microsonic

Operating manual
hps+ Ultrasonic Sensors for application in overpressure with two switching outputs

hps+25/DD/TC/E/G1
hps+35/DD/TC/E/G1
hps+130/DD/TC/E/G1
hps+340/DD/TC/E/G2
hps+340/DD/TC/G2

Product description

- The hps+ sensor measures the level in a vessel in up to 6 bar overpressure contactless. The G1 and G2 threaded pipe end permits the mounting and sealing of the sensor in a flange of the vessel. The pnp switching outputs are set according to the adjusted detect distances.
- The surfaces of the ultrasonic transducers of the hps+ sensors are protected by a PTFE film and sealed with a FFKM O-ring against the sensor housing. Therefore the surface of the ultrasonic transducer can be cleaned from cakings or spots.
- All settings are done with two push-buttons and a three-digit LED display (TouchControl).
- Light emitting diodes (three-colour LEDs) indicate all operation conditions.
- The output functions are changeable from NOC to NCC.
- The sensors are adjustable manually using the numerical LED display or may be trained via Teach-in processes.
- Useful additional functions are set in the Add-on-menu.
- Using the LinkControl adapter (optional accessory) all TouchControl and additional sensor parameter settings may be made by a Windows software.

Important instructions for assembly and application

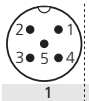
All employee and plant safety-relevant measures must be taken prior to assembly, start-up or maintenance work (see operating manual for the entire plant and the operator instruction of the plant).

The sensors are not considered as safety equipment and may not be used to ensure human or machine safety!

The hps+ sensors indicate a **blind zone**, in which the distance cannot be measured. The **operating range** indicates the distance of the sensor that can be applied in normal atmospheric pressure with sufficient function reserve.

Assembly instructions

- ▶ Assemble the sensor at the installation location.
- ▶ If necessary seal the sensor with the enclosed Viton O-ring (34 x 2,5 mm or 60 x 4 mm) against the flange.
- ▶ Plug in the connector cable to the M12 connector.



		colour
1	$+U_B$	brown
3	$-U_B$	blue
4	D2	black
2	D1	white
5	Sync/Com	grey

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

Start-up

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

- Switching outputs on NOC.
- Detecting distances at operating range and half operating range.
- Measurement range set to maximum range at ≥ 2 bar overpressure.
- Sensitivity at normal pressure.

Set the parameters of the sensor manually or use the Teach-in procedure to adjust the detect points.

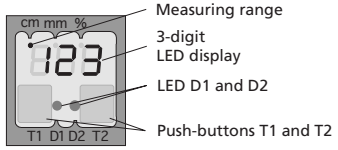


Fig. 2: TouchControl

Maintenance

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

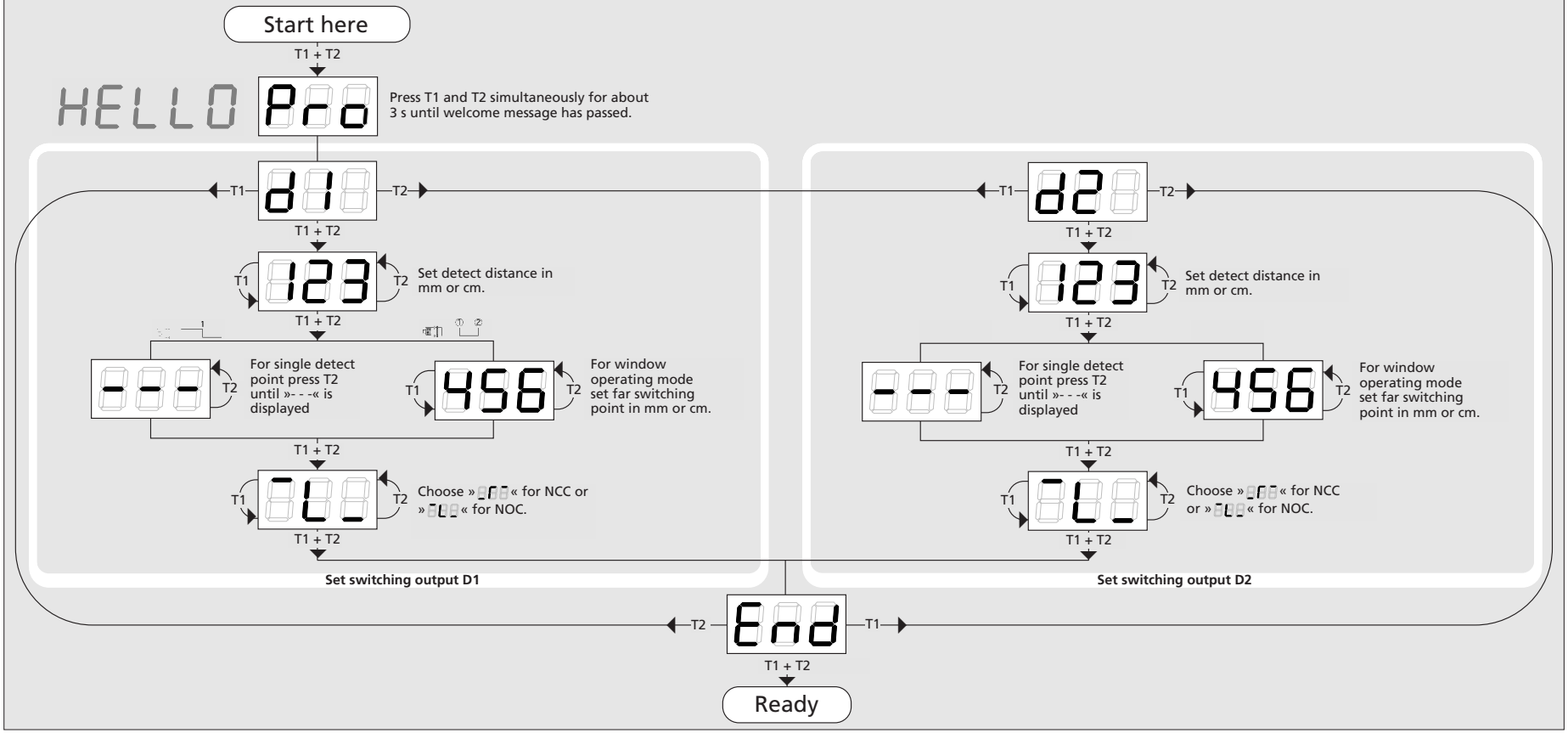
Note

- In operation in overpressure it is recommended to adjust the sensitivity of the hps+ sensor: choose the parameter A14 in the Add-on menu and set it to sensitivity E2 for atmospheric pressure from 1 to 3 bar or to sensitivity E3 for atmospheric pressure > 3 bar.
- hps+ 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.
- During normal operating mode, a yellow LED signals that the corresponding switching output is set.
- During normal operating mode, the measured distance value is displayed on the LED display 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.
- During Teach-in mode, the hysteresis value is set back to factory settings.
- If no objects are placed within the detection zone the LED display shows »- - -«.
- If no push-buttons are pressed for 20 seconds during parameter setting mode, the parameter changes are saved and the sensor returns to normal operating mode.

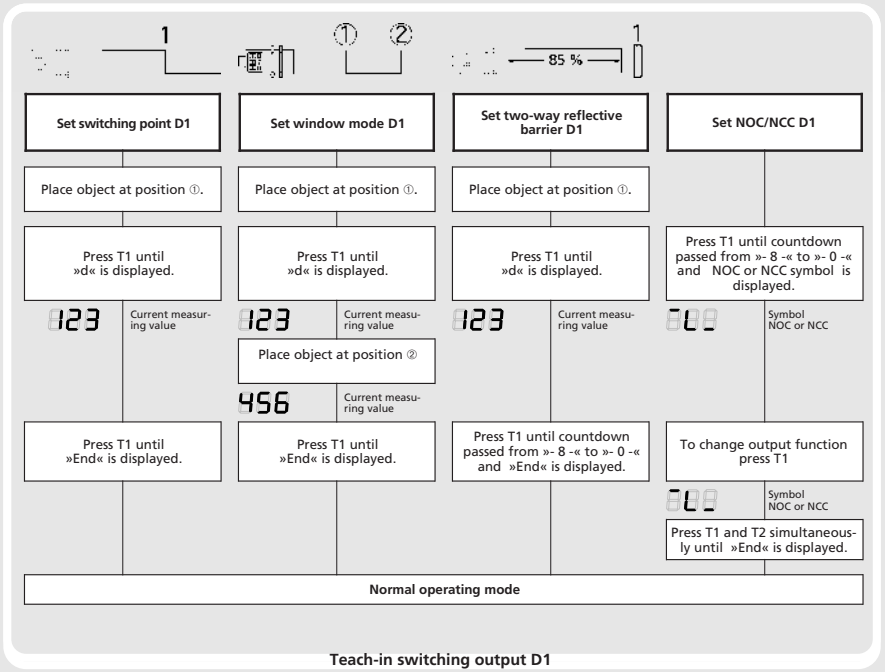
Show parameters

Tapping push-button T1 shortly during normal operating mode shows »PAr« on the LED display. Each time you tap push-button T1 the actual settings of the switching outputs are displayed.

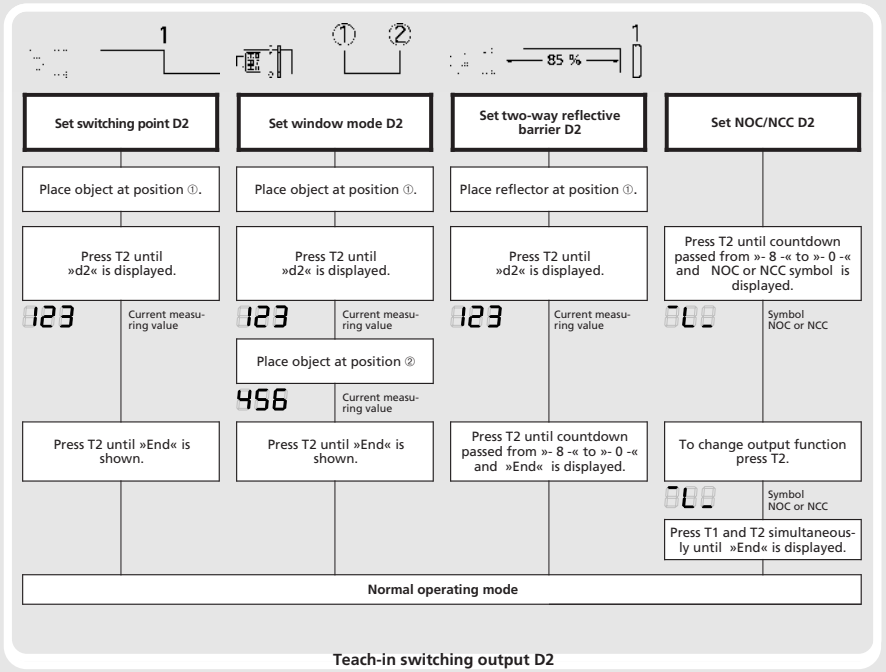
Set sensor parameters alternatively numerically using LED display...



...or via the Teach-in procedure

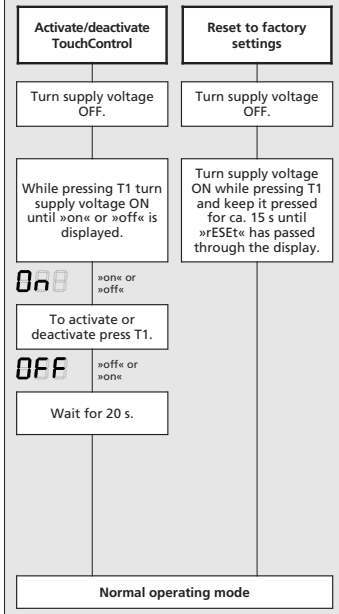


Teach-in switching output D1

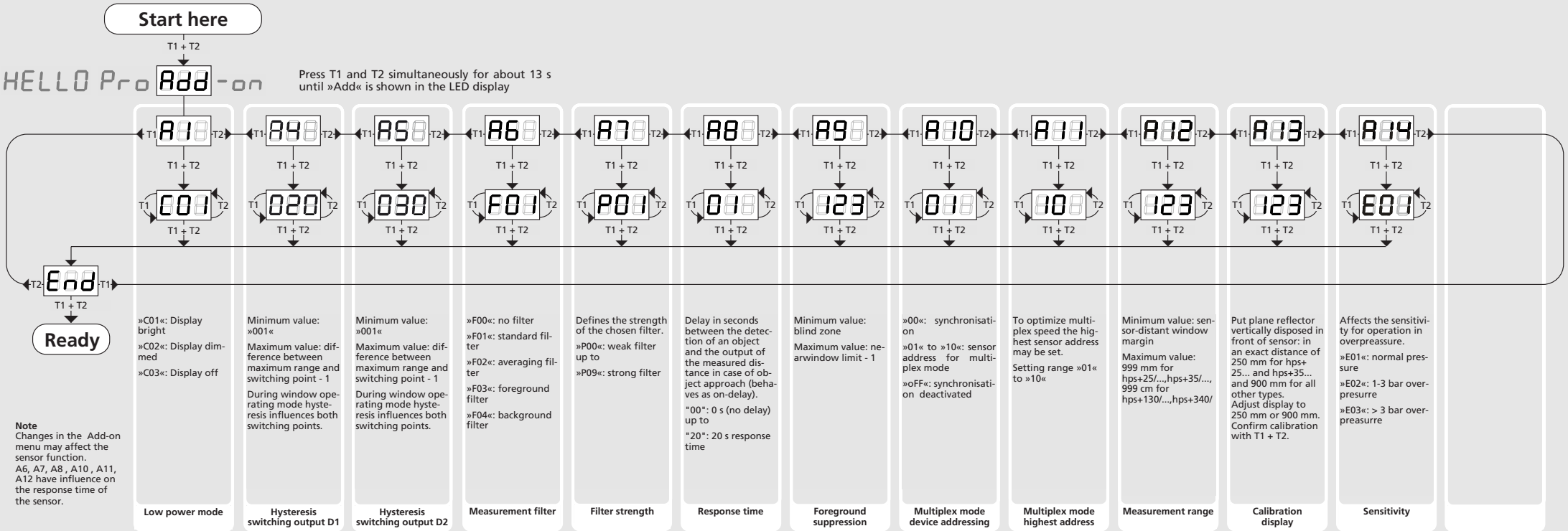


Teach-in switching output D2

Key lock and factory setting

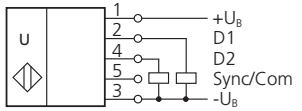


Useful additional functions in Add-on menu (for experienced users only, settings not required for standard applications)

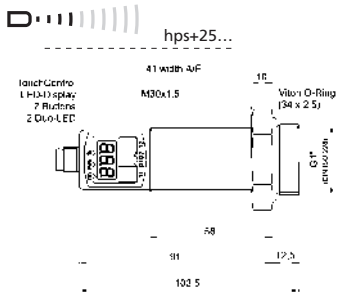
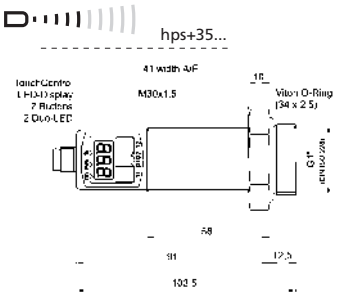
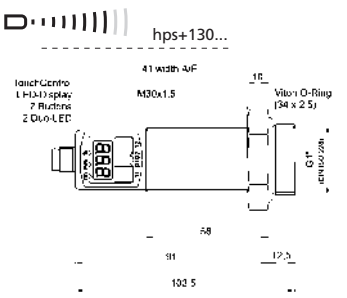
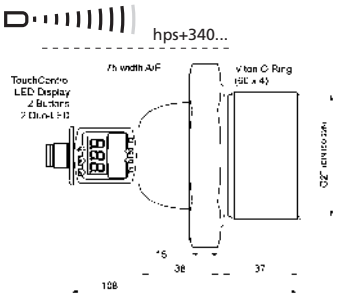
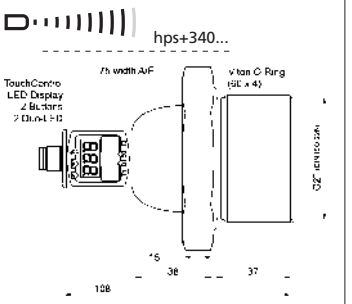
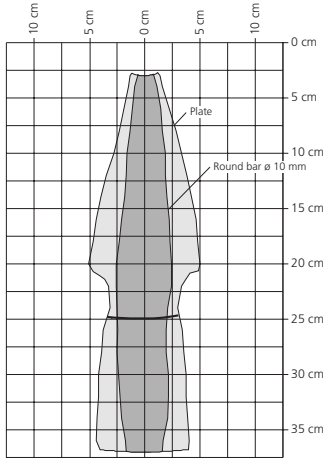
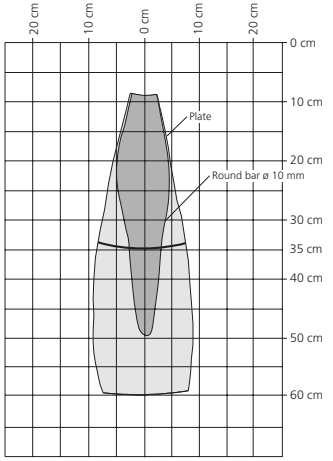
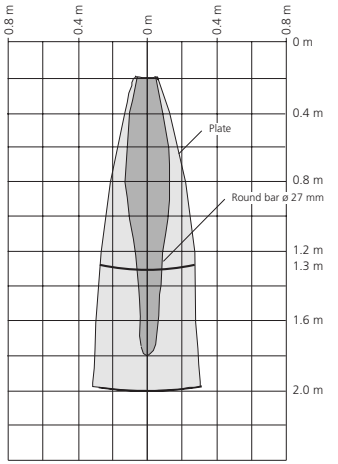
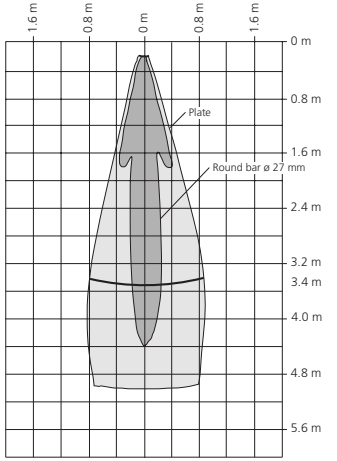
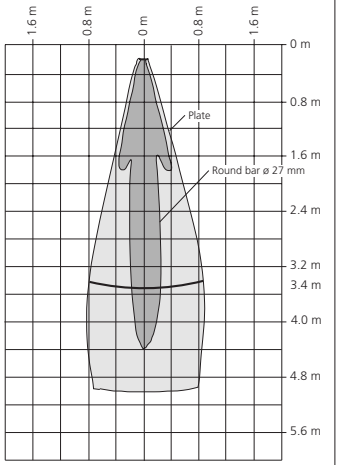


Note
Changes in the Add-on menu may affect the sensor function.
A6, A7, A8 , A10 , A11, A12 have influence on the response time of the sensor.

Technical data



2 pnp switching outputs

	hps+25...	hps+35...	hps+130...	hps+340...	hps+340...
					
blind zone	0 to 30 mm	0 to 85 mm	0 to 200 mm	0 to 350 mm	0 to 350 mm
operating range	250 mm	350 mm	1,300 mm	3,400 mm	3,400 mm
maximum range at normal pressure	350 mm	600 mm	2,000 mm	5,000 mm	5,000 mm
maximum range at ≥ 2 bar overpressure	990 mm	1,500 mm	5,000 mm	8,000 mm	8,000 mm
angle of beam spread	Please see detection zone	Please see detection zone	Please see detection zone	Please see detection zone	Please see detection zone
transducer frequency	320 kHz	320 kHz	180 kHz	120 kHz	120 kHz
resolution	0.025 mm	0.18 mm	0.18 mm	0.18 mm	0.18 mm
reproducibility	± 0,15 %	± 0,15 %	± 0,15 %	± 0,15 %	± 0,15 %
accuracy	± 1 % (temperature drift internally compensated)	± 1 % (temperature drift internally compensated)	± 1 % (temperature drift internally compensated)	± 1 % (temperature drift internally compensated)	± 1 % (temperature drift internally compensated)
Detection zones for different objects: The dark grey areas are determined with a thin round bar and indicate the typical operating range of a sensor. In order to obtain the light grey areas, a plate (500 x 500 mm) is introduced into the beam spread from the side. In doing so, the optimum angle between plate and sensor is always employed. This therefore indicates the maximum detection zone of the sensor. It is not possible to evaluate ultrasonic reflections outside this area. Displayed is the detection zone at standard pressure. At 1 bar overpressure the sensitivity of the sensor will increase 5 times.					
operating voltage U_B	9 V to 30 V DC, short-circuit-proof	9 V to 30 V DC, short-circuit-proof	9 V to 30 V DC, short-circuit-proof	9 V to 30 V DC, short-circuit-proof	9 V to 30 V DC, short-circuit-proof
voltage ripple	±10 %	±10 %	±10 %	±10 %	±10 %
no-load supply current	≤ 80 mA	≤ 80 mA	≤ 80 mA	≤ 80 mA	≤ 80 mA
ambient pressure	up to 6.0 bar	up to 6.0 bar	up to 6.0 bar	up to 6.0 bar	up to 6.0 bar
housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PTFE film, FFKM O-ring	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PTFE film, FFKM O-ring	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PTFE film, FFKM O-ring	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PTFE film, FFKM O-ring	Plastic parts: PVDF, PBT, TPU; Ultrasonic transducer: PTFE film, FFKM O-ring
process connection	G1	G1	G1	G2	G2
class of protection to EN 60529	IP 67	IP 67	IP 67	IP 67	IP 67
norm conformity	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
type of connection	5-pin initiator plug, PBT	5-pin initiator plug, PBT	5-pin initiator plug, PBT	5-pin initiator plug, PBT	5-pin initiator plug, PBT
controls	2 push-buttons (TouchControl)	2 push-buttons (TouchControl)	2 push-buttons (TouchControl)	2 push-buttons (TouchControl)	2 push-buttons (TouchControl)
indicators	3-digit LED display, 2 three-colour LEDs	3-digit LED display, 2 three-colour LEDs	3-digit LED display, 2 three-colour LEDs	3-digit LED display, 2 three-colour LEDs	3-digit LED display, 2 three-colour LEDs
programmable	TouchControl and LinkControl	TouchControl and LinkControl	TouchControl and LinkControl	TouchControl and LinkControl	TouchControl and LinkControl
operating temperature	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
storage temperature	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
weight	210 g	210 g	210 g	1,200 g	350 g
switching hysteresis[1]	3 mm	5 mm	20 mm	50 mm	50 mm
switching frequency[2]	11 Hz	9 Hz	5 Hz	3 Hz	3 Hz
response time[2]	68 ms	84 ms	160 ms	240 ms	240 ms
time delay before availability	< 300 ms	< 300 ms	< 300 ms	< 380 ms	< 380 ms
order no.	hps+25/DD/TC/E/G1	hps+35/DD/TC/E/G1	hps+130/DD/TC/E/G1	hps+340/DD/TC/E/G2	hps+340/DD/TC/G2
switching outputs	2 x pnp, U_B-2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof	2 x pnp, U_B-2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof	2 x pnp, U_B-2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof	2 x pnp, U_B-2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof	2 x pnp, U_B-2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof

1) Can be programmed with TouchControl and LinkControl 2) With TouchControl and LinkControl, the selected filter setting and the maximum range influence the switching frequency and response time.

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