atDistance

Ultrasonic Sensor Software

Software Manual MSO-atDistanceU1-V2.2-EN

Thank you for purchasing an Autonics product.
This user manual contains information about the product and its proper use,
and should be kept in a place where it will be easy to access.

Autonics

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Thank You for Purchasing The Product

Thank you for purchasing Autonics products.
Please familiarize yourself with the information contained in the **Safety Considerations** section before using this product.
This manual contains information about the porduct and its proper use, and should be kept in a place where it will be easy to access.

Manual Guide

- Please familiarize yourself with the information in this manual before using the product.
- This manual provides detailed information on the product's features. It does not offer any guarantee concerning matters beyond the scope of this manual.
- This manual may not be edited or reproduced in either part or whole without permission.
- This manual is not provided as part of the product package. Please visit our website (www.autonics.com) to download a copy.
- The manual's content may vary depending on changes to the product's software and other unforeseen developments within Autonics, and is subject to change without prior notice. Upgrade notice is provided through our homepage.
- We contrived to describe this manual more easily and correctly. However, if there are any corrections or questions, please notify us these on our website.

Common Symbols In The Manual

When there is a possibility of serious injury or death when the instructions are violated

In case of violating the instructions, there is a possibility of minor injury or product damage

Supplementary explanation of the function

Example of that function

Important information about the feature

1. atDistance

1.1. Overview

atDistance is exclusive software for the ultrasonic sensor UTR series, and can be used intuitively through UI (User Interface). It is possible to set the parameter, digital / analog output, and sensing distance details and monitor detection status in real-time.

1.2. Function list

Product information check	Checks the product information through the status window.
Log	Saves real-time measured values as a file.
Monitoring	Monitors the detection status of the ultrasonic sensor in real-time.
Parameter setting	Sets the parameter of the selected device.
Output setting	Sets the details such as digital / analog output mode, and detection area.
Multilingual support	Korean, English, Chinese and Japanese are supported.

2. Installation

2.1. System Requirements

The minimum requirements for software are as follow.

System	IBM PC compatible computer with 1 GHz+ processor
OS	Microsoft Windows 7+
RAM	2 GB+
Storage	Hard disk with 1 GB+
Resolution	Display with resolution of more than 1024 × 760
Others	USB 3.0 port (900 mA)

USB bus Power is supplied through PC or USB host controller.
Please use USB 3.0 port (900 mA).
When using atDistance, communication error may occur due to installed security programs, etc. on the PC.

2.2. Software Installation

1. Download atDistance program at Autonics web page (www.autonics.com).
2. Close all programs before installing atDistance. Double-click atDistance setup.exe to start installation.
3. Read all the details of the “License agreement procedure” and click **Agree**.
   It is possible to check all the details of the license agreement by scrolling down the mouse, clicking the down arrow, or clicking **page Down** on the keyboard.
4. Default installation path is C:\Program Files (x86)\Autonics\atDistance\.
   If you need to change the default path, click **Browse** button and select the desired destination folder. And then click **OK** to start installation.
5. “Installation Complete” window appears after installation is completed. Double-click the atDistance icon on the desktop to run the program.

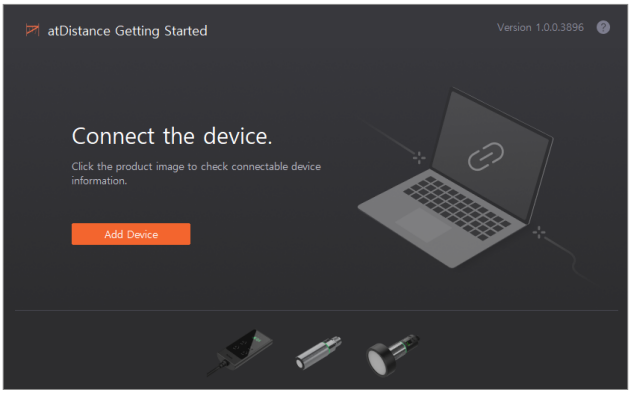
2.3. Uninstalling the Program

There are procedures to uninstall atDistance. Select Start › Program › Autonics › atDistance › Uninstall atDistance or Start › Control Panel › Remove a program.
When selecting Remove, a confirmation window will appear. Click **Yes(Y)** to remove it from the computer.

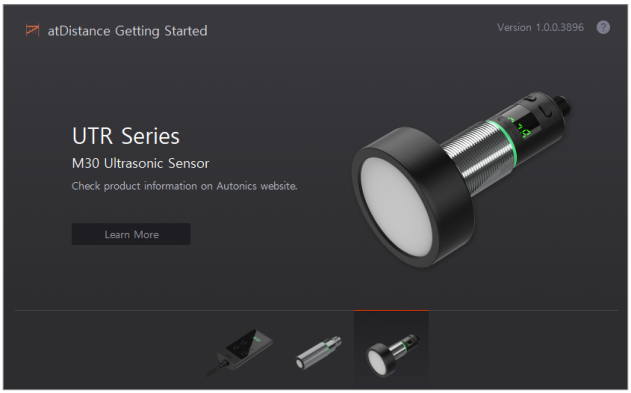
3. Conncetion

3.1. atDistance Getting Started

Starts atDistance, the below dialog box appears.

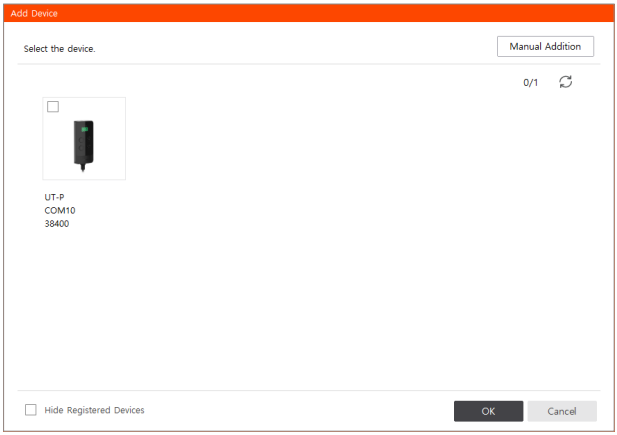


- Click **Add Device** :
  Connects PC and device. For more information, refer to 3.2, “Device Connection”.
- Click the below device image:
  Checks the device information with series name and image, etc. For more information, click **Learn More** and refer to the Autonics website.

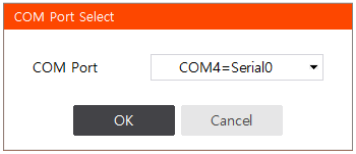


3.2. Device Connection

1. Click the + button in the device information window on the left side of the program to open the 'Add Device' window.
2. Displays the devices connected to the PC network.
   After selecting a device, click **OK**.

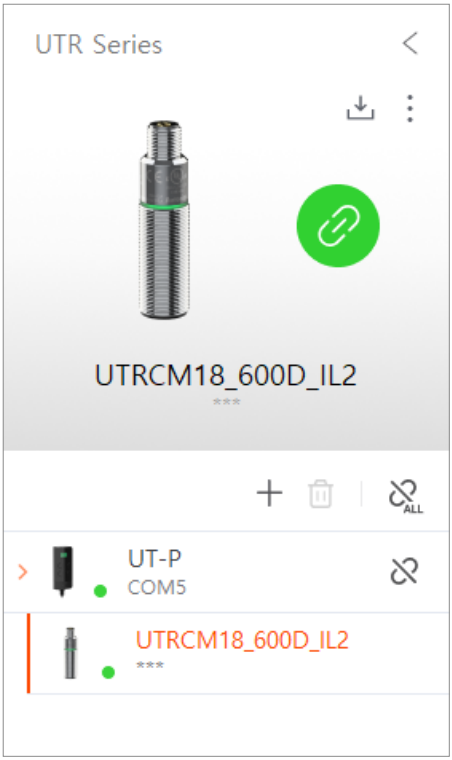


   Alternatively, click **Manual Addition** and change the COM port to connect the device.



3. When a device is added, they are displayed in the list at the bottom.

1. Click the 🔗 button at the right of the device added in the device list to connect the device. As shown below, 'Connected' is displayed and the connection is complete.



Display device connection status

Device information	Device list	Connection status
		No connection
		Connected
		Failed to Connection
		Warning

3.2.1. Warning Code

When a warning appears as table below, it displays in the device information window.
Click the warning icon or warning code to check a detailed explanation.

Warning code	Description	Cause	Action
0x00000001	Blind zone	An object is detected in the blind zone.	Remove the object in the blind zone.
0x00000002	Digital output over current	Output short circuit	Check the wiring status.
		Overload	Check the rated load capacity.
0x00000004	Overheat warning	Output short circuit	Check the wiring status.
		Overload	Check the rated load capacity.
0x00000008	Product operation time alarm	Spending the product for more than the set operation time	Change the product operation time alarm setting.

4. Screen Configuration

1. Ribbon Menu	Displays the functions of atDistance.
2. Device Information	Displays the product information and operation status.
3. Output Graph	Displays real-time monitoring information.
4. Tool bar	Sets the output graph for easier viewing.

4.1. Home

4.1.1. Project

New File	Opens a new file by initializing open data files.
Open	Opens the saved device list file.
Save	Saves the current device list as a file.
Save As	Saves the current device list as a file with a different name.

4.1.2. Monitoring

Monitoring	The data measured from the device appears as a graph. It is possible to set the graph easily with the toolbar function.

4.1.3. Setting

Parameter	Helps to set the parameter of the selected device.
Output	Sets the output mode, detection area, etc. of the selected device.

4.1.4. Tools

Options	Sets device temperature unit (Celsius (°C) / Fahrenheit (°F)).

4.2. Log

4.2.1. Log

Supports log function.

Start log	Starts and stops the log function.
Start / Elapsed time	Displays start/elapsed time of the log function.
Setting log	Configures setting value related to the log function.
View log	Opens the directory which contains the log file.

4.3. Help

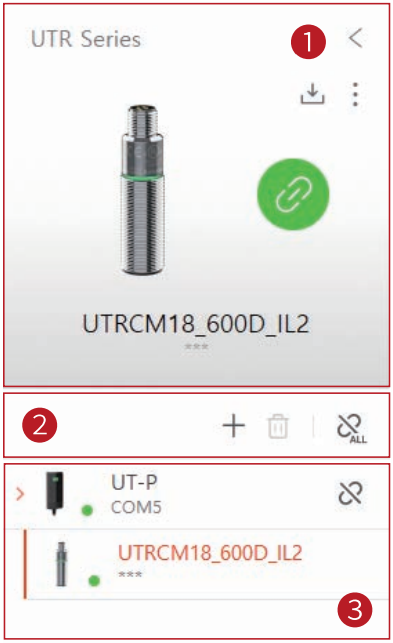
4.3.1. Information

i **Software Information**	Displays current software information.

4.3.2. Help

Help	Opens the software manual.

4.4. Device Informaion



Depending on the connected device, the icon configuration, etc. may be different.

1. Device

See More	Check / Set device related information such as connection status and model information.
Download	Applies changes of the parameter and output setting to the device.
Change Device Name	Change the name of UT-P.
Change Network	Select or change the COM port.
Device Information	Check device information such as serial number and HW / SW version.

Import	Imports the device's parameter information from the file to atDistance.
Export	Exports the device's current parameter information set in atDistance as a file.
Initialization	When selecting **OK**, resets the parameter and output settings of the device.

2. Edit device list

Helps to add and delete a device.

Add Device	Adds Device
Delete Device	Deletes Device
Connect All	Connects to all devices.
Disconnect All	Disconnects to all devices.

3. Device list

Displays registered devices, and helps to set device name, check COM port and connect/disconnect the device.

Connect	Connects Device
Disconnect	Disconnects Device

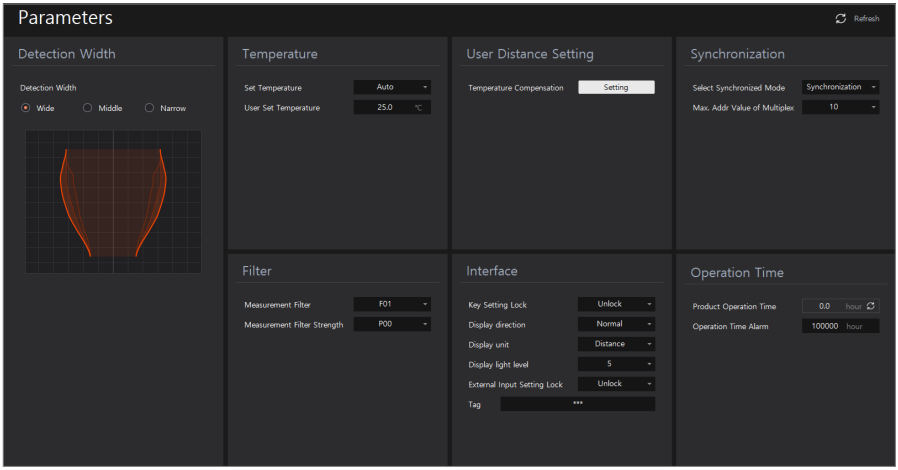
Changing the device name is only for UT-P. In case of UTR, set an alias through the tag set.
The changed device name is not saved in the device. Only the name visible in the device list is changed.
When the project is saved and loaded, the changed name is applied to the device list.

4.5. Monitoring

It is possible to check the output of the device with a graph in real-time.
Checks the output graph with toolbar settings, such as the filter or adjoint line.

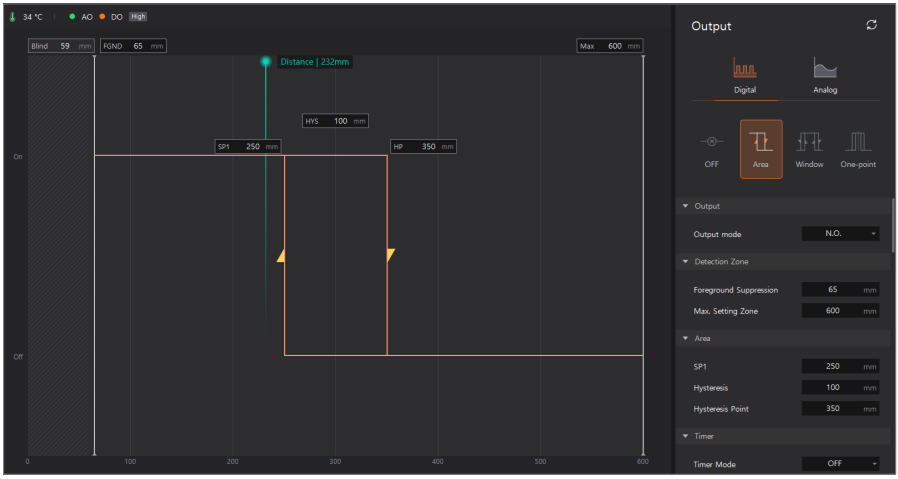
4.6. Parameters

Sets the device's parameter.
It is possible to change various settings such as detection width, temperature, filter, and display part depending on the connected device.



4.7. Output

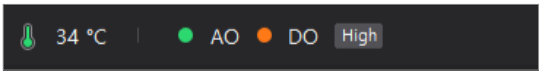
Sets the output status of the device.
It is possible to set the detection area and settings of digital or analog output in detail depending on the connected device.



5. Monitoring

5.1. Title Bar

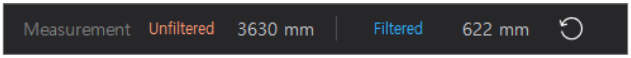
Displays the temperature and output status of digital / analog.



Icon	Description
/	Complete / Incomplete temperature stabilization It will complete after 30 minutes when power supply to the device.
AO / AO	Analog output ON / OFF
DO / DO	Digital output High / Low
/ /	Area mode / Window mode / One-point mode It depends on the digital output setting.

5.2. Measurement

Displays the unfiltered value and filtered value of measurement.



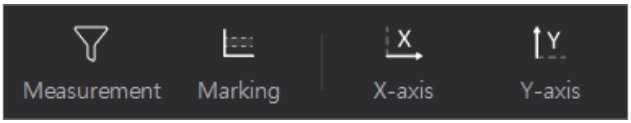
5.3. Output Graph

Displays output value in a real-time graph.

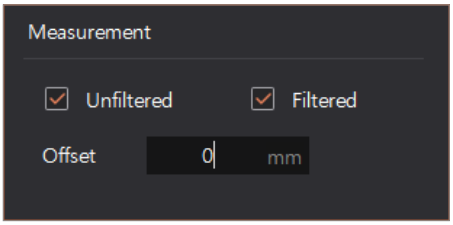
Pressing ↺ button to the right of the measurement will reset and start the output graph window.

5.4. Tool Bar

Sets the output graph for easier viewing.



5.4.1. Measurement



Unfiltered value Displays an actual measurement value.

Filtered value Displays a filtered value by the set filter. Refer to the **6.5, "Filter"** for the filter.

Offset ratio It is possible to compare the unfiltered value and the filtered value by changing the position of them on the graph.

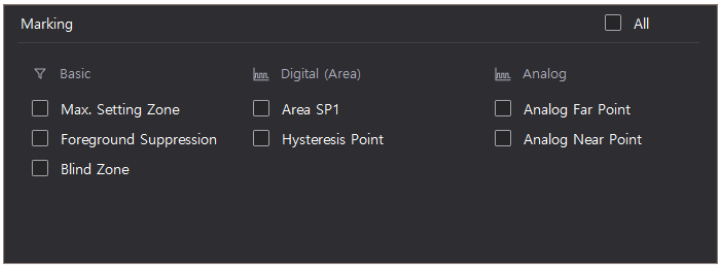
- **Setting range**: -999 to 999 mm

Please select at least one check box.

5.4.2. Marking

It is possible to check easily the graph by displaying the setting value of digital / analog output with a marking.

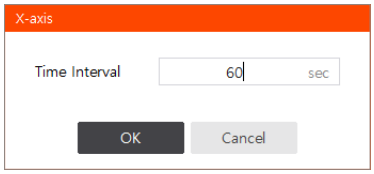
The check box change to the setting of the digital / analog mode set in Setting › Output.



5.4.3. X-axis / Y-axis

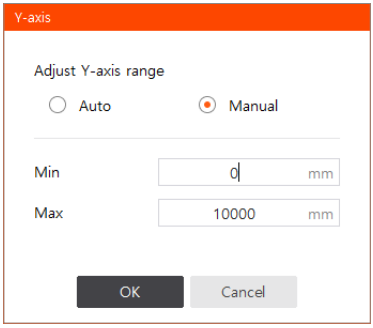
In the output graph, the X-axis displays time (unit: sec) and the Y-axis displays distance (unit: mm). Sets a time or distance range.

X-axis Sets the X-axis time interval.



- **Setting range**: 1 to 60 seconds

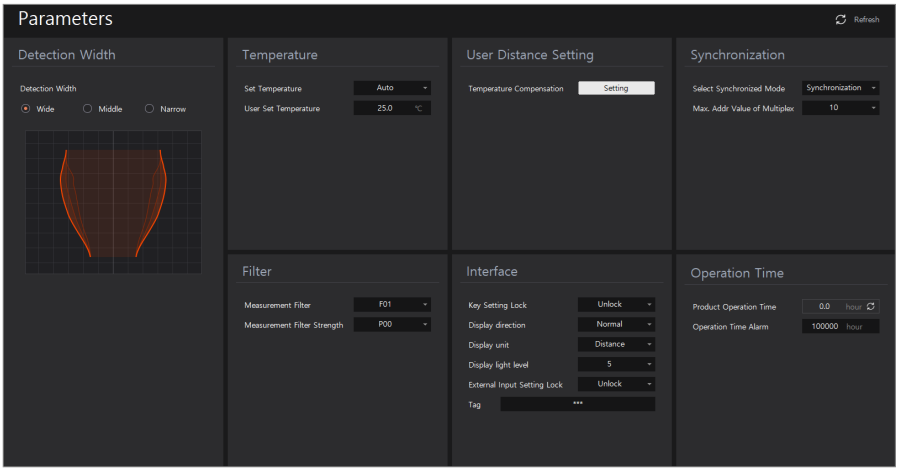
Y-axis Adjust the Y-axis range
Auto: Adjusts the Y-Axis automatically and displays a graph.
Manual: Adjusts Y-Axis manually. Enter maximum / minimum value of the Y-axis to set the display range.



- **Setting range**: 0 to 99999 mm

6. Parameter

For details of each parameter, refer to the UTR / UT-P product manual.



6.1. Detection Width

It is possible to set the detection width of the device.
This parameter is supported only for a UTRCM18-1300, UTRCM30-8M models.

- **Setting range**: Wide / Middle / Narrow

6.2. Temperature

Ultrasonic sensors may change sensing distances due to changes in sound speed caused by environmental conditions such as atmospheric temperature.
In temperature compensation, it is possible to measure accurately by minimizing the error between actual distance and measurement value.
Select the setting temperature based on models and environment.

6.2.1. Setting Temperature

In manual mode, enter the environmental temperature directly and in auto mode, estimate the ambient temperature by the internal temperature sensor.

- **Setting range**: Manual / Auto

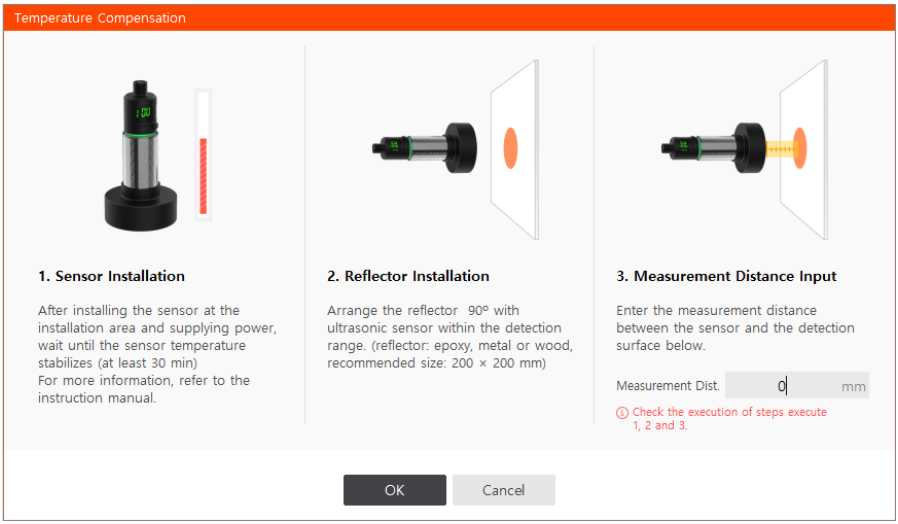
6.2.2. User Setting Temperature

Enter the environmental temperature in the manual mode.
Temperature input supports up to one decimal place.
If enter the setting value in Fahrenheit, the software will convert it to Celsius.

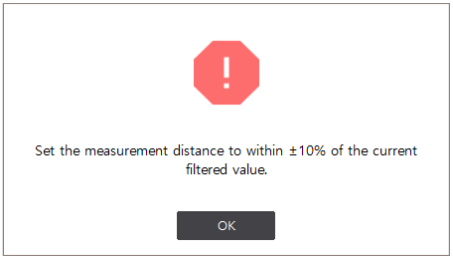
- **Setting range**: -25.0 to 70.0 °C / -13.0 to 158.0 °F

6.3. User Distance Setting

Select Temperature Compensation › Setting to install the device properly, and then enter the actual installation distance in 3. Measurement Dist.



- **Setting range**
  It cannot be set if the difference between the current device's measurement and the distance entered is more than 10 %. If it is out of the set range, a pop-up window will appear as below.



Set the Foreground suppression to Filtered value within ± 10 %

Use after the temperature stabilization(for over 30 min after power supply).
An error can occur if temperature compensation is activated before temperature stabilization.

6.4. Synchronization

When multiple ultrasonic sensors are connected with the synchronization mode, a wider detection width can be detected. Synchronization mode and multiplex mode cannot be used together.
Sets synchronization selection and multiplex maximum address values.

6.4.1. Select synchronized mode

- **Setting range**
  - Synchronization

    Ultrasonic signal connected from the synchronization is simultaneously transmitted to detect at the same time. It can detect wide areas more than the max. detection width of a product.
    In synchronization mode, the response time changes based on the longest response time among connected products.
    To prevent mutual interference, install at a distance greater than the rated distance between sensors.
    For detailed separation distances, refer to the Cautions for Installation.

  - Multiplex
    Sets the multiplex addresses differently by transmitting / receiving the ultrasonic signals in turn, it is possible to detect one or more sensing targets and monitor wide areas simultaneously.
    In the multiplex function, the overall system response time may increase and differ from the rated response time.
    Since no mutual interference occurs, the sensors can be installed regardless of the distance between sensors.

6.4.2. Max. Addr. Value of Multiplex

If synchronization mode is set to multiplex, enter the maximum address value.
For example, when connecting 5 units through multiplex, enter the maximum address value is 5 or more.

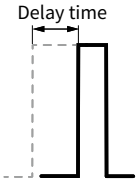
- **Setting range**: 1 to 10

6.5. Filter

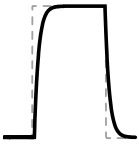
6.5.1. Measurement filter

Sets the measurement filter to change the response time on the sensor's measurements or filter the values with a stable curve.

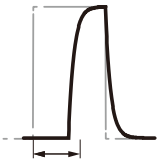
- **Setting range**: F00 to F04
  - F00: No filter
    Unfiltered measurement value
  - F01: Foreground filter
    If a distance is measured greater than the distance currently measured by the sensor, this filter maintains the existing value for a certain period of time and then outputs measured values with a delay.
    If the detection time is shorter than the delay time, the measurement value is not be output.
    The higher the measurement filter strength, the longer the delay time for the increasing distance.



  - F02: Averaging filter
    If the measured values are unstable due to vibration etc., this filter outputs the values with a curve.
    If the measurement filter strength is higher, the measurements are filtered with a more stable curve.

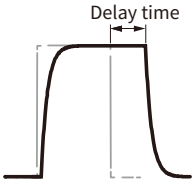


◦ F03: Foreground + averaging filter
If a distance is measured greater than the distance currently measured by the sensor [Figure 1], this filter outputs simultaneously applied to measured values with delay and curve. (Foreground + Averaging filter)
If a distance is measured closer than the distance currently measured by the sensor, this filter outputs applied to measured values with curve. (Average filter)
If the detection time is shorter than the delay time, the measurement value is not be output.
The higher the measurement filter strength, the longer the delay time for the increasing distance, and the more stable the measurements are filtered.



[Figure 1]

◦ F04: Background + averaging filter
If a distance is measured greater than the distance currently measured by the sensor, this filter outputs applied to measured values with curve. (Average filter)
If a distance is measured closer than the distance currently measured by the sensor, this filter outputs simultaneously applied to measured values with delay and curve. (Background + Averaging filter)
If a distance is measured closer than the distance currently measured by the sensor, the background filter maintains the existing value for a certain period of time and then outputs the measured value with a delay.
If the detection time is shorter than the delay time, the measurement value is not be output.
The higher the measurement filter strength, the longer the delay time for the decreasing distance, and the more stable the measurements are filtered.



[Figure 2]

6.5.2. Measurement filter strength

The higher the filter strength, the longer the sensor output delay time, or filter with a more stable curve. The measurement filter can be set to the intensity in steps 0 to 9.

- **Setting range**: P00 (weak) to P09 (strong)

6.6. Interface

6.6.1. Key input lock

Locks settings through the input key to limit unintended settings changes.
This parameter is supported only for the UTRCM30 model.

- **Setting range**: Lock / Unlock

6.6.2. Display direction

This parameter is supported only for a display part support device.

- **Setting range**: Normal / Invert

6.6.3. Display unit

This parameter is supported only for a display part support device.

- **Setting range**
  - Distance: Output value distance display (unit: mm)
  - Percentage: Analog measurement value rising % display
  - Percentage dec.: Analog measurement value descent % display

6.6.4. Display light level

This parameter is supported only for a display part support device.

- **Setting range**
  - OFF: Display part OFF
  - 1 (darkness) to 5 (lightness)

6.6.5. External input setting lock

Locks settings using wiring to limit unintended changes to settings.

- **Setting range**: Lock / Unlock

6.6.6. Tag

Specifies a tag by device.
Tag names can be up to 16 Korean characters or 32 English characters.

6.7. Operation time

6.7.1. Product operation time

Displays the operation time.

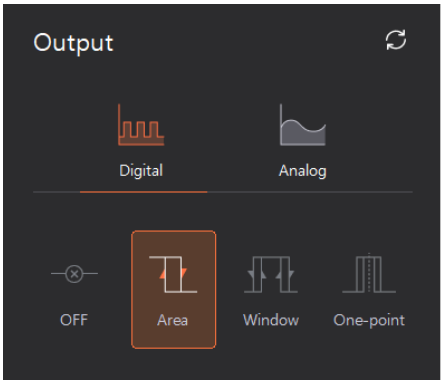
6.7.2. Operation time alarm

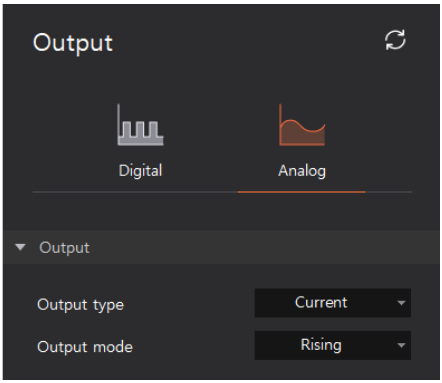
If the device is used after the set operation time alarm, a warning is displayed in the device information window.

- **Setting range**: 1 to 131071 hour

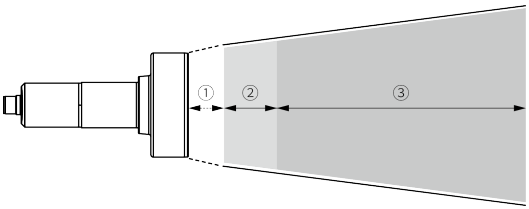
7. Output

Sets digital / analog output of the device.





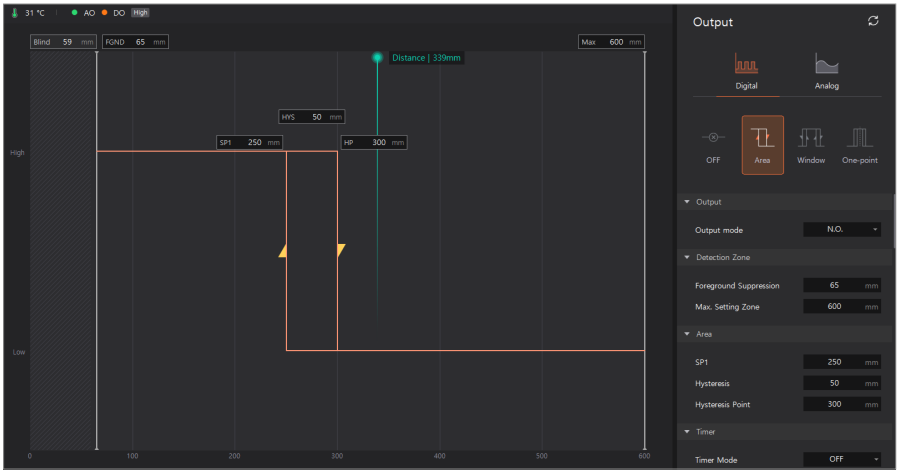
Term definition



①	Blind	Blind zone	Area that the sensor cannot physically detect
②	FGND	Foreground suppression	Area ignored even if there is a sensing target within the setting area
③	Max	Max. setting zone	Area that detection of the sensing target is valid

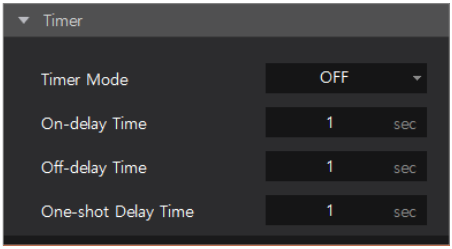
7.1. Digital output

Selects the operation mode of the digital output and set the output mode, timer, and sensing area for each operation mode.
It is possible to move the Y-axis arrow on the left-hand operation mode timing chart or enter the setting value, and also enter the setting value directly from the list on the right.



7.1.1. Timer Setting

Sets the timer mode and time.
The timer can be set in each operation mode of the digital output, and the setting range may be limited depending on the operation mode and the setting conditions.



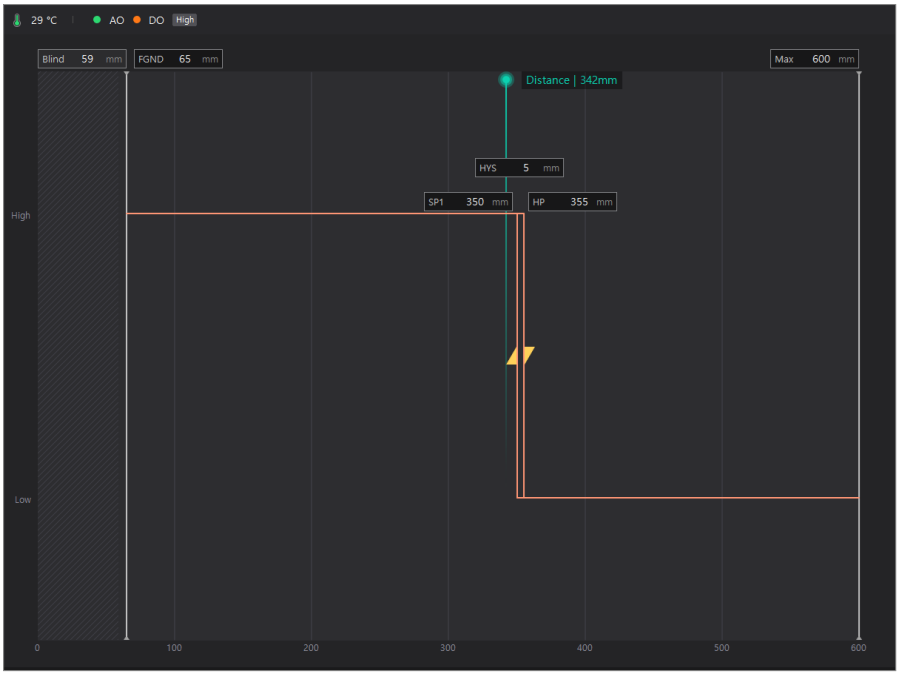
- **Setting range**: 1 to 25 sec (1 sec intervals)

7.1.2. OFF

Selects when digital output is not used.
When selecting OFF and clicking Device › Download in the ribbon menu to apply the setting, the DO indicator on the title bar is OFF.

7.1.3. Area

Determines a switching point1 (SP1) to set the detection area.

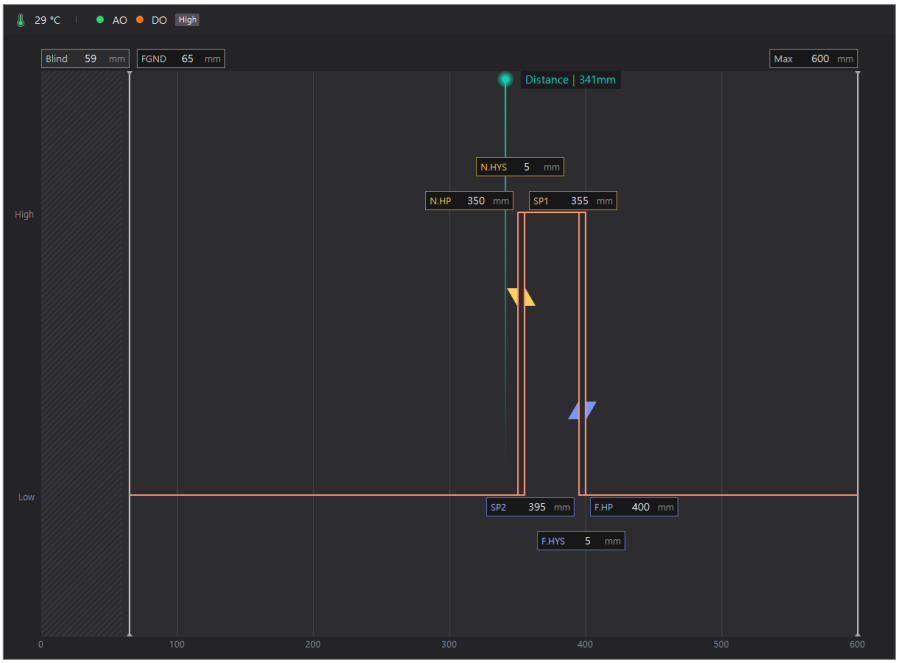


Setting	Description	Setting conditions
SP1	Switching point 1	FGND ≤ SP1 ≤ (HP - 1)
HYS	Hysteresis	1 ≤ HYS ≤ (HP = Max. setting zone)
HP	Hysteresis point	(SP1 + 1) ≤ HP ≤ Max. setting zone
FGND	Foreground suppression	FGND ≤ SP1

- The foreground suppression area is different for each model. For more information, refer to the product manual.
- The calculation formula for the setting conditions is an example of directly entering the setting value. You can change it more flexibly by dragging the mouse.

7.1.4. Window

Determines a switching point1 (SP1) and a switching point2 (SP2) to set the detection area.

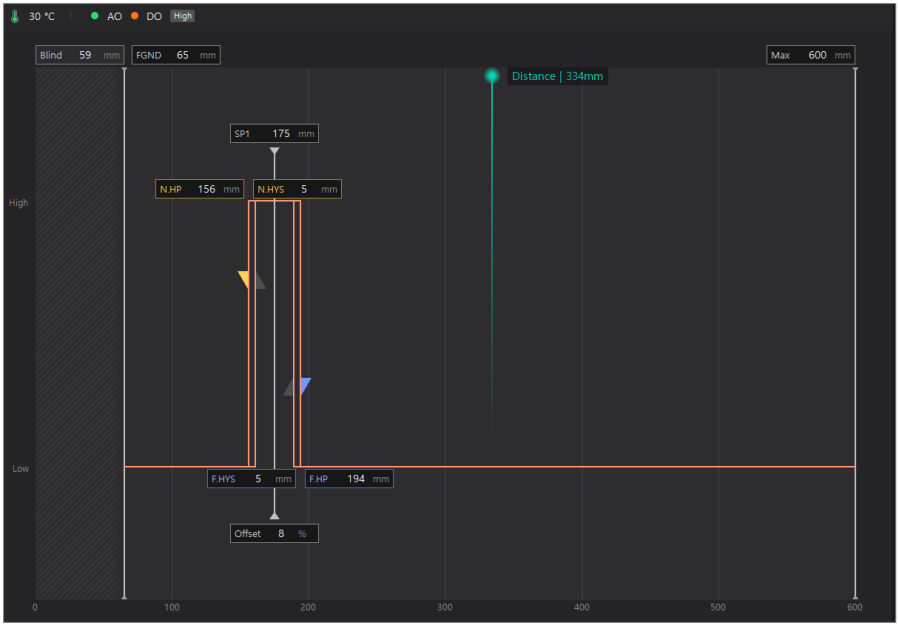


Setting	Description	Setting conditions
SP1	Switching point 1	(N.HP + 1) ≤ SP1 ≤ SP2
SP2	Switching point 2	SP1 ≤ SP2 ≤ (F.HP - 1)
F.HYS	Far hysteresis	1 ≤ F.HYS ≤ (F.HP = Max. setting zone)
F.HP	Far hysteresis point	(SP2 + 1) ≤ F.HP ≤ Max. setting zone
N.HYS	Near hysteresis	1 ≤ N.HYS ≤ (N.HP = FGND)
N.HP	Near hysteresis point	FGND ≤ N.HP ≤ (SP1 - 1)
FGND	Foreground suppression	FGND ≤ N.HP

- The foreground suppression area is different for each model. For more information, refer to the product manual.
- The calculation formula for the setting conditions is an example of directly entering the setting value. You can change it more flexibly by dragging the mouse.

7.1.5. One-point

Determines automatically the near and far switching points depending on the switching point1 (SP1) and the offset ratio to set the detection area.



Setting	Description	Setting conditions
SP1	Switching point 1	FGND ≤ N.HP AND F.HP ≤ Max. setting zone
Offset	Offset ratio	2 to 20 % (FGND ≤ N.HP AND F.HP ≤ Max. setting zone)
F.HYS	Far hysteresis	1 ≤ F.HYS ≤ (F.HP = Max. setting zone)
F.HP	Far hysteresis point	F.HP ≤ Max. setting zone AND F.HYS = 1
N.HYS	Near hysteresis	1 ≤ N.HYS ≤ (N.HP = FGND)
N.HP	Near hysteresis point	FGND ≤ N.HP AND N.HYS = 1
FGND	Foreground suppression	FGND ≤ N.HP

The foreground suppression area is different for each model. For more information, refer to the product manual.

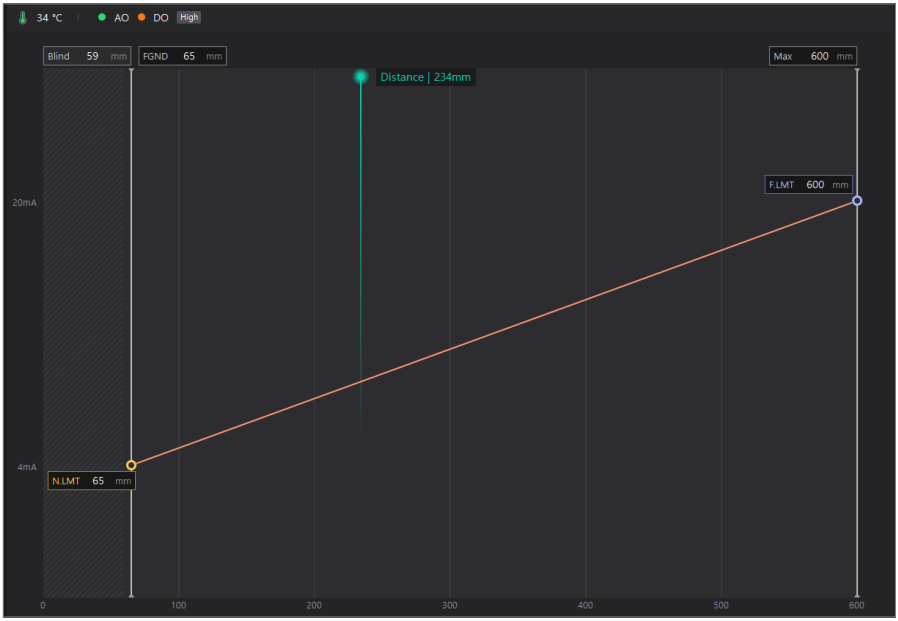
7.2. Analog output

Rising mode is to increase the analog output value as the sensing distance increases, and Falling mode is to decrease the analog output value as the sensing distance increase.
If the sensing target is in the area between the near and far points, the operation indicator (green) turns on.

Setting	Description	Setting conditions
N.LMT	Near point	FGND ≤ Near point ≤ Far point
F.LMT	Far point	Near point ≤ Far point ≤ Max. setting zone
FGND	Foreground suppression	FGND ≤ Near point

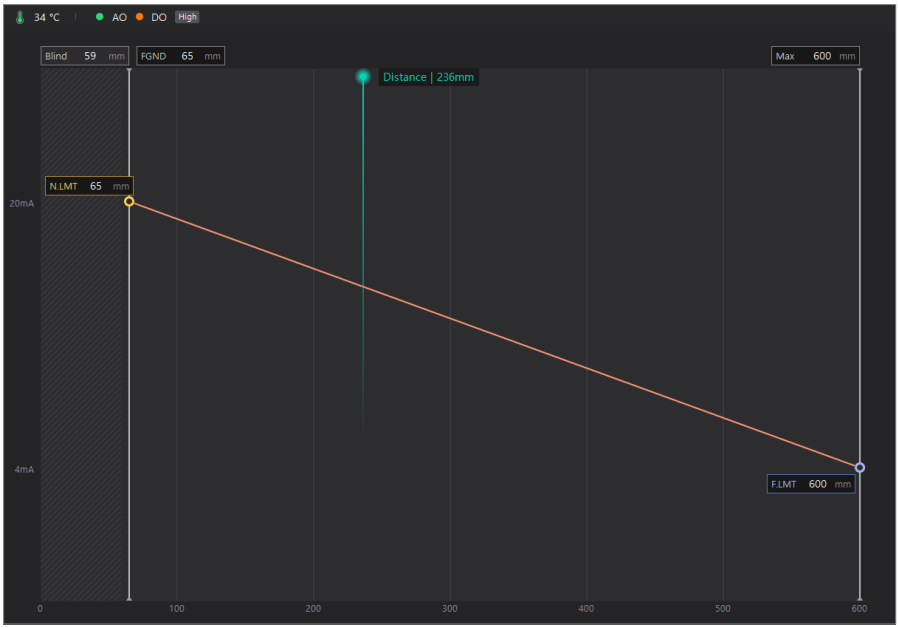
7.2.1. Rising

Analog output increases when sensing distance increases.

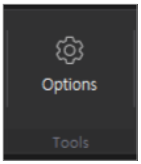


7.2.2. Falling

Analog output decreases when sensing distance increases.

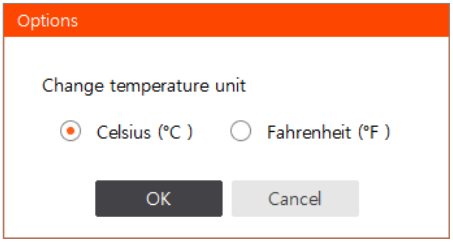


8. Tools

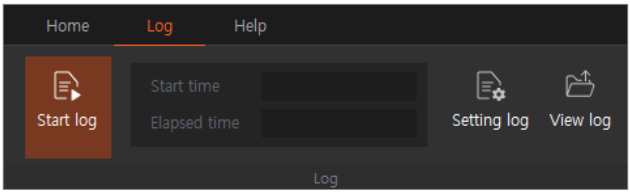


8.1. Options

It is available to change software temperature unit.
When changing the temperature unit (Celsius ↔ Fahrenheit), the setting value may be automatically converted to an approximate value.



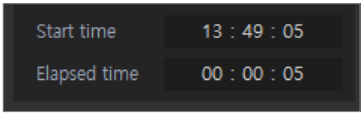
9. Log



This is a function to save the current value in as .csv file in real time.
You can set the log file saving cycle and path, or open and check the saved log file.

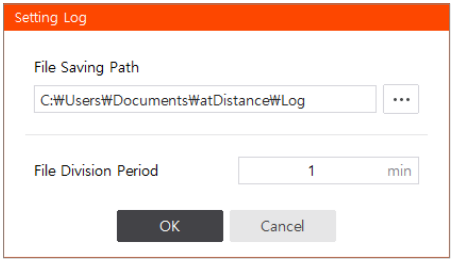
9.1. Start / Stop log

- When clicking **Start log**, it shows Start time and measuring Elapsed time is started.



9.2. Setting log

Opens setting window related to log file.
Stop measuring log before changing the setting.



File Saving path Sets the path where the log files are saved.
The log file is saved in a folder created on the specified path.

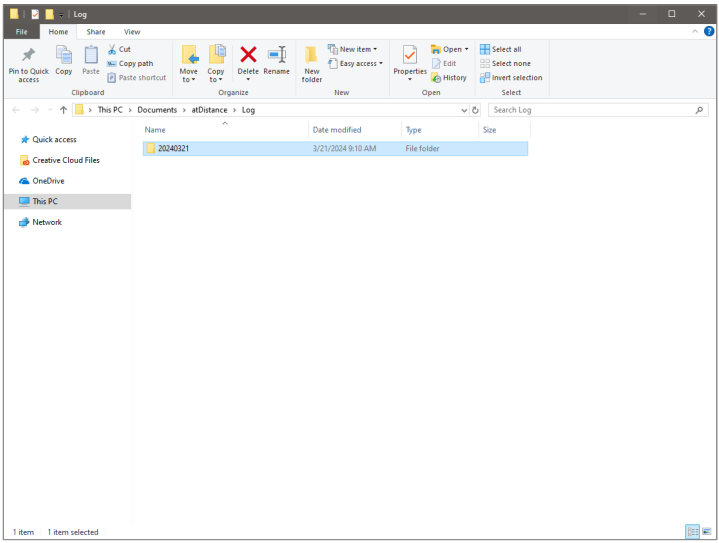
- **folder name**: YYYYMMDD

File Division Period Sets the file division period to save the log file separately.

- **Setting range**: 1 to 60 minutes

9.3. View log

Opens 'File Saving path' set by **Setting log** in the window explorer. The desired log file is available to check at this explorer.



It is possible to check up to the ms unit by running the log file in Excel to change the cell's custom display format in the Time column.
The measured time information in the log file is the time the software received the measurement value of the device, and may differ from the actual measurement time.

- **Display format**: yyyy-mm-dd hh:mm:ss.000

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Dimensions or specifications on this manual are subject to change and some models may be discontinued without notice.

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