Matsushima
Matsushima Measure Tech

TMMLM-002E
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Instruction manual for App of Radar level transmitter "FM79 Smart Com."

 # The operator should read this Instruction Manual carefully

Matsushima Measure Tech Co.,Ltd.

1-8-18 Norimatsu-Higashi,Yahatanishi-ku,Kitakyushu 807-0837 Japan
Phone No.(8193)691-3731　Fax No.(8193)691-3735
https://www.matsushima-m-tech.com
E-mail : sales@matsushima-m-tech.com

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◆Start up
-Safe notice

-Make sure to read this instruction before using the product.
-Keep this instruction at the place where anyone can see anytime.
-The contents in this instruction may change without previous notice.

-Bluetooth wireless communication

What is Bluetooth?

Bluetooth is wireless communication technology between digital devices in relatively short distance by connection with a PC or a smartphone. No need to connect with devices by an USB cable, and wireless communication with data can be available at anywhere in short distance (within approx. 10m viewable area).

Available area for communication

Distance for Bluetooth communication is within approx. 10m viewable area. Available connection distance will be changed by any block of walls and metals, or around situation and building shape. Make sure of using no barrier place, as much as possible.

Security

Make sure that we will be completely no-obligation in any case of data leaking. We recommend setting the password due to higher security.
Refer to the “Instruction manual for an app of Reader level transmitter” for setting the password. If set the password, Reader level transmitter will be locked and parameters including other specifications will not be available to be changed. We recommend that the password must be updated routinely for higher security.

Product approvals

A license from radio station to use in some countries is not required because this product has been approved to use in these countries upon Radio Act as the wireless system for power saving data communication. However, breaking, remodeling, and removing nameplate may be punished.

Usable frequency and handling instructions

Usable frequency of Bluetooth (range 2.4GHz) will be used for in-house radio stations (license required), specified low power radio stations (no license required) for mobile facilities in factory at fields of household appliances, industry, science, medical devices and mobile detectors in factory, and amateur radio stations (license required).

1. Make sure of confirming no in-house radio station for mobile detector, specified low power radio station and any amateur radio station near before starting to use.
2. Take a distance as much as possible from any electric device to connect with. If any harmful radio wave interference occurred, immediately cut power for the product.
3. In case of hard radio wave from any radio station or wireless device, it may not be connected normally.
4. Please be sure that connection with Bluetooth will make a terminal battery shorter life.

-Install and initial setting

-Before installation

Use the following OSs for adjusting device.

・Windows™ OS ：10, 11 ・Android™ OS ：10～13 ・iOS ：15.0～16.5

＊If use any other, operation may not be available.

Please apply Bluetooth version 4.2 or later for adjustment device.

-Installation

- For Windows, please search for “FM79” in Microsoft Store, or install from the following URL.

Microsoft Store URL

https://www.microsoft.com/store/apps/9PFLW43CCX8C

-In case of Android, iOS, scan QR codes in below. Or install app “FM79 Smart Com.”

Google Play (Android)　　App Store (iOS)

※Applications will be upgraded without notice. If have not set up automatic updates, please update manually.

-Initial setting

Switch ON “Bluetooth” of PC or smartphone.

＊Different OS may have different display or operation.

-Windows

1. Select start button ＞ ⚙ setting＞device＞Bluetooth and other devices.
2. Switch ON Bluetooth.

-Android

1. Swipe screen twice from top to down.
2. If Bluetooth mark “ ✱ “ is weak or slash, tap it.
3. Confirm Bluetooth mark is ON (lighting).

-iOS

1. Open control center.
   (Swipe screen from right up to down, or from down to up)
2. If Bluetooth mark ” ✱ ” is weak, tap it.
3. Confirm Bluetooth mark is ON (blue lighting).

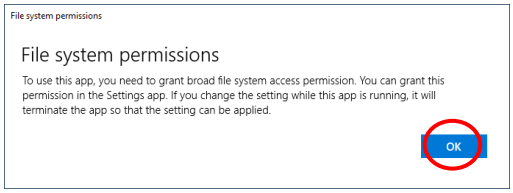
-Switch ON app

-Windows

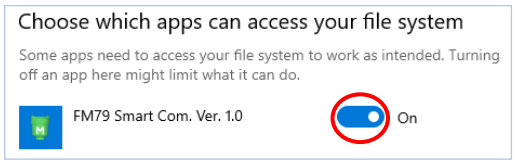
＊2 to 6 in below will be operations when installation or version up.

1. Switch ON app.

2. Click【OK】on screen “File system permissions” to open “File system”.



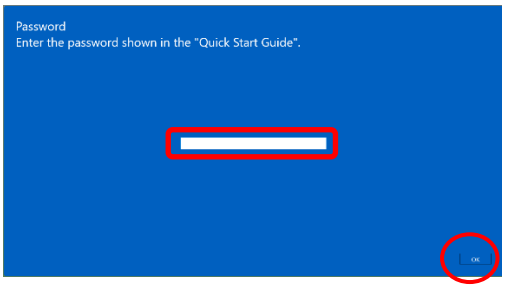
3. Select app to access “FM79 Smart Com.”.
   And switch ON .
   Close app.



4. Restart the app.

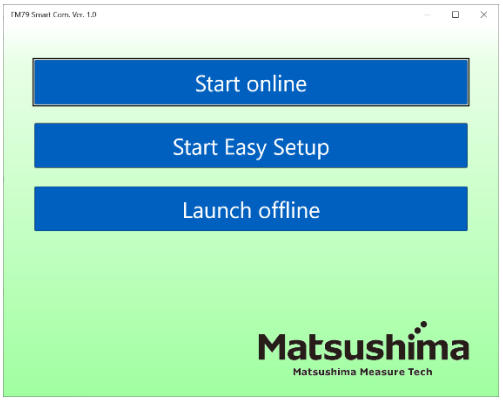
5. Input “Password”.

   The password is provided in the ”Quick Start Guide” enclosed with the level meter.



6. Click 【OK】

7. Displayed “Initial screen”→P7



-Android, iOS

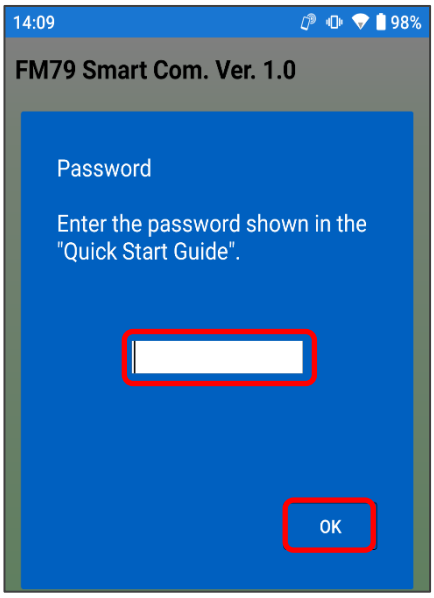
＊2 in below is operation when installation or version up.

1. Switch ON app.

2. Input “Password”.

   The password is provided in the ”Quick Start Guide” enclosed with the level meter.

3. Click 【OK】



4. Displayed “Initial screen” →P7



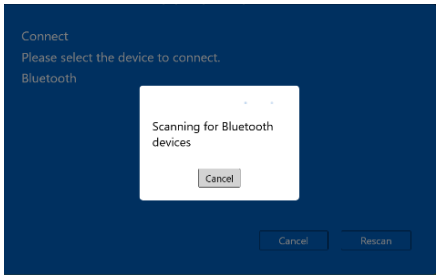
-Connection (pairing)

-Windows/Android, iOS

In “Initial screen”, Select either of below.

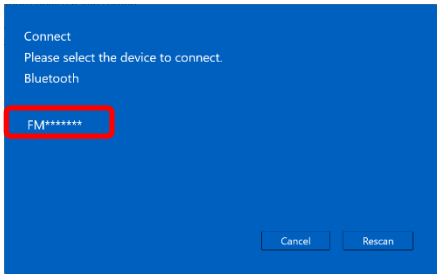
- ”Start online” /”Start Easy Setup”

1. Detect device (transmitter).

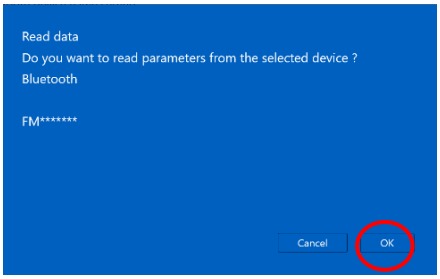


2. Select device (transmitter).
   Example)FM＊＊＊＊＊＊＊
   ＊＊＊＊＊＊＊=Serial No.

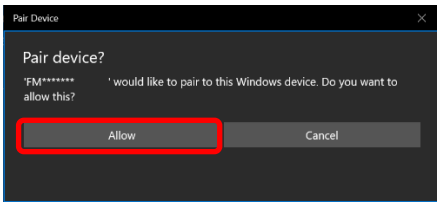
＊If not available to detect, click【Rescan】.



3. Click 【OK】



4. Click 【Allow】 on “Pair Device”. (once only)

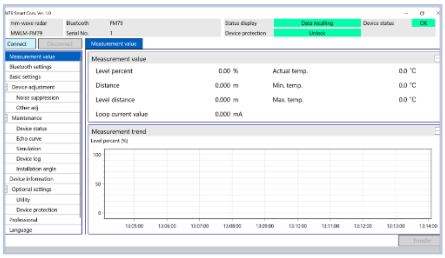


Windows

5. If displaying operation screen, connection (pairing)with transmitter is completed.

6. If click “Start Easy Setup”→P13

   If click “Launch offline ”, start on Offline status.



Windows

＊If not available to connect→P36

-App function

Using this app, it is possible to confirm conditions of transmitter connecting (pairing) with Adjustment devices (PC, Smartphone and tablet Bluetooth installed).

Under OFF line, it is possible to confirm past data of measured wave and parameter setting.

-Specify output current

Specifying distance and warning output, output current value matching measuring value will be output.

-Check present condition of measurement

Display measuring waves of present measuring value and output current value.

-Maintain stable measurement

Keep accurate measuring value automatically or individually masking unnecessary reflection.

-Data management function

Confirming present record of measuring wave and past saved or reported data will be available.

-Maintenance notice function

Automatically notify necessary of maintenance when passing specified maintenance date or some material to build up on antenna surface.

-Antenna direction and angle

It is possible to confirm antenna direction and angle of transmitter. If updating transmitter, it is easy to reset.

-Setting transmitter

Please refer Item 5. Installation of “Instruction manual for Radar level transmitter” for set up before start using this app.

-Trademark／Software license

- The logo “Matsushima Measure Tech Co., Ltd.” is our brand and registered trademark.
- Copyright of “FM79 Smart Com.” is reserved by “Matsushima Measure Tech Co., Ltd.”.
- The Windows is the brand of Microsoft Corporation.
- The Android is the brand of Google LCC.
- The Bluetooth and its logo are the registered trademark of Bluetooth SIG, Inc.
- The iOS is the brand and trademark of Cisco Systems, Inc.
- The iTunes is the brand of Apple Inc.
- The QR Codes are registered trademark of DENSO WAVE Incorporated.

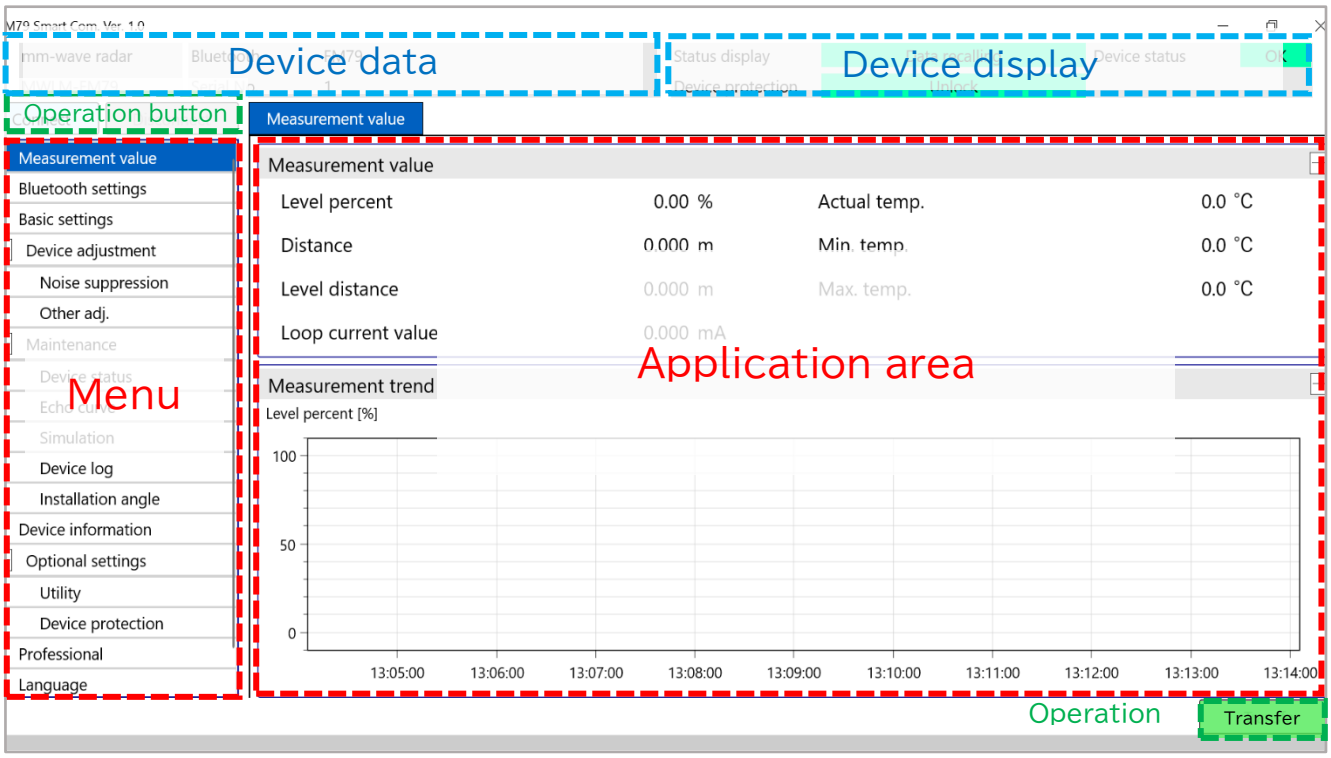
-Check（names of screen/button）

＊Make sure that procedures of app display and operation in this instruction may change without previous notice corresponding to updating firmware and software.

＊Common operation of Android, iOS will be instructed on Android.

＊Different type of Android may have different display and operation.

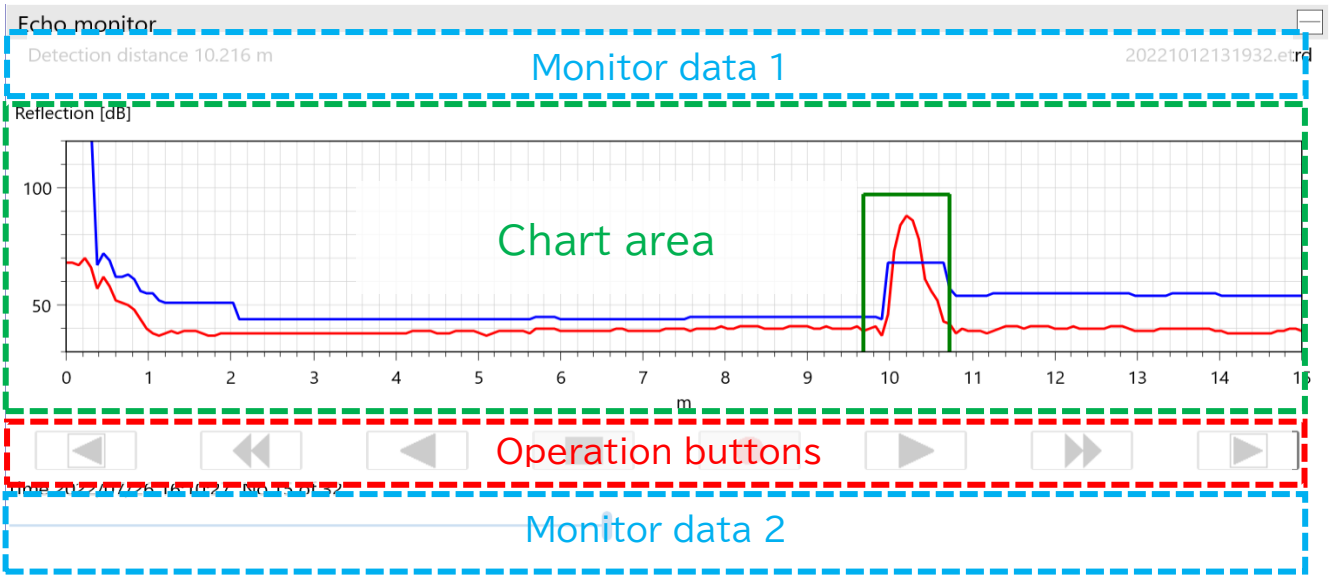
-Windows display operation



Area	Item	Instruction
Device data	Product name	mm-wave radar
	Type	MWLM-FM79
	Bluetooth device name	If change･･･P33
	Serial No.	Production No.
Device display	Status display	Details･･･P23
	Device protection	Details･･･P32
	Device status	Details･･･P23
Menu	First category	Switch app area
Application area	Tab (Second category)	Switch third category
	Third category	Display/change/adjustment of parameter
Operation button	【Connect】 button	Pairing operation Details･･･P7
	【Disconnect】 button	Disconnect Bluetooth communication
	【Transfer】 button	Input parameter on transmitter

-Check <continued>

-Echo monitor on Windows

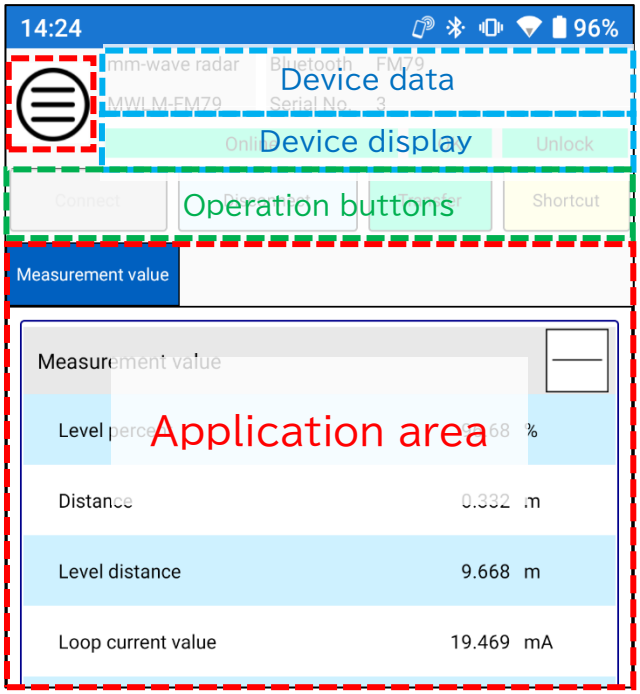


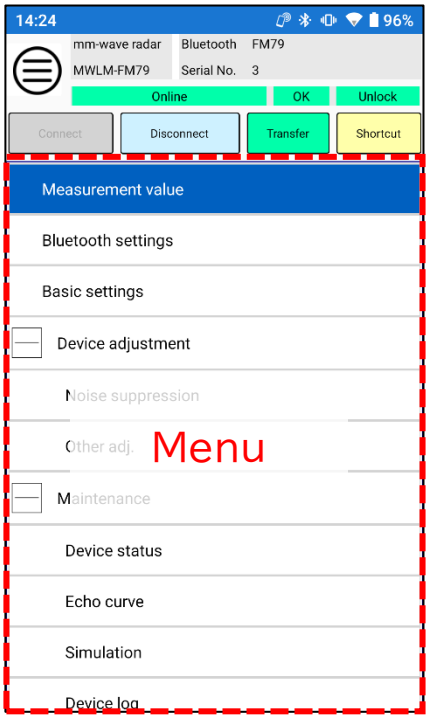
Area	Item	Instruction
Monitor data 1	Detection distance	Detect distance of echo trend (displayed wave)
	File name (right up)	File name of echo trend
Monitor data 2	Update time/number of times	Displayed date/time of echo trend No. of display of record
	Progress bar	Monitoring: display progress of updating
	Slider bar	Display position of wave on slider
Chart area	X-axis	Distance (m)
	Y-axis	Echo volume (dB)
	Echo curve (red line)	Real reflection (echo) wave
	Echo detection curve (blue line)	Masking unnecessary reflection (1.+2.+3.) 1. Noise echo learning curve 2. Manual control 3. NT curve
	Mouse Operation* (Keyboard operation)	- Put cursor on curve: view plot info. - Left click and drag: enlarge graph - Drag while clicking middle button (Direction key): scrolling graph - Double left click (Keyboard R): reset enlarged graph
Operation button	【 ● 】button	Record measured wave
	【 ■ 】button	Stop recording measured wave
	【 ▶ 】/【 ◀ 】button	Replay/reverse replay
	【 ◀◀ 】/【 ▶▶ 】button	Fast-reverse/fast forward
	【 ◀| 】/【 |▶ 】button	Single frame reverse/forward

*The mouse operation is enabled in the graph areas of Measurement Trend, Echo Monitor, Trend Monitor, and Device Trend.

-Check <continued>
-Android, iOS operation/menu screen

Menu button

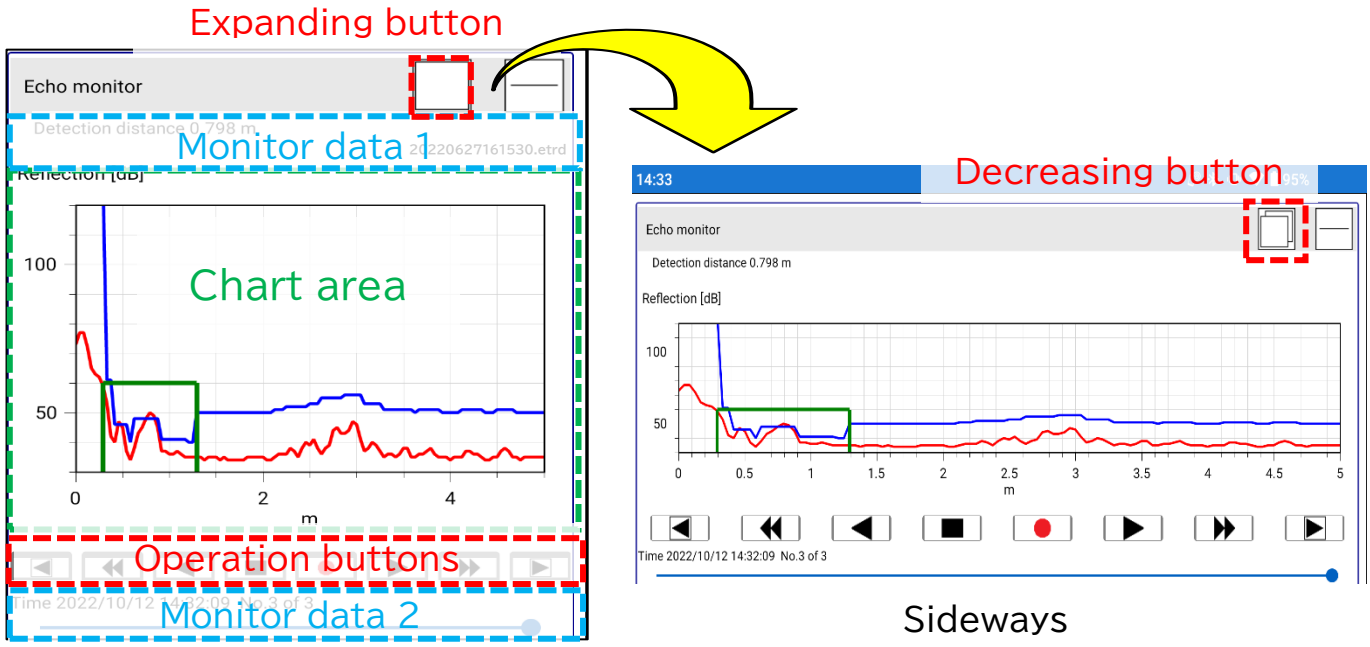




Area	Item	Instruction
Device data	Product name	mm-wave radar
	Type	MWLM-FM79
	Bluetooth device name	If change･･･P33
	Serial No.	Production No.
Device displays	Status display	Details･･･P23
	Device protection	Details･･･P32
	Device status	Details･･･P23
Menu button	【Menu】button	Switch menu display/app area
Application area	Tab (second category)	Switch third category
	Third category	Display/change/adjustment of parameter
Operation button	【Connection】button	Pairing operation Details･･･P7
	【Disconnect】button	Disconnect Bluetooth communication
	【Transfer】button	Input parameter on transmitter
	【Shortcut】button	Display measuring/chart/list

-Check <continued>

-Android, iOS echo monitor screen/expanding chart area



Area	Item	Instruction
Monitor data 1	Detection distance	Detect distance of echo trend (displayed wave)
	File name (right up)	File name of echo trend
Monitor data 2	Update time/number of times	Displayed date and time No. of display and record
	Progress bar	Monitoring: display progress of updating
	Slider bar	Display position of wave on slider
Chart area	X-axis	Distance(m)
	Y-axis	Echo volume(dB)
	Echo curve (red line)	Real reflection (echo) wave
	Echo detection curve (blue line)	Wave masking unnecessary reflection(1.+2.+3.) 1. Noise echo learning curve 2. Manual control 3. NT curve
Operation button	【 ● 】button	Record measured wave
	【 ■ 】button	Stop recording measured wave
	【 ▸ 】/【 ◂ 】button	Replay/reverse replay
	【 ◂◂ 】/【 ▸▸ 】button	Fast-reverse/fast forward
	【 ◂| 】/【 |▸ 】button	Single frame reverse/forward
Expanding/decreasing button	【 □ 】button	Switch expanding (sideways)/decreasing chart area

◆Stand by

・Basic setting

-Start simple set-up

With set-up following 1 to 4, measurement will start soon.

1. Application

If selecting application, automatically parameter will be chosen.

Item	Default	Instruction
Measuring object	Liquid	-Liquid ： Even level -Solid ： Solid/powder with angle of repose
Level change rate	Normal	-Fast : High speed level movement -Normal : Low speed level movement

＊If higher than 5m/min, select Fast.

2. Measurement range

Set output current 4-20mA on setting measurement range.

Item	Default	Instruction
Max. level percentage	100%	Percentage for output current 20mA
Max. level distance	0.000m	Max. level 100%
Min. level percentage	0%	Percentage for output current 4mA
Min. level distance	30m＊	Min. level 0%

＊Up to version

3. Date/time

Adjust time on transmitter.

Click 【Device writing】.

4. Completion

Click 【Transfer】

-Setting application

If selecting app, automatically parameter will be chosen.

Select Menu>Basic setting>Application.

Item	Default	Instruction
Measuring object	Liquid	-Liquid : Even level -Solid : Solid/powder with angle of repose
Level change rate	Fast	-Fast : High speed level movement -Normal : Low speed level movement

＊If higher than 5m/min, select Fast.

●If setting completion, click 【Transfer】.

-Specify measurement range

With specifying measuring range, output current 4-20mA will be set.

Select Menu>Basic setting>Measurement range

Item	Default	Instruction
Max. level percentage	100%	Percentage for output current 20mA
Max. level distance	0.000m	Distance of Max. level
Min. level percentage	0%	Percentage for output current 4mA
Min. level distance	30m＊	Distance of Min. level

＊Up to version

●If completion of setting, click 【Transfer】.

-Specify damping

If expanding damping value, it makes smoother trend data against sudden change.

Select Menu>Basic setting>【Tab】Damping/Output/LCD>Damping.

Item	Default	Instruction
Damping	0 s	Time to be average

●If completion of setting, click 【Transfer】.

-Output settings (Failure alarm)

With selecting current output of measuring range (0%/100%), current value in failure will be specified.
Select Menu>Basic setting>【Tab】Damping/Output/LCD>Output settings.

Item	Default	Instruction
Current output selection	4-20mA	4-20mA:Span 0%=4mA, 100%=20mA output 20-4mA:Span 0%=20mA, 100%=4mA output
Failure current value selection	Hold	Max. : Output max current value Min. : Output min current value Hold : Keep current value before failure Sel.val. : Output optional current value
Max. failure current value selection	22mA	20mA／20.5mA／22mA It is output current value when selecting “Max.” on failure current value.
Min. failure current value selection	<3.6mA	<3.6mA／3.8mA／4mA It is output current value when selecting “Min.” on failure current value.*1
Selected failure current value	22.000mA	Selecting “Sel.val.”, available to choose

●If completion of setting, click 【Transfer】.

*1. When selecting Max. fault current value selection = 20mA, 20.5mA, Min. fault current value selection = 3.8mA, 4mA, please note that it is the same range with the sensor output: 3.8mA to 20.5mA (measurement range: -10% to 110%).

·Check status

-Measurement/output current/temperature

Present status on measuring will be displayed.

Select Menu>Measurement value.

Item	Instruction
Level percent	Measuring level percent from level 0% [%]
Distance	Measuring distance from transmitter [m]
Level distance	Measuring distance from level 0% [m]
Loop current value	Output current value display [mA]
Actual temp.	It is ambient temperature [℃].
Min. temp.	It is min. temperature [℃] from starting of measurement through present.
Max. temp.	It is max. temperature [℃] from starting of measurement through present.

-Measurement trend

Display measurement value (level percent) during connecting with adjustment device.

Select Menu>Measurement value.

●Measurement trend

Vertical axis shows level [%] and horizontal axis shows time passing.

-Echo monitor

It is possible to confirm present measuring wave and trend.

＊Displaying measuring wave, echo data and echo trend should be matched.

Select Menu>Echo curve.

Proc	Operation	Instruction
1	Click【 ● 】	Start monitoring and display wave
2	Click【 ■ 】	Stop monitoring
3	Save measured wave	Followings are how to save wave (echo trend); 1. After monitoring, select Save in pop-up screen. 2. Displaying wave on screen, right-click to select Save in chart area.

・Delete noise (simple operation)

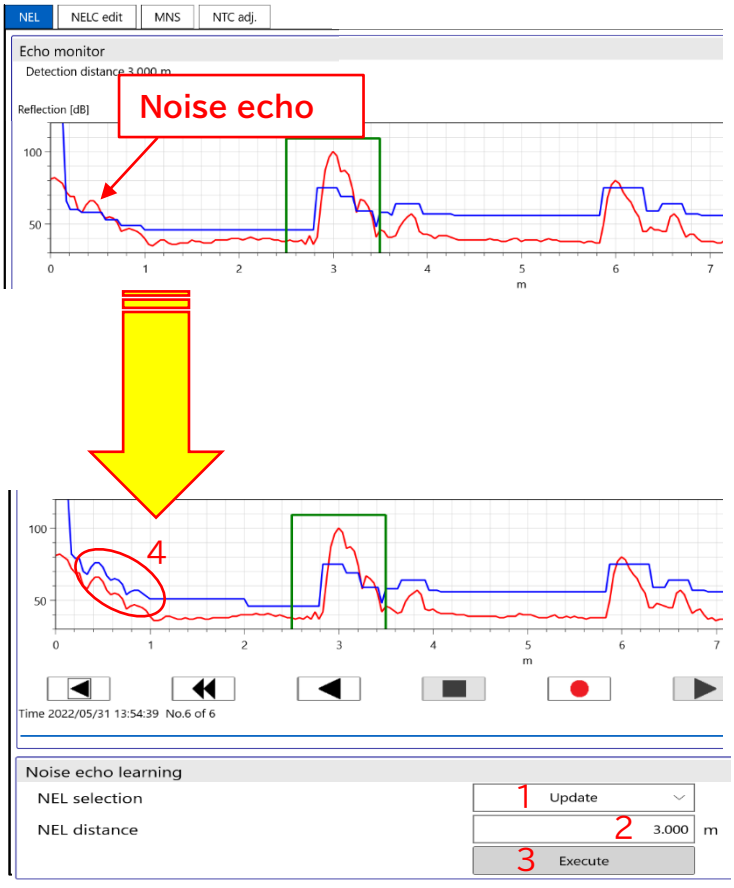
-Noise echo learning

Noise echo learning will automatically delete any influence of obstructive reflection with mask (curve of noise echo learning) on noise echo bearing from beams and H-beams of the tank in radiation angle of transmitter.

Select Menu>Device adjustment>Noise suppression.

＊Noise echo learning must be performed in empty or shorter distance than real reflection.

Proc	Operation	Instruction
1	Select NEL selection	Clear:Clear noise echo curve Update: Clear existing curve and draw new curve Addition: Add new curve on existing curve
2	Input NEL distance	Input distance for noise echo learning Range mask: 0m to input distance－1m
3	Click【Execute】	Perform noise echo learning



(Example)

If masking noise echo around 0.5m;

1. Select “Update”.

2. Input NEL distance 3m and mask 0 to 2m.

3. Click【Execute】.

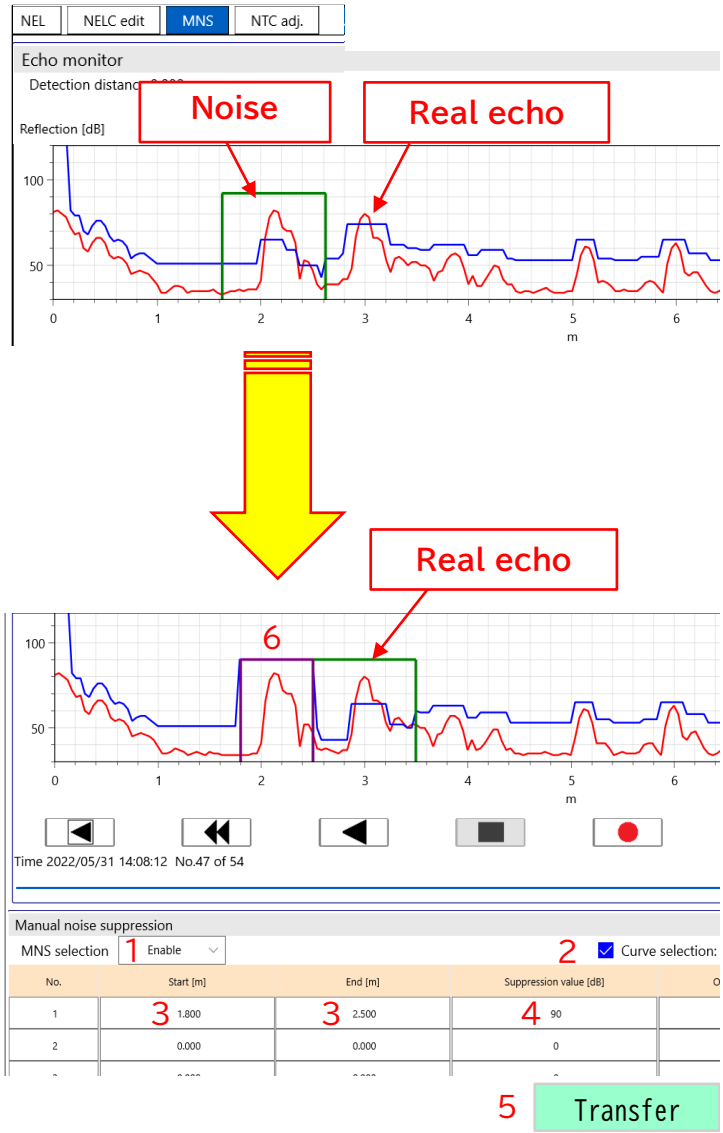
4. Mask noise echo.

-Manual noise suppression

Mask between specified 2 points and delete any influence of noise echo.

Select Menu>Device adjustment>Noise suppression>【Tab】MNS

Proc	Operation	Instruction
1	Select MNS selection =Enable	Manual noise suppression is Enable.
2	Mark ☑ Curve selection: MNS curve	If setting Manual noise suppression curve, MNS curve is displayed on chart area.
3	Input distance (start/end)	Input distance to mask (from start to end)
4	Input Suppression value	Input bigger value than noise echo.
5	Click 【Transfer】	Manual noise suppression curve is reflected.



(Example)

If masking noise echo around 2.2m;

1. Select MNS selection ＝ Enable
2. Mark Curve selection :MNS curve
3. Input start:1.8m, end:2.5m.
4. Input Suppression value 90dB.
5. Click 【Transfer】.
6. Masking noise echo and real echo is detected.

◆Operations of transmitter

・Record status

-Save echo trend

Measured echo trend will be saved on adjustment device measured on【●】to【■】.

＜How to use echo trend＞

-Check echo trend→P20

-Check past parameter→P22

-Echo trend CSV conversion→P31

Select Menu>Maintenance>Echo curve.

Proc	Operation	Instruction
1	Click【 ● 】	Start monitoring and echo curve is displayed.
2	Click【 ■ 】	Stop monitoring
3	Confirmation screen Click【Yes】	Save monitored echo trend
4	Change file name	Changing file name is available.
5	Click【Save】	Save echo trend

Displaying wave on chart area, it is possible to save with right-click>Save on chart area.

-Save present parameter

Specified parameter on transmitter will be saved on adjustment device.

＊Curve of noise echo learning is not saved.

＜How to use parameter file＞

-Check and input past parameter→P22

-CSV conversion of parameter→P31

Select Menu>Optional settings>Utility.

Proc	Operation	Instruction
1	Click【Read parameter】	Read specified parameter in adjustment device
2	Change file name	Changing file name is available.
3	Click【Save】	Save parameter in adjustment device

・Check/save/input past data

-Check echo trend

Checking echo trend saved in adjustment device. Folder address→P35

<How to use echo trend>

-Check past parameter→P22

-CSV conversion of echo trend→P31

Select Menu>Maintenance>Echo curve.

Proc	Operation	Instruction
1	Chart area>【Right-click】	–
2	Chart menu Click【Read】	–
3	Select file	Select necessary file
4	Click【Open】	Display echo trend in chart area

-Check/save device trend

It is possible to check and save trend data recorded on transmitter.

Save address→P35

Confirming measuring value will be available through transmitter is ON.

Select Menu>Maintenance>Device log.

Proc	Operation	Instruction
1	Click【Read device】	Read-in device trend
2	Pop-up Click【Yes】	* It takes a while to load.
3	Click【Save】	Save read-in device trend in adjustment device
4	Pop-up Click【Save】	Change name and save
5	Click【Data clear】	Delete trend data recorded in transmitter
6	Pop-up Click【Yes】	–
7	Click【Finish】	Clear displaying device trend

-Set up device trend

It is possible to select recording span of device trend. File address→P35

＊If exceeding term of record, older data will be overwritten.

Select Menu>Maintenance>Device log>Device trend settings.

Item	Default	Instruction
Recording interval	5min	Refer in below

Recording span and recording term

Recording span	Recording term	Recording span	Recording term
1min	2 days 20hrs 16min	15min	42 days 16hrs 0min
3min	8 days 12hrs 48min	30min	85days 8hrs 0min
5min	14 days 5hrs 20min	60min	170 days 16hrs 0min
10min	28 days 10hrs 40min	-	-

●If completion of setting, click 【Transfer】.

-Check/save event log

It is possible to confirm past event (error or any change on parameter) of transmitter.

＊If exceeding max number (128), recorded data will be overwritten from oldest.

Select Menu>Maintenance>Device log>【Tab】event log.

Proc	Operation	Instruction
1	Click 【Read device】	Read-in event log
2	Pop-up Click 【Yes】	＊It takes a while to load.
3	Click 【Save】	Save read-in event log in adjustment device
4	Pop-up Click【Save】	Change name and save
5	Click 【Data clear】	Delete event log recorded in transmitter
6	Pop-up Click 【Yes】	–
7	Click 【Finish】	Clear displaying event log

-Check past parameter

It is possible to confirm the parameter which was saved in adjustment device from echo trend.

Select Menu>Maintenance>Echo curve.

Proc	Operation	Instruction
1	Right-click on chart area	Read-in echo trend
2	Pop-up Click【Read】	Select file
3	Pop-up Click【Open】	Display past echo curve
4	Select Menu>Optional settings>Utility>【Tab】Parameter list	Available to confirm past parameter in parameter list
5	Right-click on chart area	–
6	Click【End】	Clear read-in echo trend and parameter

-Input past parameter

It is possible to input past saved parameter (setting values) in same time in transmitter.

Use if changing parameter or specifying same setting in another transmitter.

Save present parameter→P19

＊Not available to input curve of noise echo learning.

＊Do not input parameter of different version transmitter.

Select Menu>Optional settings>Utility.

Proc	Operation	Instruction
1	Click【Parameter writing】	Input saved parameter
2	Select file name	Select parameter file to input
3	Click【Open】	Input parameter data in transmitter in same time

Parameter to input

Parameter name		
-Application	-Maintenance notification current output settings	-Maintenance date notification setting
-Measurement range	-Noise echo learning	-Device status
-Damping	-Manual noise suppression	-LCD display
-Output settings	-NT curve adjustment	

・Check setting

-Check device status

It is possible to confirm present status of transmitter (failure/alarm/notice/mode).

Maintenance notification current output settings→P28

Select Menu>Maintenance>Device status.

-If light-on ● Status, failure or alarm or notice or mode is occurrencing.

-Click mark ? to display instruction.

-Check device information

It is possible to confirm serial No. and version of transmitter.

Select Menu>Maintenance>Device information.

Item	Content	Instruction
Device name	MMLM-FM79	Product type
Serial number	******	Production number
Firmware version	*.*.*	Transmitter firmware version
Order number	**********	Management number

-Check parameter list

It is possible to confirm present parameter name and setting values in list.

Check past parameter→P22

Select Menu>Optional settings>Utility>【Tab】parameter list.

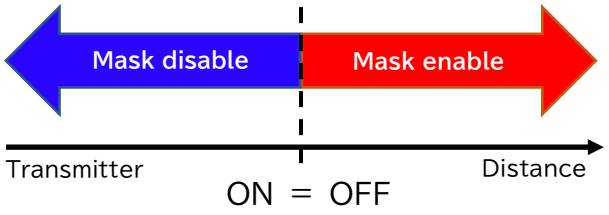
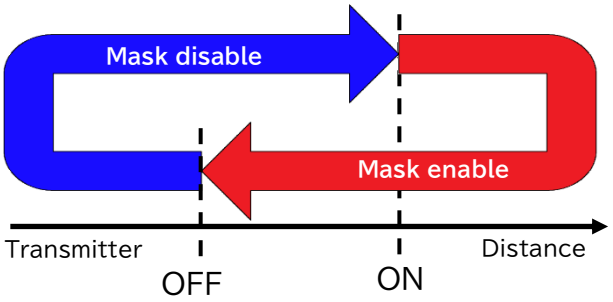
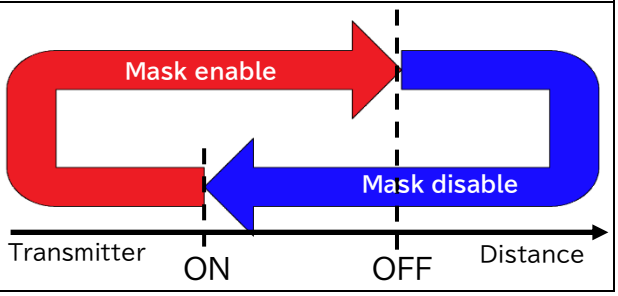
・Delete noise (multiple operations)
-Manual noise suppression (ON/OFF)

It is possible to continue specifying real echo with masking noise echo if changing noise echo position and echo volume by moving measuring object.

＊Specify masking after Manual noise suppression to be enable→P18

Select Menu>Device adjustment>Noise suppression>【Tab】MNS.

Sample

Masking position	ON/OFF	Instruction
Mask shorter distance than ON/OFF distance	ON distance ＝ OFF distance	
Mask shorter distance than OFF distance	OFF distance ＜ ON distance	
Mask longer distance than ON distance	ON distance ＜ OFF distance	

Condition to switch mask Enable/disable

Mask	Condition	Mask
If disable	Exceeding ON distance	Enable
If enable	Exceeding OFF distance	Disable

-Noise echo learning curve edit

Noise echo learning curve (ELC) made by noise echo leaning will be edited.
→P17
It is possible to edit ELC corresponding to measuring situation with carefully adjusting control volume between specified 2 points.
Select Menu>Device adjustment>Noise suppression>【Tab】NELC edit.

Proc	Operation	Instruction
1	Click 【Start edit】	Start edit NELC
2	Click 【Save】	Save present NELC to be able to play back *1
3	Input distance of start [m] and end [m]	Input zone to adjust
4	Select settings selections	-Setting value：Control volume -Offset：Offset specified value (+/-)
5	Input setting value	If selecting setting＝setting value, available to input
6	Input offset value	If selecting setting＝offset value, available to input
7	Click 【Add row】	Add new row *2
8	Click 【Device writing】	Input edited NELC in transmitter
9	Click 【Save】	Save edited NELC in adjustment device
10	Click 【Finish edit】	Complete NELC edit

*1: Click【File reading】 and select curve to edit if edit saved NELC.
*2：If delete row, mark ☑ and click【Delete selected rows】.

-NT curve adjustment

If adjusting noise threshold curve, it becomes easy to capture real echo.
Select Menu>Device adjustment>Noise suppression>【Tab】NTC adj.

Item	Default	Instruction
NT offset value	5 dB	Adjust NT curve offset value
NT detection window offset value	10dB	Adjust NT curve offset value after detection window
NT reference value	0dB	Make NT reference level with adding average value of echo curve

●If completed setting, click 【Transfer】

-Detection window adjustment

If real echo existing out of detection window, detection window to be forced to move to real echo distance is available.
Select Menu>Device adjustment>Other adj.>Detection window adjustment.

Proc	Operation	Instruction
1	Input detection window distance	Input distance to move
2	Click 【Execute】	Detection window will move

◆Easy functions

・Checking output

-Simulation

It is possible to output specified value from transmitter.
Simulation automatically stops if exceed 30min in no-operation.
Select Menu>Maintenance>Simulation.

Proc	Operation	Instruction
1	Click 【Start】	Start simulation
2	Select measuring value	Select item of simulation value Distance/level distance/level (%)/current value
3	Input simulation value	Simulation value
4	Click 【Execute】	Output current corresponding to simulation value
5	Click 【Finish】	Finish simulation

・Changing output setting

-Change of device status

It is possible to change item to confirm status of transmitter.
Current output of maintenance notice→P28
Select Menu>Maintenance>Device status.

Item	Instruction
Setting	Click check box if changing output setting ☑ : Enable、☐ : Disable Depending on setting, ✔(Enable) on Maintenance notification current output settings (Maint.) and device log (Log) will be changed.

●After completion, click 【Transfer】.

・Maintenance notification current function

This is function to notify maintenance to user by changing current output regularly.

<How to use function of notice of maintenance>

-Maintenance notification current output settings →P28
-Maintenance date notification setting →P29
-Antenna cleaning notice →P29

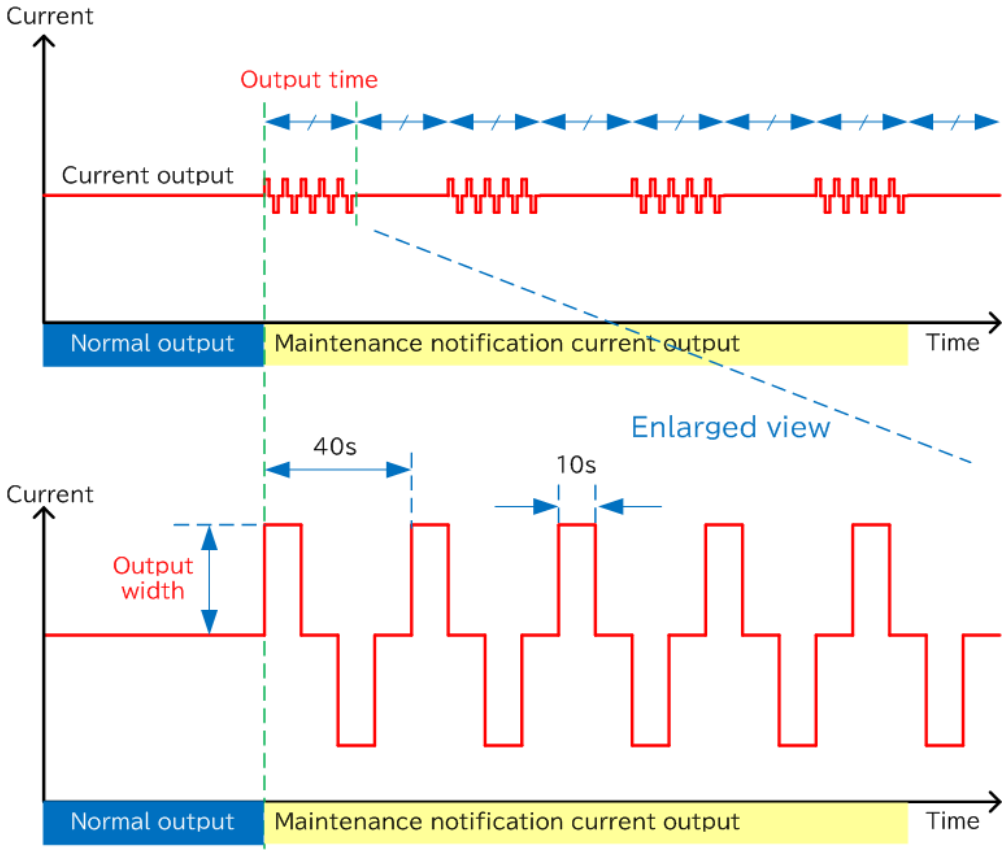
-Maintenance notification current output settings

When it reaches the value to be set in the maintenance item of device status, the maintenance notification current output will be output.

Change device status→P27

Select Menu>Basic settings>【Tab】Damping/Output/LCD>Maintenance notification current output settings.

Proc	Operation	Instruction
1	Select MN current output selection= Enable	Default:Disable
2	Input MN current output time	Output time
3	Input MN current output width	Output width 0.16mA/%
4	Click【Transfer】	Maintenance notification current is Enable.



Output time and output width

-Antenna cleaning notice

It is possible to find earlier by maintenance notice function if some materials are built up on antenna surface.

-Setting current output for notice of maintenance →P28

Select Menu>Maintenance>Device status.

Item	Instruction
Setting	Click check box of antenna cleaning notice ☑ : Enable ☐ : Disable

●After completion, click 【Transfer】.

-Maintenance date notification setting

Setting next maintenance date, and exceeding the date will be notified by function of current for notice of maintenance.

-Specify current output for notice of maintenance→P28

Select Menu>Maintenance>Device status.

Proc	Operation	Instruction
1	Setting	Click check box of date for notice of maintenance ☑ : Enable ☐ : Disable
2	Maintenance schedule Click【Date】	Select date of next maintenance on calendar
3	Click 【Transfer】	Maintenance schedule will be set.

・Check antenna direction/angle

-Check installation angle

Confirm direction/angle of transmitter

It is possible to be the close condition with the previous direction of antenna when replacing transmitter.

＊Make sure to any influence to antenna direction if existing magnetic substance around transmitter.

＊Antenna direction has individual character so be sure to use.

＊Level measuring is not working during operation of installation angle.

Select Menu>Maintenance>Installation angle.

Proc	Operation	Instruction
1	Click【Start】	Start operation of installation angle
2	Click【Execute】	Display antenna angle and antenna direction ＊1
3	Click【Stop】	Stop operation of installation angle
4	Click【Finish】	Complete operation of installation angle

＊1 : If the antenna angle is less than 5˚, the antenna direction is supposed to be the front face (name plate) of Radar Transmitter.

・Convert parameter into CSV file.

It is possible to convert saved parameter file and echo trend file into CSV file, and easily open the files as text data.

-Parameter CSV conversion

Convert saved parameter into CSV file.

Save present parameter→P19

Select Menu>Optional settings>Utility.

Proc	Operation	Instruction
1	Click 【Parameter CSV conversion】	Convert saved parameter in adjustment device into CSV
2	Select parameter file	Select file to convert
3	Click【Open】	Display pop-up in CSV
4	Save CSV Click【Save】	Change file name and save as CSV file

-Echo trend CSV conversion

Convert saved echo trend file into CSV file.

Save echo trend→P19

Select Menu>Optional settings>Utility.

Proc	Item	Instruction
1	Click 【Echo trend CSV conversion】	Convert saved echo trend into CSV
2	Select echo trend file	Select file to convert into CSV
3	Click【Open】	Display pop-up in CSV
4	Save CSV Click【Save】	Change file name and save as CSV file

･Protection of transmitter

Protecting transmitter will not accept any other person to operate and change setting.

-Specify passcode

Change a passcode to protect transmitter.

Select Menu>Optional settings>Device protection.

Proc	Item	Instruction
1	Input current passcode	Present passcode Default:**0000**
2	Input change passcode	New passcode
3	Confirm input again	Input change passcode again
4	Click【Execute】	Change to new passcode

-Protecting transmitter (device)

Input passcode to protect transmitter and being lock (protecting) it.

＊Under Lock condition: Only operations of echo curve, device trend and event log can be available.

Select Menu>Optional settings>Device protection.

Proc	Item	Instruction
1	Input passcode	Passcode **Default:0000**
2	Click【Lock】	Unlock→Lock(Protecting) Restrict operation of transmitter
3	Click【Unlock】	Lock→Unlock (No protection) Release operation of transmitter

･Change of LCD display

-Change value of LCD display

Change values on LCD display of transmitter.

Select Menu>Basic setting>【Tab】Damping/Output/LCD>LCD display.

Item	Default	Instruction
Indication value	Level percent	Select item on LCD display Distance/Level distance/level percent/current value

●After completion of setting, click【Transfer】.

◆Others

-Change Bluetooth name

Change Bluetooth name of transmitter and it becomes to be easy to confirm if pairing.

＊Please note that when you change the Bluetooth name, the transmitter will reset once (analog output 3.6mA).

Select Menu>Bluetooth setting.

Item	Default	Instruction
Bluetooth device name	FM＊＊＊＊＊＊＊	Input any name

Default:＊＊＊＊＊＊＊ serial No.

●After completion, click 【Transfer】.

-Reset parameter/temperature log

Reset parameter and temperature and it shows default value.

It must be Enable if changing setting situation.

Select Menu>Device adjustment>Other adj.

Resetting name and item to be reset

Item	Parameter reset	Factory reset	Temp. log reset
Parameters	✔	✔	–
Bluetooth device name	–	✔ ＊1	–
Device trend	✔	✔	–
Event log	–	–	–
Temperature log	–	✔	✔
Noise echo learning curve (ELC)	–	✔	–
Passcode	–	–	–

✔:Change to default value –:No change

＊1:Bluetooth device name＝FM79

●Click【Execute】

-Change chart area

By right-click in chart area (long press for smartphone), using function of changing X-Y axis and saving will be available.

Chart name	Item	Instruction
Echo monitor	X-Y axis settings	Changing starting value and end value on X and Y axis
	Curve select	Wave to be displayed ☑:Enable
	Save	Save displayed wave in adjustment device
	Read	Display past data
	End	Clear displaying wave
Trend monitor	Y axis settings	Selecting wave and changing starting value and end value on Y axis
Device trend	Y axis settings	Starting value and end value of Y axis can be changed.

-Set date/time

Reset present time on transmitter.

Select Menu>Device adjustment>Other adj.>Date/Time.

●Click【Device writing】.

-Specify language

It is possible to choose language on app display in Japanese or English.

Select Menu>Language.

Item	Default	Instruction
Language	OS language	Change language to be displayed -Japanese -English -Korean -Chinese

-Check user's manual

It is possible to download user's manual of radar level transmitter.

Select Menu>Help>User's manual.

Proc	Operation	Instruction
1	Click URL	Move to HP of Matsushima Measure Tech.
2	Click Download	Download necessary file

-Folder address for saving

Address of files for saving are as follows;
If displaying saved file on other adjustment device, please copy specified file.

-Windows/ Android

File name	Extension	Windows	Android
Echo trend	.etrd	C:...¥Documents¥Matsushima¥FM79SmartCom_V*_*¥Echo_trends	Internal storage>Android>data>com.matsushima_m_tech.fm79smartcom>files>Echo_trends
Device parameter	.para	C:...¥Documents¥Matsushima¥FM79SmartCom_V*_*¥Device_parameter	Internal storage>Android>data>com.matsushima_m_tech.fm79smartcom>files>Device_parameter
Device trend	.dtrd	C:...¥Documents¥Matsushima¥FM79SmartCom_V*_*¥Device_trends	Internal storage>Android>data>com.matsushima_m_tech.fm79smartcom>files>Device_trends

-iOS

Access file using iTunes app.

Proc	Operation	Instruction
1	Switch ON iTunes	Connect the adjustment device to the computer using a USB cable.
2	Click ”Device”	–
3	Click “Shared file”	Setting (Left side menu in screen)
4	App Click “FM79 Smart Com.”	Shared file (Center of screen)
5	Papers of FM79 Smart Com. Click “Specified folder”	Select specified folder to save -Echo trend =Echo_trends -Device parameter =Device_parameter -Device trend =Device_trends
6	Click “Save”	Copy specified folder on PC

◆Appendix
-Troubleshooting

If occurring following incidents, please try to confirm the below table before deciding failure;

Troubleshooting 1/2

Condition	Check and confirm	Countermeasure
Fail to install	Confirm OS on adjustment device and supporting version→P4	Use applicable adjustment device
Fail to be pairing	Applicable voltage on terminal block of transmitter? Power voltage:DC12V to DC36V	Apply allowable power supply
	Is the Bluetooth on the adjustment device enabled?	Perform the initial setup. →P4
	Any block to transmitter or too far?	Remove block Close to transmitter
	BLE mark is displaying on screen of transmitter?	If displaying BLE mark, other communication is going on. Disconnect the communication with other devices.
	Confirm file system access authority ON? OFF?	Switch ON for “FM79SmartCom.”→P5
	-	-Please pair again by turning Bluetooth on the adjusting device from disabled to enabled. -Remove the device → P.37 -Restart the app and try pairing again. -Restart the adjusting device and try pairing again. -Check whether Bluetooth is restricted in OS setting or anti-virus software. -Check the Bluetooth version of your adjusting device. *1 -In case of iOS, Setting > FM79 Smart Comm. > Bluetooth: Turn Enable. -If multiple sensors are connected, Please conduct “delete of device” →P.37
Cutting connection	Any block to transmitter or too far?	Remove block, and get closer to transmitter.
Not available to operate	-	Restart app Restart adjustment device
【Display screen】 No display shown or Display shown in a second	Check wiring	Try right wiring
	Check voltage on terminal block of transmitter Power voltage:DC12V to DC36V	Supply allowable voltage
	Check temperature Display:-20 to 70℃	Keep temperature range
	Check load resistance Refer “Instruction manual Radar level transmitter Fig. 1. Power supply voltage vs. Maximum load resistance”	Set load resistance lower than Maximum load resistance
Abnormal output of current	Check voltage on terminal block of transmitter Power voltage :DC12V to DC36V	Supply allowable voltage
	Check load resistance Refer “Instruction manual Radar level transmitter Fig. 1. Power supply voltage vs. Maximum load resistance”	Set load resistance lower than Maximum load resistance

＊If it is not recovered, please get contact with us.

Troubleshooting 2/2

Condition	Check and confirm	Countermeasure
Not matching between actual level and measuring value	Check antenna surface and inside beam angle	Reduce influence of obstacles. Refer “Instruction manual of Radar level transmitter”
	Check distance between transmitter and measuring surface	Keep distance longer than min. measuring distance. Example) use additional short pipe
	Check adhesion on antenna surface	Clean antenna surface Set purge
	Confirm wave Check setting for noise	Delete noise by followings; -Noise learning→P17 -Manual noise suppression→P18 -Manual noise suppression ON/OFF function →P24 -Edit noise echo learning curve→P25
	Check reflection	Change setting position and antenna direction
Over work on adjustment device	Check other app	Close any other app
	Check wave monitoring by app。	Stop wave monitoring
Displaying code on LCD	Refer to “ Code display and procedure table”→P38	

＊If it is not recovered, please get contact with us.

＊1. Make sure that the Bluetooth version is 4.2 or higher.
In case of Windows, Device Manager→Bluetooth→Right click on the target Bluetooth module→Properties→Tab [More Information]→Firmware Version = The first number of LPM must be ”8” or higher.
(Example: in case of “LPM 11.8212”, the first number of LPM is “11”.)
In case of Android iOS, please confirm the website of each brand from the product model.

-Delete of device

When “Transmitter can be detecting but not connected if pairing”, please try to perform following works and try to restart app again→P5

-Windows

1. Select Start> ⚙ Setting>Device>Bluetooth>Others.
2. Delete “Bluetooth name” of transmitter on Others.

-Android

1. ⚙ Setting> tap connected device.
2. Delete “Bluetooth name” of transmitter on already connected device.

-iOS

1. ⚙ Setting> tap Bluetooth.
2. Tap Bluetooth name of transmitter Left(i) on your device.
3. Tap “Release registration of Device” and delete it.

-LCD

If the code shows up in the display, please try to do following procedures;

Code display and procedure table

Code	Situation	Detail/Procedure	Current output
F001	Memory error	Detail:Memory in device has malfunction. Procedure:Reset power. *1	Depending on output setting if trouble <3.6mA to 22mA>
F002	RF module error	Detail: Module in device has malfunction. Procedure:Reset power. *1	
F003	Power charge error	Detail: The charge circuit malfunctions, or the supply voltage is out of range. Procedure:Confirm supply voltage range DC12V to DC36V. Reset power. *1	
F004	Loop current error	Detail:Current output value is out of range. Procedure:Confirm load resistance. Confirm supply voltage range (DC12V to 36V).	
F005	Lost echo error	Detail:No echo in measuring range. Procedure:Clean antenna surface. Change measuring range.	
S009	Startup processing	Detail:Device is waiting to start. Procedure:Wait for detecting echo.	<3.6mA
S010	Temp. out of range	Detail:Temp. in device is out of range. Procedure:Confirm ambient temp.	Continue output of Measuring value
S011	Full alert	Detail:It goes beyond the upper limit, full level (100%). Procedure:Confirm actual material level. Confirm measuring range.	
S012	Empty alert	Detail:It goes below the lower limit, empty level (0%). Procedure:Confirm actual material level. Confirm measuring range.	
S013	Measured value alert	Detail:Measuring value is out of range. Procedure:Confirm range of parameter.	
M017	LCD comm. error	Detail : LCD in device has malfunction. Procedure:Reset power. *1	Maintenance notice =Enable, Setting current output on maintenance notice
M018	Internal comm. error	Detail :Time comm. in device has malfunction. Procedure:Reset power. *1	
M021	Antenna cleaning	Detail :Antenna is not clean. Procedure:Clean antenna.	
M022	Maintenance date	Detail:Exceeding specified maintenance date Procedure:Update maintenance date.	
C041	Simulation	Detail:Under simulation	Simulation value

***1. After turning OFF the power, after confirming that the display screen has disappeared, turn ON the power again.**

*** If it is not recovered, please get contact with us.**

-Maintenance

Routine maintenance will be recommended.

Maintenance schedule will be notified according to notice of maintenance function→P29

Routine check table

Item	Content	Cycle(aim)
Visual check	-Damage on housing -Fixed cover and lead inlet -Fixed mounting bolts	Once every 12 months
Antenna check	-Cleaning of antenna surface	Once every 6 to 12 months

The time lag may be caused in the time on Radar Transmitter.Please adjust to the current time during maintenance.

Select Menu > Device adjustment > Other adj. > Date/Time

●Click【Device writing】.