Adjust switching distance on mix-xxx/D:

1. Press pushbuttons T1 and T2 simultaneously for 3 sec until the LED flashes yellow

2. Set switching distance (✱):
   T1 increases switching distance
   T2 decreases switching distance
   (if an object is detected within the actual switching distance, the LED is illuminated permanently yellow; otherwise it flashes yellow)

3. Do not press any button for 20 sec: the programmed switching distance is stored permanently within an EEPROM;
   mic-xxx/D returns to its normal operating mode

Adjust switching distance on mix-xxx/DD:

1. Press pushbuttons T1 and T2 simultaneously for 3 sec until LEDs D1 and D2 flash yellow.

2. Release buttons:
   the LEDs flash vice versa.

3. Select switching output:
   T1 chooses ouput S1
   (D1 yellow, D2 off)
   T2 chooses ouput S2
   (D2 yellow, D1 off)

4. Set switching distance (✱):
   T1 increases switching distance
   T2 decreases switching distance
   (if an object is detected within the actual switching distance, the LED is illuminated permanently yellow; otherwise it flashes yellow).

5. Do not press any button for 20 sec: the programmed switching distance is stored permanently within an EEPROM;
   mic-xxx/DD returns to its normal operating mode.

Reapeat step 1-5 for each switching output.

Select switching function on mix-xxx/D and mic-xxx/DD:

1. Press pushbuttons T1 and T2 simultaneously for 10 sec until yellow flashing stops and both LEDs are on permanently (only 1 LED on /D).

2. Release buttons:
   LED flashes green: n.c.
   LED flashes red: n.o.
   (/DD: LED D1 indicates the function of switching output S1, D2 the one of S2).

3. Button T1 toggles the function of S1, button T2 toggles the function of S2.

4. Do not press any button for 20 sec: the programmed switching characteristic is stored permanently in an EEPROM;
   the sensor returns to its normal operating mode

Remark:
In normal operating mode red LEDs indicate that the corresponding switching distance is reached - independent of the selected switching characteristic.

Adjust window margins on mic-xxx/UI:

Hint: Set the inner margin (the margin near to the sensor) first, then set the outer margin. Please take into consideration, that the margins cannot be set closer then a minimum defference of 20 to 50 mm - depending on the sensortype

1. Press pushbuttons T1 and T2 simultaneously for 3 sec until both LEDs flash yellow.

2. Relaese buttons:
   The LEDs flash vice versa.

3. Press button T2 to select inner margin
   (D2 yellow, D1 off)
   Press button T1 te select outer margin
   (D1 yellow, D2 off).

4. Move margin (✱):
   T1 increases distance
   T2 decreases sistance

5. Do not press any button for 20 sec:
   The programmed margin will be stored permanently in an EEPROM;
   mic-xxx/IU returns to its normal operating mode

Repeat step 1-5 for each margin

Selec output characteristic on mic-xxx/IU:

1. Press pushbuttons T1 and T2 simultaneously for 10 sec until flashing stops and both LEDs D1 and D2 are illuminated yellow.

2. Release buttons:
   LEDs flash green: falling output characteristic (20-4 mA / 10-0 V)
   LEDs flash red: rising output characteristic (4-20 mA / 0-10 V)

3. T1 chooses falling output characteristic
   T2 chooses rising output characteristic

4. Do not press any button for 20 sec:
   The programmed characteristic will be stored permanently within an EEPROM;
   mic-xxx/IU returns to its normal operating mode.

Remark:
If an object is detected within the margins, both LEDs are illuminated green. If the distance of an object falls below the inner margin, LED D2 turns red. If no object is detected or the object is off the outer margin, LED D1 turns red.

When switching on the power supply mic-xxx/IU checks the load resistance, which is connected to the analogue output. It automatically decides which output mode to choose (voltage or current).

✱Quick adjust on mic-xxx/D/DD/IU:

If the pushbuttons T1 and T2 are pressed simultaneously, the sensor saves the actual distance as the switching distance respectivly the analogue window margin in to the EEPROM; the sensor returns to the normal operating mode immedeiately (learning function).

Pinning of plug connector:

All mic-sensors come with a 5-pin plug connector Binder Series 713

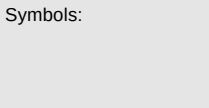
The pinning of the plug and the cable colours of the KSTx connector cables (to be ordered separately) can be found in the following table:

pin-nr.	/DD	/D	/IU	kleur
1	+UB	+UB	+UB	brown
2	S1	-	analogue	white
3	-UB	-UB	-UB	blue
4	S2	S	-	black
5	Contr.	Contr.	Contr.	grey

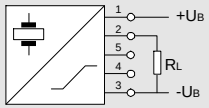
View onto plug (male):

Common electical and mechanical data	
Supply voltage U_B: Voltage ripple: Current consumption:	12 to 30 VDC, reverse polarity protected ± 10 % ≤ 60 mA (≤ 70 mA mic-xxx/IU)
Switching output mic-xxx/D and /DD:	PNP, U_B -2 V, I_{max} - 500 mA Protected against short circuit and reverse polarity, default function set to n.o.
Analogue output: mic-xxx/IU:	Current output 4 - 20 mA (R_L = ≤ 500 Ω, U_B ≥ 20 V; R_L ≤ 100 Ω, U_B ≥ 12V) Voltage output 0 - 10 V (R_L = ≥ 100 kΩ, U_B ≥ 15 V) Automatic selection by measuring R_L
Housing:	Bass-pipe, nickelized, (opt. stainless steel), thread M30*1,5
Control Elements (TouchControl):	2 pushbuttons, accessible aside the housing
Display Elements:	2 three-colour LED's (1 LED on mic-xxx/D) green: under operation red: distance below trip point or object outside selected windows margins yellow (on or blinking): programming
Operating temperature: Storage temperature: Connector type::	-20°C to +70°C -40°C to +85°C Universal plug Binder Seris 713 material PBTP

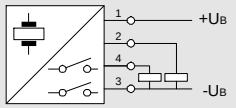
Symbols:



mic-xxx/D/HV/M30



mic-xxx/IU/HV/M30



mic-xxx/DD/HV/M30

- **0,36 mm-resolution**
- **5 different detection ranges (max. values from 30 to 6000 mm)**
- **3 outputs available**
  - **1 PNP switching outputs**
  - **2 PNP switching outputs**
  - **analogue output 4 - 20 mA en 0 - 10V**
- **N.O. en N.C. selectable**
- **Automatisc selection of voltage or current output**
- **Touchcontrol (settings by pushbuttons)**
- **Protects against short circuit and reverse polarity**

Ultrasonic proximity switches of the **mic**-family work on the principle of the echo runtime measurement.

The sensor emits short burst impulses. When hitting a target, these bursts are rerlected and returned to the sensor. From the runtime between sending and receiving the sensor then calculates the distance to the detected object.

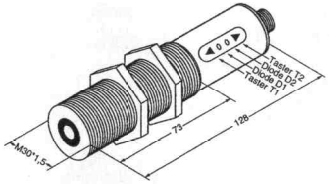
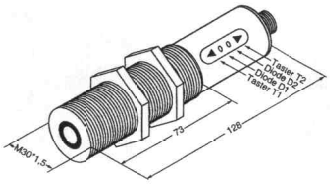
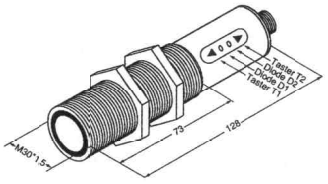
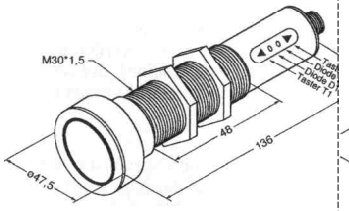
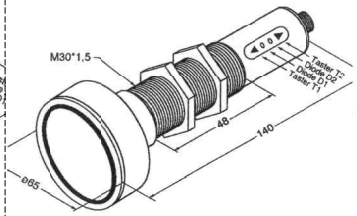
Depending on the output type the measured distance is either transformed into an analogue signal or the switching output is set, when the distance has fallen below the selected trip distance.
All adjestments are made via 2 push-buttons which are located aside the housing (TouchControl).
Three-colour-LED's indicate all possible operating states.

On devices with switching output the output function can be set to normally open (n.o.) or normally closed (n.c.)

The analogue signal of **mic**-sensors shows a very high accuracy and a minimal linearity error.

The output characteristic of the analogue signal can be set to rising or falling values, when an object approaches.

mic- Ultrasonic proximity switches - Overview

Operating range	30 - 250 mm	60 - 350 mm	200 - 1300 mm	350 - 3400 mm	800 - 6000 mm
					
1 PNP switch output 2 PNP switch outputs Analogue output	mic-25/D/HV/M30 mic-25/DD/HV/M30 mic-25/IU/HV/M30	mic-31/D/HV/M30 mic-31/DD/HV/M30 mic-31/IU/HV/M30	mic-101/D/HV/M30 mic-101/DD/HV/M30 mic-101/IU/HV/M30	mic-301/D/HV/M30 mic-301/DD/HV/M30 mic-301/IU/HV/M30	mic-601/D/HV/M30 mic-601/DD/HV/M30 mic-601/IU/HV/M30
Housing dimensions					
Blind zone (software reduction)	0 mm to 30 mm	0 mm to 60 mm	0 mm to 200 mm	0 mm to 350 mm	0 mm to 800 mm
Angle of beam spread	See detection area	See detection area	See detection area	See detection area	See detection area
Transducer frequency	ca. 320kHz	ca 400kHz	ca 200kHz	ca 120kHz	ca 80kHz
Resolution, sampling rate	0,36 mm	0,36 mm	0,36 mm	1 mm	1 mm
Reproducibility (constant environment)	± 1 mm	± 1 mm	± 2 mm	± 3 mm	± 4 mm
Temperature drift	0,17% / K	0,17% / K	0,17% / K	0,17% / K	0,17% / K
Switchinghysteresis mic-xxx/D en /DD	2,5 mm	5 mm	20 mm	50 mm	100 mm
Switchingfrequecy mic-xxx/D en /DD	14 Hz	8 Hz	7 Hz	4 Hz	2 Hz
Setting time of analogue output mic-xxx/IU	40 ms	55 ms	70 ms	130 ms	225 ms
Protection class according DIN 40 050	IP 65	IP 65	IP 65	IP 65	IP 65
Detection areas using different reflectors The area shaded in dark grey represents the area where a standardized test reflector (pipe) is detected securely. This is defined to be the wordking area of the sensor. The area shaded in a lighter grey represents the area where a big test refelector (plate) is detected - assuming an optional orientation towards the sensor. Outside of the grey areas there is no detection of targets.