RAYCOH®

UCC Corrosion Resistant Series Ultrasonic Sensors - Quick Start

- Small blind spot
- Corrosive environment use
- Proximity Fine Inspection

IO-Link

CE

Precautions

- Please read the operating instructions of RAYCOH before commissioning.
- Connection, installation and configuration must be carried out by trained RAYCOH specialists.
- During debugging, the equipment should be protected from moisture and contamination.
- This device does not constitute a safety component according to the corresponding machine safety standards.
- Do not allow moisture or water to enter the internal components of the sensor and the output contacts of the wiring board.
- Protected against use in explosive atmospheres.
- Do not use solvents, paraffin, propylene glycol, gasoline or other chemically active substances to clean the sensor.
- The sensor should be installed away from moisture, water droplets, dust, corrosive and harmful substances, as well as high temperature, discharge and vibration.
- Do not use the sensor in corrosive environments where the atmosphere contains acids, alkalis, and other corrosive substances.
- In the process of operation and maintenance, RAYCOH professionals recommend that you abide by the requirements of "User Electrical Equipment Technical Operation Regulations" and "Labor Protection Regulations in Electrical Equipment Operation". Before connecting the sensor, you must ensure that all connections are correct and that the power and signal lines must not be mixed, otherwise the sensor may be damaged or personnel may be injured.
- Sensors that have reached the end of their useful life should be disassembled and RAYCOH recommends disposing of them through a facility that recycles ferrous and non-ferrous metals.

Packaged content

Sensor	1 pcs
Mounting Nut	2 pcs
Manual	1 pcs

Dimensions

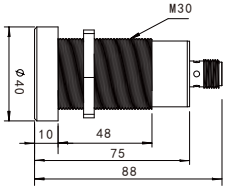


Figure 1 - Outline Dimensions UCC - 30GM60 Series

Model range

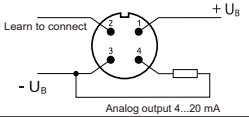
UCC [ ] – [ ] – [ ]

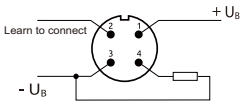
Working Distance			
Working Distance 150...2500 mm	2500		
Shell (size, material, length)		30GM60	
Output type			
Analog output: 4...20 mA			I
Analog output: 0...10 V			U
Digital output :RS-485(Modbus RTU)			R4

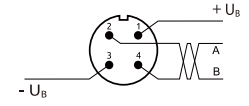
parameter

Working Distance	150. . . 2500mm
Blind spot	0. . . 150mm
Operating medium	Air (velocity ≤16 m/s)
Resolution	0. 2~0. 5mm
Repeatability	±0. 15%
Absolute Accuracy	±1mm
Response time	160ms
Output type	Analog/RS485
Power-Up Timer	＜ 500ms
Operating Voltage	DC 10...30 V
Overload protection	200mA
load impedance	I ~300 Ohm, U > 1 kOm
No-load current consumption	≤ 30mA
Shell material	Stainless steel + PDFE
Protection level	IP67
Connector	5芯M12
Ambient temperature	−25. . . +70 ° C
Atmospheric pressure	460. . . 918 mm p.s.l
Storage temperature	−40. . . +85 ° C
Weight	180g

Electrical connection

Symbol/Connection: (I analog output)		Connection method
 Analog output 4...20 mA	1. BN	DC 10...30V
	2. WH	teaching information
	3.BU	GND
	4. BK	Analog output 4...20 mA

Symbol/connection: (U analog output)		Connection method
 Analog voltage 0...10V	1. BN	DC 10...30V
	2. WH	teaching information
	3.BU	GND
	4. BK	Analog voltage 0...10V

Symbol/Connection: (RS485 output)		Connection method
	1. RD	DC 10...30V
	2. YE	Signal A (RS-485)
	3.BK	0 volts DC
	4. GN	Signal B (RS-485)

Instructions

Figure2-Ultrasonic sensor operating range

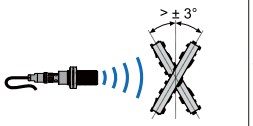


Figure 3 - Detecting non-smooth objects

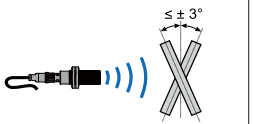


Figure 4 - Detecting smooth objects

- The sensor is installed at a distance from the object corresponding to "Zone 2" or "Zone 2+3" (see Figure 2), depending on the object and operating conditions (see points 8 and 15).
- The object must not be within a distance of "Zone 1" or "Zone 4" from the sensor corresponding to the "Zone".
- The sensor should be placed in front of the object so that the reflective surface perpendicular to the sensor axis does not deviate more than 3° from the vertical axis (Fig. 4). If the obliquity of the object increases, the reflected ultrasonic pulse may not be able to pick up the reflected sound waves, making the measurement impossible.
- If the surface of the object is uneven (e.g. gravel, gravel), the permissible deviation of the sensor from the vertical is 3° (Fig. 4). During installation, the sensor may deviate more than 3° from the vertical (Figure 3).
- The sensor should be placed in front of the object so that the reflecting surface is perpendicular to the sensor axis, with a permissible deviation of no more than 3° from the vertical axis (Fig. 4).
- If the tilt angle of the object increases, the reflected ultrasonic pulses may not reach the transducer, making measurements impossible. If the surface of the object is uneven (e.g. gravel, gravel), the permissible deviation of the sensor from the vertical is 3° (Fig. 4).
- During installation, the sensor may deviate from vertical by more than 3° (fig. 3).

Make sure the power and sensor are turned off before connecting/disconnecting the sensor connector.

安装说明

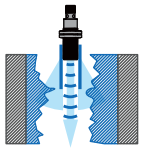


Figure 5 - Applying Ultrasonic Sensors

- If there are multiple reflections in the ultrasonic propagation area, or if there is a risk of mechanical damage in the ultrasonic propagation area (e.g. multiple reflections in the ultrasonic propagation area), it is recommended to mount the receiver inside the waveguide.
- Mount the receiver in a waveguide made of highly reflective material and of any length (Figure 5).
- When measuring the liquid level in the container, if the sensor cannot be installed vertically downward due to the installation conditions or the medium vapor temperature is high, the sensor can be installed from the side, and through the smooth surface at an angle of 45° to the emitter surface, the reflector will Ultrasonic waves are guided vertically downward (Figure 6).
- Two nut mounts, included in the supplied set. The installation of the sensor should comply with the following requirements (allowable distances shown in Figure 7 below).
- If the minimum distance requirements are not met, the sensors will interfere with each other.

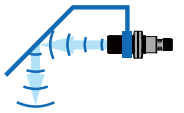


Figure 6 - Apply Reflector Diagram

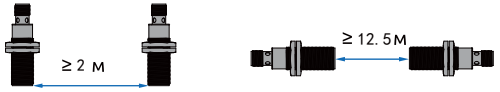
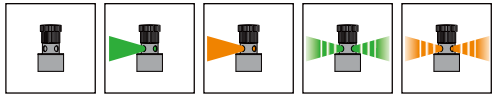


Figure 7 - Allowed distance operation between sensors

Transport and storage

- RAYCOH sensors are transported and stored in independent factory packaging at an ambient temperature of -40~85°C, a relative humidity of 35~95%, and no condensation to prevent the packaging from being affected by atmospheric precipitation.
- RAYCOH reminds you not to store the sensor in a room containing corrosive gases and other harmful impurities (acid, alkali).

Indicator status



LEDs on the sensor housing indicate the status of the sensor. (RAYCOH professionals remind: switch product overload protection green light, red light are on at the same time)

- off - the sensor is off;
- Green - object detected;
- Red light on - no object detected;
- Green light flashes - the sensing range of the object is set;
- Blinking red light - complete setup for no object sensing range.

RS48 digital output operating mode

Sensors with RS-485 digital output can be included in MODBUS industrial network.
Factory default network settings are used to communicate with sensors:

- ModBus RTU operating mode (8 data bits, 1 stop bit, no parity);
- Sensor address in ModBus network: 01, baud rate: 9600 (default)
- There are two sets of registers available for operation: reading and recording.

Read the registry			
Address	Data	Pattern	Unit
00H	Measure distance	HEX	0. 1 ㎜
01H	Internal temp	HEX	1 ° C
02H	Ultrasonic transit time	HEX	1 μ s

- The data in the read register is stored in HEX format. In order to read the result, the received value must be converted to decimal format.

To read registers, the 04 command must be used. For example:

- To read the measured distance, a command 01 04 00 00 00 01 31 ca must be sent. The sensor will respond to this request: 01 04 02 07 01 7A 8B. The number 701 in hexadecimal corresponds to the number 1793 in decimal. Therefore, the measured distance is 179.3 mm.
- To read the internal temperature, send the command 01 04 00 01 00 01 60 0A. The sensor will reply to the request: 01 04 02 00 17 B9 3A. The value 17 in hexadecimal format corresponds to the number 23 in decimal format. This means that the internal temperature of the sensor is 23°C.
- To read the time, the following command must be sent 01 04 00 02 00 01 90 0A. The sensor will reply to this request: 01 04 02 04 92 3A 5D. The hexadecimal value 492 corresponds to the decimal number 1170. Therefore, the propagation time of ultrasonic waves is 1170μs.

Record registration:		
Address	Data	Value
00h	External temperature command (0…100 0C)	0. . . 64
01h	Select temperature compensation type	0: Via internal temperature sensor 1: Via external temperature sensor
02h	ModBus network communication speed (240…256000)	01…0B
1Fh	Sensor address in the ModBus network (01...256)	0. . . 100

These write registers are used to configure the operation of the sensor.

- The operating mode and communication parameters for thermal compensation can be configured by the user. When running thermal compensation in a mode using an external temperature sensor, the reading from that sensor must be written to a register. To run thermal compensation in a mode using an external temperature sensor, the reading from that sensor must be written to register 00h and the appropriate operating mode selected in register 01h. Use command 06 to record.

Example using record registers:

- To log the temperature, send the following command 01 06 00 00 00 1E 09 C2. The sensor will reply with this command: 01 06 00 00 00 1E 09 C2. The value 1E in hexadecimal format corresponds to 30 in decimal format. This means that the sensor will store a value of 30 °C.
- To select temperature compensation mode via an external temperature sensor, send: 01 06 00 01 00 01 19 CA. The sensor will respond to this command: 01 06 00 01 00 01 19 CA. By default, the register is set to 0 - temperature compensation via built-in temperature sensor.
- To record the baud rate, send the following command: 01 06 00 02 00 09 E8 0C: The sensor will reply: 01 06 00 02 00 09 E8 0C. A value of 9 is equivalent to a baud rate of 115 200. There are 11 speeds to choose from.
- To write the sensor address, send the command: 01 06 00 1F 00 10 B9 C0. The sensor will reply: 01 06 00 1F 00 10 B9 C0. The value 10 is equivalent to the decimal number 16. Therefore, the sensor address in the ModBus network will become 16.

01:	2 400	05:	19 200	09:	115 200
02:	4 800	06:	38 400	0A:	128 000
03:	9 600	07:	56 000	0B:	256 000
04:	14 400	08:	57 600		

Influencing factors

The measurement accuracy and working range of the sensor are affected by the following factors:

- Object surface temperature. If the air temperature changes suddenly (for example, if you are measuring the distance to hot metal), the ultrasonic waves will be refracted at the junction of cold and warm air and will not return to the sensor at right angles.
- Object surface material. Porous and sound-absorbing objects (such as wool, foam rubber, foam, feathers) reflect ultrasonic waves poorly. Due to the damping effect of the sound waves, the working range of the transducer is reduced.
- environmental conditions. Air temperature and humidity, air velocity Air velocity and atmospheric pressure affect the speed and attenuation of sound waves.
- object position. In order to operate stably on a smooth surface, the position of the sensor should be perpendicular to the object surface, and the allowable deviation from the vertical plane should not exceed 3°.
- If the surface of the object is uneven (such as gravel, gravel), the perpendicularity of the sensor is allowed to deviate not more than 3°.
- Formation and attachment of foreign matter on the sensor PE. During sensor operation, water, dust, or other substances may form on the sensor surface, limiting sensor performance. RAYCOH recommends that you protect the sensor from external influences, clean the sensor or use a reflector (for mounting the sensor at an angle).

Transport and storage

- RAYCOH sensors are transported and stored in independent factory packaging at an ambient temperature of -40~85°C, a relative humidity of 35~95%, and no condensation to prevent the packaging from being affected by atmospheric precipitation.
- RAYCOH reminds you not to store the sensor in a room containing corrosive gases and other harmful impurities (acid, alkali).

Warranty

- Running Warranty - 12 months from date of sale*
- On the premise that the user abides by RAYCOH's transportation, storage, installation, operation and maintenance rules, if the sensor fails during the warranty period, RAYCOH promises to repair or provide technical support for free
- Conditions under which RAYCOH Enterprises terminates its warranty obligations: internal components showing signs of opening and handling, chemical or mechanical damage,* - dated on the delivery note (SDP) / promissory note