microsonic mic-25/IU/M mic Ultrasonic Sensors with One Analogue Output Installation Guide

Contents

Operating Manual

mic Ultrasonic Sensors with one analogue output

mic-25/IU/M
mic-35/IU/M
mic-130/IU/M
mic-340/IU/M
mic-600/IU/M

Product description

- The mic-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 sensor automatically detects the load put to the analogue output and switches to current output or voltage output respectively.
- Choosing between rising and falling output characteristic is possible.
- The sensors are adjustable using Teach-in processes via the Comchannel (Pin 5).
- Using the LinkControl adapter (optional accessory) all sensor parameter settings can be adjusted by a Windows® Software.

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**

The mic-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.

Installation

➔ Assemble the sensor at the installation location.
➔ Plug in the connector cable to the M12 connector, see Fig. 1.

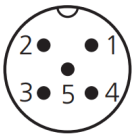
		**colour**
1	$+U_B$	brown
2	$-U_B$	blue
3	–	black
4	I/U	white
5	Com	grey

Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

Start-up

➔ Connect the power supply.
➔ Set sensor parameters via the Teach-in procedure (see Diagram 1)

Factory setting

mic-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
- Maximum detection range set to maximum range

Synchronisation

If the assembly distances shown in Fig. 2 for two or more sensors are exceeded the integrated synchronisation should be used. Connect Com-channels (pin 5 at the units receptable) of all sensors (10 maximum).

		
mic-25…	≥0.35 m	≥2.50 m
mic-35…	≥0.40 m	≥2.50 m
mic-130…	≥1.10 m	≥8.00 m
mic-340…	≥2.00 m	≥18.00 m
mic-600…	≥4.00 m	≥30.00 m

Fig. 2: Assembly distances, indicating synchronisation

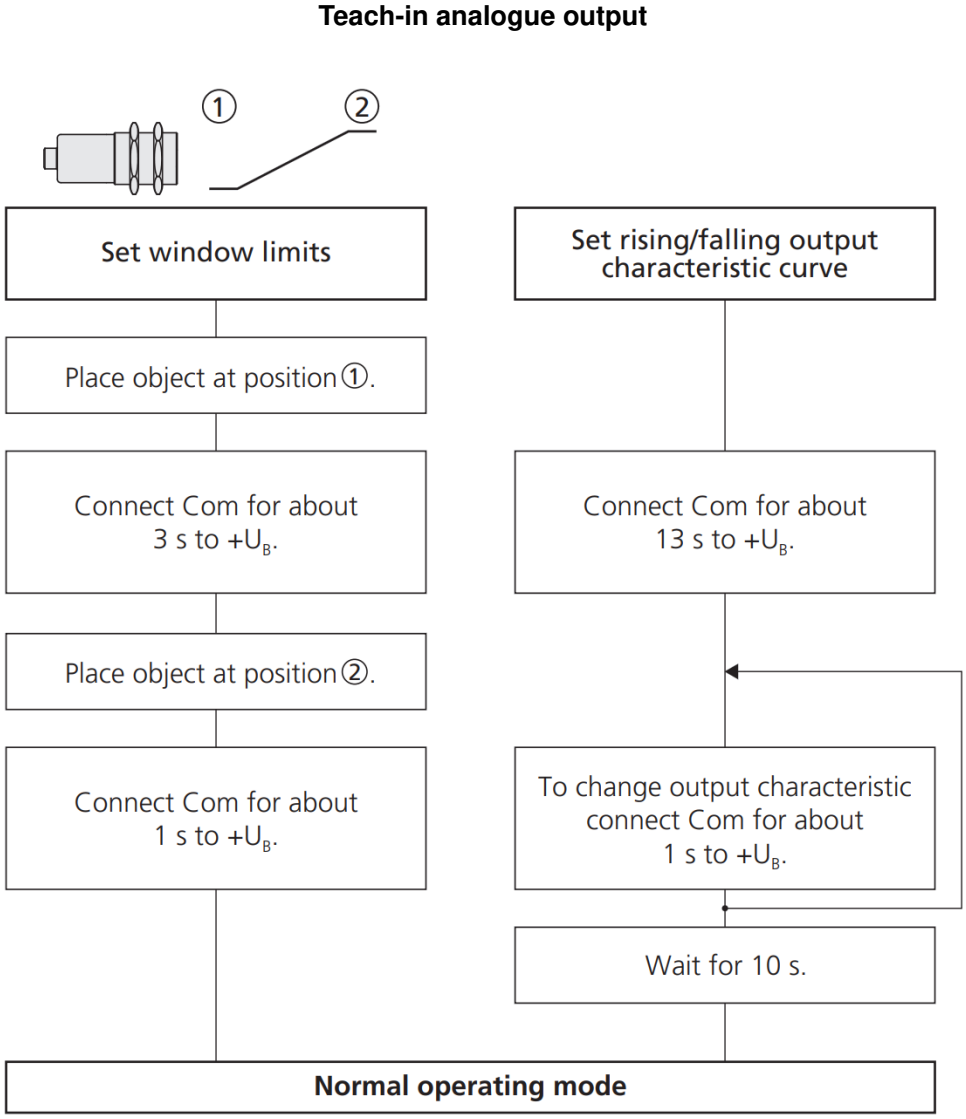
Maintenance

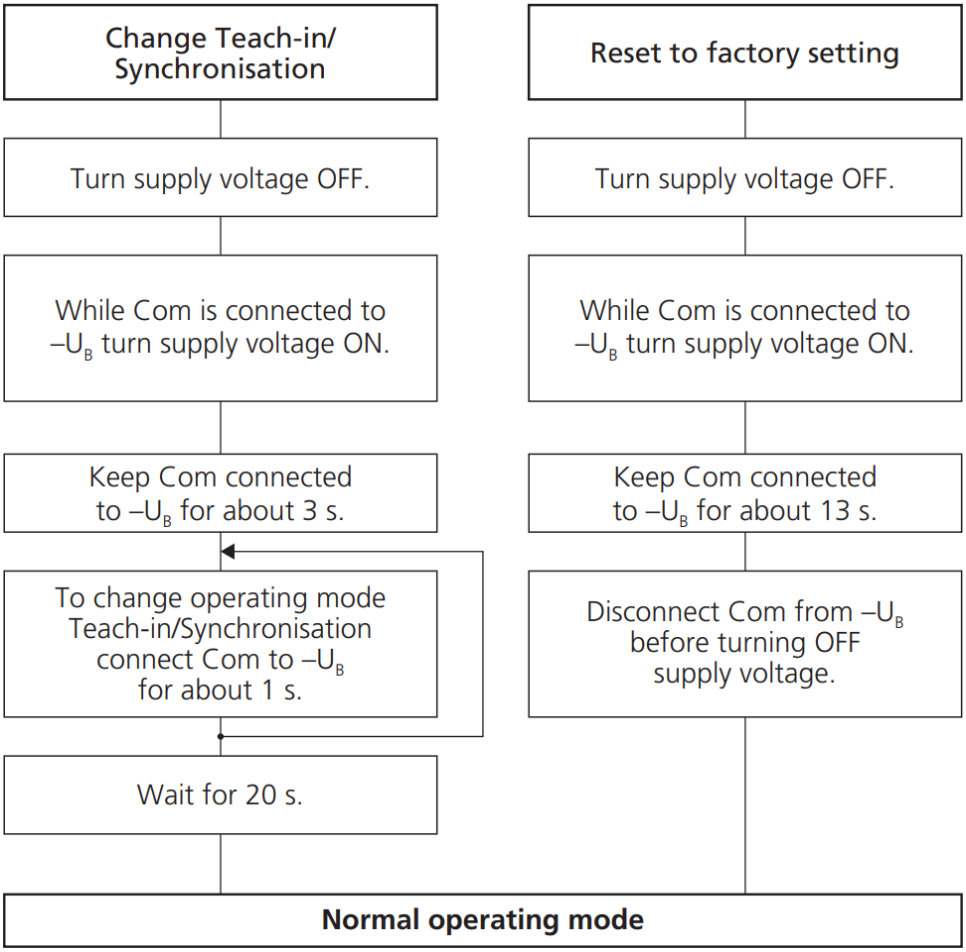
mic-sensors work maintenance free. Small amounts of dirt on the surface do not influence function. Thick layers of dirt and caked-on dirt affect sensor function and therefore must be removed.

Notes

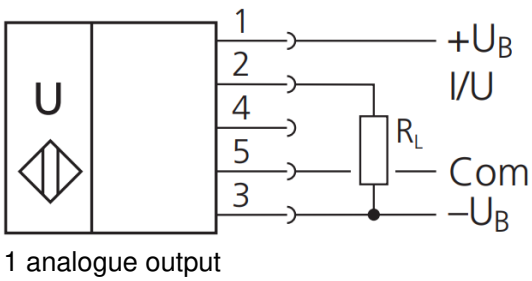
- mic-sensors have internal temperature compensation. Because the sensors heat up on their own, the temperature compensation reaches its optimum working point after approx. 30 minutes of operation.
- The load put to the analogue output is detected automatically when turning supply voltage on.
- If no signal is detected for 20 seconds during teach-in procedure the made changes are stored and the sensor returns to normal mode operation.
- You can reset the factory settings at any time, see Diagram 1.

Diagram 1: Set sensor parameters via Teach-in procedure



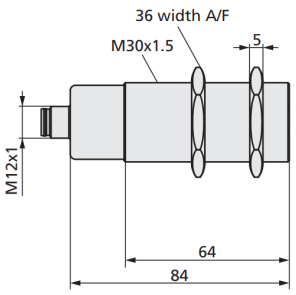


Technical data

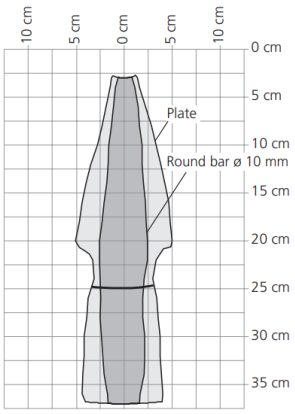


1 analogue output

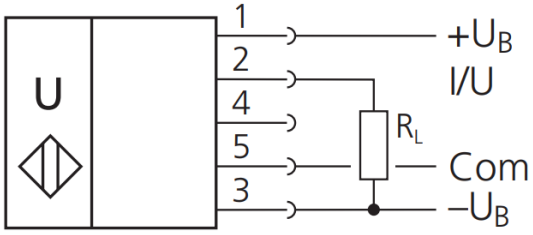
mic-25…



blind zone	0 to 30 mm
operating range	250 mm
maximum range	350 mm
angle of beam spread	see detection zone

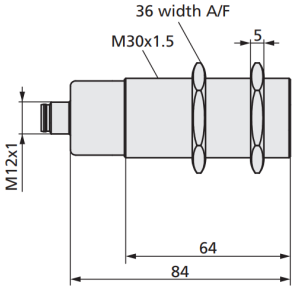
transducer frequency	320 kHz
resolution	0.025 mm to 0.10 mm, depending on the analogue window
detection zones for different objects: The dark grey areas represent the zone where it is easy to recognise the normal reflector (round bar). This indicates the typical operating range of the sensors. The light 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.	
reproducibility	±0.15 %
accuracy	±1 % (Temperature drift internal compensated, may be deactivated [1)], 0.17%/K without compensation)
operating voltage U_B	9 to 30 V DC, short-circuit-proof, Class 2
voltage ripple	±10 %
no-load supply current	≤55 mA
housing	Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection to EN 60529	IP 67
norm conformity	EN 60947-5-2
type of connection	5-pin initiator plug, Brass, nickel-plated
controls	via Com-channel

programmable	via Teach-in and LinkControl
operating temperature	–25 to +70 °C
storage temperature	–40 to +85 °C
weight	200 g
response time [1)]	32 ms
time delay before availability [1)]	<390 ms
order No.	**mic-25/IU/M**
Current output 4 to 20 mA	R_L ≤ 100 Ω at 9 V ≤ U_B ≤ 20 V; R_L ≤ 500 Ω at U_B ≥ 20 V Rising/falling output characteristic
Voltage output 0 to 10 V	R_L ≥ 100 kΩ at U_B ≥ 15 V, short-circuit-proof Rising/falling output characteristic

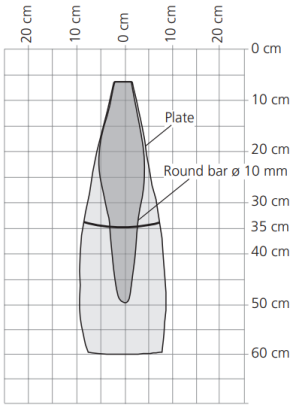


1 analogue output

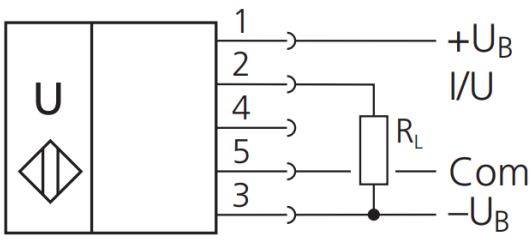
mic-35…



blind zone	0 to 65 mm

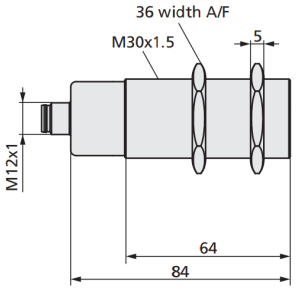
operating range	350 mm
maximum range	600 mm
angle of beam spread	see detection zone
transducer frequency	400 kHz
resolution	0.025 mm to 0.17 mm, depending on the analogue window
detection zones for different objects: The dark grey areas represent the zone where it is easy to recognise the normal reflector (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.	
reproducibility	±0.15 %
accuracy	±1 % (Temperature drift internal compensated, may be deactivated [1)], 0.17%/K without compensation)
operating voltage U_B	9 to 30 V DC, short-circuit-proof, Class 2
voltage ripple	±10 %
no-load supply current	≤55 mA
housing	Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection to EN 60529	IP 67

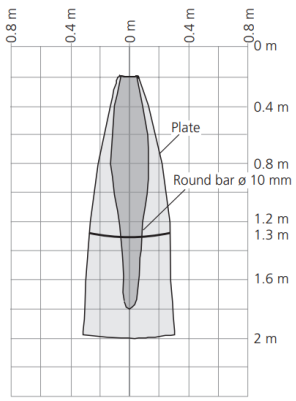
norm conformity	EN 60947-5-2
type of connection	5-pin initiator plug, Brass, nickel-plated
controls	via Com-channel
programmable	via Teach-in and LinkControl
operating temperature	–25 to +70 °C
storage temperature	–40 to +85 °C
weight	200 g
response time [1)]	64 ms
time delay before availability [1)]	<420 ms
order No.	**mic-35/IU/M**
Current output 4 to 20 mA	R_L ≤ 100 Ω at 9 V ≤ U_B ≤ 20 V; R_L ≤ 500 Ω at U_B ≥ 20 V Rising/falling output characteristic
Voltage output 0 to 10 V	R_L ≥ 100 kΩ at U_B ≥ 15 V, short-circuit-proof Rising/falling output characteristic



1 analogue output

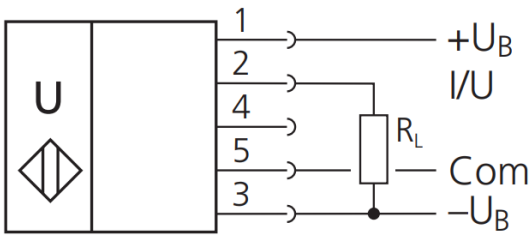
mic-130…



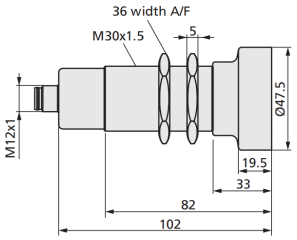
blind zone	0 to 200 mm
operating range	1,300 mm
maximum range	2,000 mm
angle of beam spread	see detection zone
transducer frequency	200 kHz
resolution	0.18 mm to 0.57 mm, d epending on the analog ue window
detection zones for different objects: The dark grey areas represent the zone where it is easy to recognise the normal refle ctor (round bar). This indicates the typical operating range of the sensors. The light g rey 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.	
reproducibility	±0.15 %
accuracy	±1 % (Temperature drift internal compensated, may be deactivated [1)], 0.17%/K without compe nsation)
operating voltage U_B	9 to 30 V DC, short-circ uit-proof, Class 2
voltage ripple	±10 %
no-load supply current	≤55 mA
housing	Brass sleeve, nickel-pla ted, plastic parts: PBT; Ultrasonic transducer: p olyurethane foam, epox y resin with glass conte nt

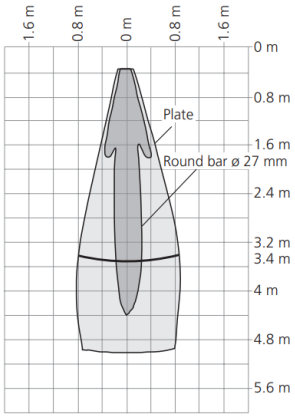
class of protection to EN 60529	IP 67
norm conformity	EN 60947-5-2
type of connection	5-pin initiator plug, Bras, nickel-plated
controls	via Com-channel
programmable	via Teach-in and LinkControl
operating temperature	–25 to +70 °C
storage temperature	–40 to +85 °C
weight	200 g
response time [1)]	92 ms
time delay before availability [1)]	<440 ms
order No.	**mic-130/IU/M**
Current output 4 to 20 mA	$R_L \leq 100\ \Omega$ at 9 V ≤ U_B ≤ 20 V; $R_L \leq 500\ \Omega$ at $U_B \geq 20$ V Rising/falling output characteristic
Voltage output 0 to 10 V	$R_L \geq 100\ k\Omega$ at $U_B \geq 15$ V, short-circuit-proof Rising/falling output characteristic

	mic-340…

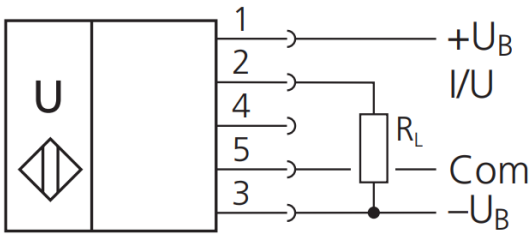
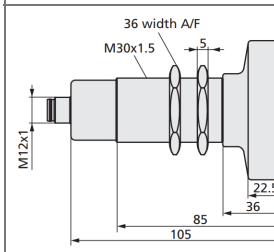
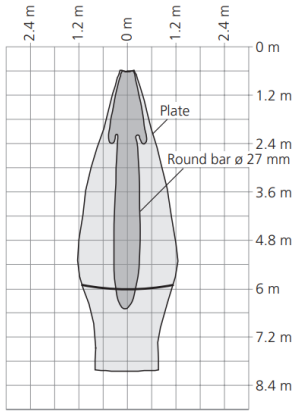


1 analogue output



blind zone	0 to 350 mm
operating range	3,400 mm
maximum range	5,000 mm
angle of beam spread	see detection zone
transducer frequency	120 kHz
resolution	0.18 mm to 1.5 mm, de pending on the analogu e window
detection zones for different objects: The dark grey areas represent the zone where it is easy to recognise the normal refle ctor (round bar). This indicates the typical operating range of the sensors. The light g rey 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.	
reproducibility	±0.15 %
accuracy	±1 % (Temperature drift internal compensated, may be deactivated [1)], 0.17%/K without compe nsation)
operating voltage U_B	9 to 30 V DC, short-circ uit-proof, Class 2
voltage ripple	±10 %
no-load supply current	≤55 mA

housing	Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection to EN 60529	IP 67
norm conformity	EN 60947-5-2
type of connection	5-pin initiator plug, Brass, nickel-plated
controls	via Com-channel
programmable	via Teach-in and LinkControl
operating temperature	–25 to +70 °C
storage temperature	–40 to +85 °C
weight	260 g
response time [1)]	172 ms
time delay before availability [1)]	<530 ms
order No.	**mic-340/IU/M**
Current output 4 to 20 mA	$R_L \leq 100\ \Omega$ at $9\ V \leq U_B \leq 20\ V$; $R_L \leq 500\ \Omega$ at $U_B \geq 20\ V$ Rising/falling output characteristic
Voltage output 0 to 10 V	$R_L \geq 100\ k\Omega$ at $U_B \geq 15\ V$, short-circuit-proof Rising/falling output characteristic

 1 analogue output	**mic-600…** 
blind zone	0 to 600 mm
operating range	6,000 mm
maximum range	8,000 mm
angle of beam spread	see detection zone
transducer frequency	80 kHz
resolution	0.18 mm to 2.4 mm, de pending on the analogu e window
detection zones for different objects: The dark grey areas represent the zone where it is easy to recognise the normal refle ctor (round bar). This indicates the typical operating range of the sensors. The light g rey 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.	
reproducibility	±0.15 %
accuracy	±1 % (Temperature drift internal compensated, may be deactivated [1)], 0.17%/K without compe nsation)
operating voltage U_B	9 to 30 V DC, short-circ uit-proof, Class 2

voltage ripple	±10 %
no-load supply current	≤55 mA
housing	Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection to EN 60529	IP 67
norm conformity	EN 60947-5-2
type of connection	5-pin initiator plug, Brass, nickel-plated
controls	via Com-channel
programmable	via Teach-in and LinkControl
operating temperature	–25 to +70 °C
storage temperature	–40 to +85 °C
weight	320 g
response time [1)]	240 ms
time delay before availability [1)]	<600 ms
order No.	**mic-600/IU/M**
Current output 4 to 20 mA	$R_L \leq 100\ \Omega$ at 9 V ≤ U_B ≤ 20 V; $R_L \leq 500\ \Omega$ at $U_B \geq 20$ V Rising/falling output characteristic

Voltage output 0 to 10 V	$R_L \geq 100\ k\Omega$ at $U_B \geq 15$ V, short-circuit-proof Rising/falling output characteristic

[1] Can be programmed via LinkControl.

microsonic GmbH / **Phoenixseestraße 7** / **44263 Dortmund** / **Germany** / **T** +49 231 975151-0 / **F** +49 231 975151-51 / **E** info@microsonic.de / **W** microsonic.de

c UL us LISTED

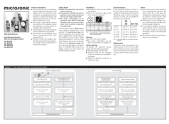
Enclosure Type 1
For use only in industrial machinery NFPA 79 applications.

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.

UKCA CE 2014/30/EU

MV-DO-042098-801569

Documents / Resources

	microsonic mic-25/IU/M mic Ultrasonic Sensors with One Analogue Output [pdf] Installation Guide mic-25 IU M mic Ultrasonic Sensors with One Analogue Output, mic-25 IU M mic, Ultrasonic Sensors with One Analogue Output, One Analogue Output, Analogue Output