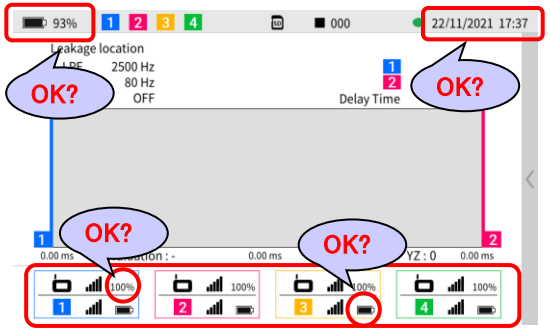
GPS-equipped digital 4-point real-time leak noise correlator
Model: LC-5000 Simple Operation Manual <Basic Correlation Method>

SUBSURFACE INSTRUMENTS, INC

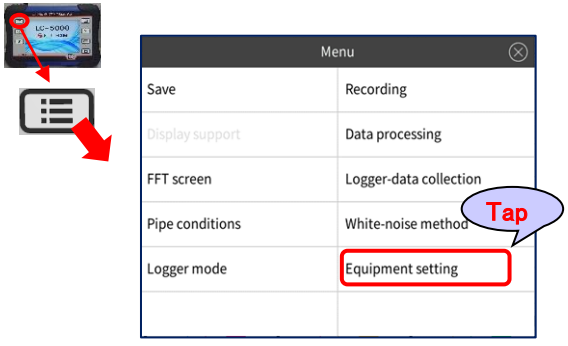
2023.07.26 (E) ver.5.0

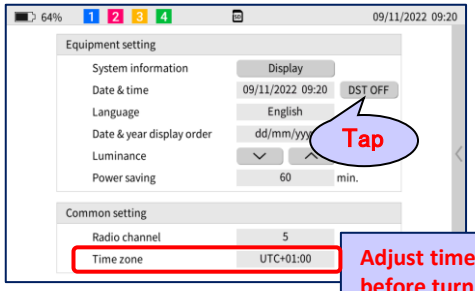
(1) Attach the antenna or antenna base with cable + antenna to the preamplifier, and turn on the power of the main unit and the preamplifiers.

(2) Check the following on the main unit screen.

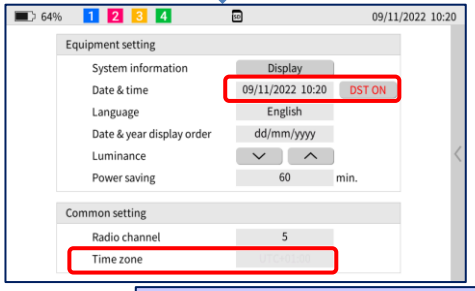


During daylight saving time, tap 'Equipment Settings' from the menu and enable daylight saving time.



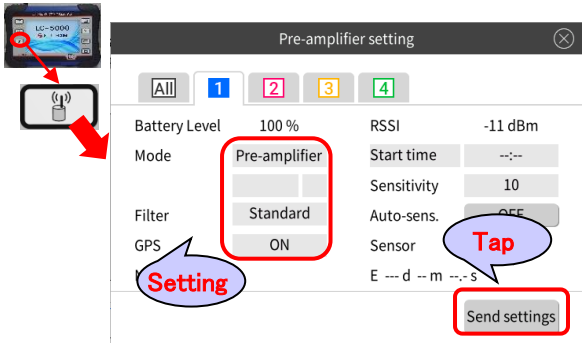


Adjust time zone before turning on DST.



The display changes to DST ON and the clock advances by one hour. You will not be able to change the time zone at this stage.

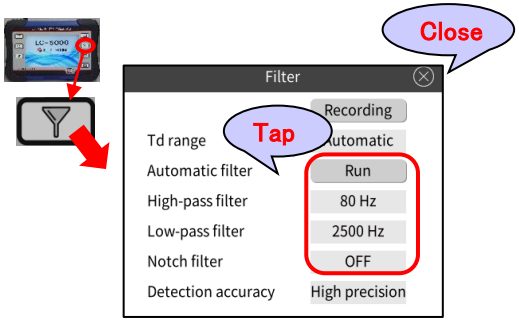
(3) Press the preamplifier switch to check and set the preamplifier conditions.



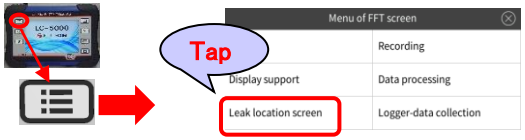
(4) If the antenna is attached directly to the preamplifier, replace the antenna of the preamplifier with the antenna base of the extension cable, and set up the preamplifier and antenna.

OR

(5) Press the filter switch to set the filter items.



When the auto filter is executed, select the leak position detection screen from the menu.



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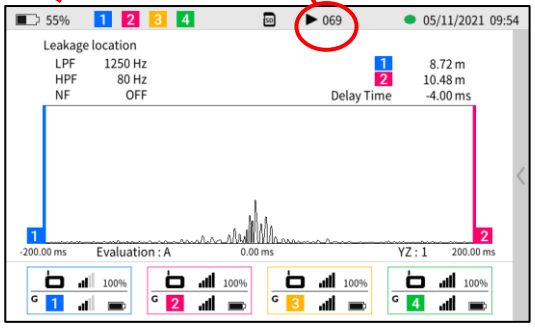
(6) Press the correlation switch to start the correlation process.

Start the correlation

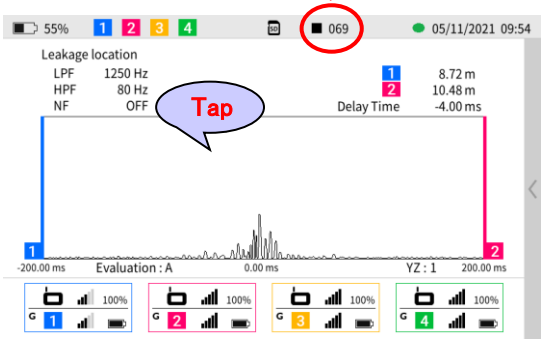
Indicates that correlation processing is progress. The number on the right represents the addition number of correlations and gradually increases.



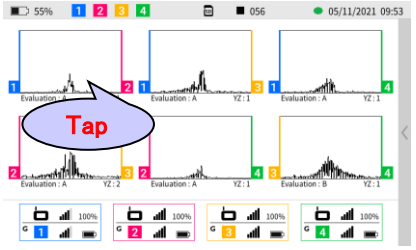
(7) After confirming the waveform, press the correlation switch to stop the correlation and tap the graph

Stop the correlation

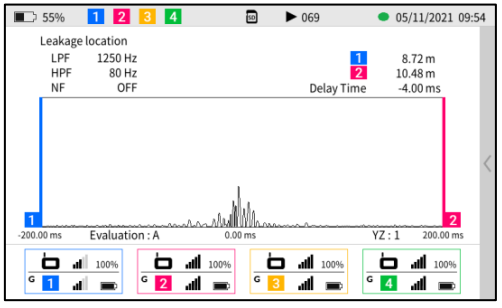
■ Indicates correlation stop. The additional number of counts is stopped for the correlation.



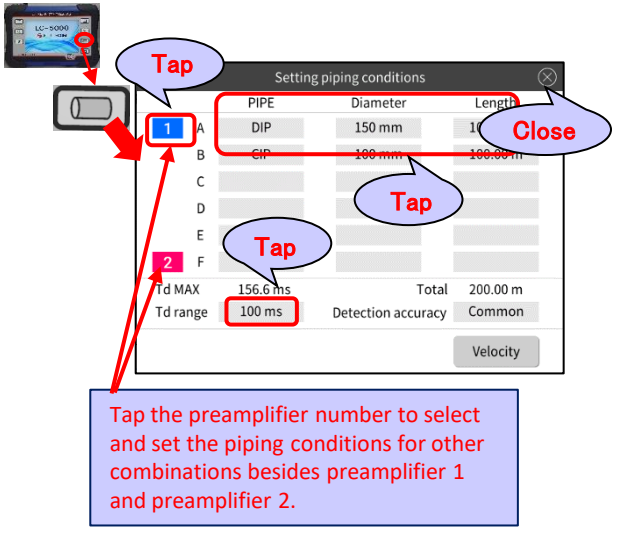
(8) Switch to the multiple correlation screen. To set the piping conditions, check the combination of preamplifiers that are correlated, and tap the screen.



(9) Be switched to the single screen of correlation again.



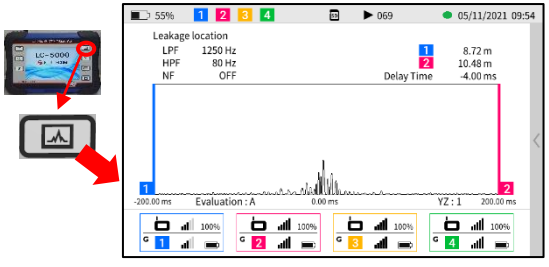
(10) Press the "Setting pipe conditions" switch to set the piping conditions.



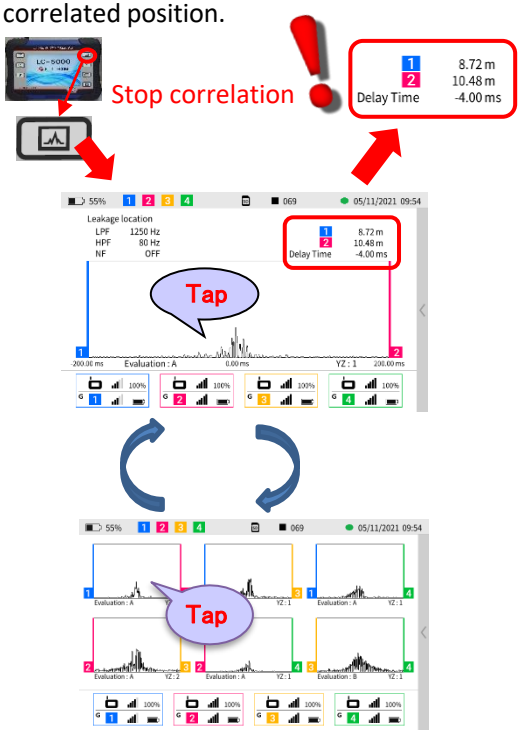
Tap the preamplifier number to select and set the piping conditions for other combinations besides preamplifier 1 and preamplifier 2.

(11) Press the correlation switch again to start the correlation process.

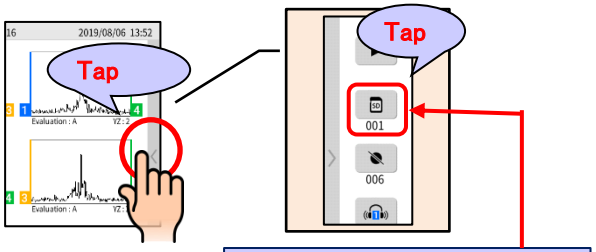
Start correlation



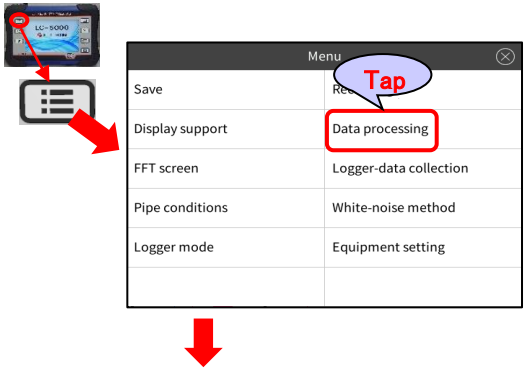
(12) When correlation results are obtained, press the correlation switch to stop, and check the correlated position.



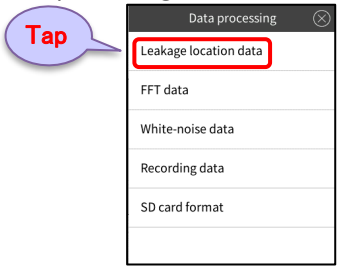
(13) Save to SD card.

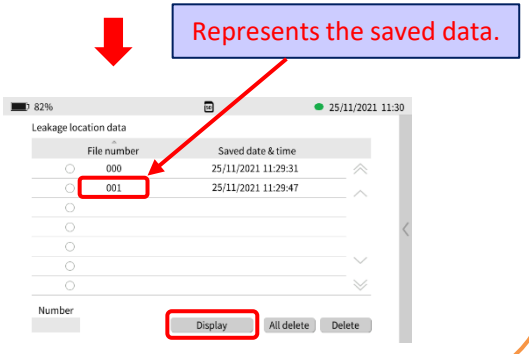


Note : To check the saved data, press the menu switch and tap "Data processing".



Tap “Leakage location data".





File number 001 is the first saved data.

Tap the file number, then tap the “Data display” to be shown the correlation graph of the saved data.

<NOTE>
File number 000 is an automatically generate file, and each time the correlation is started and stopped, the same file as the latest saved data is overwritten.
For example, when the latest saved data is at 003, the data at 000 is recorded as same data as 003 in order to the internal function processing.

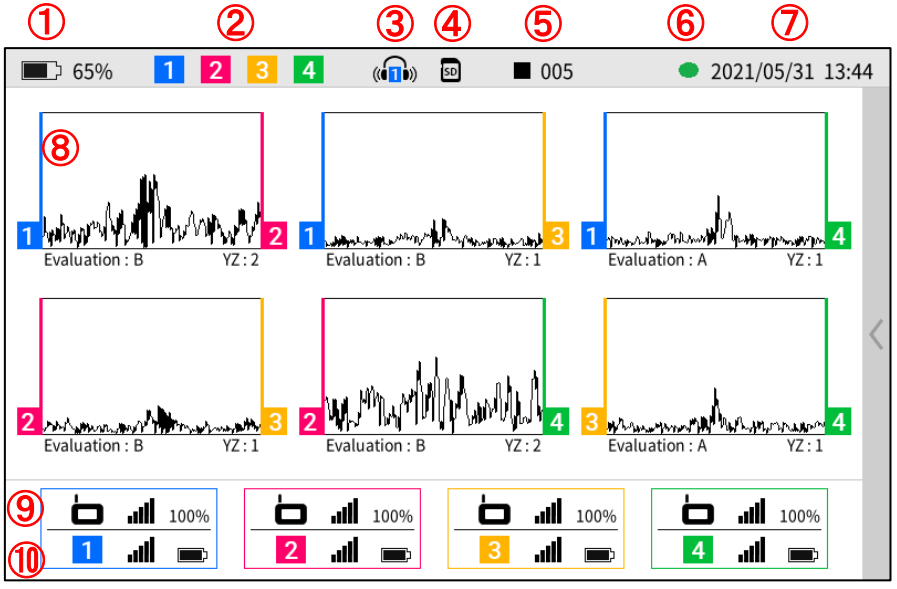
LED displays of preamplifier on quick logger mode.

NOTE	
●	Turn on
◍	Blinking
○	Turn off

Status (Operation flow of Quick Logger Mode)	LCD Display
After starting	● ○ ◍ ○
After turning on the quick logger mode with the main unit	● ● ●
During logging (Including waiting for the 2nd and 3rd time)	●
Waiting for main unit communication	●
Status that logging data can be transferred	●
After sucking up (power off automatically)	○

The preamplifier will automatically power off in about 9 minutes when data collection is performed from the logging data pickup enabled state. After collecting data, turn off the main unit and preamp once.
The recording data is stored in the preamplifier when the logging data is performed enabled state, and the power can be turned off. However, the data will be overwritten when the logger mode is executed again.

Display description of the main unit LCD panel.



(1) Battery level in the main unit.
(2) Preamplifier in communication.
(3) Headphone connection in progress.
(4) SD card being inserted
(5) Number of addition times of correlation
(6) Wireless indicator.
(7) Current date and time.
(8) Correlation waveform (single or multiple)
(9) Main unit reception strength, data arrival rate.
(10) Preamplifier reception strength, remaining battery power.

GPS-equipped digital 4-point real-time leak noise correlator
Model: LC-5000 Simple Operation Manual <Logger Mode - Quick mode>

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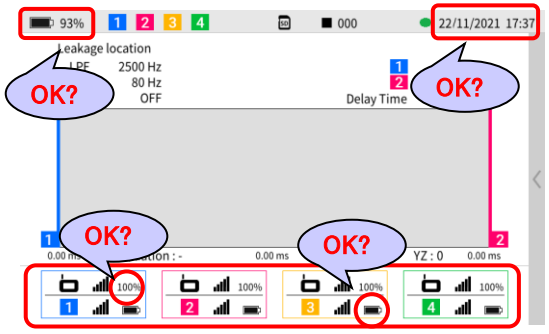
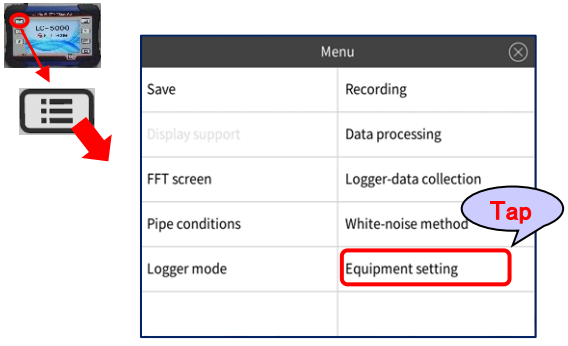
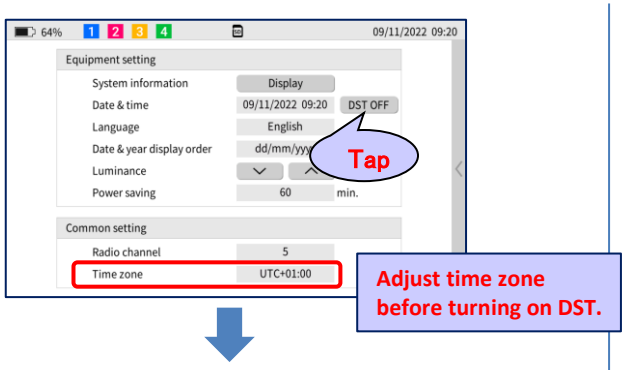
(1) Attach the antenna to the preamplifier and turn on the power of the main unit and the preamplifier.

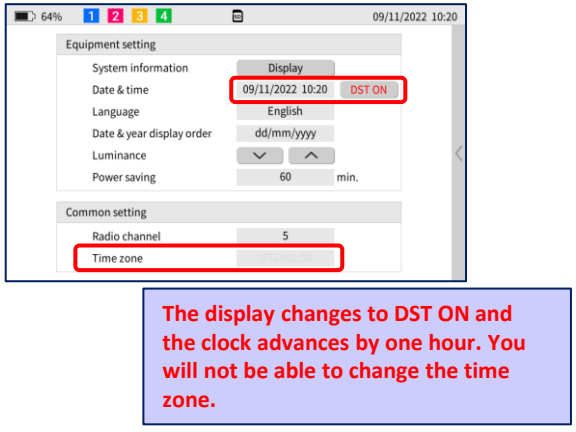
(2) Check the following on the main unit screen.



During daylight saving time, tap 'Equipment Settings' from the menu and enable daylight saving time.

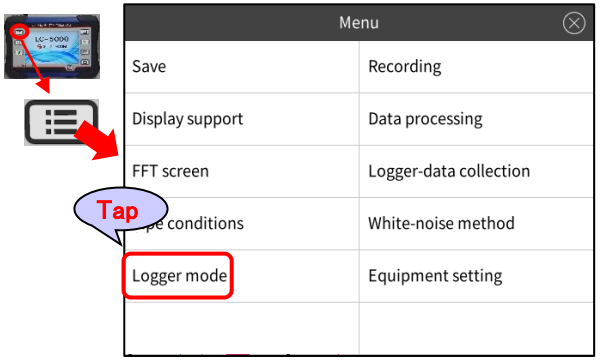




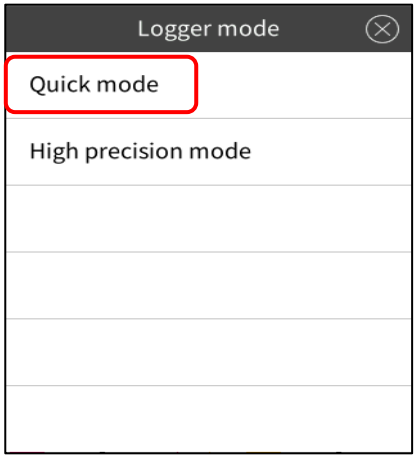


The display changes to DST ON and the clock advances by one hour. You will not be able to change the time zone.

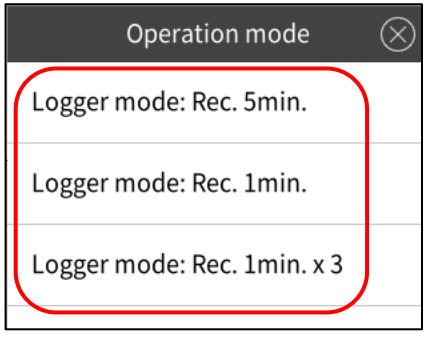
(3) Press the menu switch and tap the logger mode.



(4) Tap the Quick mode.



(5) Select any operation mode.



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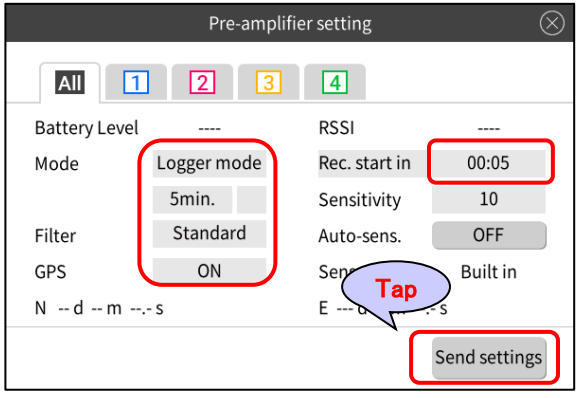
(6) Enter the time until recording starts.
(Set after 3 to 30 minutes)

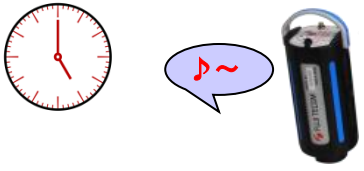
(7) Transit to the preamplifier setting screen.
Check the settings and tap Send Settings.



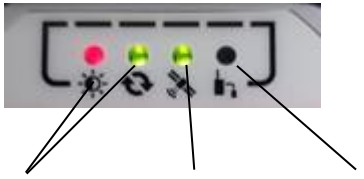
(8) Make sure that all the LEDs of the preamplifier are lit.

(9) Remove the antenna of preamp and install its preamplifier.
At this time, in order to prevent damage due to flooding, cover the antenna connector with the attached cap to make it completely waterproof.

(10) Recording will start at the specified time.

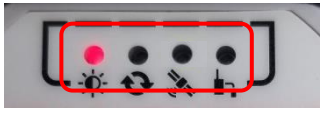


(11) When the recording is finished, the LED of the preamplifier will be as follows. In the place where the radio wave from the main unit reaches, it becomes like (13).

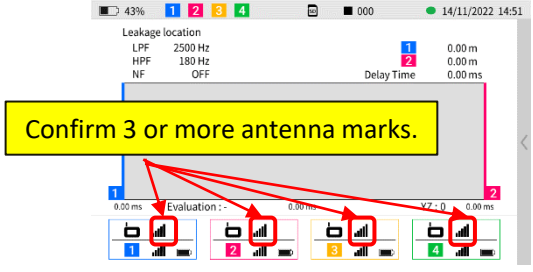


(12) Attach again the antenna to the preamplifier and bring it near the main unit. At this time, leave the power of the preamplifier and the main unit turned on.

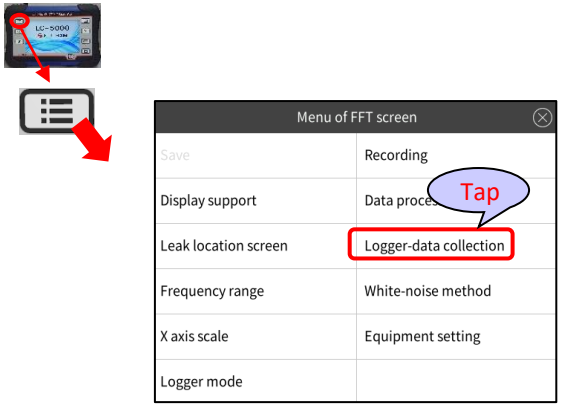
(13) The post-processing of the quick mode is performed, and the LED of the preamplifier is as follows. Make sure that the LEDs on all preamps you have installed look like this.



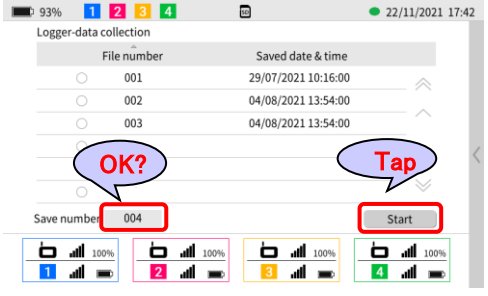
(14) Check that three or more antennas are shown for the preamplifier symbol at the bottom of the screen. At this time, the data arrival rate next to the antenna is not displayed.



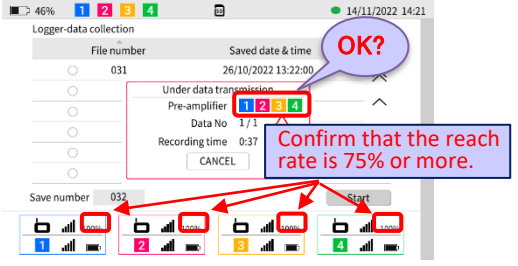
(15) Press the menu switch and tap Logger Data Collection.



(16) Check the file number and tap Start Collection.

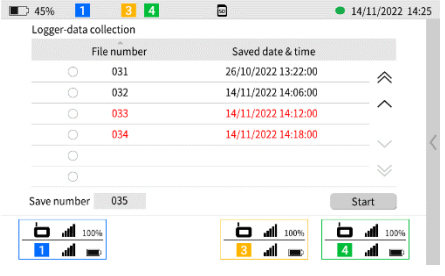


(17) While collecting data, confirm that all preamp numbers installed in the message screen are displayed. A radio reach rate of 75% or higher is desirable. If the radio reach rate is less than 75% during collection, the warning display will flash. Tap 'CANCEL', move the location, and start over from (14).

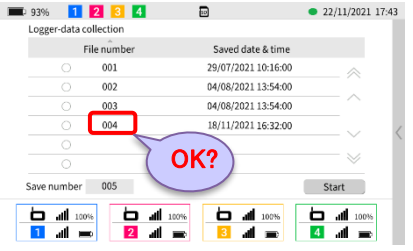


If you exit without pressing 'CANCEL', the following screen will appear. If you want to collect data again, move to a place with a good wireless environment and tap 'RETRY'.

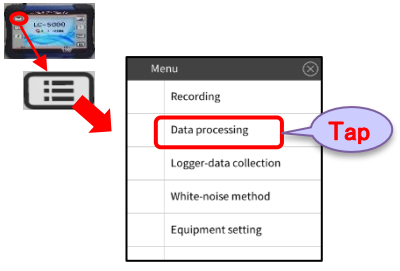
Press Cancel to return to the Logger Data Collection screen. Files that can be collected normally are displayed in black, and files with missing data are displayed in red.



(18) Check the file number of the collected (saved) data.



(19) When the collection is completed, press the menu switch to display the menu screen and tap Data processing.



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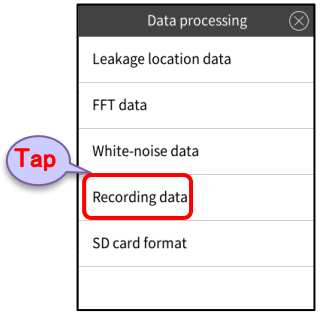
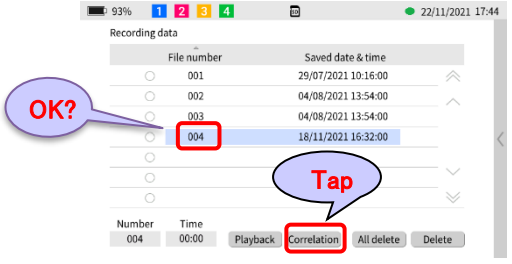
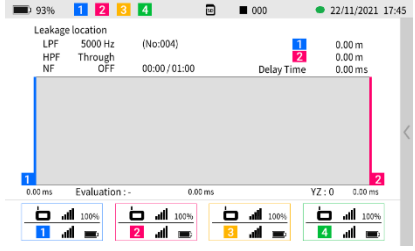
(20) Tap the recording data.

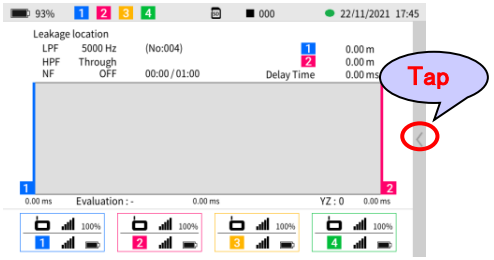


(21) Tap the saved file number and tap Re-correlation.

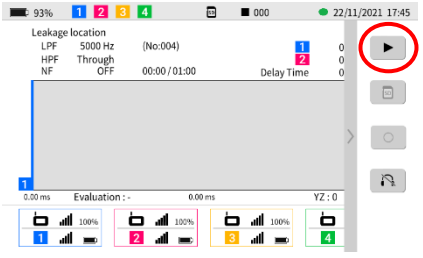




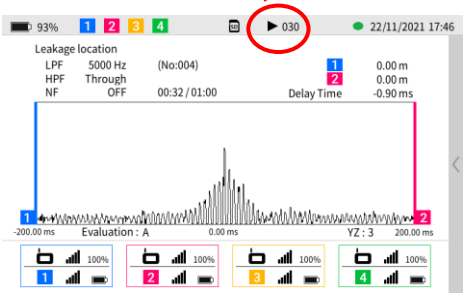
(22) Displays a Quick menu.



(23) Tap the replay button ▶. After a while, the correlation graph will be displayed.

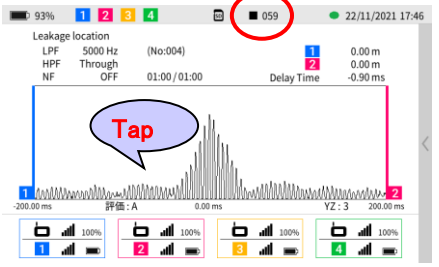


▶ Indicates that the recorded data is being played.
The number on the right represents the addition number of times of correlation and gradually increases.

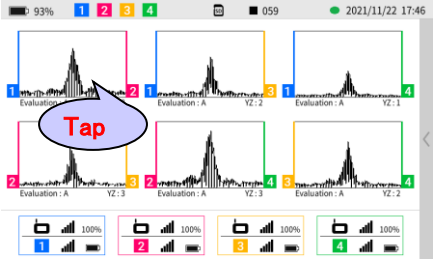


(24) After playing the recorded data, tap the graph.

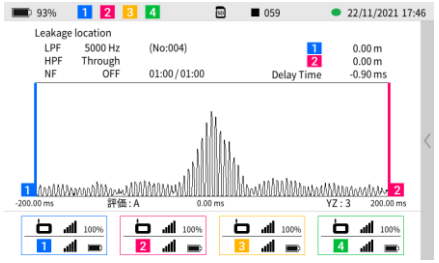
■ Indicates that the recorded data is stopped.
The correlation addition stops the calculation.



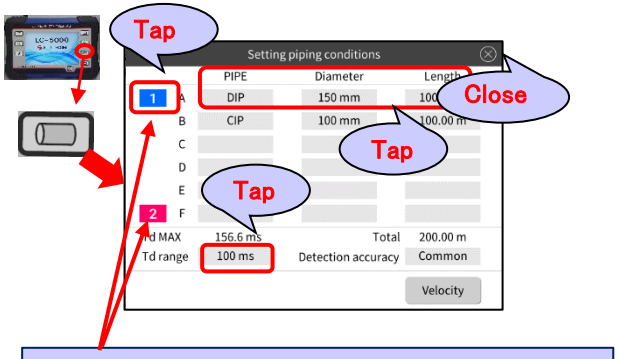
(25) Switches to the multiple correlation screen.
To set the piping conditions, check the combination of preamplifiers that are correlated and tap the screen.



(26) Switch to the single correlation screen again.

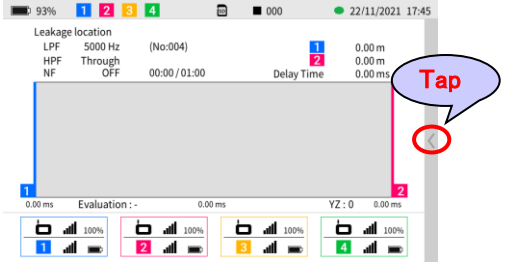


(27) Setting for piping conditions press the switch to set the piping conditions.

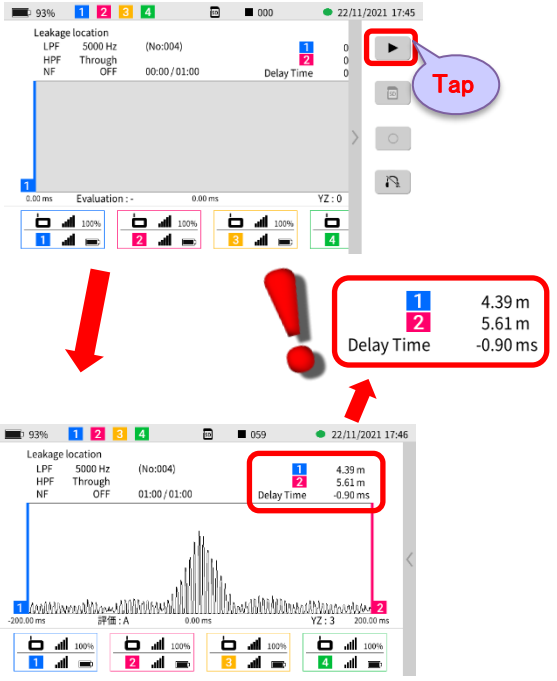


By tapping the preamplifier number, you can select and set piping conditions for combinations other than preamplifiers 1 and 2.

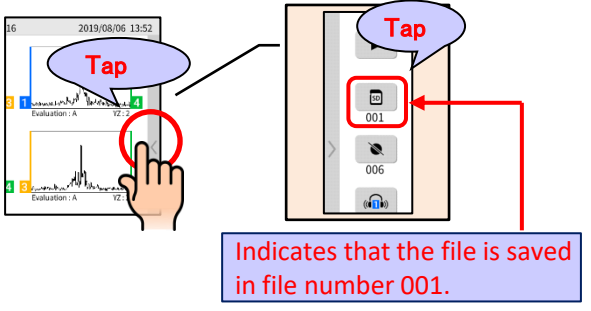
(28) Display the Quick menu.



(29) Tap the replay button▶ to display the correlation graph. Check the correlation position.



(30) Save to SD card.



Indicates that the file is saved in file number 001.

(31) After executing the logger mode, turn off the power of the main unit and the preamp once.

GPS-equipped digital 4-point real-time leak noise correlator
Model: LC-5000 Simple Operation Manual <Logger Mode – High precision>

SUBSURFACE INSTRUMENTS, INC

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(1) Attach the antenna to the preamplifier and turn on the power of the main unit and the preamplifier.

(2) Since the preamplifier receives weak radio waves from artificial satellites, take it outdoors. Please do it in a place where you can see the sky and there is nothing blocking your view such as buildings. Wait for the LED for GPS among the 4 LEDs to switch from blinking to lit out. It may take 5 to 10 minutes to synchronize the GPS signal from the satellite with the preamplifier.

Waiting

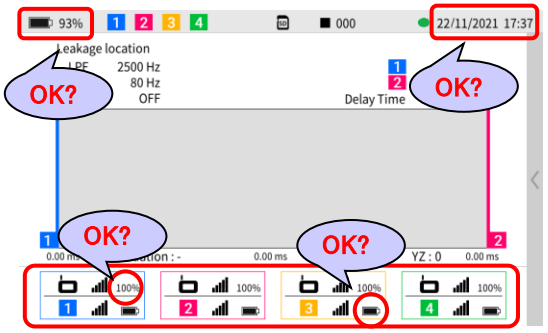
Power supply LED

GPS LED : Blinking

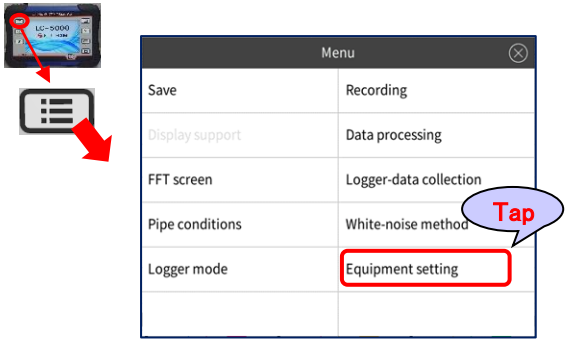
Finished

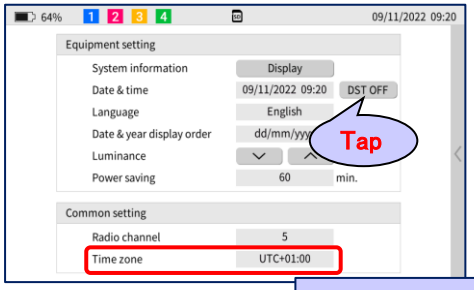
GPS LED : Lighting

(3) Check the following on the main unit screen.

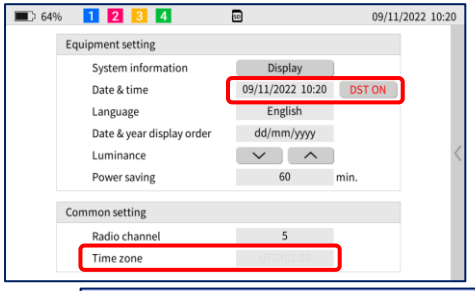


During daylight saving time, tap 'Equipment Settings' from the menu and enable daylight saving time.



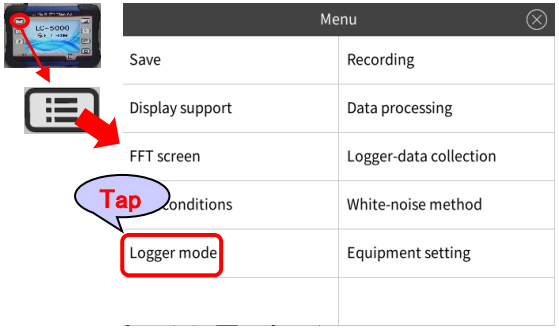


Adjust time zone before turning on DST.

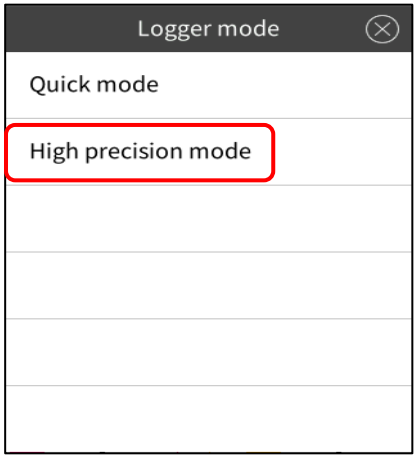


The display changes to DST ON and the clock advances by one hour. You will not be able to change the time zone.

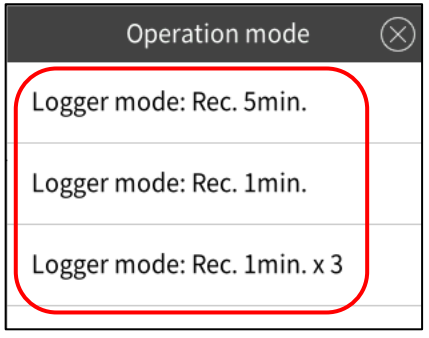
(4) Press the menu switch and tap the logger mode.



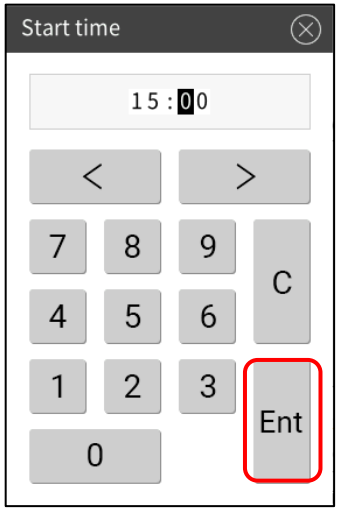
(5) Tap the Quick mode.



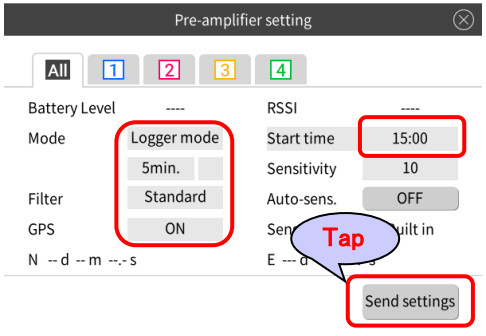
(6) Select any operation mode.



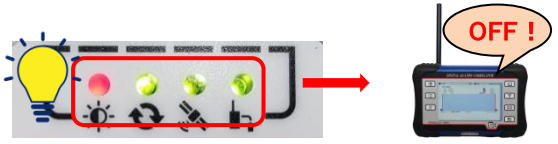
(7) Enter the recording start time. (24-hour display)



(8) Transit to the preamplifier setting screen.
Check the setting contents and tap "Send settings".

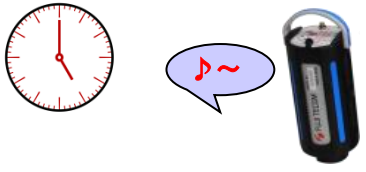


(9) When all the LEDs of the preamplifier light up, turn off the power of the main unit.

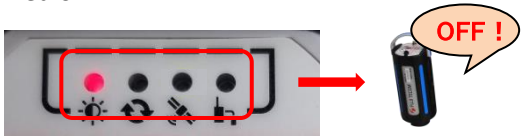


(10) Install the preamplifier.
At this time, in order to prevent damage due to flooding, cover the antenna connector with the attached cap to make it completely waterproof.

(11) Recording will start at the specified time.

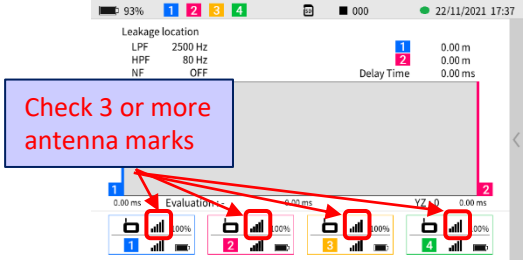


(12) Recording and post-processing are complete when all lights except the power LED of the preamplifier go out.
The power of the preamplifier is automatically turned off.

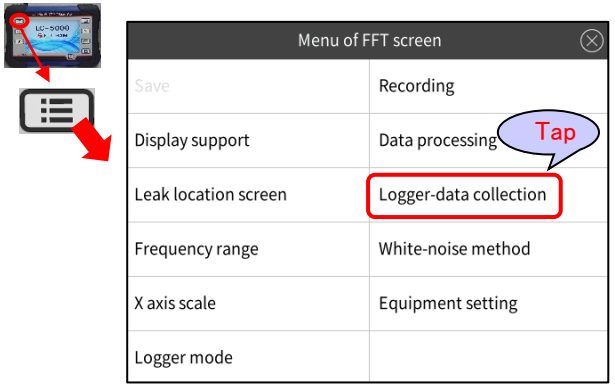


(13) Attach the antenna to the preamplifier again and turn on the power of the main unit and the preamplifier.

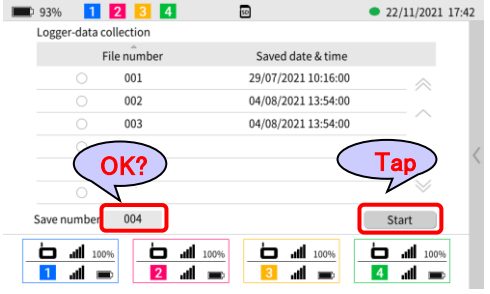
(14) Check that three or more antenna symbols of the preamplifiers are shown at the bottom of the screen.



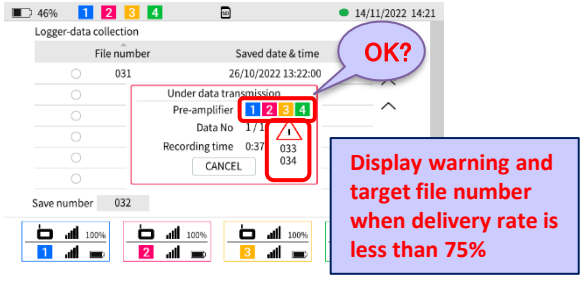
(15) Press the menu switch and tap Logger-data collection.



(16) Check the file number and tap Start Collection.

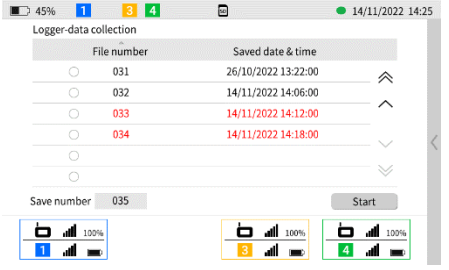


(17) While collecting data, confirm that all preamp numbers installed in the message screen are displayed. A radio reach rate of 75% or higher is desirable. If the delivery rate is less than 75% during collection, the warning display will flash.
Tap Cancel, move the location, and start over from (14).

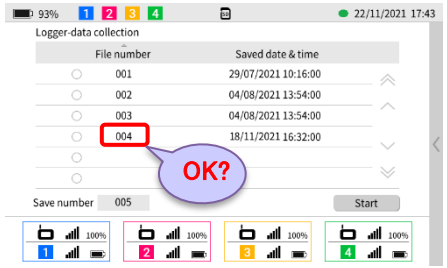


If you exit without pressing 'CANCEL', the following screen will appear. If you want to collect data again, move to a place with a good wireless environment and tap 'RETRY'.

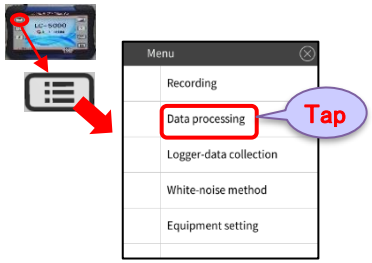
Press Cancel to return to the Logger Data Collection screen. Files that can be collected normally are displayed in black, and files with missing data are displayed in red.



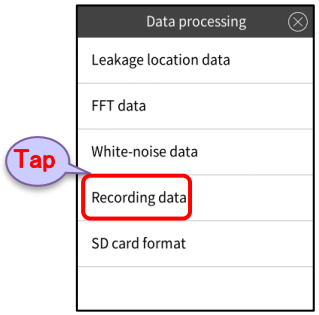
(18) Check the file number of the collected (saved) data.



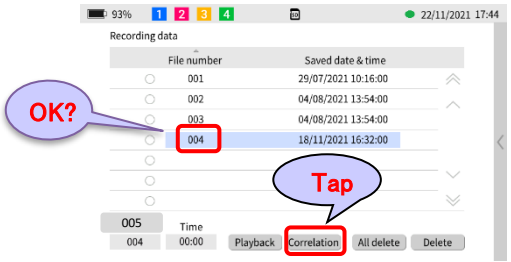
(19) When the collection is complete, press the menu switch to display the menu screen and tap Data processing.

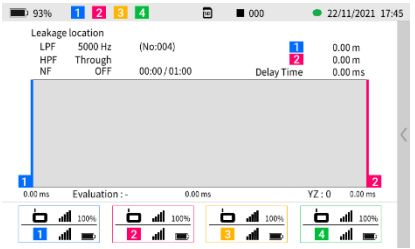


(20) Tap the recording data.

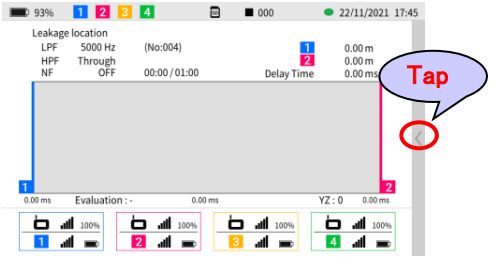


(21) Tap the saved file number and tap Re-correlation.

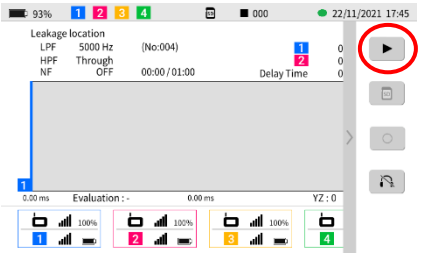




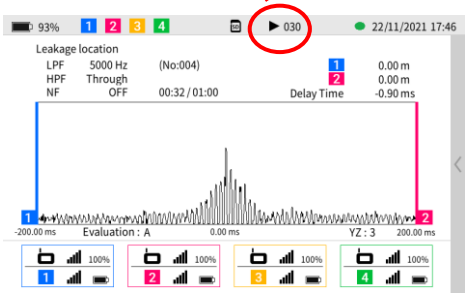
(22) Displays a Quick menu.



(23) Tap the replay button ▶. After a while, the correlation graph will be displayed.

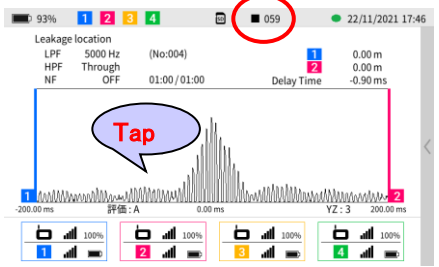


▶ Indicates that the recorded data is being played.
The number on the right represents the addition number of times of correlation and gradually increases.

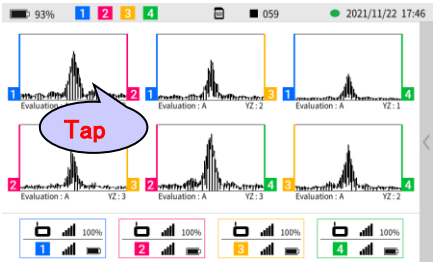


(24) After playing the recorded data, tap the graph.

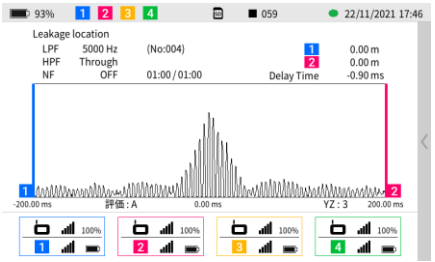
■ Indicates that the recorded data is stopped.
The correlation addition stops the calculation.



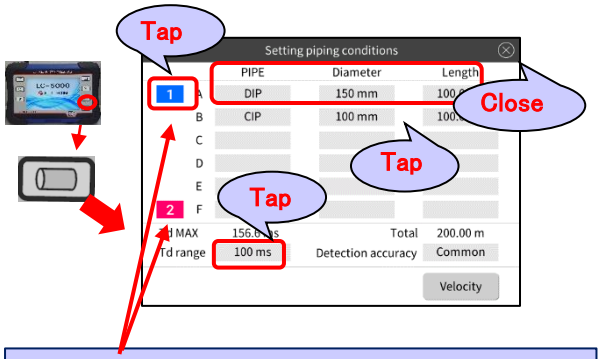
(25) Switches to the multiple correlation screen.
To set the piping conditions, check the combination of preamplifiers that are correlated and tap the screen.



(26) Switch to the single correlation screen again.

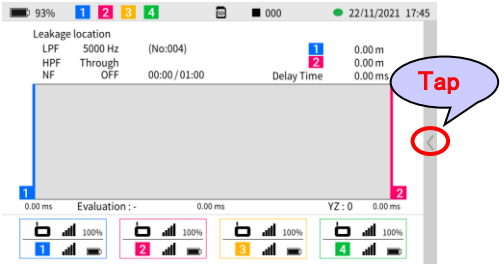


(27) Setting for piping conditions press the switch to set the piping conditions.

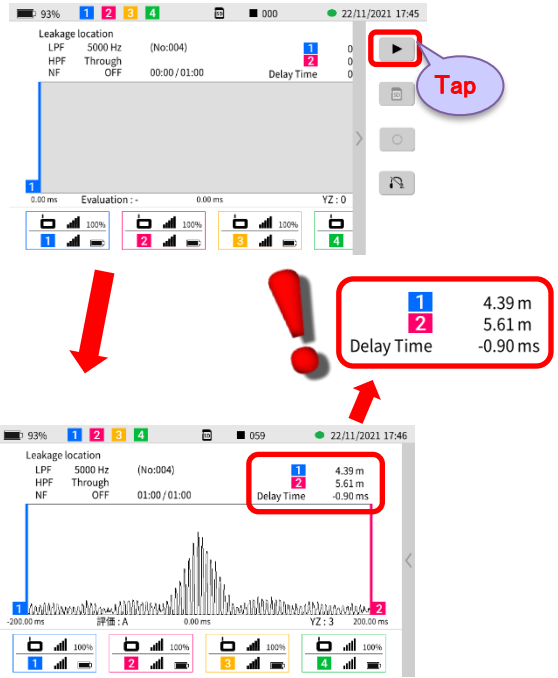


By tapping the preamplifier number, you can select and set piping conditions for combinations other than preamplifiers 1 and 2.

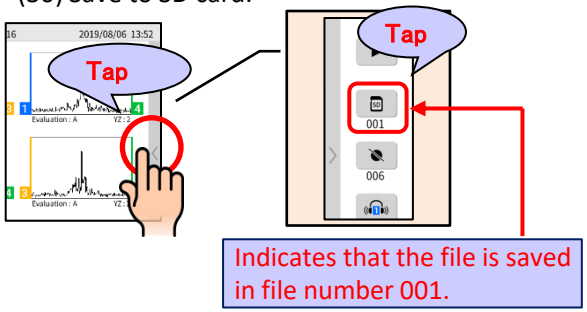
(28) Display the Quick menu.



(29) Tap the replay button▶ to display the correlation graph. Check the correlation position.



(30) Save to SD card.



Indicates that the file is saved in file number 001.

(31) After executing the logger mode, turn off the power of the main unit and the preamp once.