

## Cylindrical Ultrasonic Sensors

# UTR Series

## INSTRUCTION MANUAL

TCD240003AF

**Autonics**

Thank you for choosing our Autonics product.

**Read and understand the instruction manual and manual thoroughly before using the product.**

**For your safety, read and follow the below safety considerations before using. For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**

Keep this instruction manual in a place where you can find easily.



Visit Autonics website (www.autonics.com or QR code) for the latest information. Manuals, CAD files, certifications, software, etc. are available. The dimensions, specifications, certifications, etc. are subject to change without notice for product improvement. Certain models may be discontinued without notice.

### 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.

- 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.
- Do not use or store 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.
- Do not disassemble or modify the unit.**  
Failure to follow this instruction may result in fire.
- Do not connect, repair, inspect, or replace the unit while connected to a power source.**  
Failure to follow this instruction may result in fire.
- Check 'Connections' before wiring.**  
Failure to follow this instruction may result in fire.
- 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.

- Use the product within the rated specifications.**  
Failure to follow this instruction may result in fire or product damage.
- Depending on the temperature and humidity of the air, atmospheric pressure, or wind, the sound speed may be changed and it affects detection performance.**  
Use the product within the rated specifications.
- At high temperatures, ensure that relative air humidity does not exceed 50%RH.**  
Sensing performance may deteriorate in humid environments.
- 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.
- 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.
- 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.
- 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.
- In case of IO-Link models, IO-Link and UT-P communications cannot be used simultaneously.**  
Do not connect wiring arbitrarily.

### 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.  
When power is applied, vibration and sound occur by sound waves at the front part of the sensor.
- 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.
- When changing the sensor settings, test the sensor before use. Check whether the indicator light operates correctly according to the detection range and filter or other settings change.

#### ■ Wire

- The waterproof function may be damaged if the product is subjected to impact from a hard object or bent excessively or repeatedly.
- 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.

Type	Model	UTRCM18-350	UTRCM18-600	UTRCM18-1300	UTRCM30-8M
A		2,500 mm	2,500 mm	4,000 mm	30,000 mm
B		350 mm	400 mm	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]

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

UTR ① ② - ③ ④ - ⑤ - ⑥

<b>① Connection</b> CM: Connector type	<b>② DIA. of mount</b> Number: DIA. of mount (unit: mm)												
<b>③ Sensing distance</b> Number: Sensing distance (unit: cm) Number + M: Sensing distance (unit: m)	<b>④ Output</b>												
	<table border="1"> <thead> <tr> <th></th> <th>Digital output</th> <th>Analog output</th> </tr> </thead> <tbody> <tr> <td>No-mark</td> <td></td> <td>-</td> </tr> <tr> <td>D</td> <td>Push-pull</td> <td>4 - 20 mA</td> </tr> <tr> <td>DB</td> <td></td> <td>4 - 20 mA / 0 - 10 V</td> </tr> </tbody> </table>		Digital output	Analog output	No-mark		-	D	Push-pull	4 - 20 mA	DB		4 - 20 mA / 0 - 10 V
	Digital output	Analog output											
No-mark		-											
D	Push-pull	4 - 20 mA											
DB		4 - 20 mA / 0 - 10 V											
<b>⑤ Display part</b> No-mark: None D: 3-digit display	<b>⑥ Communication</b> 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. When required, connect the ultrasonic sensor programming unit UT-P Series (sold separately)

#### ■ 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).

### 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-□

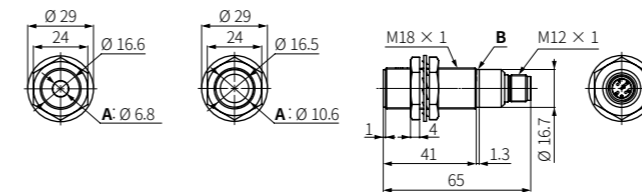
### Dimensions

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

A	B	C
Transducer (sensing side)	Operation Indicator	Display part

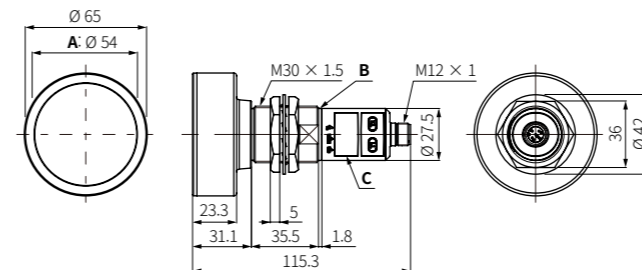
#### ■ UTRCM18

- UTRCM18-350 / 600
- UTRCM18-1300



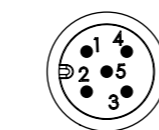
#### ■ UTRCM30

- UTRCM30-8MDD-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
②	White	I/V
③	Blue	GND
④	Black	C/Q
⑤	Yellow	COM

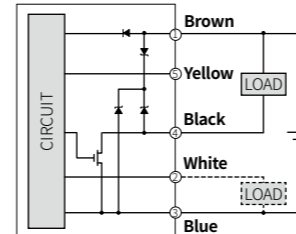
### Connections

- This is the connection diagram when using the SIO mode. The control output mode can be selected through load connection.
- Since the digital output is based on the PNP type, the operation status may be reversed when wired for NPN.

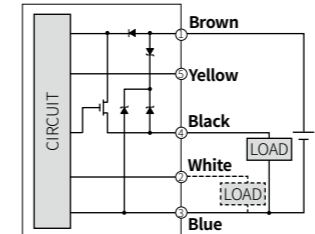
① Brown	② White	③ Blue	④ Black	⑤ Yellow
VCC	I/V (analog output)	GND	C/Q (digital output)	COM

#### ■ SIO mode

##### • NPN



##### • PNP



### 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

cm	mm	%
100 cm	100 mm	100 %

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

### Operation Indicator

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

### Specification

Model	UTRCM18-350-□-□	UTRCM18-600-□-□	UTRCM18-1300-□-□	UTRCM30-8M-□-□-□
<b>Sensing distance</b>	30 to 350 mm	65 to 600 mm	120 to 1300 mm	600 to 8000 mm
<b>Blind zone</b> <sup>01)</sup>	0 to 27 mm	0 to 59 mm	0 to 115 mm	0 to 590 mm
<b>Foreground suppression</b> <sup>02)</sup>	30 to 90 mm	65 to 195 mm	120 to 360 mm	600 to 1800 mm
<b>Max. setting zone</b>	350 mm	600 mm	1300 mm	8000 mm
<b>Transducer frequency</b>	305 kHz	305 kHz	200 kHz	80 kHz
<b>Switching frequency</b>	≥ 25 Hz	≥ 12.5 Hz	≥ 10 Hz	≥ 3 Hz
<b>Response time</b>	≤ 32 ms	≤ 64 ms	≤ 100 ms	≤ 300 ms
<b>Hysteresis</b> <sup>02)</sup>	3 mm	5 mm	20 mm	100 mm
<b>Standard sensing target: Aluminum</b>	200 × 200 mm	200 × 200 mm	200 × 200 mm	500 × 500 mm
<b>Resolution</b>	≥ 0.069 mm	≥ 0.069 mm	≥ 0.175 mm	≥ 0.180 mm
<b>Accuracy</b> <sup>03)</sup>	± 1 % F.S.			
<b>Repeat accuracy</b>	± 0.15 % F.S.			
<b>Weight (packaged)</b>	≈ 30 g (≈ 85 g)	≈ 30 g (≈ 85 g)	≈ 32 g (≈ 90 g)	≈ 210 g (≈ 330 g)

01) If a sensing target is detected in over blind zone and below foreground suppression range, the distance value is displayed as foreground suppression value.

02) Set parameter or dedicated software (atDistance)

03) Ambient temperature 25 °C, temperatures characteristic ± 0.1 % F.S. / °C

Model	UTRCM18-350-□-□	UTRCM18-600-□-□	UTRCM18-1300-□-□-□	UTRCM30-8M-□-□-□
<b>Power supply</b>	12 - 30 VDC (ripple P-P: ≤ 10 %)			
<b>Current consumption</b>	≤ 40 mA (no load)	≤ 45 mA (no load)	≤ 45 mA (no load)	≤ 80 mA (no load)
<b>Digital output</b>	Push-pull			
Load voltage	≤ 30 V			
Load current	≤ 100 mA			
Residual voltage	≤ 3 V			
<b>Analog output</b>	[current output] DC 4 - 20 mA / [voltage output] DC 0 - 10 V			
Load resistance	[voltage output] 12 - 30 VDC: ≥ 100 kΩ [current output] 12 - 20 VDC: ≤ 100 Ω / 20 - 30 VDC: ≤ 500 Ω			
<b>Protection circuit</b>	Surge protection circuit, output short over current protection circuit, reverse polarity protection			
<b>Insulation resistance</b>	≥ 50 MΩ (500 VDC megger)			
<b>Dielectric strength</b>	Between the charging part and the case: 1,000 VAC ~ 50 / 60 Hz for 1 min			
<b>Vibration</b>	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours			
<b>Shock</b>	500 m/s <sup>2</sup> (≈ 50 G) in each X, Y, Z direction for 3 times			
<b>Ambient temperature</b>	-25 to 70 °C, storage: -40 to 85 °C (no freezing or condensation)			
<b>Protection structure</b>	UTRCM18-350, UTRCM18-600: IP66, IP67 (IEC standard), IP69K (DIN standard), IP68 UTRCM18-1300: IP66, IP67 (IEC standard), IP69K (DIN standard) UTRCM30-8M: IP66, IP67 (IEC standard)			
<b>Connection</b>	Connector models			
<b>Connector spec.</b>	M12 5-pin plug connector			
<b>Material</b>	Case: mount - SUS316L, body - PC transducer: polyurethane foam, epoxy resin with glass			
<b>Certification</b>	CE, RoHS, IO-Link <sup>TM</sup> EAC			

01) It applies only to the UTRCM□-□-□-□-IL2 model.

### Communication Interface

#### ■ IO-Link

<b>Version</b>	Ver. 1.1
<b>Class</b>	Class A
<b>Baud rate</b>	COM2 (38.4 kbps)
<b>Min. cycle time</b>	4 ms
<b>Data length</b>	PD: 4 byte, OD: 2 byte (M-sequence: TYPE_2_V)
<b>Vendor ID</b>	899 (0x383)