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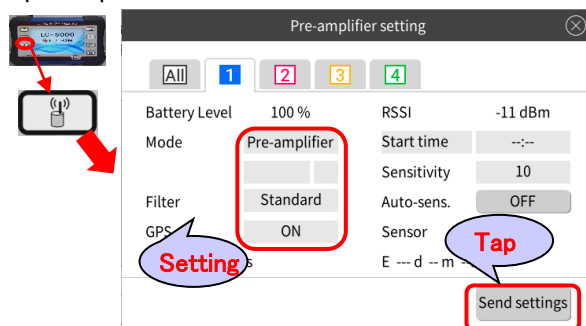# Model: LC-5000   Simple Operation Manual   <Basic Correlation Method>

FUJI TECOM INC.

2021.12.03 (E) ver.4.1

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

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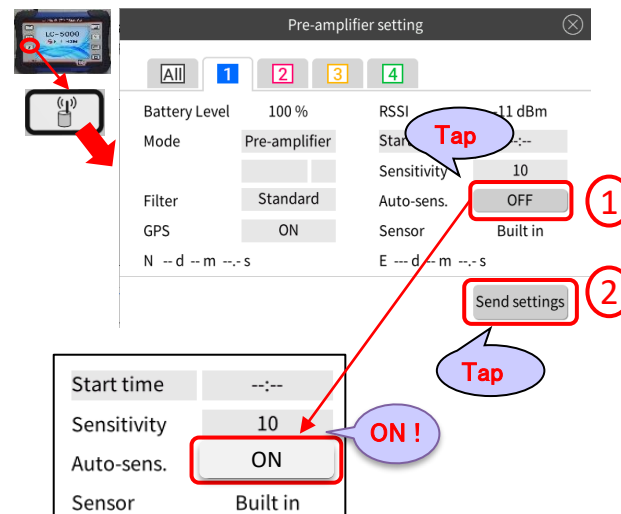
(2) Check the following on the main unit screen.

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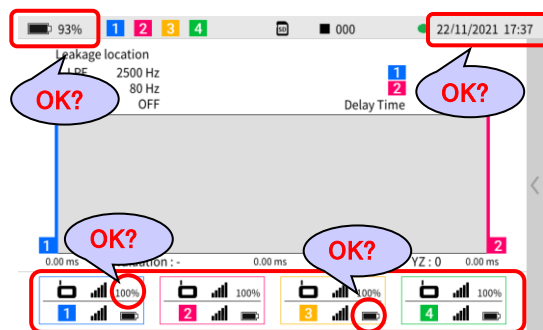
(3) Press the preamplifier switch to check and set the preamplifier conditions.

Pre-amplifier setting

| All | 1 | 2 | 3 | 4 |

Battery Level 100 %   RSSI -11 dBm
Mode   Pre-amplifier   Start time --:--
      Sensitivity 10
Filter   Standard   Auto-sens. OFF
GPS   ON   Sensor   E --- d -- m
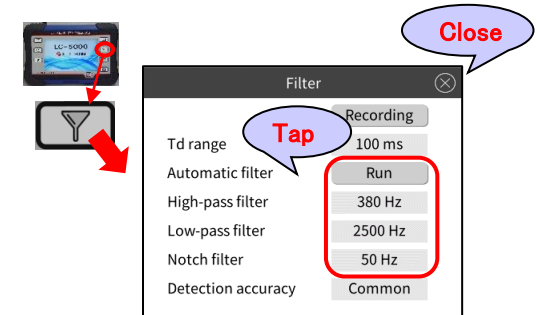
Setting   Tap

Send settings

(4) Replace the antenna of the preamplifier with the antenna base of the extension cable, and set up the preamplifier and antenna.

OR
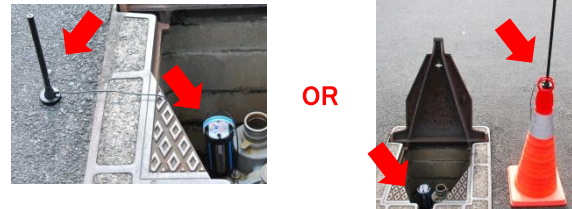
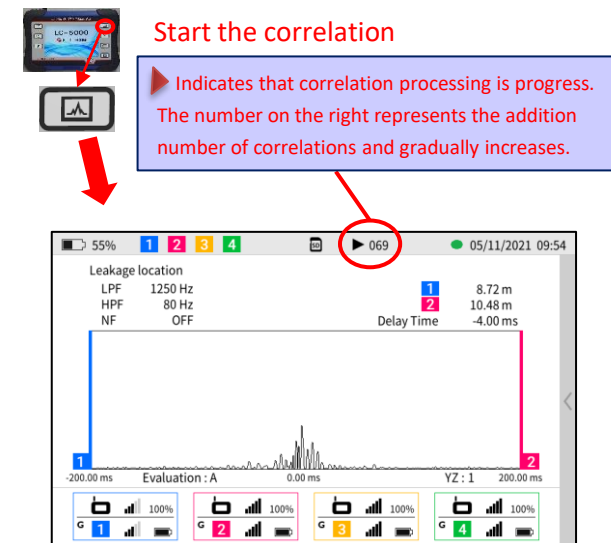(5) Press the preamplifier switch again and to make for automatic sensitivity adjustment.

Pre-amplifier setting

| All | 1 | 2 | 3 | 4 |

Battery Level 100 %   RSSI -11 dBm
Mode   Pre-amplifier   Start --:--
      Sensitivity 10
Filter   Standard   Auto-sens. OFF ①
GPS   ON   Sensor   Built in
N -- d -- m --.- s   E --- d -- m --.- s

Send settings ②

Tap

Start time	--:--
Sensitivity	10
Auto-sens.	ON
Sensor	Built in

ON！

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

Close

Filter	
	Recording
Td range	100 ms
Automatic filter	Run
High-pass filter	380 Hz
Low-pass filter	2500 Hz
Notch filter	50 Hz
Detection accuracy	Common

Tap

(7) 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.

55%   ▶ 069   05/11/2021 09:54
Leakage location
LPF 1250 Hz   8.72 m
HPF 80 Hz   10.48 m
NF OFF   Delay Time -4.00 m
-200.00 ms   Evaluation : A   0.00 ms   YZ : 1   200.00 ms

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

Stop the correlation

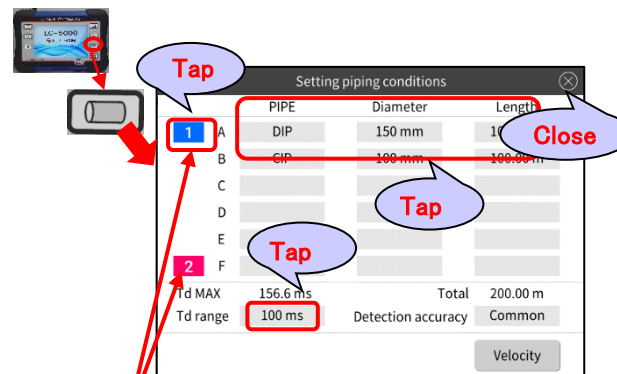■ Indicates correlation stop. The additional number of counts is stopped for the correlation.

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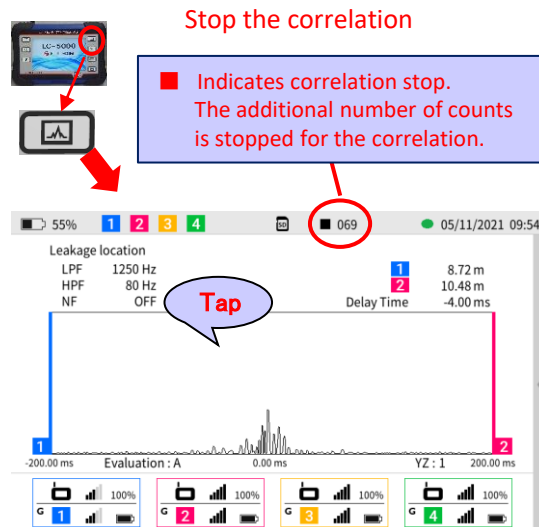
(9) Switch to the multiple correlation screen. To set the piping conditions, check the combination of preamplifiers that are correlated, and tap the screen.

Tap
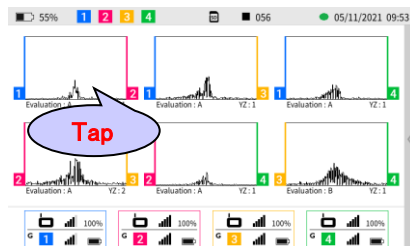
(10) Be switched to the single screen of correlation again.
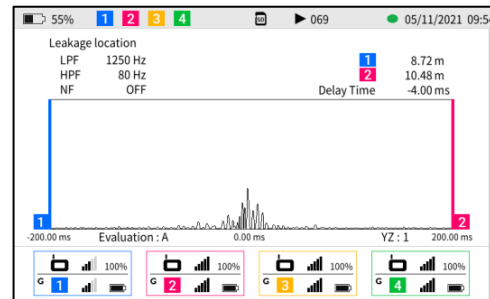
(11) Press the "Setting pipe conditions" switch to set the piping conditions.

Tap

Setting piping conditions

	PIPE	Diameter	Length
A	DIP	150 mm	
B	CIP	100 mm	100.00 m
C			
D			
E			
F			

Close

Tap

Tap

Td MAX   156.6 ms   Total   200.00 m
Td range   100 ms   Detection accuracy   Common

Velocity

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

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

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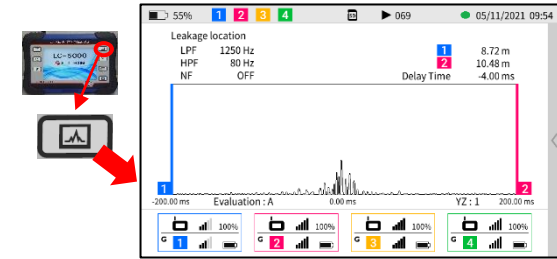
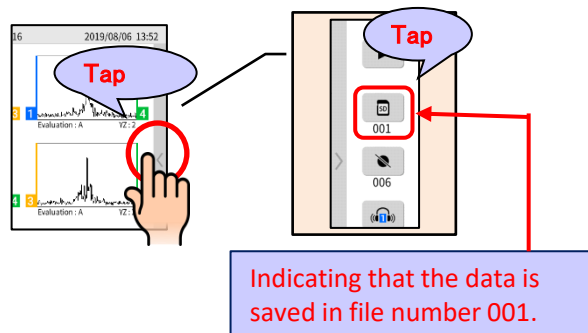(13) When correlation results are obtained, press the correlation switch to stop, and check the correlated position.
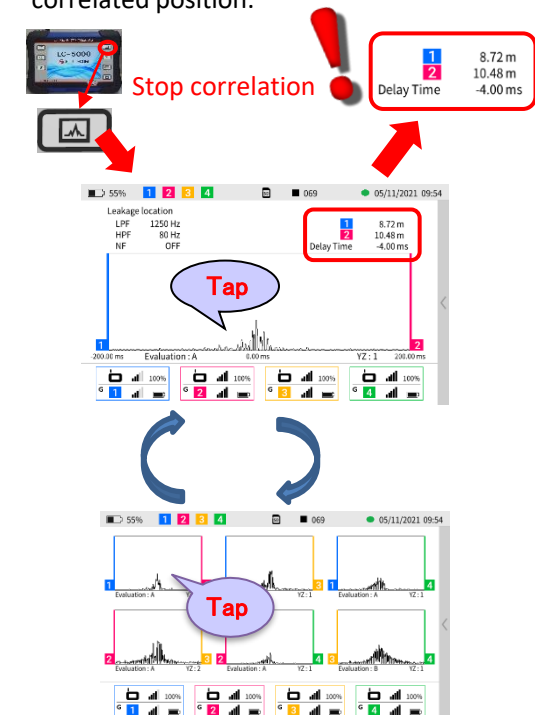
Stop correlation

1	8.72 m
2	10.48 m
Delay Time	-4.00 ms

Tap

Tap

(14) Save to SD card.

Tap

Tap

Indicating that the data is saved in file number 001.

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

Tap

Menu	⊗
Save	Rec
Display support	Data processing
FFT screen	Logger-data collection
Pipe conditions	White-noise method
Logger mode	Equipment setting

Tap "Leakage location data".

Tap

Data processing	⊗
Leakage location data
FFT data
White-noise data
Recording data
SD card format
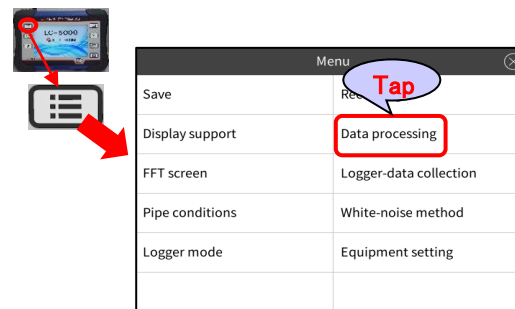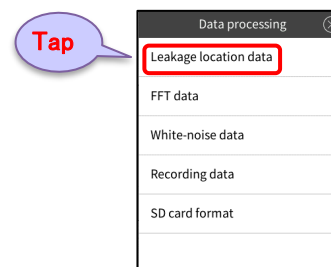
Represents the saved data.

82%		📅	● 25/11/2021 11:30
Leakage location data			
	File number	Saved date & time	≫
○	000	25/11/2021 11:29:31	
○	001	25/11/2021 11:29:47	∧
○			
○			
○			∨
○			≫
Number			

Display   All delete   Delete
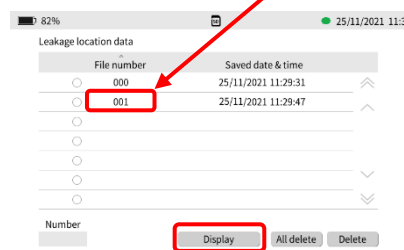
File number 001 is the first saved data.

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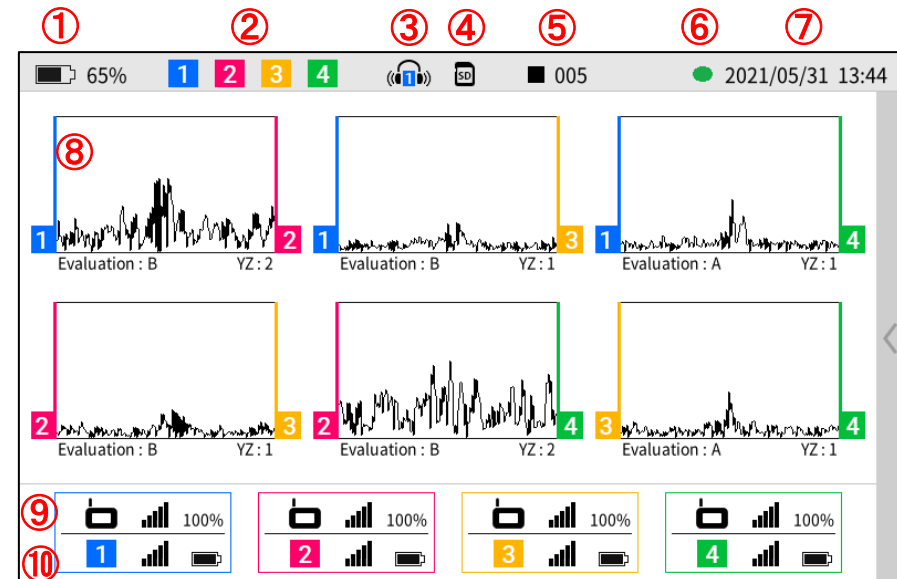
(1) Battery level in the main unit.
(2) Preamplifier in communication.
(3)   Headphone connection in progress.
(4)   SD card being inserted
(5)   Number of addition times of correlation
(6)   Wireless indicator.
(7)   Current date and time.
(8)   Correlation waveform (single or multiple)
(9)   Main unit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

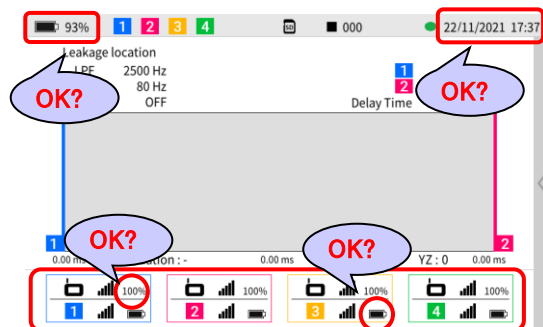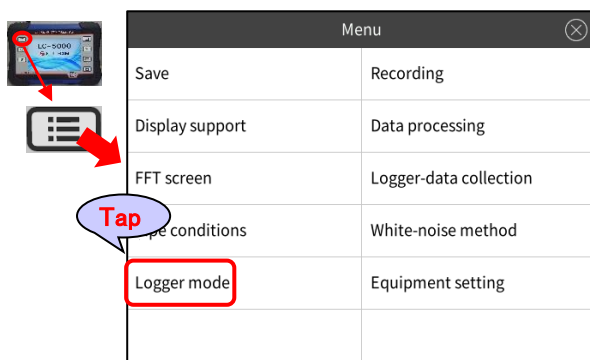(1) Attach the antenna to the preamplifier and turn on the power of the main unit and the preamplifier.

ON！ ON！ ON！

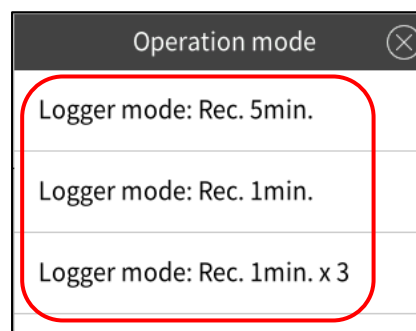(2) Check the following on the main unit screen.

OK? OK? OK? OK?

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

Menu	⊗
Save	Recording
Display support	Data processing
FFT screen	Logger-data collection
pe conditions	White-noise method
Logger mode	Equipment setting

Tap

(4) Tap the Quick mode.

Logger mode	⊗
Quick mode	
High precision mode	

(5) Select any operation mode.

Operation mode	⊗
Logger mode: Rec. 5min.	
Logger mode: Rec. 1min.	
Logger mode: Rec. 1min. x 3	
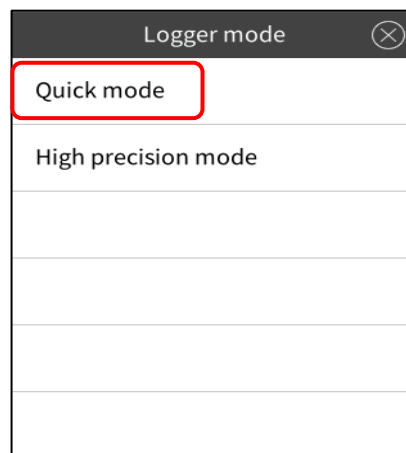
(6) Enter the time until recording starts. (Set after 3 to 30 minutes)

Rec. start in ⊗

05 min.

< >
7 8 9 C
4 5 6
1 2 3 Ent
0

(7) Transit to the preamplifier setting screen. Check the settings and tap Send Settings.
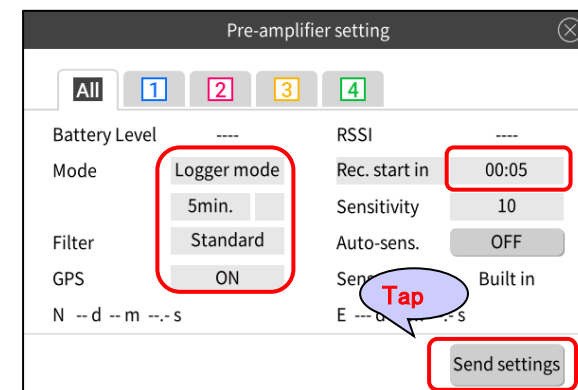
Pre-amplifier setting ⊗
All 1 2 3 4

Battery Level	----	RSSI	----
Mode	Logger mode	Rec. start in	00:05
	5min.	Sensitivity	10
Filter	Standard	Auto-sens.	OFF
GPS	ON	Sen	Built in
N -- d -- m --.- s		E ---	

Tap

Send settings

5

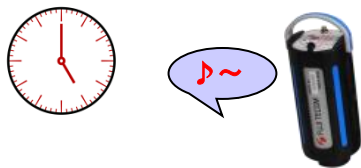(8) Make sure that all the LEDs of the preamplifier are lit.

(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).
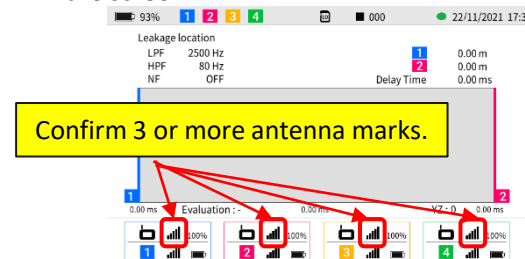

Turn on   Blinking   Turn off

(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.
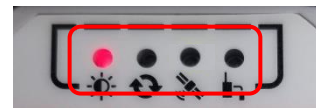
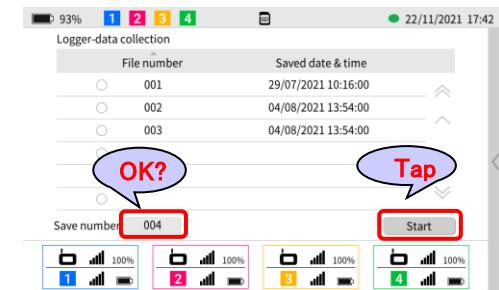(14) Check that three or more antennas are shown for the preamplifier symbol at the bottom of the screen.

Confirm 3 or more antenna marks.

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

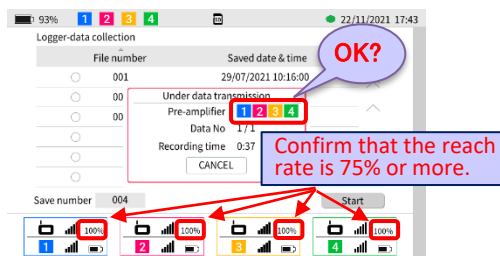| Menu of FFT screen	
Save	Recording
Display support	Data process.
Leak location screen	Logger-data collection
Frequency range	White-noise method
X axis scale	Equipment setting
Logger mode	

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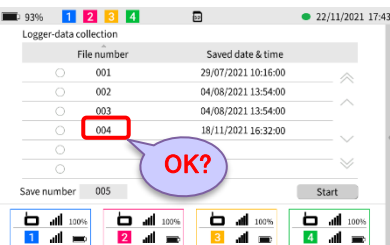
(16) Check the file number and tap Start Collection.

File number	Saved date & time
001	29/07/2021 10:16:00
002	04/08/2021 13:54:00
003	04/08/2021 13:54:00

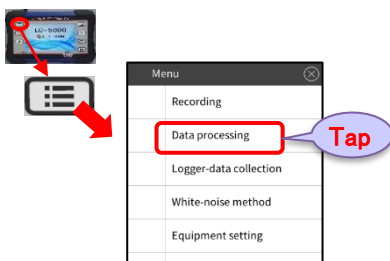Save number   004   Start

OK?   Tap

(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 it is less than 75%, the communication environment is bad, so after turning off the power, then move to another location and try again from (14).
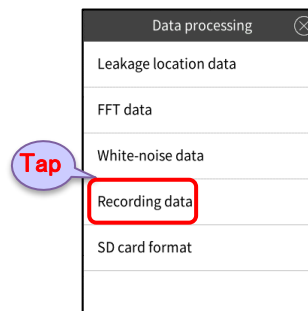

OK?

Confirm that the reach rate is 75% or more.

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

OK?

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

Tap

(20) Tap the recording data.

Data processing

Leakage location data

FFT data

White-noise data

Recording data

SD card format

Tap

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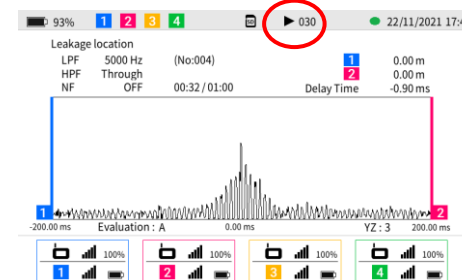

OK?

Tap

(22) Displays a Quick menu.

Tap

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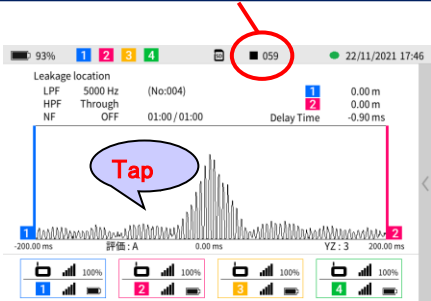

▶ Indicates that the recorded data is being played.
The number on the right represents the addition number of times of correlation and gradually increases.
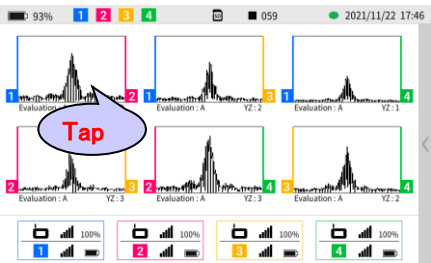
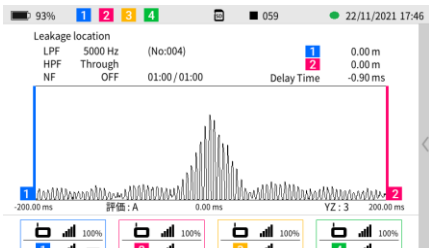(24) After playing the recorded data, tap the graph.

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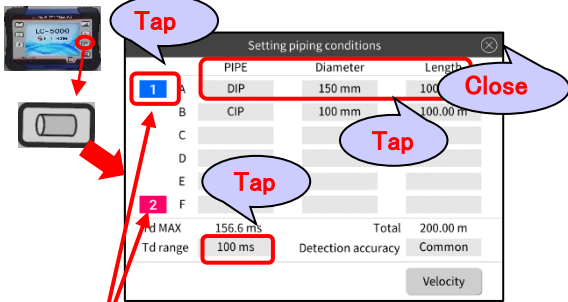The correlation addition stops the calculation.

Tap

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

Tap

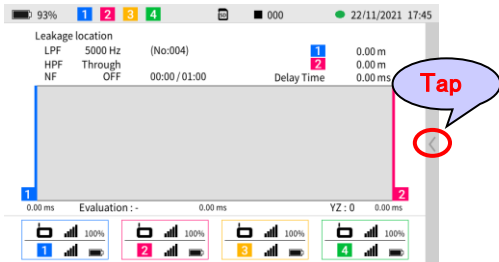(26) Switch to the single correlation screen again.

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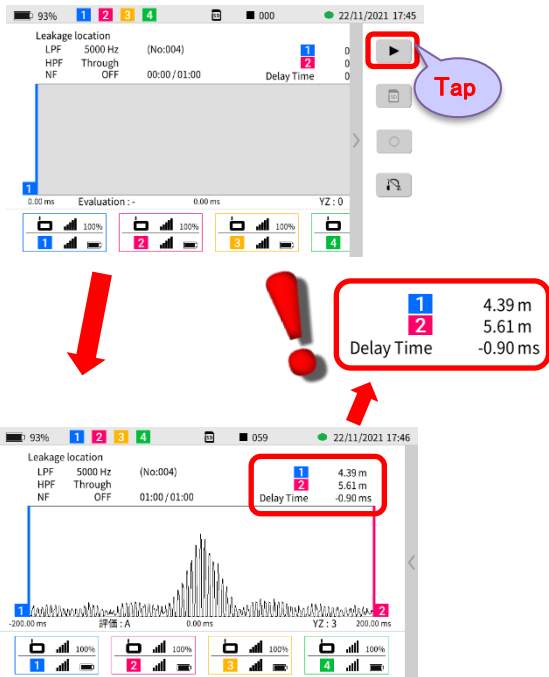

Tap

Close

Tap

Tap

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

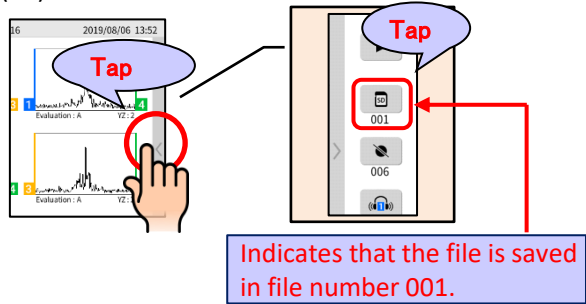(28) Display the Quick menu.

Tap

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

Tap

1	4.39 m
2	5.61 m
Delay Time	-0.90 ms

(30) Save to SD card.

Tap

Tap

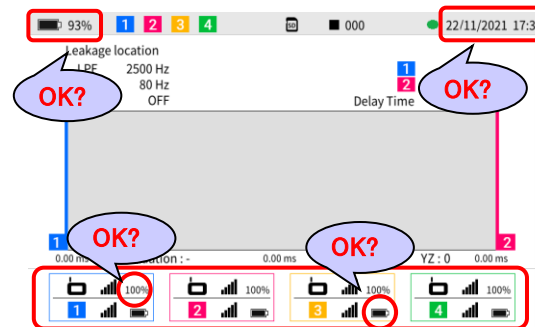Indicates that the file is saved in file number 001.

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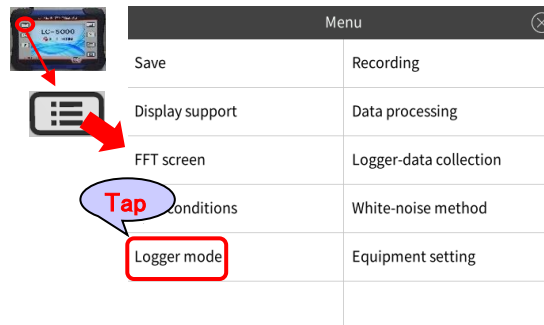

ON！ ON！ ON！

(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.
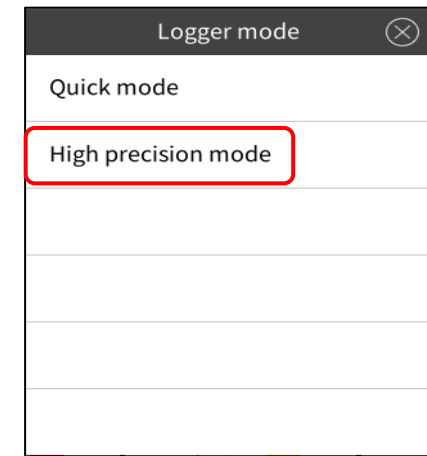

Waiting

Power supply LED

GPS LED：Blinking

Finished

GPS LED：Lighting

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

OK? OK? OK? OK?

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

Menu	
Save	Recording
Display support	Data processing
FFT screen	Logger-data collection
Conditions	White-noise method
Logger mode	Equipment setting

Tap

(5) Tap the Quick mode.

Logger mode	
Quick mode	
High precision mode	

(6) Select any operation mode.
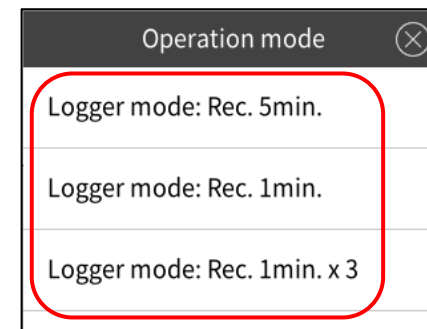
| Operation mode	
Logger mode: Rec. 5min.	
Logger mode: Rec. 1min.	
Logger mode: Rec. 1min. x 3	

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

Start time

15 : 00
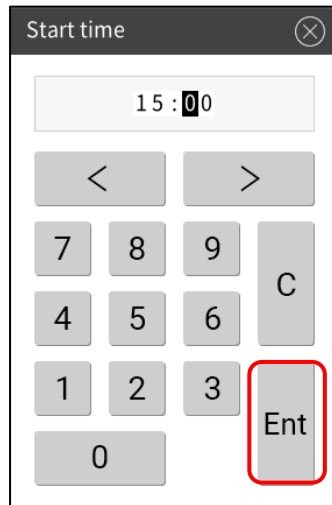
(8) Transit to the preamplifier setting screen.
Check the setting contents and tap "Send settings".

Pre-amplifier setting

| All | 1 | 2 | 3 | 4 |

Battery Level	----	RSSI	----
Mode	Logger mode	Start time	15:00
	5min.	Sensitivity	10
Filter	Standard	Auto-sens.	OFF
GPS	ON		Built in
N -- d -- m --.- s		E ---	

Tap

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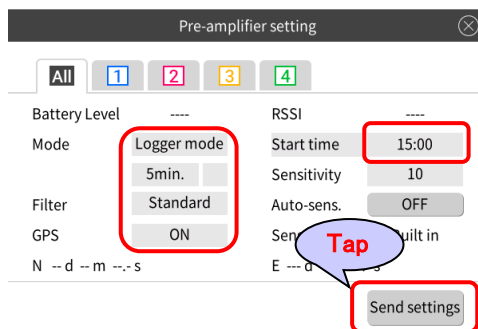
(9) When all the LEDs of the preamplifier light up, turn off the power of the main unit.

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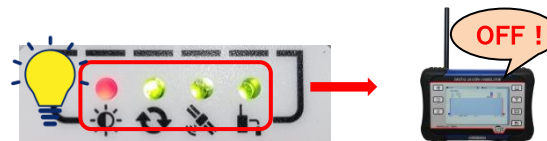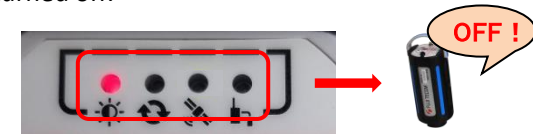
(10) Install the preamplifier.
At this time, in order to prevent damage due to flooding, cover the antenna connector with the attached cap to make it completely waterproof.

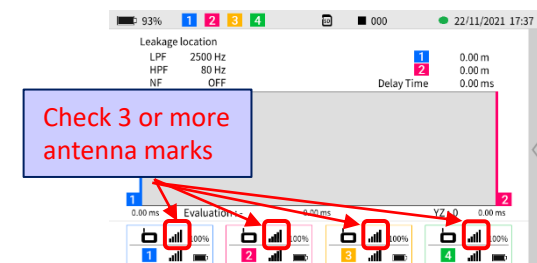(11) Recording will start at the specified time.

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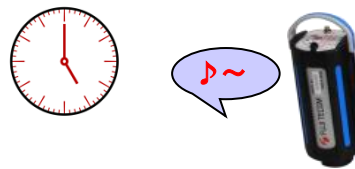
(12) Recording and post-processing are complete when all lights except the power LED of the preamplifier go out.
The power of the preamplifier is automatically turned off.

OFF！

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

ON！ ON！ ON！

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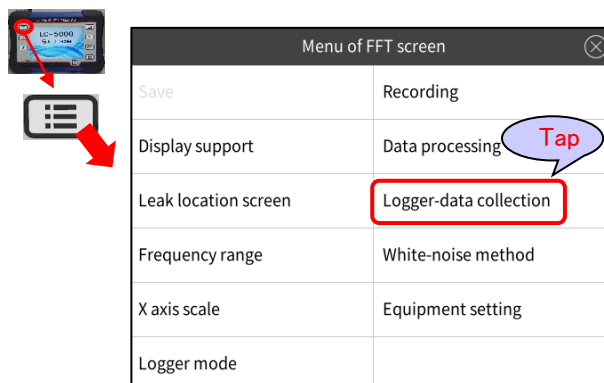

Check 3 or more antenna marks

93% 1 2 3 4 000 22/11/2021 17:37
Leakage location
LPF 2500 Hz
HPF 80 Hz
NF OFF

1 0.00 m
2 0.00 m
Delay Time 0.00 ms

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

Menu of FFT screen

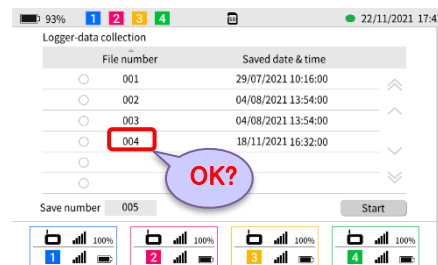| Save	Recording
Display support	Data processing
Leak location screen	Logger-data collection
Frequency range	White-noise method
X axis scale	Equipment setting
Logger mode	

Tap

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

OK?　　Tap

(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 it is less than 75%, the communication environment is bad, so after turning off the power, then move to another location and try again from (13).
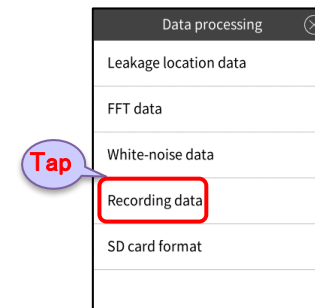

OK?

Confirm that the reach rate is 75% or more.

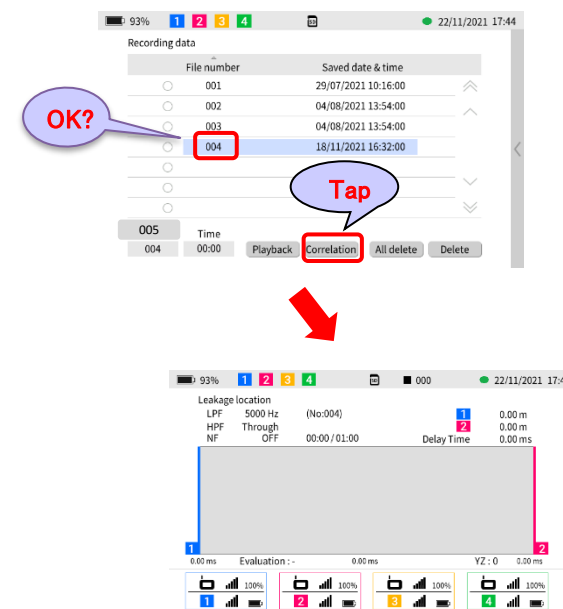(18) Check the file number of the collected (saved) data.

OK?

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

Tap

(20) Tap the recording data.

Data processing

Leakage location data

FFT data

White-noise data

Recording data

SD card format

Tap

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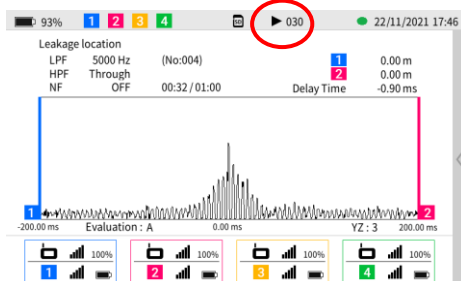

OK?

Tap

(22) Displays a Quick menu.

Tap

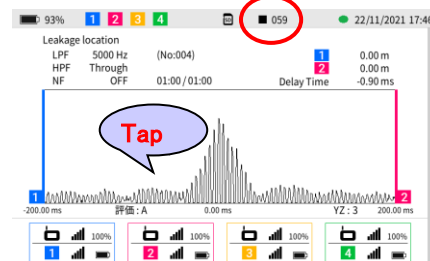(23) Tap the replay button ▶. After a while, the correlation graph will be displayed.

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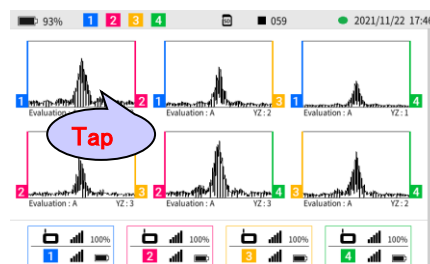

(24) After playing the recorded data, tap the graph.

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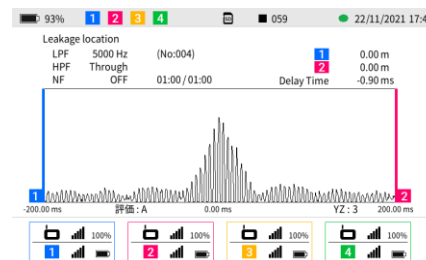

Tap

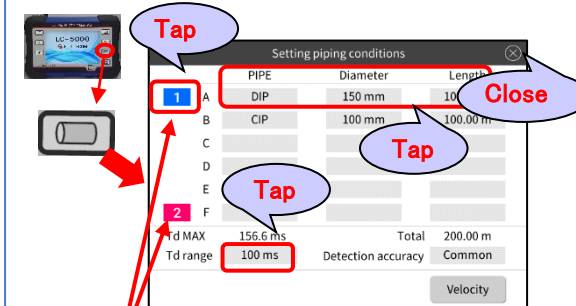(25) Switches to the multiple correlation screen.
To set the piping conditions, check the combination of preamplifiers that are correlated and tap the screen.

Tap

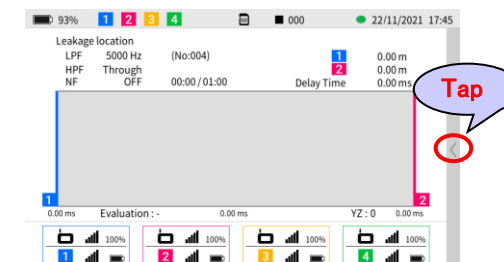(26) Switch to the single correlation screen again.

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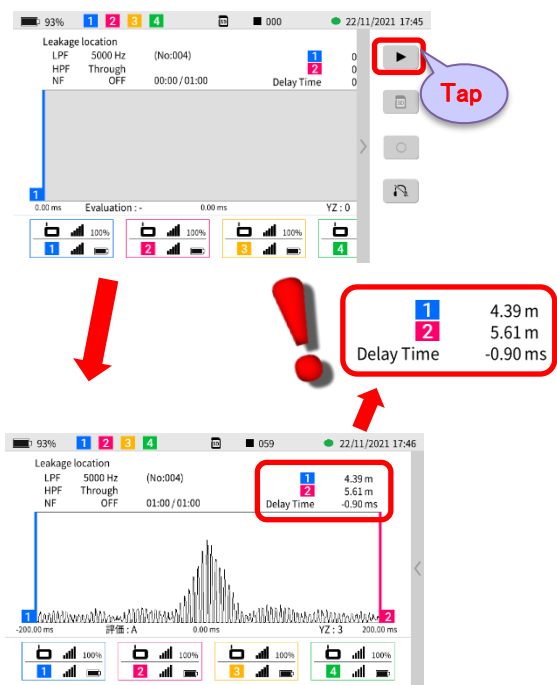

Tap
Close
Tap
Tap

By tapping the preamplifier number, you can select and set piping conditions for combinations other than preamplifiers 1 and 2.
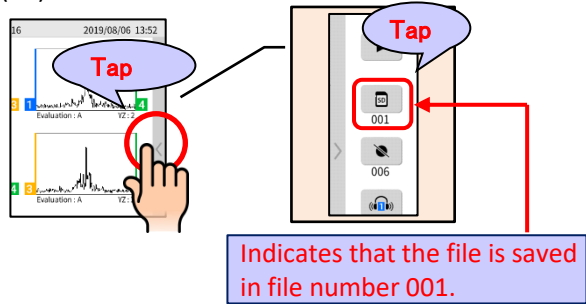
(28) Display the Quick menu.

Tap

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

Tap

1	4.39 m
2	5.61 m
Delay Time	-0.90 ms

(30) Save to SD card.

Tap

Tap

Indicates that the file is saved in file number 001.