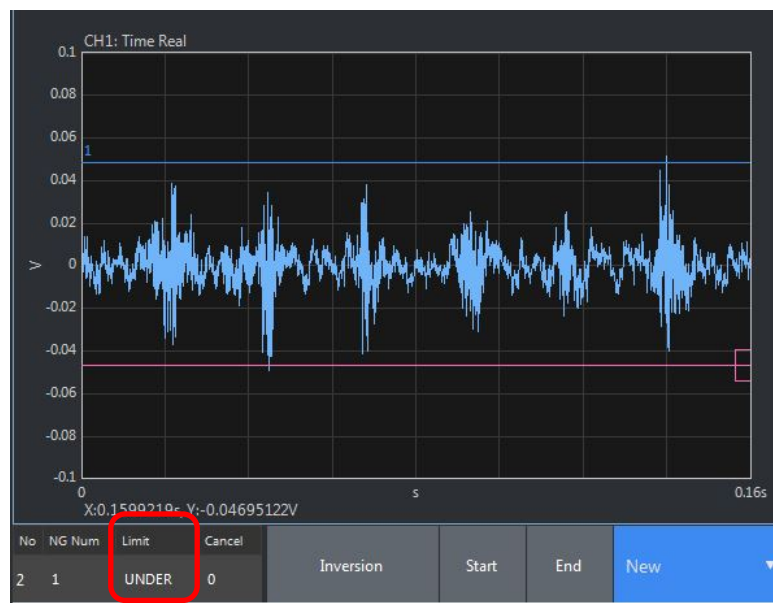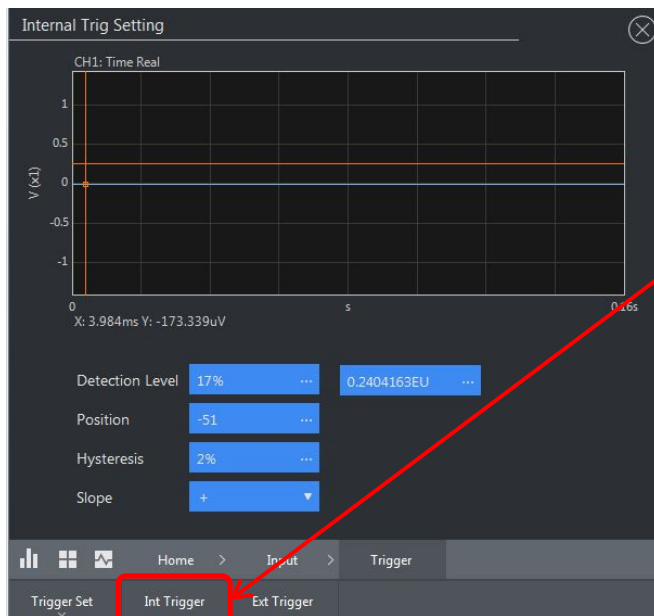
2-4 Comparison of the time summation averaged time waveform

1. Trigger function is necessary to perform time summation averaging.
   『Home』 → 『Input』 → 『Trigger』 → 『Trigger Set』
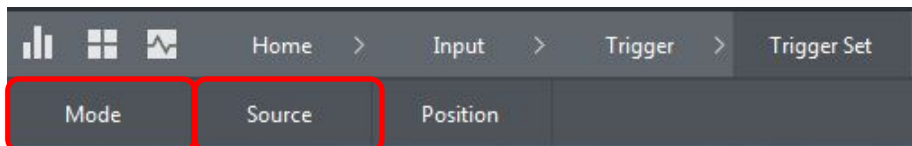
2. Select Repeat form the Mode. The data is acquired every time the rigger is applied.

3. Select Internal from [Source]. The trigger is applied to the measurement signal in Internal.

   Select 『Home』 → 『Input』 → 『Trigger』 in this order to select 『Int Trigger』.

4. Select the level and position of the trigger.

Set the level and position of the trigger.

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5. Set the time summation averaging processing:
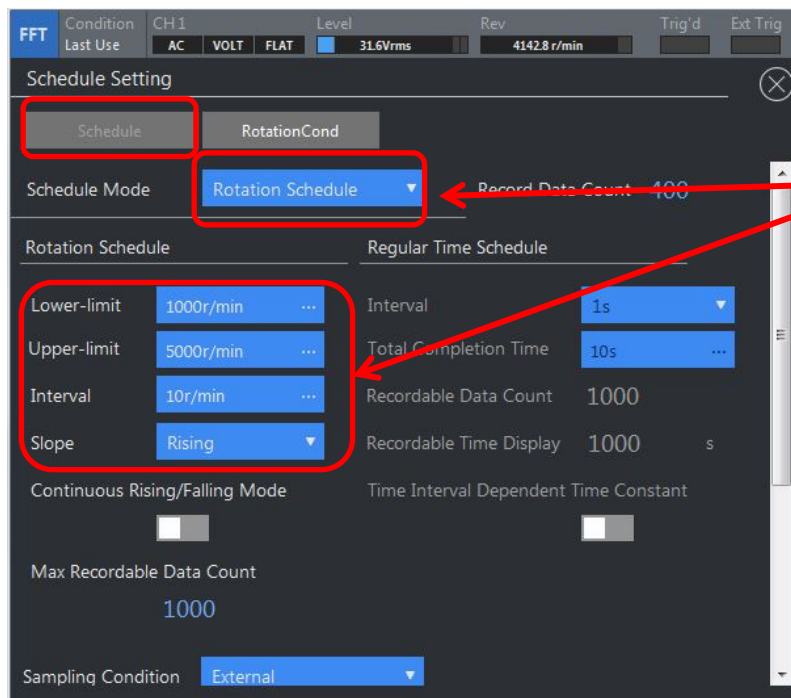『Home』→『Measurement』→『Average』
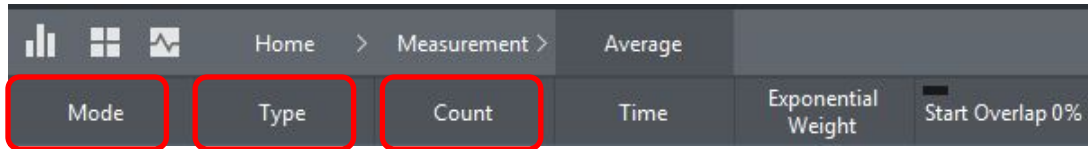
6. Select Time Sum from the [Mode].

7. Select Count from the [Type].

8. Select number of averaging from [Count].

9. Touch [COMP], [TRIG] and [AVG] to set the condition to trigger waiting state.
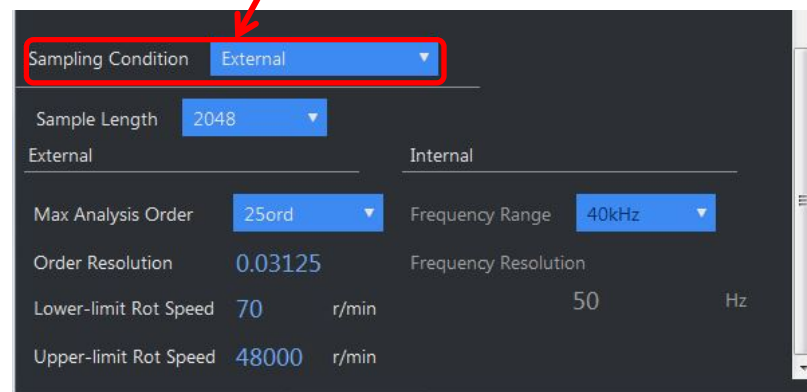
3. Tracking waveform shape comparator

3-1 Tracking analysis setting

1. Touch 『Home』→『Measurement』 in this order to select 『Schedule』.

Perform tracking setting in this screen. Set the measurement rotation range (Lower, Upper) and measurement rotation interval. Also, lower the screen and set the sampling condition and max. analysis order.

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2. Set the rotation pulse for the tracking analysis:

Touch 『Home』 → 『Measurement』 in this order to select 『Schedule』.

The rotation pulse is able to be set in the setting screen by touching the RotationCond. After setting, check if the rotation speed is displayed in the upper right of Rev.
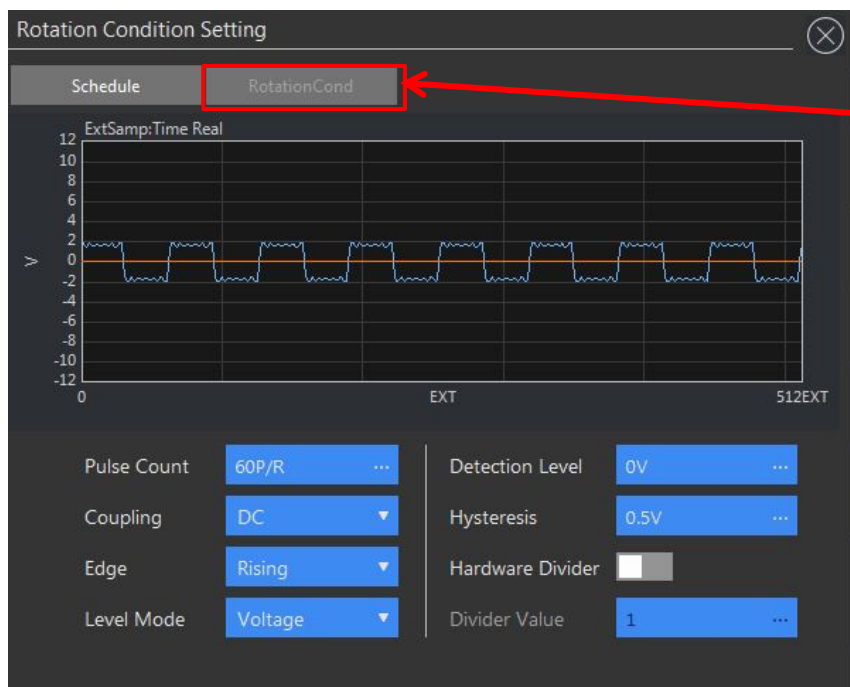
The rotation pulse can be set in the RotationCond when the tracking is performed. Set the number of pulses (Pulse Count) in one rotation, threshold value (Detection Level) and coupling.
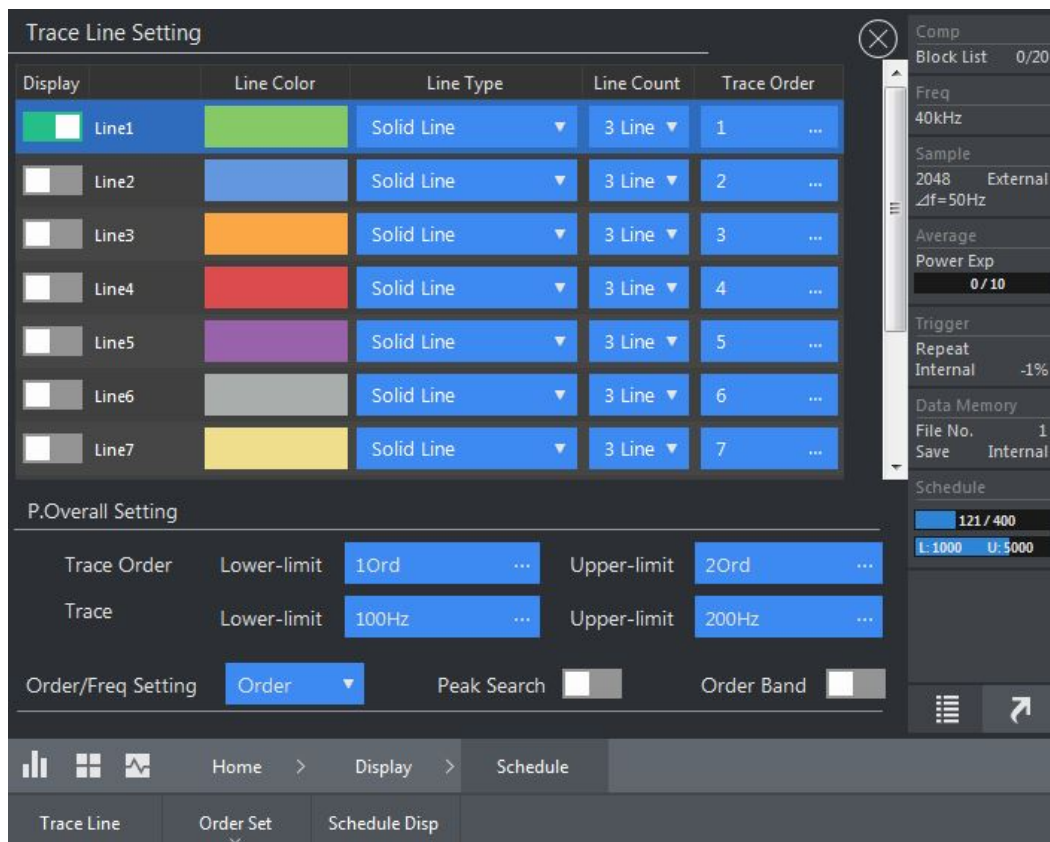
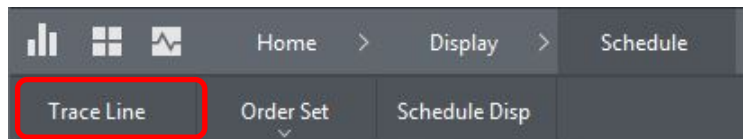3. Switch the screen to tracking analysis screen.
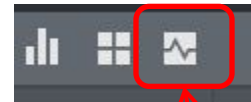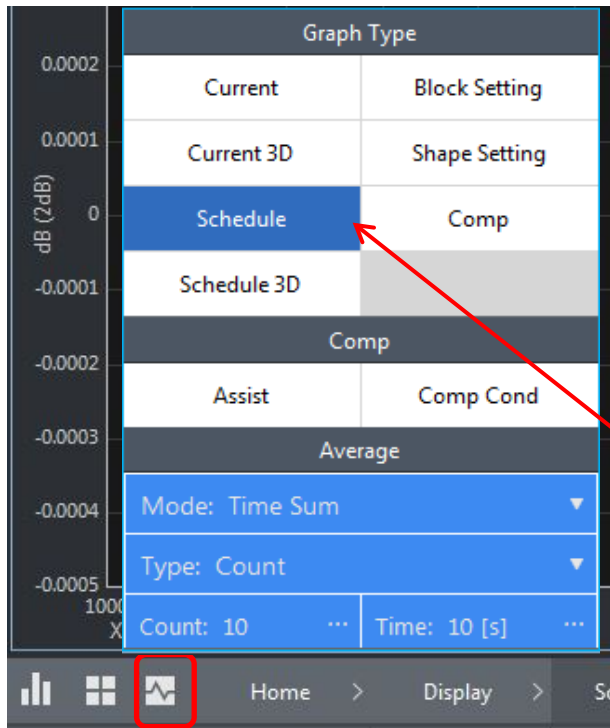
Change the Graph Type.

When the Schedule is selected, the screen is changed.

4. Touch 『Home』→『Display』 →『Schedule』 in this order to select Trace Line.

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5. Set the tracking diagram (trace line) to be displayed：

Touch『Home』→『Display』→『Schedule』in this order to select Trace Line.

Select the trace line (order component) to be displayed.

In this manual, first order component and overall value (O.A) are displayed.
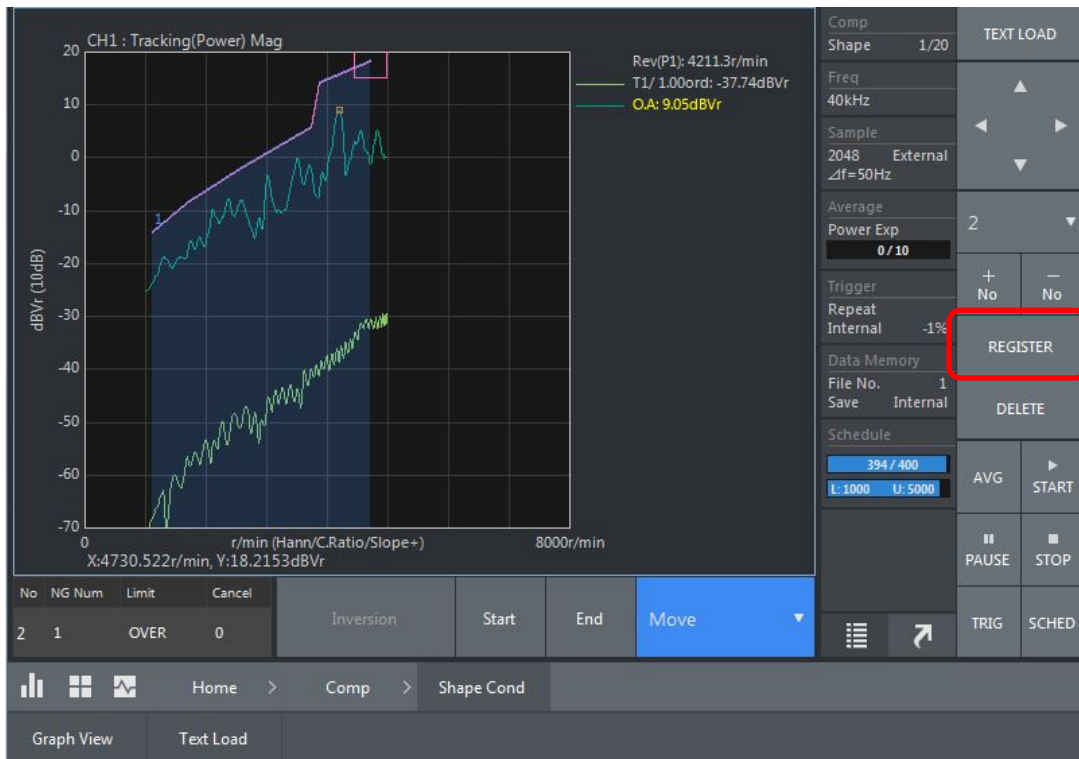
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3-2 Execute the tracking analysis
• Touch the [SHED] button, then touch[START] button.
  The measurement is started when the rotation speed is reached to the selected value.

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3-3 Tracking analysis judgment line setting

- Touch 〖 ⟋ 〗 → 〖Shape Setting〗 in this order to set Graph View.

Please refer to the shape comparator setting method for this setting.

Touch the screen to select the judgment line. Then touch [REGISTER] to register the judgment line.

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3-4 Execute the tracking analysis judgment
- Touch [SCHED] and [COMP] button, then touch [START] button.

When perform judgment after displaying the tracking results, activate the
[Single Compare] by touching [Home] →[Comp] →[Comp Cond] in this order.
The judgment is executed when the [COMP] button is touched after the
measurement.