



# Ultrasonic Sensors UTR Series

Detection and Measurement Solution for Various Materials and Surfaces

# Detect and Measure Various Target Material with Ultrasonic Sensing

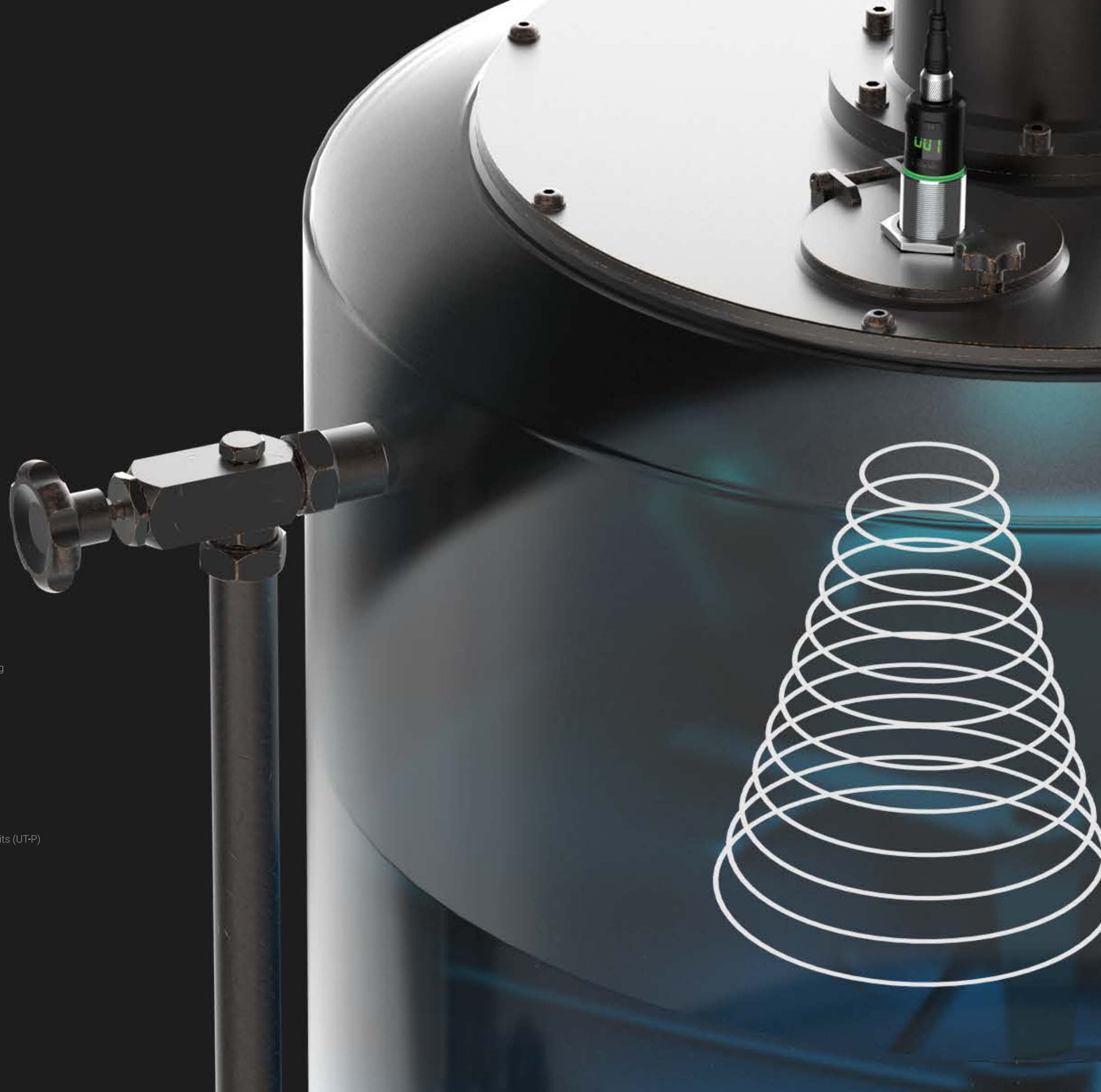
## Cylindrical Ultrasonic Sensors UTR Series

The UTR series cylindrical ultrasonic sensors can detect and measure distance of objects by emitting and receiving high frequency sound waves and measuring the time lapse in between. Ultrasonic sensing method allows detection of various material and surface types with a maximum detection distance of up to 8 m.

The sensors also offer temperature tracking, detection width conversion, and other various functions to provide accurate and precise measurement. Ultrasonic sensors can be used in various applications including presence detection and liquid/solid/powder level measurement.

### Features

- Detect and measure various material and surface types with ultrasonic sensing
- Sensing distance (by mount diameter)
  - M18 Model : 30 to 350 mm / 65 to 600 mm / 120 to 1,300 mm
  - M30 Model : 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 direction
- 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)
- Protection structure: IP66, IP67, IP68, IP69K (may vary by model)



## Applications



### Object Detection

Users can detect the presence of objects regardless of transparency, color, pattern, and shape.



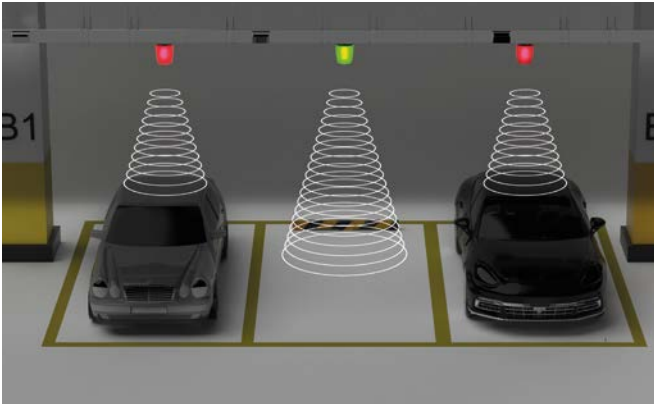
### Break Detection

Users can detect the break of objects such as film, pulp, and textiles.



### Crash Prevention

Users can detect presence or distance of objects by installing sensors in AGVs or AMRs.



### Space Detection

Users can get parking status information by detecting the presence of vehicles in the parking lots.



### Transparent Object Detection

Users can detect the presence of transparent objects such as glass on the conveyor belt.



### Stretch Measurement

Users can measure the amount of stretch or speed of loops during tire or textile manufacturing process.



## Main Features

### 1 Detect and Measure Various Material and Surface Types

Detect various materials including transparent or metallic objects, powder, or liquid, regardless of color, pattern, texture, or luster of the surfaces. Ultrasonic sensors can also be used to measure distance of target objects.

### 2 Long Sensing Distance up to 8 m

Long sensing distance up to 8 m allows application in difficult environments including high temperatures.

### 3 Ring Type Indicator and Display

360° ring type indicator to check operation status from any direction. Models with display panels show the current and parameter set values for user convenience.

### 4 High Accuracy of Detection

With the dedicated software, atDistance, users can set multiple functions such as temperature tracking, detection width conversion, measurement filter function, synchronization and multiplex function for high accuracy of detection.

### 5 316L Stainless Steel Body

316L stainless steel body offers high corrosion resistance ideal for various industries including food/beverage and pharmaceutical industries.

### 6 IO-Link Communication

IO-Link model allow users to check sensor status for convenient maintenance.

### 7 Ultrasonic Sensor Programming Units (Sold Separately)

Users can monitor the present values in real-time with the display of the ultrasonic sensor programming unit (UT-P). Some functions can be easily set with the buttons.

## Specification

### [ Cylindrical Ultrasonic Sensors UTR Series ]

#### 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 | 1 | - | 2 | 3 | 4 | - | 5 | - | 6 |
|-------|---|---|---|---|---|---|---|---|---|

|                                                                                        |                                                                                                            |                                                                          |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>1 DIA. of mount</b><br>Number: DIA. of mount (unit: mm)                             | <b>2 Sensing distance</b><br>Number: Sensing distance (unit: mm)<br>Number + M: Sensing distance (unit: m) | <b>3 Output</b><br>No-mark: Digital output<br>D: Digital + Analog output |
| <b>4 Analog output</b><br>No-mark: None<br>B: Voltage (0 ~ 10 V) / current (4 ~ 20 mA) | <b>5 Display part</b><br>No-mark: None<br>D: 3-digit display                                               | <b>6 Communication</b><br>No-mark: Unsupported<br>IL2: IO-Link COM2      |

#### Specification

| Model                             | UTRCM18-350-□□□□□□□□□□ | UTRCM18-600-□□□□□□□□□□ | UTRCM18-1300-□□□□□□□□□□ | UTRCM30-8M-□□□□□□□□□□ |
|-----------------------------------|------------------------|------------------------|-------------------------|-----------------------|
| Sensing distance                  | 30 to 350 mm           | 65 to 600 mm           | 120 to 1300 mm          | 600 to 8000 mm        |
| Blind zone                        | 0 to 22 mm             | 0 to 59 mm             | 0 to 115 mm             | 0 to 590 mm           |
| Foreground suppression            | 30 to 90 mm            | 65 to 155 mm           | 120 to 360 mm           | 600 to 1800 mm        |
| Max. setting zone                 | 350 mm                 | 600 mm                 | 1300 mm                 | 8000 mm               |
| Transducer frequency              | 20.5 kHz               | 20.5 kHz               | 20.5 kHz                | 20.5 kHz              |
| Switching frequency               | ≥ 25 Hz                | ≥ 12.5 Hz              | ≥ 10 Hz                 | ≥ 3 Hz                |
| Response time                     | ≤ 32 ms                | ≤ 64 ms                | ≤ 100 ms                | ≤ 300 ms              |
| Hysteresis                        | 4 mm                   | 5 mm                   | 20 mm                   | 100 mm                |
| Standard sensing target: Aluminum | 200 × 200 mm           | 200 × 200 mm           | 200 × 200 mm            | 500 × 500 mm          |
| Resolution                        | ≥ 0.059 mm             | ≥ 0.059 mm             | ≥ 0.175 mm              | ≥ 0.180 mm            |
| Accuracy                          | ± 1 % F.S.             | ± 1 % F.S.             | ± 1 % F.S.              | ± 1 % F.S.            |
| Repeat accuracy                   | ± 0.15 % F.S.          | ± 0.15 % F.S.          | ± 0.15 % F.S.           | ± 0.15 % F.S.         |
| Weight (packaged)                 | ≤ 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-□□□□□□□□□□                                                                               | UTRCM18-1300D-□□□□□□□□□□                                                                              | UTRCM18-8M-□□□□□□□□□□                                                                                 | UTRCM30-8M0B-□□□□□□□□□□                                                                               |
|-----------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Power supply          | 12 ~ 30 VDC (= ripple P-P: ≤ 10 %)                                                                    | 12 ~ 30 VDC (= ripple P-P: ≤ 10 %)                                                                    | 12 ~ 30 VDC (= ripple P-P: ≤ 10 %)                                                                    | 12 ~ 30 VDC (= ripple P-P: ≤ 10 %)                                                                    | 12 ~ 30 VDC (= ripple P-P: ≤ 10 %)                                                                    | 12 ~ 30 VDC (= ripple P-P: ≤ 10 %)                                                                    |
| Current consumption   | ≤ 40 mA (no load)                                                                                     | ≤ 40 mA (no load)                                                                                     | ≤ 40 mA (no load)                                                                                     | ≤ 40 mA (no load)                                                                                     | ≤ 40 mA (no load)                                                                                     | ≤ 40 mA (no load)                                                                                     |
| Digital output        | Push-pull                                                                                             | Push-pull                                                                                             | Push-pull                                                                                             | Push-pull                                                                                             | Push-pull                                                                                             | Push-pull                                                                                             |
| Load voltage          | ≤ 30 V                                                                                                | ≤ 30 V                                                                                                | ≤ 30 V                                                                                                | ≤ 30 V                                                                                                | ≤ 30 V                                                                                                | ≤ 30 V                                                                                                |
| Load current          | ≤ 100 mA                                                                                              | ≤ 100 mA                                                                                              | ≤ 100 mA                                                                                              | ≤ 100 mA                                                                                              | ≤ 100 mA                                                                                              | ≤ 100 mA                                                                                              |
| Residual voltage      | ≤ 4 V                                                                                                 | ≤ 4 V                                                                                                 | ≤ 4 V                                                                                                 | ≤ 4 V                                                                                                 | ≤ 4 V                                                                                                 | ≤ 4 V                                                                                                 |
| Analog output         | Current output DC 4 ~ 20 mA / Voltage output DC 0 ~ 10 V                                              | Current output DC 4 ~ 20 mA / Voltage output DC 0 ~ 10 V                                              | Current output DC 4 ~ 20 mA / Voltage output DC 0 ~ 10 V                                              | Current output DC 4 ~ 20 mA / Voltage output DC 0 ~ 10 V                                              | Current output DC 4 ~ 20 mA / Voltage output DC 0 ~ 10 V                                              | Current output DC 4 ~ 20 mA / Voltage output DC 0 ~ 10 V                                              |
| Current output        | -                                                                                                     | ●                                                                                                     | -                                                                                                     | ●                                                                                                     | -                                                                                                     | ●                                                                                                     |
| Voltage output        | -                                                                                                     | -                                                                                                     | -                                                                                                     | -                                                                                                     | -                                                                                                     | ●                                                                                                     |
| Load resistance       | Voltage output 12 ~ 30 VDC = ≤ 100 kΩ<br>Current output 12 ~ 20 VDC = ≤ 100 Ω / 20 ~ 30 VDC = ≤ 500 Ω | Voltage output 12 ~ 30 VDC = ≤ 100 kΩ<br>Current output 12 ~ 20 VDC = ≤ 100 Ω / 20 ~ 30 VDC = ≤ 500 Ω | Voltage output 12 ~ 30 VDC = ≤ 100 kΩ<br>Current output 12 ~ 20 VDC = ≤ 100 Ω / 20 ~ 30 VDC = ≤ 500 Ω | Voltage output 12 ~ 30 VDC = ≤ 100 kΩ<br>Current output 12 ~ 20 VDC = ≤ 100 Ω / 20 ~ 30 VDC = ≤ 500 Ω | Voltage output 12 ~ 30 VDC = ≤ 100 kΩ<br>Current output 12 ~ 20 VDC = ≤ 100 Ω / 20 ~ 30 VDC = ≤ 500 Ω | Voltage output 12 ~ 30 VDC = ≤ 100 kΩ<br>Current output 12 ~ 20 VDC = ≤ 100 Ω / 20 ~ 30 VDC = ≤ 500 Ω |
| Protection circuit    | Surge protection circuit, output short over current protection circuit, reverse polarity protection   | Surge protection circuit, output short over current protection circuit, reverse polarity protection   | Surge protection circuit, output short over current protection circuit, reverse polarity protection   | Surge protection circuit, output short over current protection circuit, reverse polarity protection   | Surge protection circuit, output short over current protection circuit, reverse polarity protection   | Surge protection circuit, output short over current protection circuit, reverse polarity protection   |
| Insulation resistance | ≥ 50 MΩ (500 VDC = megger)                                                                            | ≥ 50 MΩ (500 VDC = megger)                                                                            | ≥ 50 MΩ (500 VDC = megger)                                                                            | ≥ 50 MΩ (500 VDC = megger)                                                                            | ≥ 50 MΩ (500 VDC = megger)                                                                            | ≥ 50 MΩ (500 VDC = megger)                                                                            |
| Dielectric strength   | Between the charging part and the case: 1,000 VAC ~ 50 / 60 Hz for 1 min                              | Between the charging part and the case: 1,000 VAC ~ 50 / 60 Hz for 1 min                              | Between the charging part and the case: 1,000 VAC ~ 50 / 60 Hz for 1 min                              | Between the charging part and the case: 1,000 VAC ~ 50 / 60 Hz for 1 min                              | Between the charging part and the case: 1,000 VAC ~ 50 / 60 Hz for 1 min                              | 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             | 1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours             | 1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours             | 1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours             | 1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours             | 1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours             |
| Shock                 | 500 ms (≤ 50 G) in each X, Y, Z direction for 3 times                                                 | 500 ms (≤ 50 G) in each X, Y, Z direction for 3 times                                                 | 500 ms (≤ 50 G) in each X, Y, Z direction for 3 times                                                 | 500 ms (≤ 50 G) in each X, Y, Z direction for 3 times                                                 | 500 ms (≤ 50 G) in each X, Y, Z direction for 3 times                                                 | 500 ms (≤ 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)                                     | -25 to 70 °C, storage: -40 to 85 °C (no freezing or condensation)                                     | -25 to 70 °C, storage: -40 to 85 °C (no freezing or condensation)                                     | -25 to 70 °C, storage: -40 to 85 °C (no freezing or condensation)                                     | -25 to 70 °C, storage: -40 to 85 °C (no freezing or condensation)                                     | -25 to 70 °C, storage: -40 to 85 °C (no freezing or condensation)                                     |
| Protection structure  | UTRCM18-350, UTRCM18-600: IP66, IP67 (IEC standard), IP69K (DIN standard), IP69K (DIN standard)       | UTRCM18-350, UTRCM18-600: IP66, IP67 (IEC standard), IP69K (DIN standard), IP69K (DIN standard)       | UTRCM18-350, UTRCM18-600: IP66, IP67 (IEC standard), IP69K (DIN standard), IP69K (DIN standard)       | UTRCM18-350, UTRCM18-600: IP66, IP67 (IEC standard), IP69K (DIN standard), IP69K (DIN standard)       | UTRCM18-350, UTRCM18-600: IP66, IP67 (IEC standard), IP69K (DIN standard), IP69K (DIN standard)       | UTRCM18-350, UTRCM18-600: IP66, IP67 (IEC standard), IP69K (DIN standard), IP69K (DIN standard)       |
| Connection            | Connector models                                                                                      | Connector models                                                                                      | Connector models                                                                                      | Connector models                                                                                      | Connector models                                                                                      | Connector models                                                                                      |
| Connector spec.       | M12 5-pin plug connector                                                                              | M12 5-pin plug connector                                                                              | M12 5-pin plug connector                                                                              | M12 5-pin plug connector                                                                              | M12 5-pin plug connector                                                                              | M12 5-pin plug connector                                                                              |
| Material              | Case: mount: S3516, body: PC; transducer: polyurethane foam; epoxy resin with glass                   | Case: mount: S3516, body: PC; transducer: polyurethane foam; epoxy resin with glass                   | Case: mount: S3516, body: PC; transducer: polyurethane foam; epoxy resin with glass                   | Case: mount: S3516, body: PC; transducer: polyurethane foam; epoxy resin with glass                   | Case: mount: S3516, body: PC; transducer: polyurethane foam; epoxy resin with glass                   | Case: mount: S3516, body: PC; transducer: polyurethane foam; epoxy resin with glass                   |
| Certification         | CE, RoHS, REACH                                                                                       | CE, RoHS, REACH                                                                                       | CE, RoHS, REACH                                                                                       | CE, RoHS, REACH                                                                                       | CE, RoHS, REACH                                                                                       | CE, RoHS, REACH                                                                                       |

01) It is applied to UTRCM□□□□□□□□□□ model.

### [ Ultrasonic Sensors Programming Unit UT-P Series ]

#### Specification

|                       |                                                                                                                                        |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Model                 | UT-P                                                                                                                                   |
| Power supply          | External power: 12 ~ 30 VDC (= ripple P-P: ≤ 10 %)<br>USB power: 5 VDC = USB bus power                                                 |
| Current consumption   | ≤ 25 mA (no load)                                                                                                                      |
| Functions             | Real-time monitoring of sensing distance. Perform UTR Series functions and set parameters through the dedicated software (atDistance). |
| 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 amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours                                                     |
| Shock                 | 500 ms (≤ 50 G) in each X, Y, Z direction for 3 times                                                                                  |
| Ambient temperature   | 5 to 60 °C, storage: -40 to 85 °C (no freezing or condensation)                                                                        |
| Ambient humidity      | 0 to 50 %RH, storage: 0 to 50 %RH (no freezing or condensation)                                                                        |
| Protection structure  | IP20 (IEC standard)                                                                                                                    |
| Connection            | Cable connector type models                                                                                                            |
| Connector spec.       | USB (mini-B type), M12 5-pin socket connector, M12 4-pin plug connector                                                                |
| Material              | Case: PC, cable: PVC                                                                                                                   |
| Certification         | CE, RoHS, REACH                                                                                                                        |

01) USB bus Power is supplied from PC or USB host controller.

02) 3 sec after supplying power, up to 50 mA with button input.

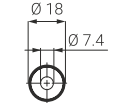
#### Dimensions

Unit: mm. For the detailed, follow the Autonics website.

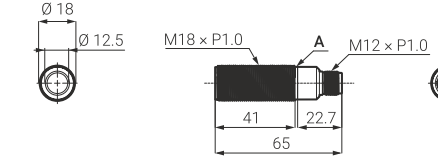
|   |                     |   |              |
|---|---------------------|---|--------------|
| A | Operation Indicator | B | Display part |
|---|---------------------|---|--------------|

#### ■ UTRCM18

• UTRCM18-350 / 600

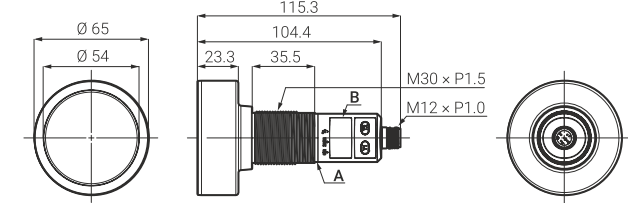


• UTRCM18-1300



#### ■ UTRCM30

• UTRCM30-8M0B-D-□□. The dimension depends on the display part.



#### 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)                                   |

##### Software

##### ■ atDistance

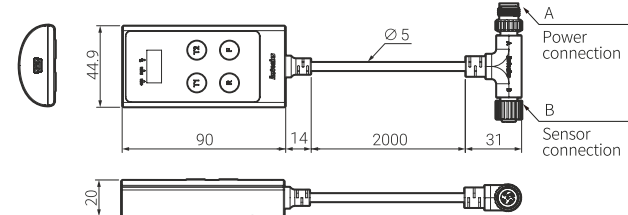
It is the monitoring data management program for installation of the ultrasonic sensor, parameter setting, and status information.

##### ■ atIO-Link

atIO-Link with purposes for setting, diagnosis, and maintenance of IO-Link device via IODD file is provided as the Port and Device Configuration Tool (PDCT).

#### Dimensions

Unit: mm. For the detailed drawings, follow the Autonics website.



#### Ferrite Core



# Ultrasonic Sensors vs Photoelectric Sensors vs Laser Sensors vs Proximity Sensors

| Item                                       | Ultrasonic Sensors | Photoelectric Sensors | Laser Sensors | Proximity Sensors |
|--------------------------------------------|--------------------|-----------------------|---------------|-------------------|
| Distance Measurement                       | ○                  | ×                     | ○             | ×                 |
| Luster Detection                           | ○                  | ×                     | ○             | ○                 |
| Transparent Objects Detection (Glass/Film) | ○                  | ×                     | ×             | △                 |
| Transparent Liquid Detection               | ○                  | ×                     | ×             | △                 |
| Objects with Holes Detection               | ○                  | △                     | ×             | △                 |
| Uneven Objects Detection                   | ○                  | △                     | △             | △                 |
| Ambient Humidity                           | △                  | ×                     | △             | ○                 |
| Against Water/Dust                         | Strong             | Weak                  | Weak          | Strong            |
| Detection Area                             | Wide               | Narrow                | Narrow        | Narrow            |

\* This table is only for reference. Actual performance may differ depending on user environments.

## Autonics

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### Products

#### Sensors, Controllers, Motion Devices, Safety, Measuring Equipment, Connection Equipment and more

- Photoelectric Sensors • Photomicro Sensors • Fiber Optic Sensors • Displacement Sensors • LiDAR • Ultrasonic Sensors • Door Sensors
- Area Sensors • Proximity Sensors • Linear Positioning Sensors • Rotary Encoders • Temperature Sensors • Temperature Transmitters
- Pressure Sensors • Pressure Transmitters • Smart Camera • Vision Sensors • Safety Light Curtains • Safety Door Switches • Safety Switches
- Safety Controllers • Safety I/O Terminal Blocks • Temperature Controllers • Solid State Relays • Power Controllers • Counters • Timers
- Digital Panel Meters • Digital Display Units • Sensor Controllers • SMPS • Industrial PC • HMIs • Recorders • Indicators • Network Converters
- Closed Loop Stepper Motor System • 5-Phase Stepper Motor & Drivers • 2-Phase Stepper Motor Drivers • Motion Controllers
- Industrial Networking • I/O Terminal Blocks • Distribution Boxes • Cables • Control Switches / Pilot Lights / Buzzers • Software

\* The dimensions or specifications on this product guide may change and some models may be discontinued without notice.