Autonics

Cylindrical
Ultrasonic Sensors

UTR Series
PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Features

- Detect and measure various material and surface types with ultrasonic sensing
- Sensing distance (by mount diameter)
  - Ø 18 mm : 120 to 1,300 mm
  - Ø 30 mm : 600 to 8,000 mm
- Temperature compensation (auto/manual) and detection width conversion function for high accuracy
- 316L stainless steel body for high corrosion resistance
- 360° ring type indicator to check operation status from any directions
- Digital output (Push-Pull) support
- IO-Link models available
- Simultaneous digital and analog output models available
- Configure settings and monitor status with ultrasonic sensor programming units (UT-P)
- Dedicated software provided (atDistance)
- IP67 protection rating

CE UK CA cUL us LISTED IO-Link

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ **Warning** Failure to follow instructions may result in serious injury or death.

01. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
Failure to follow this instruction may result in personal injury, economic loss or fire.
02. **Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, salinity, moisture, or steam, or dust may be present.**
Failure to follow this instruction may result in explosion or fire.
03. **Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.
04. **Do not connect, repair, inspect, or replace the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
05. **Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.
06. **Qualified personnel shall carry out installation, configuration. Responsible person for use is an operator who:**
- is fully knowledgeable about the installation, settings, use and maintenance of the product.
Failure to follow this instruction may cause malfunction or result in accident.

⚠ **Caution** Failure to follow instructions may result in injury or product damage.

01. **Use the product within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
02. **Depending on the medium and the ambient temperature, the sound speed may change and the sensing performance may change.**
Use the product within the rated specifications.
03. **When the ambient temperature is 70 °C, make sure that the relative humidity does not exceed 50 % RH.**
Sensing performance may deteriorate in humid environments.
04. **Use a dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire.
05. **Do not allow dust to be on the surface of the sensing surface or build up a thick layer of dust.**
Failure to follow this instruction may result in product damage and malfunction.
06. **Keep the product away from metal chip, dust, and wire residue which might flow into the unit.**
Failure to follow this instruction may result in fire or product damage.
07. **Do not connect the load if power is supplied only to UT-P (sold separately, ultrasonic sensor programming unit).**
Failure to follow this instruction may result in fire or product damage.
08. **In case of IO-Link models, IO-Link and UT-P communications cannot be used simultaneously.**
Do not connect wiring arbitrarily.

Product Components

- Product × 1
- Instruction Manual × 1
- Nut × 2
- Washer × 1

Sold Separately

- Ultrasonic sensor programming unit : UT-P Series
- M12 connector cable: CID5-□, C1D5-□

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- The 12 - 30 VDC⎓ power input is insulated and limited voltage/current or use SELV, Class 2 power supply.
- Use the product, after about 30 min of supplying power. Temperature compensation stabilizes the sensor. If sensor stabilization is not completed, sensing performance deteriorate or an error occurs when setting parameters.
- The filtered distance may not be immediately reflected due to EMC interference.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise. Do not use near the equipment which generates strong magnetic force or high frequency noise (transceiver, etc.).
  In case installing the product near the equipment which generates strong surge (motor, welding machine, etc.), use diode or varistor to remove surge.
- This unit may be used in the following environments.
  - Indoors (UL Type 1 Enclosure)
  - Altitude max. 2,000 m
  - Pollution degree 3
  - Installation Category II

Cautions for Installation

■ Environment

- Install the unit correctly with the usage environment, location, and the designated specifications.
- Install the sensor and the sensing target at right angles.
- It cannot be used in a vacuum without a medium.
- If there is an object nearby that absorbs sound strongly or diffuses, sensing performance may deteriorate.
- Install no objects other than the sensing target in the detection width area.
  For the detection width area, refer to the product manual.

■ Wire

- Do NOT impacts with a hard object or excessive bending of the wire lead-out. It may cause damage the water resistance.
- In case of IO-Link mode, the cable length between the unit and the IO-Link Master should be under 20 m.

■ Installation

• Distance

When plural ultrasonic sensors are mounted in a close row, malfunction of sensor may be caused due to mutual interference.
Therefore, be sure to provide a minimum distance between the two sensors, as below table.

[Face to face] [Parallel]

Model Type	UTRCM18	UTRCM30
A	4,000 mm	30,000 mm
B	700 mm	4,000 mm

• Tightening torque

Use the provided washer to tighten the nuts.
The tightening torque of the nut varies with the distance from the fore-end. [Figure 1]
If the nut tip is located at the front of the product, apply the front tightening torque.
The allowable tightening torque table is for inserting the washer as [Figure 2]

[Figure 1] [Figure 2]

Model Strength	UTRCM18	UTRCM30
Front size	13 mm	
Front torque	9.81 N m	15 N m
Rear torque	15 N m	

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

UTRCM ❶ - ❷ ❸ ❹ - ❺ - ❻

❶ DIA. of mount
Number: DIA. of mount (unit: mm)

❷ Sensing distance
Number: Sensing distance (unit: mm)
Number + M: Sensing distance (unit: m)

❸ Output
No-mark: Digital output
D: Digital + Analog output

❹ Analog output
No-mark: current (4 - 20 mA)
B: Voltage (0 - 10 V) / current (4 - 20 mA)

❺ Display part
No-mark: None
D: 3-digit display

❻ Communication output
No-mark: Unsupported
IL2: IO-Link COM2

Software

Download the installation file and the manuals from the Autonics Website.

■ atDistance

It is the monitoring data management program for installation of the ultrasonic sensor, parameter setting, and status information.

■ atIOLink

atIOLink with purposes for setting, diagnosis, and maintenance of IO-Link device via IODD file is provided as the Port and Device Configuration Tool (PDCT).
- IODD (IO Device Desription)
This file contains information such as manufacturer information, process data, diagnostic data, and parameter setting of a sensor using IO-Link communication. By uploading the IODD file to PDCT Software, you can check the setting and communication data according to the user interface. Download the IODD file from the Autonics website. For the parameter index, refer to the product manual.

Dimensions

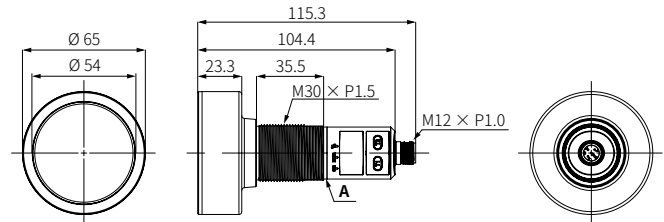- Unit: mm, For the detailed, follow the Autonocs website.

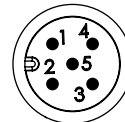| A	Operation Indicator

■ UTRCM18
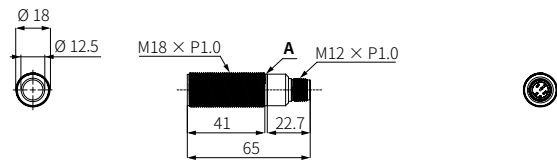
■ UTRCM30

- UTRCM30-8MDB-D-□: The dimension depends on the display part.

Connector Specification

- For LOAD connection, follow the cable type connection.
- Fasten the connector along the thread. (tightening torque: 0.39 to 0.49 N m)
- Fasten the vibration part with PTFE tape.

Pin no.	Color	Function	
①	Brown	VCC	12 - 30 VDC⎓
②	White	I/V	Analog output
③	Blue	GND	0 V
④	Black	C/Q	Digital output / IO-Link
⑤	Yellow	COM	Multifunctional input

Connections

① Brown	② White	③ Blue	④ Black	⑤ Yellow
VCC	I/V (analog output)	GND	C/Q (digital output)	COM

■ IO-Link mode

- The control output mode can be switched through parameter setting.
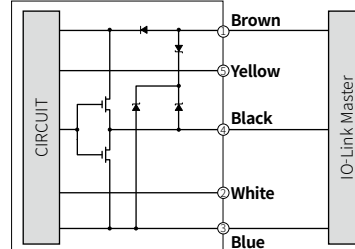
■ SIO mode

- NPN

- PNP

Operation Indicator
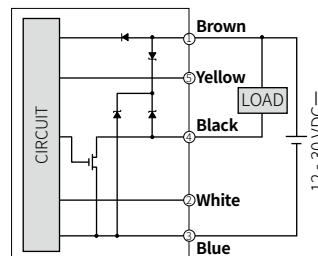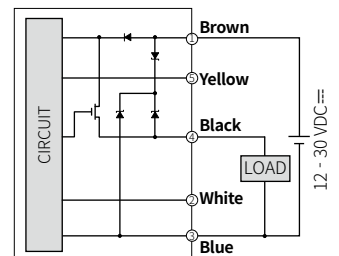
Status		Indicator
Supply power		Flashes with green + orange rotation (1 Hz)
Setting	Entering mode	Orange flashes (the key input elapse time)
	Set parameter	Orange + green cross-flashing
Signal output	Digital output	Orange ON
	Analog output	Green ON
Abnormal accurance		Orange + green cross-flashing (3 Hz)
Communication	COM	Orange flashes (1 Hz) (digital priority output)
	IO-Link	Green flashes (1 Hz) (analog priority output)

Specification

Model	UTRCM18-1300-□	UTRCM18-1300D-□	UTRCM30-8M-□-□	UTRCM30-8MDB-□-□
Sensing distance	120 to 1300 mm		600 to 8000 mm	
Blind zone	0 to 120 mm		0 to 600 mm	
Foreground suppression	120 to 360 mm		600 to 1800 mm	
Max. setting zone	1300 mm		8000 mm	
Transducer frequency	200 kHz		80 kHz	
Switching frequency	≥ 10 Hz		≥ 3 Hz	
Response time	≤ 100 ms		≤ 300 ms	
Hysteresis [01]	20 mm		100 mm	
Standard sensing target: Aluminum	200 × 200 mm		500 × 500 mm	
Resolution (sampling period)	≥ 0.175 mm		≥ 0.180 mm	
Accuracy [02]	± 1 % F.S.		± 1 % F.S.	
Repeat accuracy	± 0.15 % F.S.		± 0.15 % F.S.	
Power supply	12 - 30 VDC⎓ (ripple P-P: ≤ 10 %)		12 - 30 VDC⎓ (ripple P-P: ≤ 10 %)	
Current consumption	≤ 45 mA (no load)		≤ 80 mA (no load)	
Digital output	Push-pull		Push-pull	
Load voltage	≤ 30 V		≤ 30 V	
Load current	≤ 100 mA		≤ 100 mA	
Residual voltage	≤ 3 V		≤ 3 V	
Analog output	-	[current output] DC 4 -20 mA	-	[voltage output] DC 0 - 10 V [current output] DC 4 - 20 mA
Load resistance	[voltage output] 12 - 30 VDC⎓: ≥ 100 kΩ [current output] 12 - 20 VDC⎓: ≤ 100 Ω / 20 - 30 VDC⎓: 100 to 500 Ω			
Protection circuit	Surge protection circuit, output short over current protection circuit, reverse polarity protection			
Insulation resistance	≥ 50 MΩ (500 VDC⎓ megger)			
Dielectric strength	Between the charging part and the case: 1,000 VAC~ 50 / 60 Hz for 1 min			
Vibration	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours			
Shock	500 m/s² (≈ 50 G) in each X, Y, Z direction for 3 times			
Ambient temperature	-25 to 70 °C, storage: -40 to 85 °C (no freezing or condensation)			
Protection structure	IP67 (IEC standard)			
Connection	Connector models			
Connector spec.	M12 5-pin plug connector			
Material	Case: mount - SUS316L, body - PC / transducer: ceramic			
Certification	CE ⓊⓀ ⓊⓁ US LISTED IO-Link [03]			
Weight (packaged)	≈ 32 g (≈ 90 g)		≈ 214 g (≈ 310 g)	

01) Set parameter or dedicated software (atDistance)
02) Ambient temperature 25 °C, temperatures characteristic ± 0.1 % F.S. / °C
03) It is applied to UTRCM□-□□□-□-IL2 model.

Communication Interface

■ IO-Link

Version	Ver. 1.1
Class	Class A
Baud rate	COM 2 (38.4 kbps)
Min. cycle time	4 ms
Data length	PD: 4 byte, OD: 2 byte (M-sequence: TYPE_2_V)
Vendor ID	899 (0x383)

Unit Descriptions

• It is for the display part supporting models.
• In case of the non-display part models, it is possible to set the parameter in the ultrasonic sensor programming unit UT-P Series (sold separately) or in the ultrasonic sensor software atDistance.
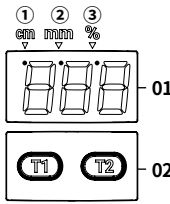
01. Display part (3-digit)
Displays present value and parameter setting value
① cm: displays 10 units (𝟷𝟶𝟶 = 1000)
② mm: displays 1 units (𝟷𝟶𝟶 = 100)
③ %: displays % (𝟷𝟶𝟶 = 100 %)

02. [T1], [T2] key
Parameter selection, moving digit of the setting value or changing the setting value

Mode Setting

• Quick mode can be set to the input key or M12 connector cable (sold separately) connection.
• On entering the mode, the key input elapse time is displayed through the display part. If there is no key input for 27 sec, the settings are ignored and it returns to the RUN mode.
• For more information, refer to the product manual.
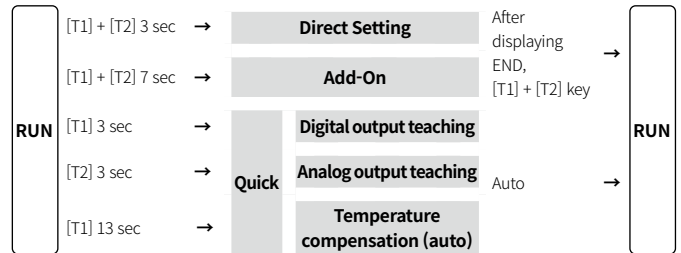
Setting for Supplying Power

• When supplying power, it is possible to set multiplex OFF / reset by the [T2] key.
• It is possible to set to the input key or M12 connector cable (sold separately) connection. The setting action of the input key and M12 connector cable connection and the input / release time are the same.
• When pressing and releasing the [T2] keys for 12 sec on each parameter, the existing settings are ignored and the CAN is displayed before returning to RUN mode.

■ Multiplex OFF

• Same as the select synchronization mode (setting value: 00) setting in Add-on mode.

Display	Setting operation
Supply power	Press the [T2] key to supply power.
	Press the [T2] key for 3 to 5 sec.
𝟻𝟿𝖢	Release the key.
𝟻𝟿𝗇	Press the [T2] key for 3 sec.
RUN mode	YES: Multiplex OFF (synchronization use) Release the [T2] key to complete setting and enter RUN mode.

■ Reset

Display	Setting operation
Supply power	Press the [T2] key to supply power.
	Press the [T2] key for 9 sec.
𝗋𝟻𝗍	Release the key.
𝗋𝖤𝟻	Press the [T2] key for 3 sec.
RUN mode	YES: reset completion, Release the [T2] key to reset to factory default and enter RUN mode.

Wire Setting

• Quick mode can be set to the input key or M12 connector cable (sold separately) connection.
• The setting action of the input key and connector cable connection and the input / release time are the same.

Wire setting	Input key
1 terminal (VCC, brown) + 5 terminal (COM, yellow)	[T1]
3 terminal (GND, green) + 5 terminal (COM, yellow)	[T2]

Error

Display	Operation	Cause
𝖤𝗋𝗋𝗈𝗋	Orange, green indicator 3 Hz cross-flashing, setting cancel and return to RUN mode.	Out of the parameter setting range or teaching range
		When running the temperature compensation before the temperature stabilization (for over 30 min after power supply)
		When setting the analog output or the analog output teaching on analog output unsupported models

Direct Setting

- Some parameters are activated / deactivated depending on the model or setting of other parameters.
- [T1] + [T2] keys: Select the parameter.
  [T1] key: Transfers the previous parameter and digit of the setting value.
  [T2] key: Transfers the next parameter and change the setting value.

■ Digital output

Parameter	Slide display	Defaults	Setting range	Display condition
Output method	dir SEt	d	**D: digital output** IV: analog output	-
Operation mode	ōodE SELECt	ArE	ARE: area, WIN: window 1-P: one-point	-
Switching point 1 [01]	SP1	1000	[UTRCM18] 120 to 1299 mm	Operation mode : ARE
		6000	[UTRCM30] 600 to 7999 mm	
		1000	[UTRCM18] 121 to 1299 mm	Operation mode : WIN
		6000	[UTRCM30] 601 to 7999 mm	
		500	[UTRCM18] 123 to 1274 mm	Operation mode : 1-P
		3000	[UTRCM30] 613 to 7843 mm	
Switching point 2 [01]	SP2	1200	[UTRCM18] 121 to 1299 mm	Operation mode : WIN
		7900	[UTRCM30] 601 to 7999 mm	
Output mode (N.O. / N.C.)	nonC	no	NO: normally open NC: normally closed	-

01) According to the operation mode and the setting conditions, the setting range can be limited.

■ Analog output

- In case of analog output unsupported models, an error may occur during setting.

Parameter	Slide display	Defaults	Setting range	Display condition
Output method	dir SEt	d	D: digital output **IV: analog output**	-
Analog near point [01]	nEAr LiāiE	120	[UTRCM18] 120 to 1299 mm	Output method : IV
		600	[UTRCM30] 600 to 7999 mm	
Analog far point [01]	FAr LiāiE	1300	[UTRCM18] 121 to 1300 mm	
		8000	[UTRCM30] 601 to 8000 mm	
Output mode (rising / falling)	CHArAC -tEriStiCS	- - -	⌐¬: rising (0 → 100 %) ¬⌐: falling (100 → 0 %)	

01) According to the operation mode and the setting conditions, the setting range can be limited.

Add-On

- Some parameters are activated / deactivated depending on the model or setting of other parameters.
- [T1] + [T2] keys: Select the parameter.
  [T1] key: Transfers the previous parameter and digit of the setting value.
  [T2] key: Transfers the next parameter and change the setting value.

Parameter	Mark	Slide display	Defaults	Setting range
Display part light	d01	LIGHt LEuEL	Std	[Display part supporting model] STD: lightness, DRK: darkness, OFF: turn-off
Display part direction	d02	diSPLAY InuErt	nor	[Display part supporting model] NOR: forward direction, INV: half-turn
Display part unit	d03	diSPLAY Unit	- - -	[Display part supporting model] - - -: distance display ¬ - ⌐: 100 → 0 % display ⌐ - ¬: 0 → 100 % display
Analog output type	d04	AnALoG oUtPUt tYPE	I	[Digital + analog output model] V: voltage output, I: current output
Digital output hysteresis [01]	d05	HYStErESIS	20	[UTRCM18] Area mode: 1 to 1180 mm Window mode: 1 to 590 mm One-point mode: 1 to 576 mm
			100	[UTRCM30] Area mode: 1 to 7400 mm Window mode: 1 to 3700 mm One-point mode: 1 to 3614 mm
Measurement filter	d06	FILtEr tYPE	F01	F00: no filter F01: foreground filter, F02: averaging filter F03: foreground + averaging filter F04: background + averaging filter
Measurement filter strength	d07	FILtEr StrEnGtH	P00	P00 to P09: (weak to strong)
Timer mode	d08	dELAY	- - -	- - -: OFF, ON: on-delay OFF: off-delay, ONE: one-shot delay
Timer delay time	d09	dELAY uALUE	001	001 to 025 sec
Foreground suppression [01] (detection start position)	d10	FGnd SUPPrESSIon	120	[UTRCM18] 120 to 360 mm
			600	[UTRCM30] 600 to 1800 mm
Temperature manual compensation	d11	CAL-tEāP	-	• ≤ ± 10 % of setting location • Place a sensing target before the temperature compensation. • Temperature compensation before the temperature stabilization (for over 30 min after supplying power) may cause occur an error.
Detection width	d12	SEnSItIuitY	Yid	WID: wide, MID: middle NAR: narrow
Max. address value of multiplex	d13	āULtI āEābEr	10	01 to 10 • Set higher than the multiplex address.
Synchronization mode [02]	d14	SYnC-id	00	00: synchronization 01 to 10: multiplex address 11: IO-Link synchronization

01) According to the operation mode and the setting conditions, the setting range can be limited.
02) In case of the IO-Link synchronization, you can only set on IO-Link models.

Quick

- The setting method depends on the output method. With the setting in order, the setting value is saved and returned to RUN mode.
- When pressing and releasing the [T1], and [T2] keys for 12 sec on each parameter, the existing settings are ignored and the CAN is displayed before returning to RUN mode.

■ Digital output teaching

No	Display			Operation
1	SP1 teaching	RUN mode		Place the sensing target on the switching point1 (SP1) position.
		dt 1		Press the [T1] key for 3 sec.
				Release the [T1] key to complete the SP1 teaching.
2	Select the operation mode	*ṅod*	*I-P*	Press and release the [T1] key for 3 sec.
			ArE	Press and release the [T1] key for 5 sec.
			* Чіn*	Place the sensing target on the window switching point2 (SP2) position.
				Press and release the [T1] key for 7 sec.
				Release the [T1] key to complete the SP2.
3	N.O. / N.C.	*noC* [01]	*no*	Normally open Press and release the [T1] key for 3 sec to return to the RUN mode.
			nC	Normally closed Press and release the [T2] key for 3 sec to return to the RUN mode.

01) When pressing the [T1] key in the RUN mode for 7 seconds, the same parameter is displayed and can be set independently.

■ Analog output teaching

- In case of analog output unsupported models, an error may occur during setting.

No	Display			Operation
1	Analog output	RUN mode		Place the sensing target on the near point (AT1) position.
		At 1	AT1 teaching	Press the [T2] key for 3 sec.
				Release the [T2] key to complete the AT1 teaching.
		At 2	AT2 teaching	Place the sensing target on the far point (AT2) position.
				Press the [T2] key for 3 sec.
				Release the [T2] key to complete the AT2 teaching.
2	Analog output mode	*rF* [01]	Rising / Falling	_‾ ‾: Rising (0 → 100 %), Press and release the [T1] key for 3 sec to return to the RUN mode. ‾ _ _: Falling (100 → 0 %), Press and release the [T2] key for 3 sec to return to the RUN mode.

01) When pressing the [T2] key in the RUN mode for 7 seconds, the same parameter is displayed and can be set independently.

■ Temperature Compensation (Auto)

- Use this fuction after the temperature stabilization (for over 30 min after power supply).

| Display	Setting operation
RUN mode	Press the [T1] key for 13 sec.
CAL	Release the key
CLb	YES: Activate the automatic calibration of the detection value Press and release the [T1] key for 3 sec to return to the RUN mode.

Digital Output : Operation Mode

■ Area

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

SP1 setting	Foreground suppression ≤ SP1 ≤ Max. setting zone - Hysteresis
Hysteresis	1 ≤ Hysteresis ≤ Max. setting zone - SP1
Foreground suppression	Foreground suppression ≤ SP1

- Normally Open (N.O.)
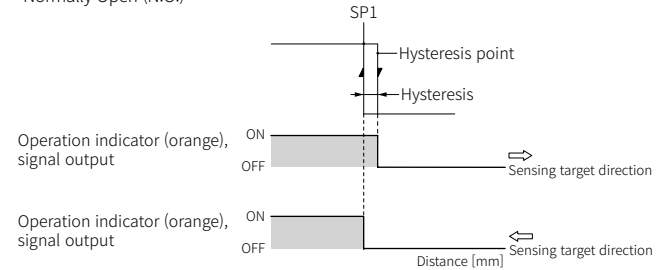
- Normally Closed (N.C.)
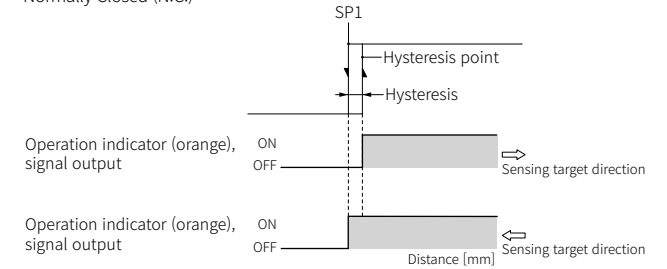
■ Window

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

SP1 setting	Foreground suppression + Near hysteresis ≤ SP1 ≤ SP2
SP2 setting	SP1 ≤ SP2 ≤ Max. setting zone - Far hysteresis
Near hysteresis	1 ≤ Near hysteresis ≤ SP1 - Foreground suppression
Far hysteresis	1 ≤ Far hysteresis ≤ Max. setting zone - SP2
Foreground suppression	Foreground suppression ≤ SP1 - Near hysteresis

- Normally Open (N.O.)
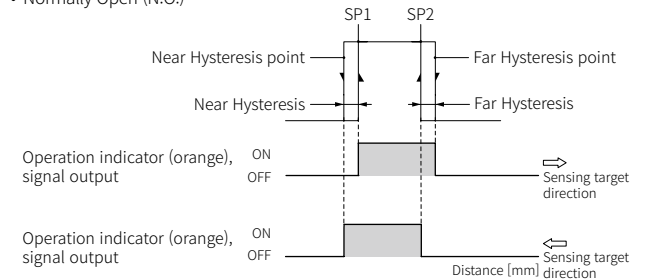
- Normally Closed (N.C.)
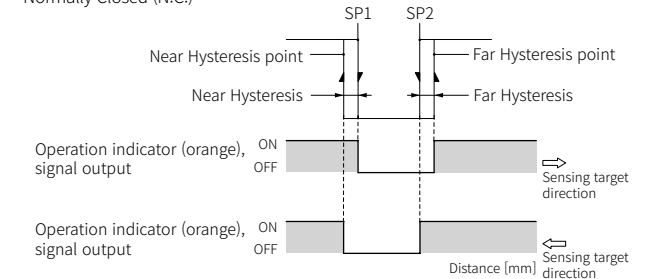
■ One-point

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

| SP1 setting	Foreground suppression + Offset + Near hysteresis ≤ SP1 ≤ Max. setting zone - Offset - Far hysteresis
Offset	SP1 × Offset ratio
Offset ratio	8 % (atDistance setting: 2 to 20 %)
Near hysteresis	1 ≤ Near hysteresis ≤ SP1- Offset - Foreground suppression
Far hysteresis	1 ≤ Far hysteresis ≤ Max. setting zone - SP1 - Offset
Foreground suppression	Foreground suppression ≤ SP1 - Offset - Near hysteresis

• Normally Open (N.O.)
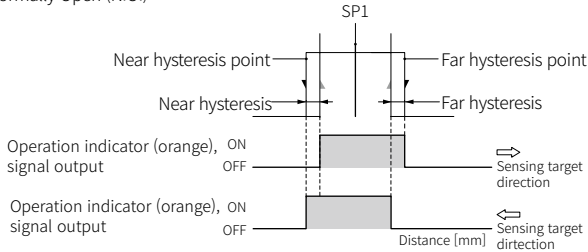
• Normally Closed (N.C.)
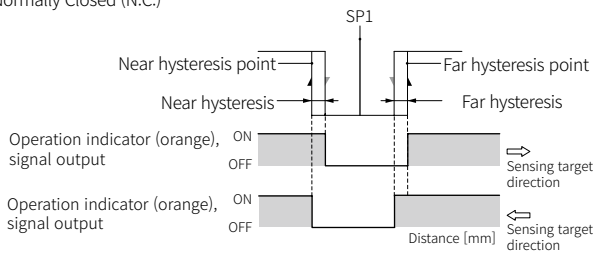
Analog Output: Output Mode

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

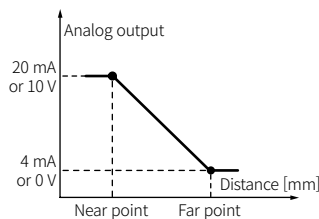| Near point	Foreground suppression ≤ Near point ≤ Far point
Far point	Near point ≤ Far point ≤ Max. setting zone
Foreground suppression	Foreground suppression ≤ Near point

■ Rising

• Analog output increases when sensing distance increases.
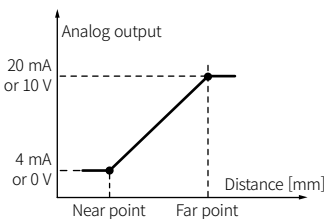
■ Falling

• Analog output decreases when sensing distance increases.

Timer

• Setting range: 1 to 25 sec, set at 1 sec intervals
• T: Timer time
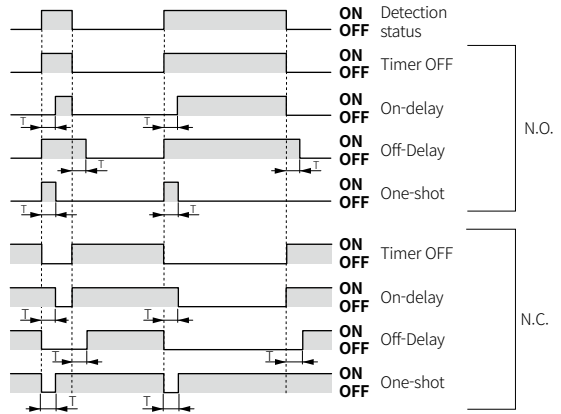
Measurement Filter and Strength

■ Measurement filter

Set the measurement filter (F00 to F04) to change the response time on the sensor's measurements or filter the values with a stable curve.

– – – –	Unfiltered
——	Filtered

Filter	Description	
No filter : F00		Measurements with no filter
Foreground filter : F01		If the measured value increases rapidly, it keeps the existing value and delays the output. The higher the measurement filter strength, the longer the delay time for the increasing distance.
Averaging filter : F02		If the measured values are unstable due to vibration etc., filter the values with a curve. If the measurement filter strength is higher, the measurements are filtered with a more stable curve.
foreground + averaging filter : F03		If the measured values increase rapidly, the foreground filter and the averaging filter are applied simultaneously, if the measured value decreases rapidly, the averaging filter is applied. The higher the measurement filter strength, the longer the delay time for the increasing distance, and the more stable the measurements are filtered.
Background + averaging filter : F04		If the measured values increase rapidly, the averaging filter is applied, if the measured values decrease rapidly, the background filter and the averaging filter are applied. The higher the measurement filter strength, the longer the delay time for the decreasing distance, and the more stable the measurements are filtered.

■ 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. (P00 (weak) to P09 (strong))

Temperature Compensation (Auto / Manual)

- Select Auto or Manual temperature compensation depending on models and environment to minimize the error between the actual distance and the measured value for measurement accuracy.
- If the difference between the standard or the actual distance and the measured value is less than ± 10 %, the value is compensated according to the distances, and if it is more than ± 10 %, the value is compensated according to the internal algorithm.
- Use after temperature stabilization (for over 30 min after power supply). An error can occur if temperature compensation is activated before temperature stabilization.

■ Auto temperature compensation

- Compensate the measured values using model standard distances. Set through the wire or the key input.
- Standard distance

UTRCM18	600 mm
UTRCM30	1200 mm

■ Manual temperature compensation

- Input the actual installation distance to compensate the measurement difference correctly.
- It is possible to set the manual temperature compensation (D11) parameter or dedicated software (atDistance) in Add-on mode.

Synchronization Mode

- When multiple ultrasonic sensors are connected with the synchronization mode, a wider detection width can be detected without interference. Synchronization mode and multiplex mode cannot be used together.
- It is possible to set select the synchronization mode (D14) or dedicated software (atDistance) in Add-on mode.

■ Synchronization

Ultrasonic signal connected from the synchronization is simultaneously transmitted / received to detect at the same time. It can detect wide areas more than the max. detection width of a product.
In the synchronization mode, the response time changes based on the longest response time among connected products.

COM (yellow)
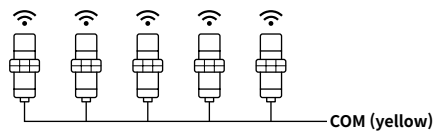
■ Multiplex

Set 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.

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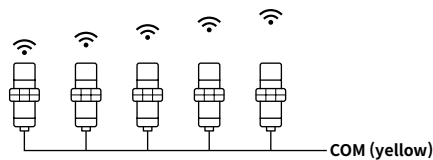
Term Definition
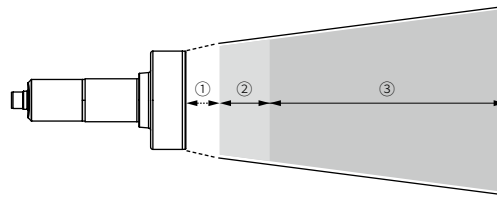
① Blind zone	Area that the sensor cannot physically detect
② Foreground suppression	Area ignored even if there is a sensing target within the setting area
③ Max. setting zone	Area that detection of the sensing target is valid

Detection Data

- Detection condition
  Sensing target size
  : Standard sensing target / Detection width: Wide / Foreground suppression: 0 mm

■ UTRCM18

Detection distance (mm)

Left ← Center → Right
Detection width (cm)

■ UTRCM30

Detection distance (mm)

Left ← Center → Right
Detection width (cm)
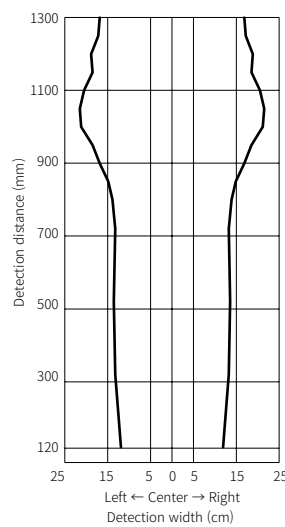
Parameter Index

■ Process Data

• The current data value is displayed in real time.

Parameter	Byte0 (PD0)	Byte1 (PD1)	Byte2 (PD1)	Byte3 (PD3)	Format	Setting range	Description
Process Data Value	1 to 15		-	-	Integer	Measured value: 0 to 1300 / 0 to 8000 Out of measuring range (-): -32760 Out of measuring range (+): 32760 No measurement data: 32764	Display the measured distance value.
Process Data Scale	-	-	0 to 7	-	Integer	0	Display the measured distance scale.
Analog signal channel 1 state	-	-	-	1	Boolean	True: active, false: inactive	Analog output status
Switch signal channel 1 state	-	-	-	0	Boolean	True: active, false: inactive	Digital output status

■ Identification Menu

• The device's manufacturer and sensor information is displayed.
  It includes additional information on companies and sensors other than the IO-Link standard.

Parameter	Index	Format	R / W	Discription
Vendor Name	16	String	RO	Manufacturer name
Vendor Text	17	String	RO	Manufacturer description
Product Name	18	String	RO	Product name
Product ID	19	String	RO	Product ID
Product Text	20	String	RO	Product description
Serial Number	21	String	RO	Product srial number
Application specific tag	24	String	RW	Application program tag

■ Observation Menu

• The device setting value is displayed.

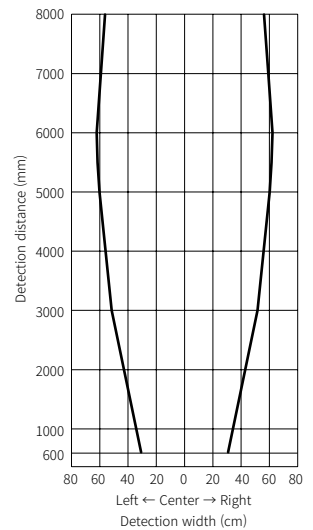| Parameter		Index	Sub-index	R / W	Discription
Temperature diagnosis	Sensor temperature	2000	1	RO	Tempereature measurement data
	Heating-up phase		2	RO	Temperature stabilization status
Measurement data channel description	Blind Zone	16512	1	RO	Blind zone
	Max. setting zone		2	RO	Max. setting zone
	Unit code		3	RO	1013
	Scale		4	RO	0
Process data input	Process data value	40	1	RO	Distance measurement
	Process data scale		2	RO	Distance Scale
	Analog signal channel 1 state		3	RO	Analog output status
	Switch signal channel 1 state		4	RO	Digital output status
UOT diagnosis	UOT time	380	1	RO	Operation time
	User operation timeout flag	380	2	RO	Operation time alarm

■ Parameter Menu

• Product setting can be changed according to the user environment.

Parameter		Index	Sub-index	Format	R / W	Description	Setting range UTRCM18	Setting range UTRCM30	Factory default UTRCM18	Factory default UTRCM30
Teaching	Teaching mode	58	-	UInteger	RW	Tecahing operation mode	0: One-point mode, 1: Area mode, 2: Window mode 192: Analog output		0	0
	Teaching status	59	1	UInteger	RO	Teaching status	0: Idle (Wait), 1: SP1 success (SP1 teaching success) 2: SP1 success (SP2 teaching success), 3: SP12 success (SP1, SP2 teaching success), 4: Wait for command (wait for operation mode selection) 5: Busy (processing previous step), 7: Error (teaching error)		0	0
	SP1 TP1		2	Boolean	RO	SP1 teaching status	True (1): Active, False (0): Inactive		0	0
	SP2 TP1		3	Boolean	RO	SP2 teaching status	True (1): Active, False (0): Inactive		0	0
	SP1 Teaching	2	-	-	WO	SP1 teaching start	0x41		-	-
	SP2 Teaching		-	-	WO	SP2 teaching start	0x42		-	-
Digital Output (Switch signal channel 1 state)	One-point SP1	60	1	Integer	RW	One-point Switching point1	120 to 1300 mm	600 to 8000 mm	500	3000
	Area SP1		2	Integer		Area Switching point1	120 to 1300 mm	600 to 8000 mm	1000	6000
	Window SP1		3	Integer		Window Switching point1	120 to 1300 mm	600 to 8000 mm	1000	6000
	Window SP2		4	Integer		Window Switching point2	120 to 1300 mm	600 to 8000 mm	1200	7900
	Digital output mode	61	1	UInteger	RW	Digital output mode	0: Normally Open (N.O.), 1: Normally Closed (N.C.)		0	0
	Mode		2	UInteger		Digital output operation mode	0: OFF 1: One-point mode, 2: Area mode, 3: Window mode		2	2
	One-point near hysteresis		3	Integer		One-point near hysteresis	1 to 1300 mm	1 to 8000 mm	20	100
	One-point far hysteresis		4	Integer		One-point far hysteresis	1 to 1300 mm	1 to 8000 mm	20	100
	Offset ratio		5	UInteger		Offset ratio	2 to 20 %		8	8
	Area hysteresis		6	Integer		Area hysteresis	1 to 1300 mm	1 to 8000 mm	20	100
	Window near hysteresis		7	Integer		Window near hysteresis	1 to 1300 mm	1 to 8000 mm	20	100
	Window far hysteresis		8	Integer		Window far hysteresis	1 to 1300 mm	1 to 8000 mm	20	100
	Delay type	100	1	UInteger	RW	Timer mode	0: OFF, 1: On-delay, 2: Off-delay, 3: One-shot delay		0	0
	On-delay time		2	UInteger		On-delay time	1 to 25 Sec		1	1
	Off-delay time		3	UInteger		Off-delay time	1 to 25 Sec		1	1
	One-shot delay time		4	UInteger		One-shot delay time	1 to 25 Sec		1	1
Analog Output (Analog signal channel 1 state)	SP1	160	1	Integer	RW	Analog near point	120 to 1300 mm	600 to 8000 mm	120	600
	SP2		2	Integer		Analog far point	120 to 1300 mm	600 to 8000 mm	1300	8000
	Analog output type	161	1	UInteger	RW	Analog output type	0: Current, 1: Voltage		0	0
	Analog output mode		2	UInteger		Analog output mode	0: Rising, 1: Falling		0	0
Measurement configuration	Foreground suppression	200	1	Integer	RW	Foreground suppression	120 to 360 mm	600 to 1800 mm	120	600

Parameter		Index	Sub-index	Format	R / W	Description	Setting range		Factory default	
							UTRCM18	UTRCM30	UTRCM18	UTRCM30
Filter	Type	256	1	UInteger	RW	Measurement filter	0: No filter, 1: Foreground filter, 2: Averaging filter 3: Foreground + averaging filter 4: Background + averaging filter		1	1
	Strength		2	UInteger	RW	Measurement filter strength	0: P00 (weak filter), 1 to 9: P01 to P09 (strong filter)		0	0
Temperature compensation	Setting temperature	300	1	UInteger	RW	Set temperature	0: Auto, 1: Manual		1	1
	Reference temperature		2	Integer	RW	User set temperature	-25 to 70 ℃		25	25
Synchronization and multiplex operation	Synchronization mode	350	1	UInteger	RW	Synchronization mode selection	0: Synchronization active, 1 ~ 10: Multiplex address, 128: IO-Link Synchronization active		0	0
	Max. address value of multiplex		2	UInteger	RW	Max. address value of multiplex	1 to 10		10	10
User Interface	External input setting lock	370	1	UInteger	RW	External input setting lock	0: Unlock, 1: Lock		0	0
	Indicator	371	1	UInteger	RW	Indicator	0: OFF, 1: ON		1	1
	Display unit	372	1	UInteger	RW	Display unit	-	0: Position, 1: Rising, 2: Falling	-	0
	Display light level		2	UInteger	RW	Display light level	-	0: Display off, 1 to 5: Display level 1 to 5	-	5
	Display direction		3	UInteger	RW	Display direction	-	0: Display normal, 1: Display 180dgree	-	0
System command	Restore factory reset	2	-	-	WO	Factory reset	0x82		-	-
Device access locks	Data Storage	12	2	Boolean	RW	Data storage locked between IO-Link Master - Device	0: False, 1: True		0	0
Operating time	Operating time alarm	381	1	UInteger	RW	Operating time alarm	1 to 131,071 h		100,000	100,000
Detection width	Detection width	257	1	UInteger	RW	Detection width	0: Wide, 1: Middle, 2: Narrow		0	0

■ Events

• When the corresponding error occurs, the abnomal indicator flashes.

Event name	Event code	Type	Description
Error	6151 (0x1807)	Parameter Error	Parameter using warning
Warning	16912 (0x4210)	Device temperature over-run	Overheating detection warnning
Notification	36000 (0x8ca0)	Teaching error	Teaching error
	36001 (0x8ca1)	Teaching success	Teaching success

Sold Separately : M12 Connector Cable

• For detailed information, refer to the 'M8/M12 Connector Cable' manual.

Appearance	Power	Connector 1	Connector 2	Length	Feature	Model
	DC	M12 (Socket-Female)	5-wire	1 m	PVC	CID5-1
				2 m		CID5-2
				3 m		CID5-3
				5 m		CID5-5
				7 m		CID5-7
	DC	M12 (Socket-Female)	M12 (Plug-Female)	1 m	PVC	C1D5-1
				2 m		C1D5-2
				3 m		C1D5-3
				5 m		C1D5-5
				7 m		C1D5-7

Segment Table

The segments displayed on the product indicate the following meanings. It may differ depending on the product.

7 segment				11 segment				12 segment				16 segment			
0	0	I	I	0	0	I	I	0	0	I	I	0	0	I	I
I	1	J	J	I	1	J	J	I	1	J	J	I	1	J	J
2	2	K	K	2	2	K	K	2	2	K	K	2	2	K	K
3	3	L	L	3	3	L	L	3	3	L	L	3	3	L	L
4	4	M	M	4	4	M	M	4	4	M	M	4	4	M	M
5	5	N	N	5	5	N	N	5	5	N	N	5	5	N	N
6	6	O	O	6	6	O	O	6	6	O	O	6	6	O	O
7	7	P	P	7	7	P	P	7	7	P	P	7	7	P	P
8	8	Q	Q	8	8	Q	Q	8	8	Q	Q	8	8	Q	Q
9	9	R	R	9	9	R	R	9	9	R	R	9	9	R	R
A	A	S	S	A	A	S	S	A	A	S	S	A	A	S	S
b	B	T	T	b	B	T	T	b	B	T	T	B	B	T	T
C	C	U	U	C	C	U	U	C	C	U	U	C	C	U	U
d	D	V	V	d	D	V	V	d	D	V	V	D	D	V	V
E	E	W	W	E	E	W	W	E	E	W	W	E	E	W	W
F	F	X	X	F	F	X	X	F	F	X	X	F	F	X	X
G	G	Y	Y	G	G	Y	Y	G	G	Y	Y	G	G	Y	Y
H	H	Z	Z	H	H	Z	Z	H	H	Z	Z	H	H	Z	Z