Ultrasonic sensors
2370-00000190 / 2370-00000186

Operating Instructions
following EMC Directive 2014/30/EU

EN

Product description
The ultrasonic sensors described:
- measure the distance to the medium without contacting it and according to their detection area.
- have a blind zone from which distance measuring is not possible.
- Indicate whether an object is inside or outside of the pre-set limits (see table Display of the switching states)
- have an internal temperature compensation. Due to the self-heating of the ultrasonic sensors the temperature compensation reaches its optimum operating point after an operating time of about 30 minutes.
- The related switching outputs are set depending on the preset switch points.

Regulatory notes
Electrical equipment according to EMC 2014/30/EU

no safety components acc. to machinery directive 2006/42/EC

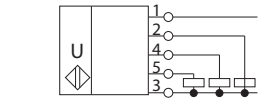
Enclosure type 1
For use in industrial machinery NFPA 79 applications only

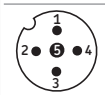
Intended use
Non-contact distance measurement of lubrication oils and greases in the frame of the technical data.

Safety instructions
Read these operating instructions before the installation and commissioning.
Installation and electrical connection by authorized qualified personnel only.

Installation and commissioning
- Clean the installation surface. When doing so make sure that no dirt enters the reservoir.
- Mount the ultrasonic sensor with the sensor surface (white area) centrically above the bore (Ø 20 mm) into the reservoir lid.
- Connect the connection cable to the M12 plug.
- Switch the power supply on.

Electrical connection



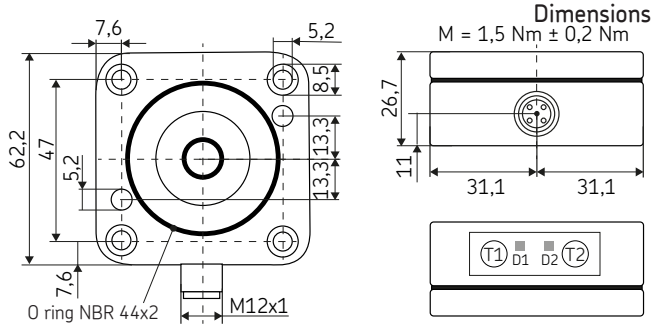


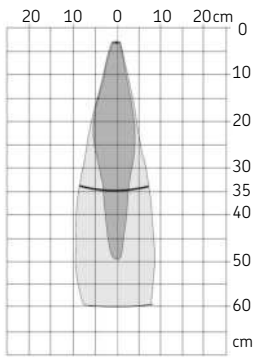
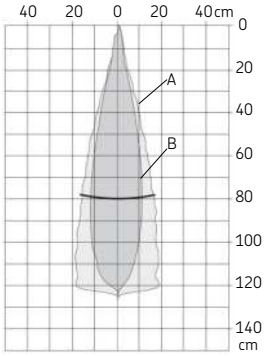
		Colour
1	+ U_B	brown
3	- U_B	blue
4	D2	black
2	D1	white
5	D3/Com	grey

Cleaning
Clean the sensor surface (white area), if it is contaminated.

Maintenance
The ultrasonic sensors do not require any maintenance.

Dimensions



Technical data			
Order number		2370-00000190	2370-00000186
Blind zone		0 - 65 mm	0 - 120 mm
Scanning range limit		600 mm	1300 mm
Opening angle of the sound beam		see detection zones	
Ultrasonic frequency		approx. 400 kHz	approx. 200 kHz
Resolution		0, 18 mm	
Repeatability		±0.15 %	
Detection zone in centimetres The light grey areas indicate the zone in which a big reflector – like, e.g. a lubricant surface – is still detected – provided it is optimally positioned to the sensor. Outside the light grey area an evaluation is not possible any more.			
Accuracy		±1 %	
Operating voltage U_B		9 - 30 V DC protected against reverse polarity	
Residual ripple		±10 %	
No-load current consumption		≤ 60 mA	
Housing material		PBT, polyester, ultrasonic transducer: PUR, epoxy resin with glass contents	
Type of connection		5-pole M12 circular socket connector	
Type of protection following EN 60529		IP 65/ 67 (depending on the cable socket used)	
Display elements		LED green / LED red | Switching output not set/ set	
Range of operating temperatures		-40 °C to + 70 °C	
Weight		120 g	
Response delay		272 ms	340 ms
Readiness delay		< 300 ms	
Compliance with standards		EN 60947-5-2	
Setting elements		2 pushbuttons	
Switching output		3x pnp; U_B-2V; I_{max} = 3x 200 mA; selectable between NO contact/ NC contact, short-circuit resistant	
Factory setting	High-level indication	065 mm	120 mm
	Pre-low-level indication	410 mm	730 mm
	Low level indication	420 mm	780 mm

Manufacturer: SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, DE-69190 Walldorf

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Activate / deactivate Teach-in

Switch the power supply off

Switch on power supply while pushbut-ton T1 is pressed

Keep pushbutton T1 pressed for about 3 seconds until both LEDs flash simultaneously

LED D2 flashes

LED D1

ON: teach in activate
OFF: teach in deactivate

To activate / deactivate keep pushbutton T1 pressed for about 1 second

Wait 10 seconds

Reset to factory setting

Switch the power supply off

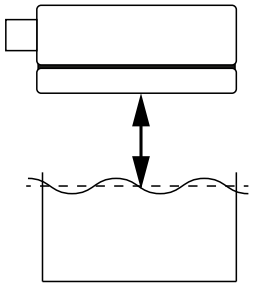
Switch on power supply while pushbut-ton T1 is pressed

Keep pushbutton T1 pressed for about 13 seconds until both LEDs flash alternately

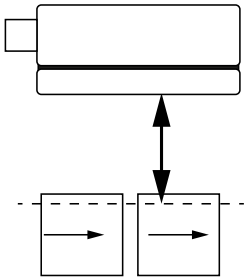
Standard operation

- In the Teach-in procedure »Set switch point – Method A« the sensor learns the actual distance to the object to be the switch point. In case of the object moving towards the sensor, e.g. when measuring the filling level, the taught-in distances is the level where the sensor is to switch.
- To sensor objects entering the sound field later-ally, the Teach-in procedure »Set switch point +8 % – Method B« should be chosen. There will be set a switch point exceeding the actual distance to the object by 8 %. By doing so a stable switch point will be ensured even in case of minor height fluctuations.

Set switch point - Method A



Set switch point +8 % - Method B

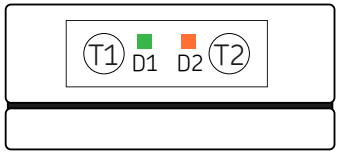


- During standard operation a red LED signals that the corresponding switching output has switched. The switching status of D3 is indicated by the two flashing LEDs.
- The sensor can be reset to factory setting (see sensor setting with Teach-in).

The high-level indication of the ultrasonic sensors described in these instructions has been programmed unchangeably by the manufacturer (switch point D3 / 65 mm re-spectively 120 mm). The low-level indication, and as the case may be, the pre-low-level or pre-high-level indications may be freely programmed by the programmer on switch points D1 and D2 via the described method.

Display of the switching states

	Switch points			Indication by LED		
	D1	D2	D3	D1	D2	
High-level indication	A	A	A	green	green	D
Between high- and pre-low-level indication	A	A	B	green	green	C
Pre-low-level signal	B	A	B	orange	green	C
Low level indication	B	B	B	orange	orange	C
A = switched B = not switched				C = permanent D = flashing		



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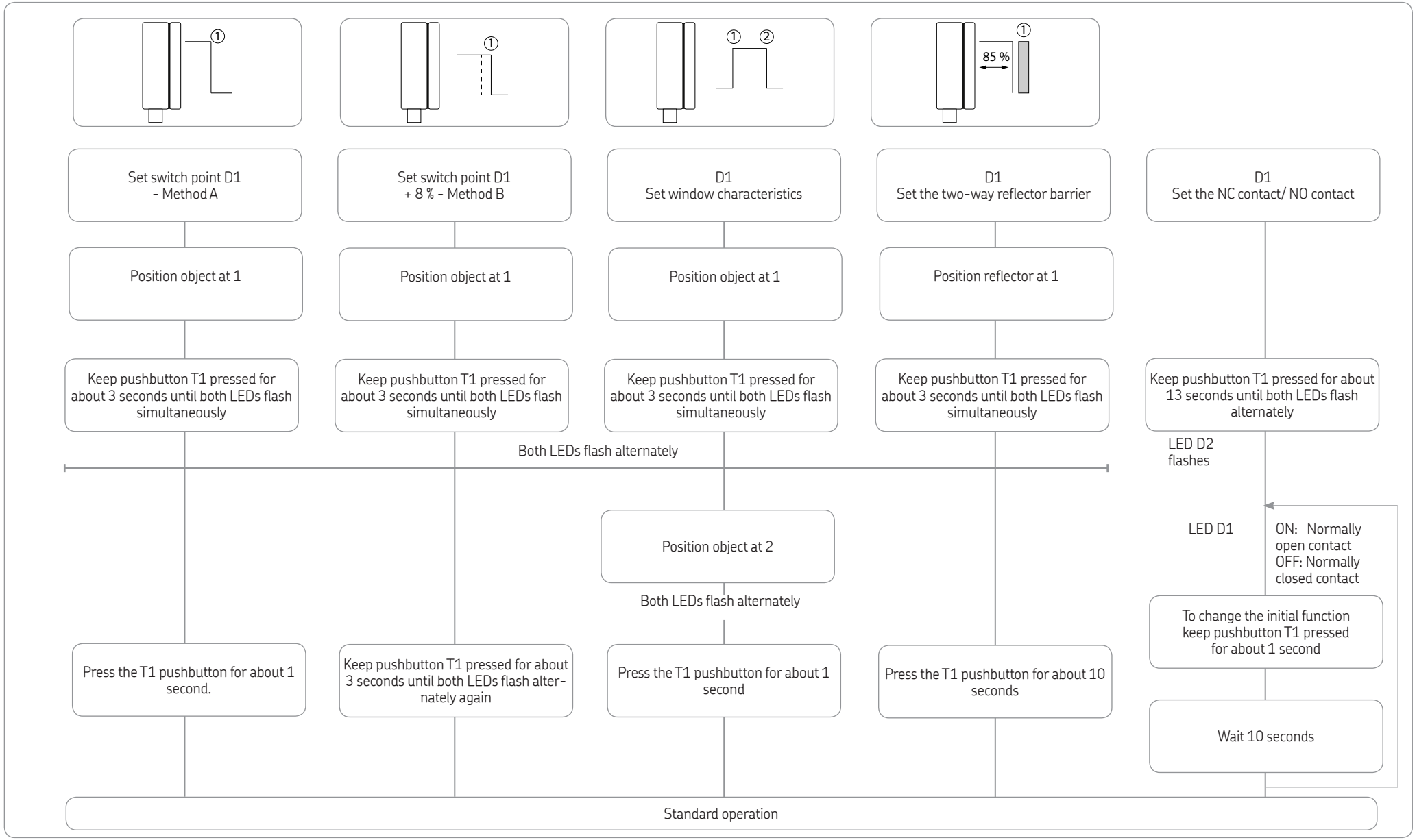
Sensor setting with Teach-in: Set switch point D1



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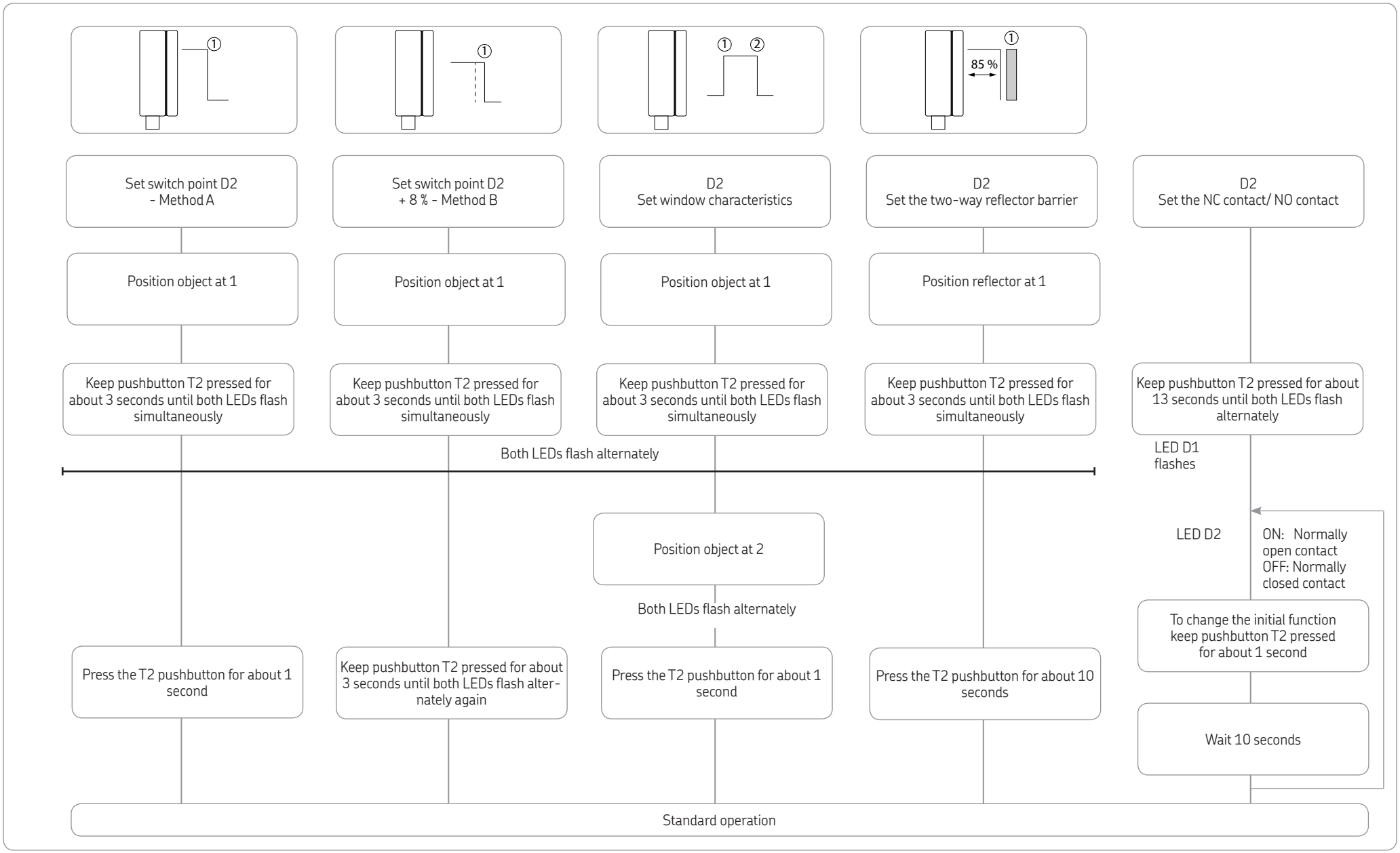
Sensor setting with Teach-in: Set switch point D2



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