microsonic crm+25-IU-TC-E Ultrasonic Sensors with One Analogue Output Instruction Manual

Operating Manual
crm+ Ultrasonic Sensors with one analogue output
crm+25/IU/TC/E crm+35/IU/TC/E
crm+130/IU/TC/E crm+340/IU/TC/E
crm+600/IU/TC/E

Contents

Product description

- The crm+ sensor with one analogue output measures the distance to an object within the detection zone contactless. A signal proportional to distance is created according to the adjusted window limits of the analogue characteristic curve.
- The ultrasonic transducer surface of the crm+ sensors is laminated with a PEEK film. The transducer itself is sealed against the housing by a PTFE joint ring. This composition ensures a high resistance against many aggressive substances.
- All settings are done with two pushbuttons and a three-digit LED display (TouchControl).
- Three-colour LEDs indicate all operation conditions.
- Choosing between rising and falling output characteristic is possible.
- The sensors are adjustable manually via TouchControl or via Teach-in procedure.
- Useful additional functions are set in the Add-on menu.
- Using the LinkControl adapter (optional accessory) and the LinkControl software for Windows®, all Teach-in and additional sensor parameter settings can be optionally undertaken.
  The crm+ sensors have a blind zone in which distance measurement is not possible. The operating range indicates the distance of the sensor that can be applied with normal reflectors with sufficient function reserve. When using good reflectors, such as a calm water surface, the sensor can also be used up to its maximum range. Objects that strongly absorb (e.g. plastic foam) or diffusely reflect sound (e.g. pebble stones) can also reduce the defined operating range.

Safety Notes

- Read the operating instructions prior to start-up.
- Connection, installation and adjustment works may only be carried out by expert personnel.
- No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted
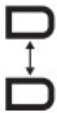
crm+25… crm+35… crm+130… crm+340… crm+600…	≥0.35 m ≥0.40 m ≥1.10 m ≥2.00 m ≥4.00 m	≥2.50 m ≥2.50 m ≥8.00 m ≥18.00 m ≥30.00 m

Fig. 1: Assembly distances, indicating synchronisation/multiplex

Multiplex mode

The Add-on-menu allows to assign an individual address »01« to »10« to each sensor connected via the Sync/Com-channel (Pin5). The sensors perform the ultrasonic measurement sequentially from low to high address.

Therefore any influence between the sensors is rejected.

The address »00« is reserved to synchronisation mode and deactivates the multiplex mode.

To use synchronised mode all sensors must be set to address »00«.

Installation

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M12 connector, see Fig. 2.
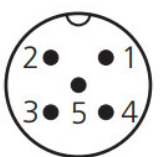
1		colour
3		brown
4		blue
2		black
5		white
		grey

Fig. 2: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

Start-up

- Connect the power supply.
- Set the parameters of the sensor manually via TouchControl (see Fig. 3 and Diagram 1)
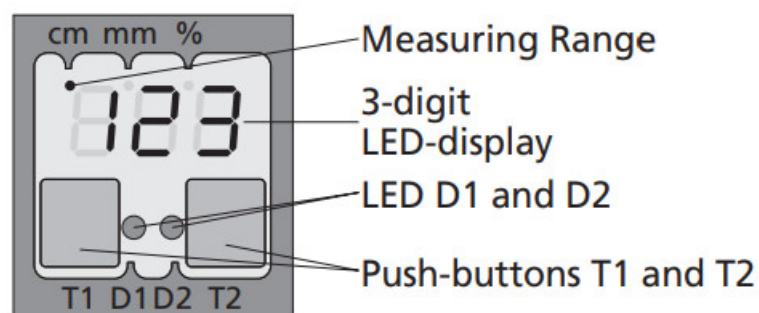- or use the Teach-in procedure to adjust the detect points (see Diagram 2).

Fig. 3: TouchControl/LED display

Fig. 3: TouchControl/LED display

Factory setting

crm+ sensors are delivered factory made with the following settings:

- Rising analogue characteristic
- Window limits for the analogue output set to blind zone and operating range
- Measurement range set to maximum range

Maintenance

crm+ sensors work maintenance free.
Small amounts of dirt on the surface do not influence function. Thick layers of dirt and caked-on dirt affect sensor function and therefore must be removed.

Notes

- As a result of the design the assembly of PEEK film and PTFE joint ring is not gas-proof.
- The chemical resistance has to be tested experimentally if necessary.
- crm+ sensors have internal temperature compensation. Because the sensors heat up on their own, the temperature compensation reaches its optimum working point after approx. 30 minutes of operation.
- If an object is within the set window limits of the analogue output, then LED D1 lights up green, if the object is outside the window limits, then LED D1 lights up red.
- The load put to the analogue output is detected automatically when turning supply voltage on.
- During normal mode operation, the measured distance value is dis- played on the LED-indicator in mm (up to 999 mm) or cm (from 100 cm). Scale switches automatically and is indicated by a point on top of the digits. Alternatively a percentage scale may be set in the add-on menu. In this connection 0 % and 100 % correspond to the set window limits of the analogue output.
- If no objects are placed within the detection zone the LED-indicator shows »— — —«.
- The sensor can be set to its factory setting, see Diagram 3.
- If no push-buttons are pressed for 20 seconds during parameter set- ting mode the made changes are stored and the sensor returns to normal operating mode.

Show parameters

- In normal operating mode shortly push T1. The LED display shows »PAr.«

Each time you tap push-button T1 the actual settings of the analogue output re shown.

Diagram 1: Set sensor parameters numerically using LED display

Diagram 2: Set sensor parameters via Teach-in procedure

Set window limits	Set rising/falling output characteristic curve
Place object at position ①.	
Press T1 until »IU« is shown.	Press T1 until countdown passed from »8 « to »0« and symbol for rising/falling characteristicis displayed.
123 Current measuring value	_ _ ¯ rising/falling characteristis
Place object at position ②.	_ _ _ falling/rising characteristis
456 Current measuring value	To change output characteristic press T1.
Press T1 until »End« is shown.	Press T1 and T2 simultaneously until »End« is displayed.
Normal operating mode	

Diagram 3: Key lock and factory setting

Activate/deactivate TouchControl

Activate/deactivate TouchControl	Reset to factory setting
Turn supply voltage OFF.	Turn supply voltage OFF.
While pressing T1 turn supply voltage ON.	While pressing T1 turn supply voltage ON.
Keep T1 pressed for about 3 s until »on« or »off« is displayed .	Keep T1 pressed for about 13 s until »rESEt« has passed through the display.

»on« or »off«

On/OFF

»off« or »on«

To activate or deactivate press T1.

Don´t press any push-button for 20 s.

Normal operating mode
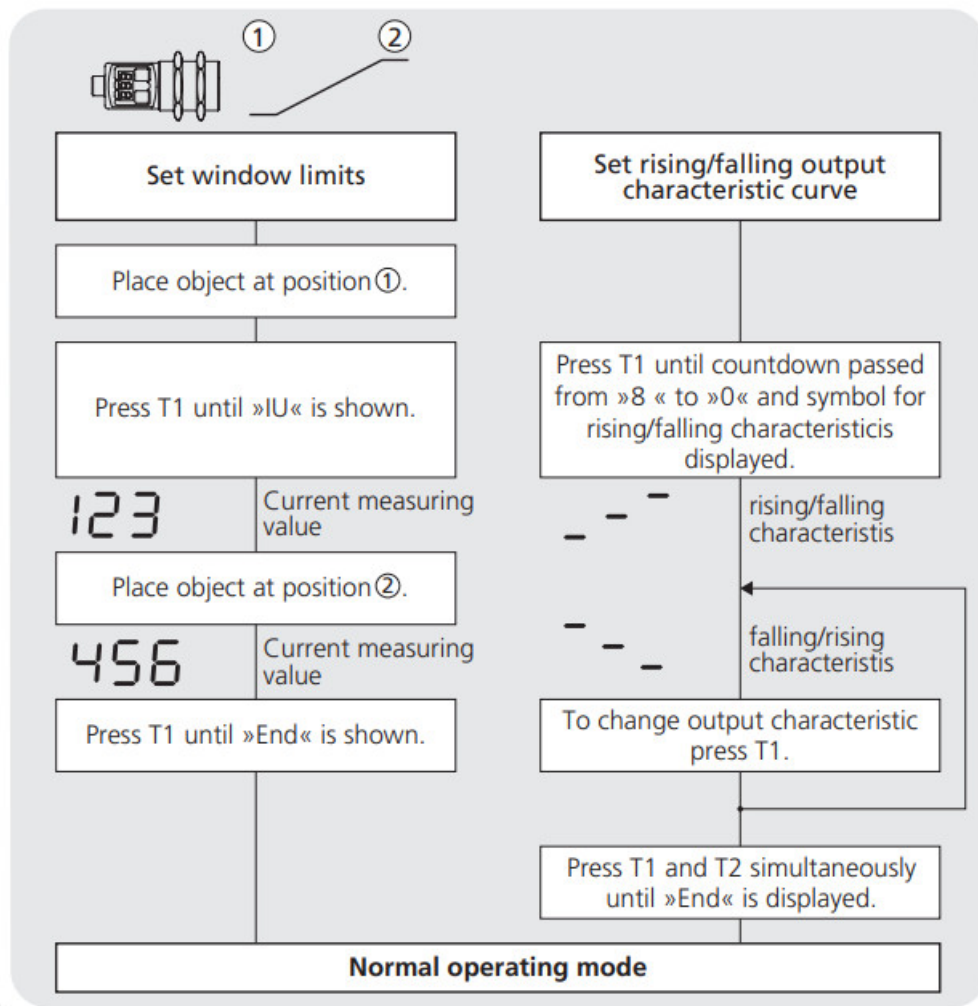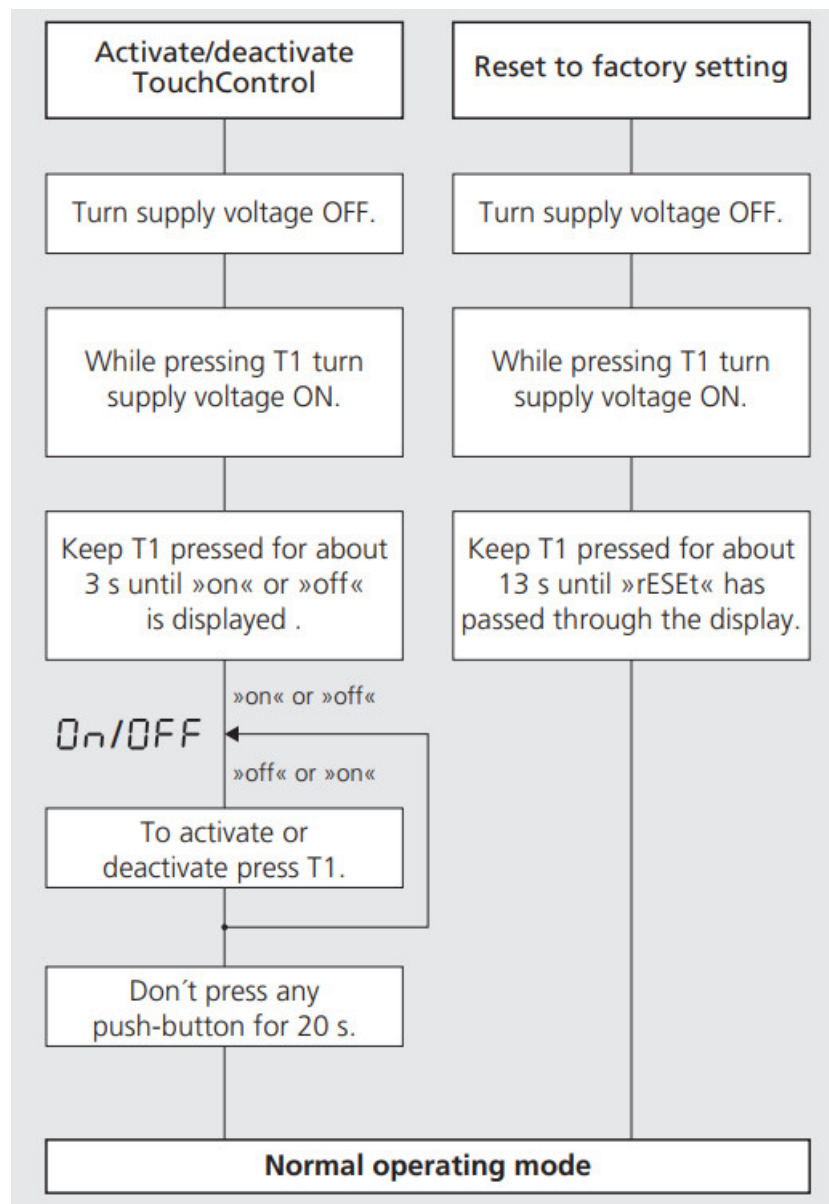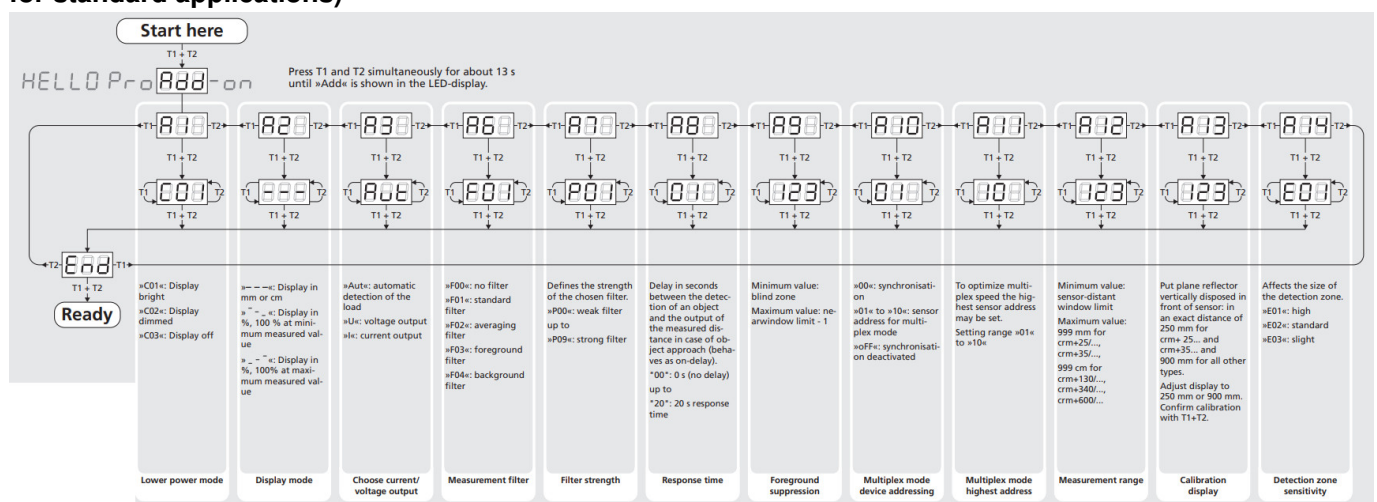
Diagram 4: Useful additional functions in Add-on menu (for experienced users only, settings not required for standard applications)

Start here

HELLO Pro Add-on — Press T1 and T2 simultaneously for about 13 s until »Add« is shown in the LED-display.

A1 → A2 → A3 → A6 → A7 → A8 → A9 → A10 → A11 → A12 → A13 → A14

	A1	A2	A3	A6	A7	A8	A9	A10	A11	A12	A13	A14
	C01	8-8-8	AoE	F01	P01	0-8-8	123	0-1-8	10	123	123	E01

End
Ready

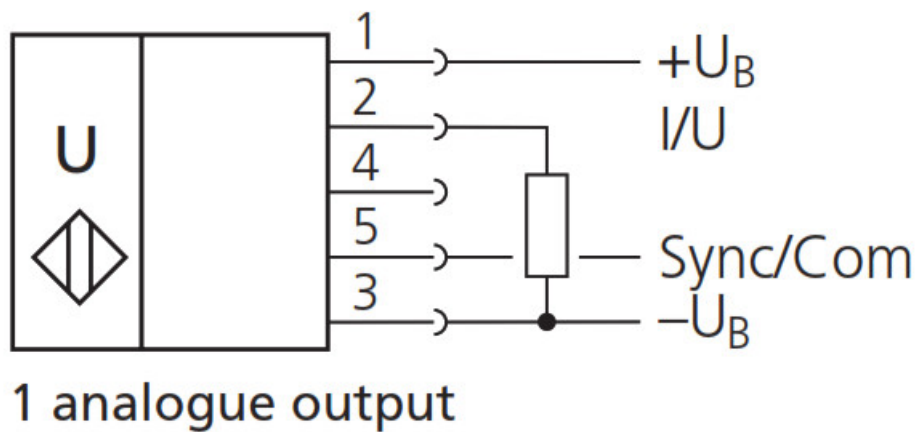| Lower power mode	Display mode	Choose current/voltage output	Measurement filter	Filter strength	Response time	Foreground suppression	Multiplex mode device addressing	Multiplex mode highest address	Measurement range	Calibration display	Detection zone sensitivity
»C01«: Display bright »C02«: Display dimmed »C03«: Display off	»– – –«: Display in mm or cm » ⁻ ⁻ «: Display in %, 100 % at minimum measured value » _ ⁻ ⁻ «: Display in %, 100% at maximum measured value	»Aut«: automatic detection of the load »U«: voltage output »I«: current output	»F00«: no filter »F01«: standard filter »F02«: averaging filter »F03«: foreground filter »F04«: background filter	Defines the strength of the chosen filter. »P00«: weak filter up to »P09«: strong filter	Delay in seconds between the detection of an object and the output of the measured distance in case of object approach (behaves as on-delay). *00*: 0 s (no delay) up to *20*: 20 s response time	Minimum value: blind zone Maximum value: nearwindow limit - 1	»00«: synchronisation »01« to »10«: sensor address for multiplex mode »oFF«: synchronisation deactivated	To optimize multiplex speed the highest sensor address may be set. Setting range »01« to »10«	Minimum value: sensor-distant window limit Maximum value: 999 mm for crm+25/..., crm+35/..., 999 cm for crm+130/..., crm+340/..., crm+600/...	Put plane reflector vertically disposed in front of sensor: in an exact distance of 250 mm for crm+ 25... and crm+35... and 900 mm for all other types. Adjust display to 250 mm or 900 mm. Confirm calibration with T1+T2.	Affects the size of the detection zone. »E01«: high »E02«: standard »E03«: slight

Note

Changes in the Add-on menu may impair the sensor function.
A6, A7, A8, A10, A11, A12 have influence on the response time of the sensor.

Technical data

1 analogue output

- blind zone
- operating range
- maximum range
- angle of beam spread
- transducer frequency
- resolution

detection zones
for different objects:
The dark grey areas represent the zone where it is easy to recognise the normal reflector (round bar).
This indicates the typical operating range of the sensors. The light grey areas represent the zone where a very large reflector – for instance a plate – can still be recognised.
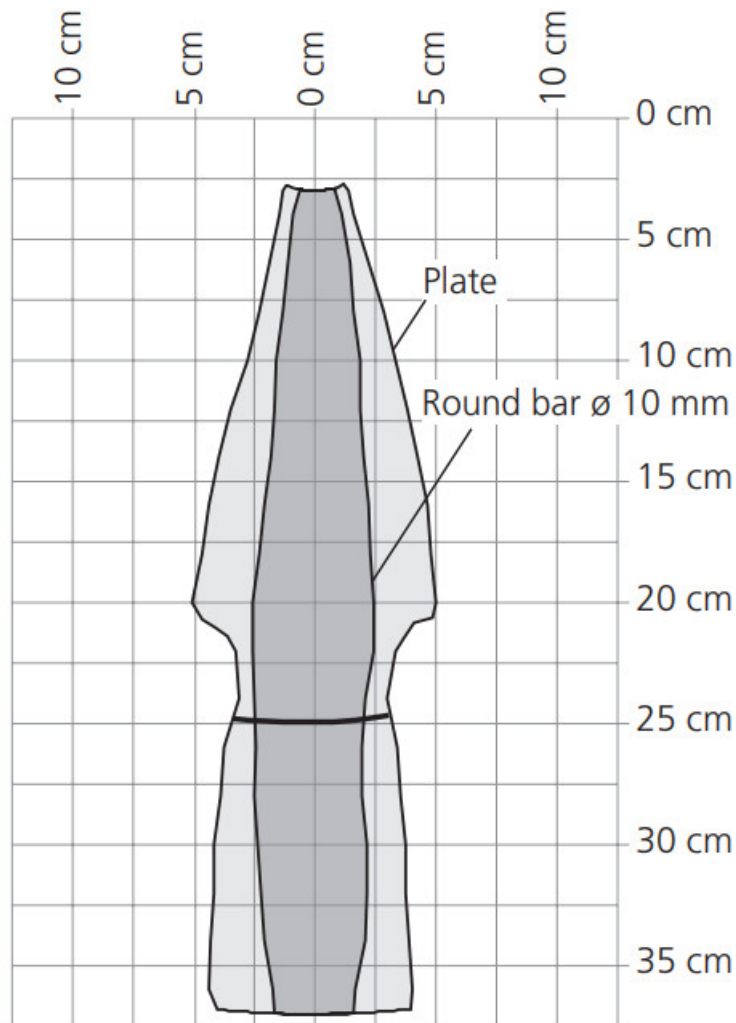The requirement here is for an optimum alignment to the sensor.
It is not possible to evaluate ultrasonic reflections outside this area.

crm+25…
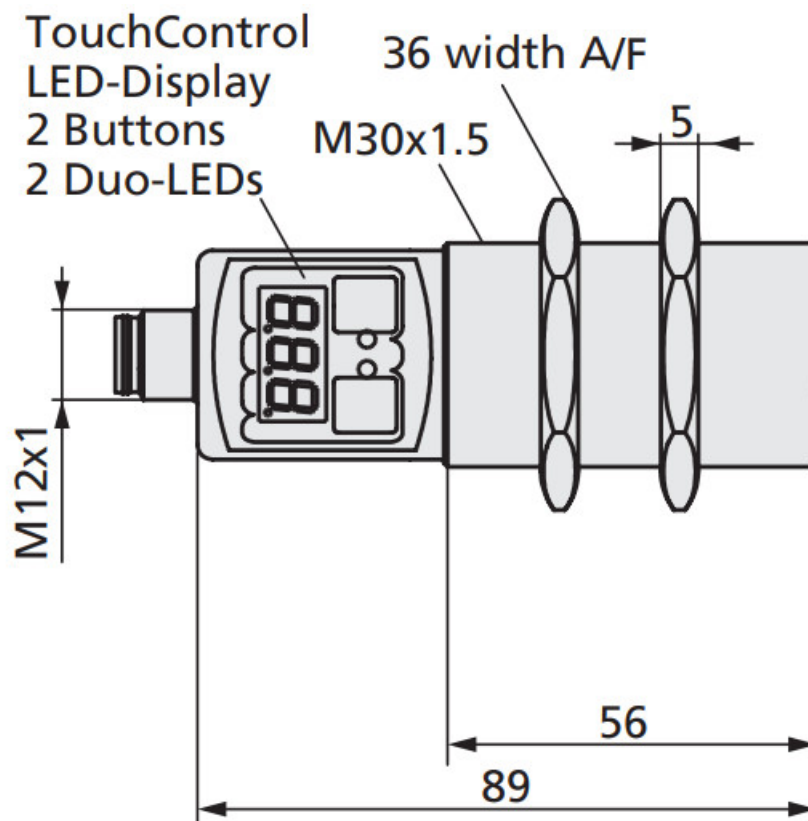
0 to 30 mm
250 mm
350 mm
see detection zone
320 kHz
0.025 to 0.10 mm, depending on the
window limits

Plate

Round bar ø 10 mm

±0.15 %
±1 % (Temperature drift internal compensated, may be deactivated 2) , 0.17%/K without compensation) 9 to 30 V
DC, short-circuit-proof, Class 2
±10 %
≤ 80 mA
Stainless steel 1.4571, plastic parts: PBT, TPU;
Ultrasonic transducer: PEEK film, PTFE epoxy resin with glass content
IP 67
EN 60947-5-2
5-pin initiator plug, PBT
2 push-buttons (TouchControl)
3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl
–25 to +70 °C
–40 to +85 °C
150 g
32 ms
<300 ms
crm+25/IU/TC/E
RL ≤ 100 Ω at 9 V ≤ UB ≤ 20 V
RL ≤ 500 Ω at UB ≥ 20 V
Rising/falling output characteristic

RL ≥ 100 kΩ at UB ≥ 15 V, short-circuit-proof
Rising/falling output characteristic

crm+35…

TouchControl
LED-Display
2 Buttons
2 Duo-LEDs

36 width A/F

M30x1.5

5

M12x1

51

84
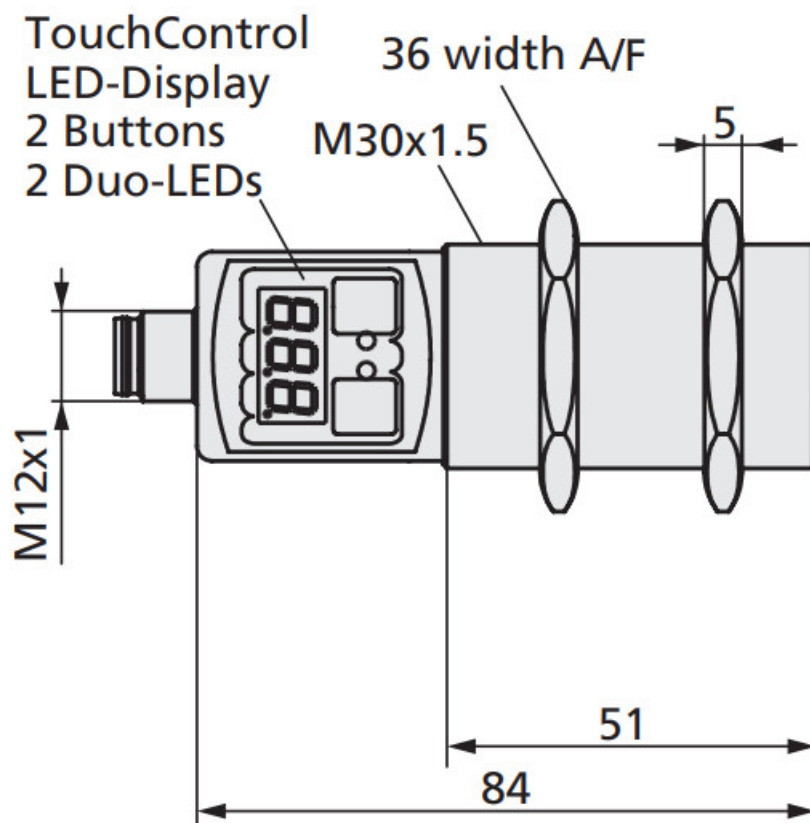
0 bis 85 mm
350 mm
600 mm
see detection zone
360 kHz
0.025 to 0.17 mm, depending on the
window limits
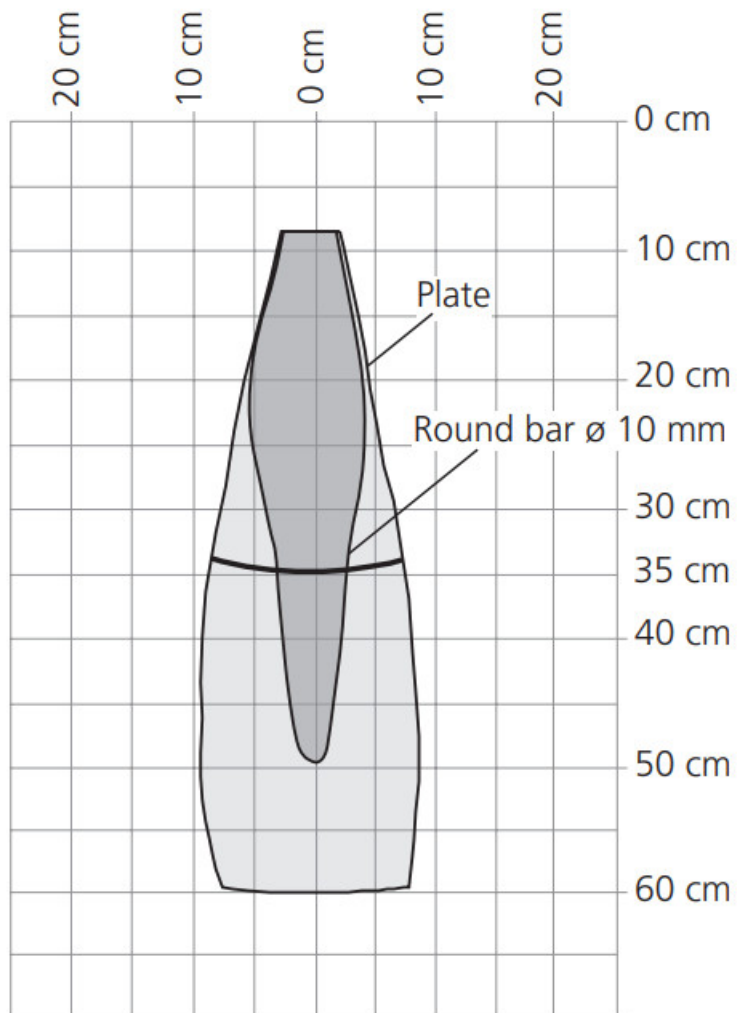
±0.15 %
±1 % (Temperature drift internal compensated, may be deactivated 2), 0.17%/K without compensation)
9 to 30 V DC, short-circuit-proof, Class 2
±10 %
≤ 80 mA
Stainless steel 1.4571, plastic parts: PBT, TPU;
Ultrasonic transducer: PEEK film, PTFE epoxy resin with glass content
IP 67
EN 60947-5-2
5-pin initiator plug, PBT
2 push-buttons (TouchControl)
3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl
−25 to +70 °C
−40 to +85 °C
150 g
64 ms
<300 ms

crm+35/IU/TC/E
RL ≤ 100 Ω at 9 V ≤ UB ≤ 20 V
RL ≤ 500 Ω at UB ≥ 20 V
Rising/falling output characteristic
RL ≥ 100 kΩ at UB ≥ 15 V, short-circuit-proof
Rising/falling output characteristic

crm+130…

TouchControl
LED-Display
2 Buttons
2 Duo-LEDs

36 width A/F

M30x1.5

5

M12x1

51

84
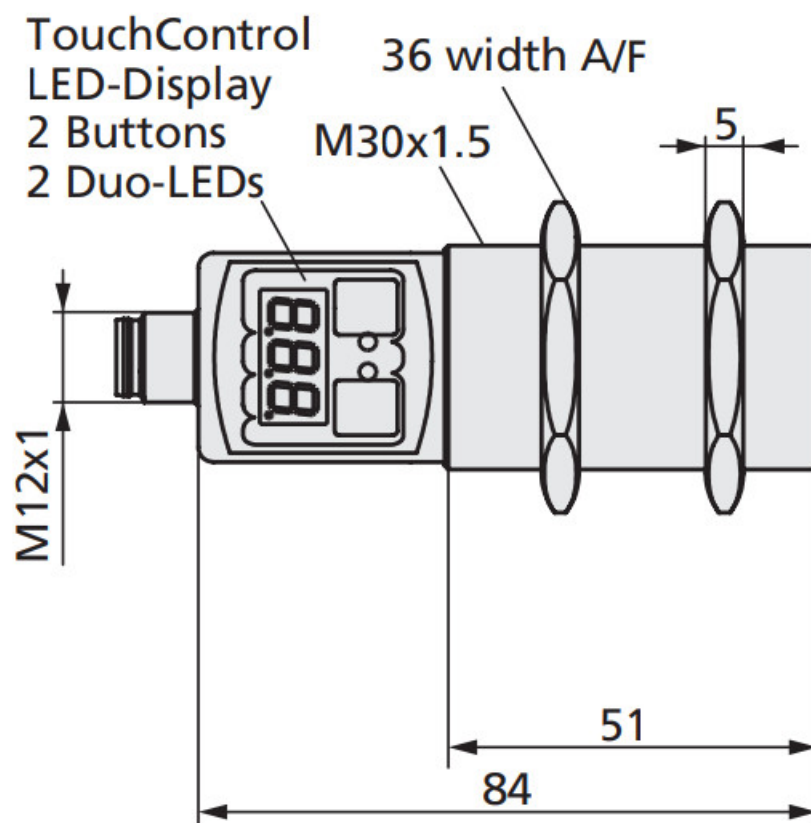
0 to 200 mm
1,300 mm
2,000 mm
see detection zone
200 kHz
0.18 to 0.57 mm, depending on the window limits
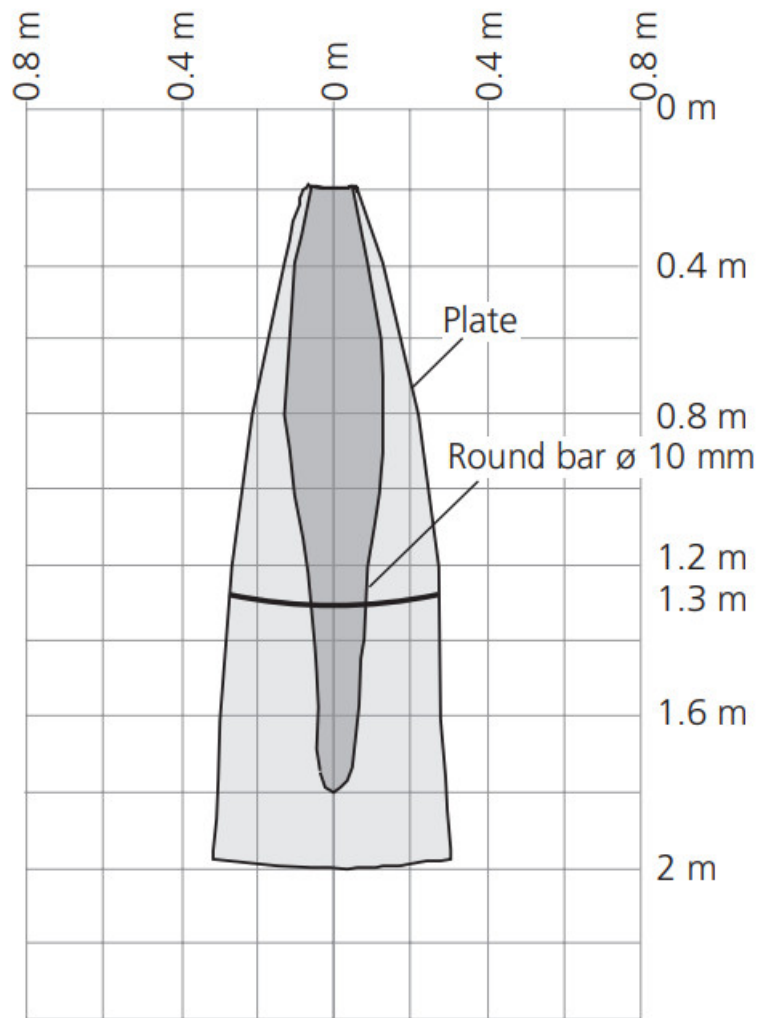
±0.15 %

±1 % (Temperature drift internal compensated, may be deactivated 2), 0.17%/K without compensation) 9 to 30 V DC, short-circuit-proof, Class 2

±10 %

≤ 80 mA

Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE epoxy resin with glass content

IP 67

EN 60947-5-2

5-pin initiator plug, PBT

2 push-buttons (TouchControl)

3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl

−25 to +70 °C

−40 to +85 °C

150 g

92 ms

<300 ms

crm+130/IU/TC/E

RL ≤ 100 Ω at 9 V ≤ UB ≤ 20 V

RL ≤ 500 Ω at UB ≥ 20 V

Rising/falling output characteristic

RL ≥ 100 kΩ at UB ≥ 15 V, short-circuit-proof

Rising/falling output characteristic

crm+340…

TouchControl
LED-Display
2 Buttons
2 Duo-LEDs

36 width A/F

M30x1.5

5

Ø47.5

M12x1

19.5

33

69

102
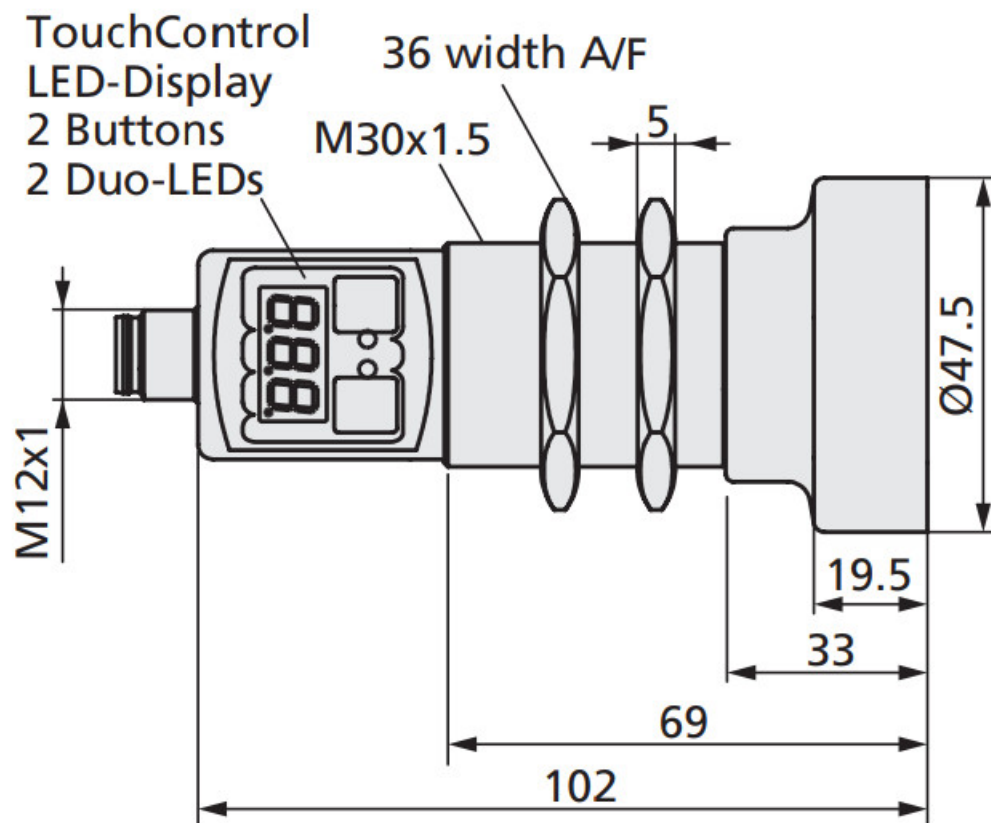
0 to 350 mm
3,400 mm
5,000 mm
see detection zone
120 kHz
0.18 to 1.5 mm, depending on the window limits
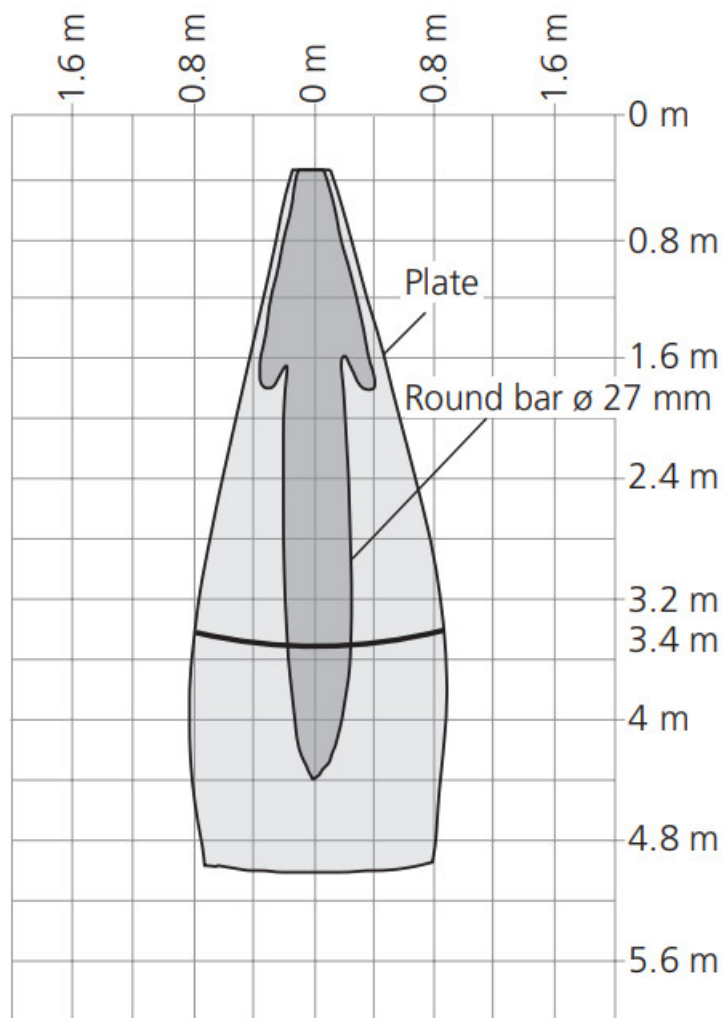
±1 % (Temperature drift internal compensated, may ±0.15 % be deactivated 2), 0.17%/K without compensation) 9 to 30 V DC, short-circuit-proof, Class 2
±10 %
≤ 80 mA
Stainless steel 1.4571, plastic parts: PBT, TPU;
Ultrasonic transducer: PEEK film, PTFE epoxy resin with glass content
IP 67
EN 60947-5-2
5-pin initiator plug, PBT
2 push-buttons (TouchControl)
3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl
−25 to +70 °C
−40 to +85 °C
210 g
172 ms
<380 ms

crm+340/IU/TC/E
RL ≤ 100 Ω at 9 V ≤ UB ≤ 20 V
RL ≤ 500 Ω at UB ≥ 20 V
Rising/falling output characteristic
RL ≥ 100 kΩ at UB ≥ 15 V, short-circuit-proof
Rising/falling output characteristic

crm+600…

TouchControl
LED-Display
2 Buttons
2 Duo-LEDs

36 width A/F

M30x1.5

M12x1

Ø65

5

22.5

36

72

105
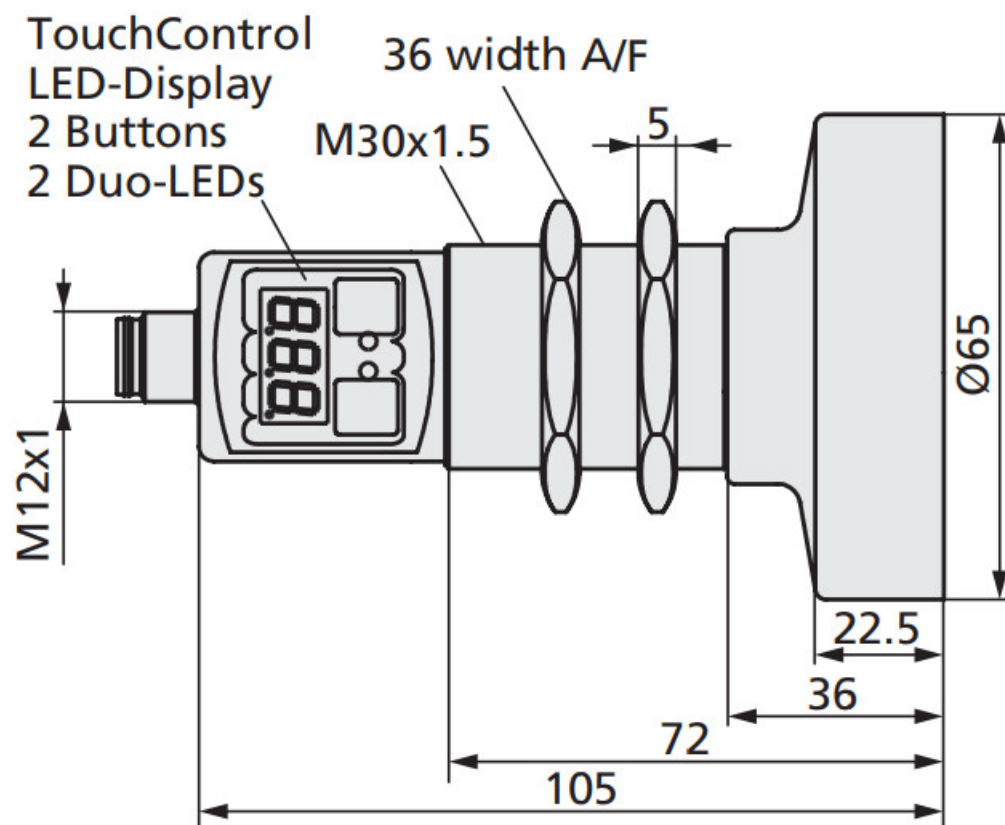
0 to 600 mm
6,000 mm
8,000 mm
see detection zone
80 kHz
0.18 to 2.4 mm, depending on the window limits
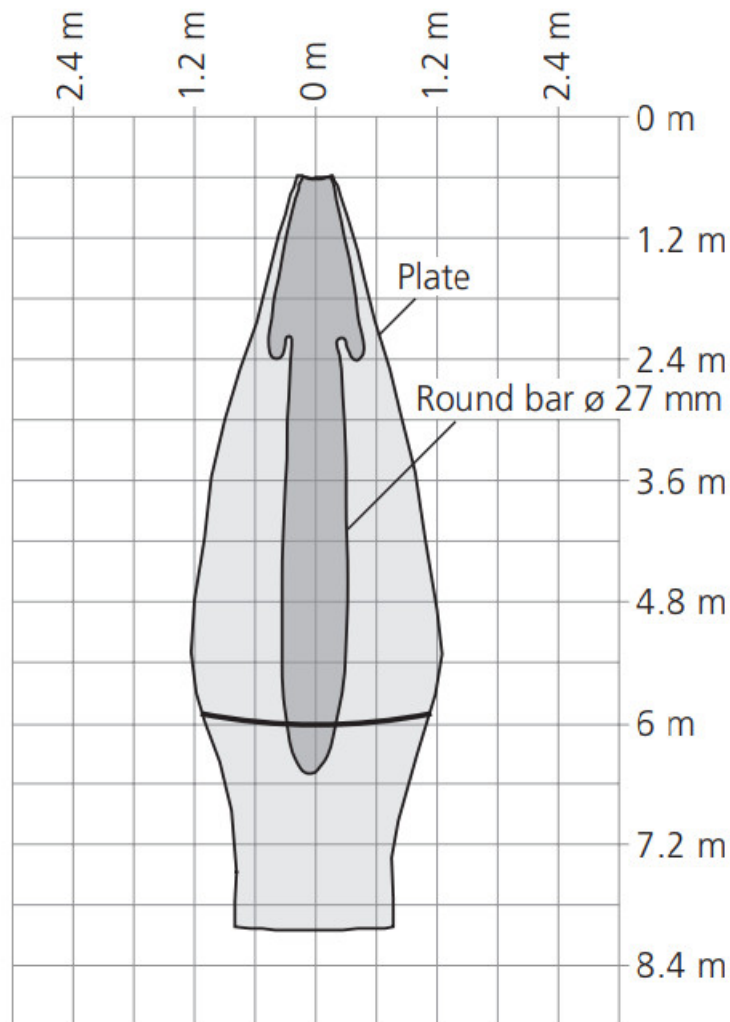
Plate

Round bar ø 27 mm

Columns: 2.4 m, 1.2 m, 0 m, 1.2 m, 2.4 m

Rows: 0 m, 1.2 m, 2.4 m, 3.6 m, 4.8 m, 6 m, 7.2 m, 8.4 m

±1 % (Temperature drift internal compensated, may ±0.15 % be deactivated 2), 0.17%/K without compensation) 9 to 30 V DC, short-circuit-proof, Class 2
±10 %
≤ 80 mA
Stainless steel 1.4571, plastic parts: PBT, TPU;
Ultrasonic transducer: PEEK film, PTFE epoxy resin with glass content
IP 67
EN 60947-5-2
5-pin initiator plug, PBT
2 push-buttons (TouchControl)
3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl
–25 to +70 °C
–40 to +85 °C
270 g
240 ms
<450 ms

crm+600/IU/TC/E
RL ≤ 100 Ω at 9 V ≤ UB ≤ 20 V
RL ≤ 500 Ω at UB ≥ 20 V
Rising/falling output characteristic
RL ≥ 100 kΩ at UB ≥ 15 V, short-circuit-proof
Rising/falling output characteristic

microsonic GmbH / Phoenixseestraße 7 / 44263 Dortmund / Germany / T +49 231 975151-0 / F +49 231 975151-51 / E info@microsonic.de / W microsonic.de
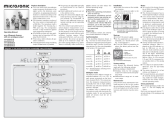The content of this document is subject to technical changes. Specifications in this document are presented in a

descriptive way only. They do not warrant any product features.

The proximity switches shall be used with a Listed (CYJV/7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

Documents / Resources

	microsonic crm+25-IU-TC-E Ultrasonic Sensors with One Analogue Output [pdf] Instruction Manual crm 25-IU-TC-E Ultrasonic Sensors with One Analogue Output, crm 25-IU-TC-E, Ultrasonic Sensors with One Analogue Output, Sensors with One Analogue Output, Analogue Output