



Product description

- The hps- sensor measures the level in a pressurized vessel in up to 6 bar overpressure contactless. The G1/2 or NPT threaded pipe end permits the mounting and sealing of the sensor in a flange of the vessel. The hps- sensor is designed for applications in 1 up to 6 bar overpressure. At the analogue output a signal proportional to the level is created and the pnp switched output is set according to the adjusted detect distance.
- The surfaces of the ultrasonic transducers of the hps-25/TF/DIU/TC/E/G1_2 and hps-25/TF/DIU/TC/E/NPT are protected by a PTFE film (Teflon film). Therefore the surface of the ultrasonic transducer can be cleaned from cakings or spots.
- The sensor automatically detects the load put to the analogue output and switches to current output or voltage output respectively.
- 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.
- Choosing between rising and falling output characteristic as well as output function NOC and NCC is possible.

- The sensors are adjustable manually using the numerical LED-display or may be trained using Teach-in processes.
- Useful additional functions are set in the Add-on-menu.
- With the LinkControl- Adapter LCA-2, available as accessory, all sensor settings can be made optionally with a PC using the LinkControl 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 operation 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 from 1 bar overpressure on with sufficient function reserve.

Assembly instructions

- ▶ Assemble the sensor at the installation location.
- ▶ If necessary seal the sensor with the enclosed Viton O-ring (26,7 x 1,78 mm) against the flange.
- ▶ Plug in the connector cable to the M 12 connector.

Pin	Signal	Colour
1	+U _B	brown
3	-U _B	blue
4	D	black
2	I/U	white
5	Synd/Com.	grey

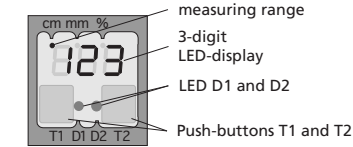
Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

Start-up

- hps-sensors are delivered factory made with the following settings:
- Rising analogue characteristic
 - Window margins for the analogue output set to blind zone and operating range

- Switched output on NOC
- Detecting distance at operating range
- Measurement range set to maximum range

Set the parameters of the sensor manually or use the Teach-in procedure to adjust the de-



text points.

Fig. 2: TouchControl

Operation

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.

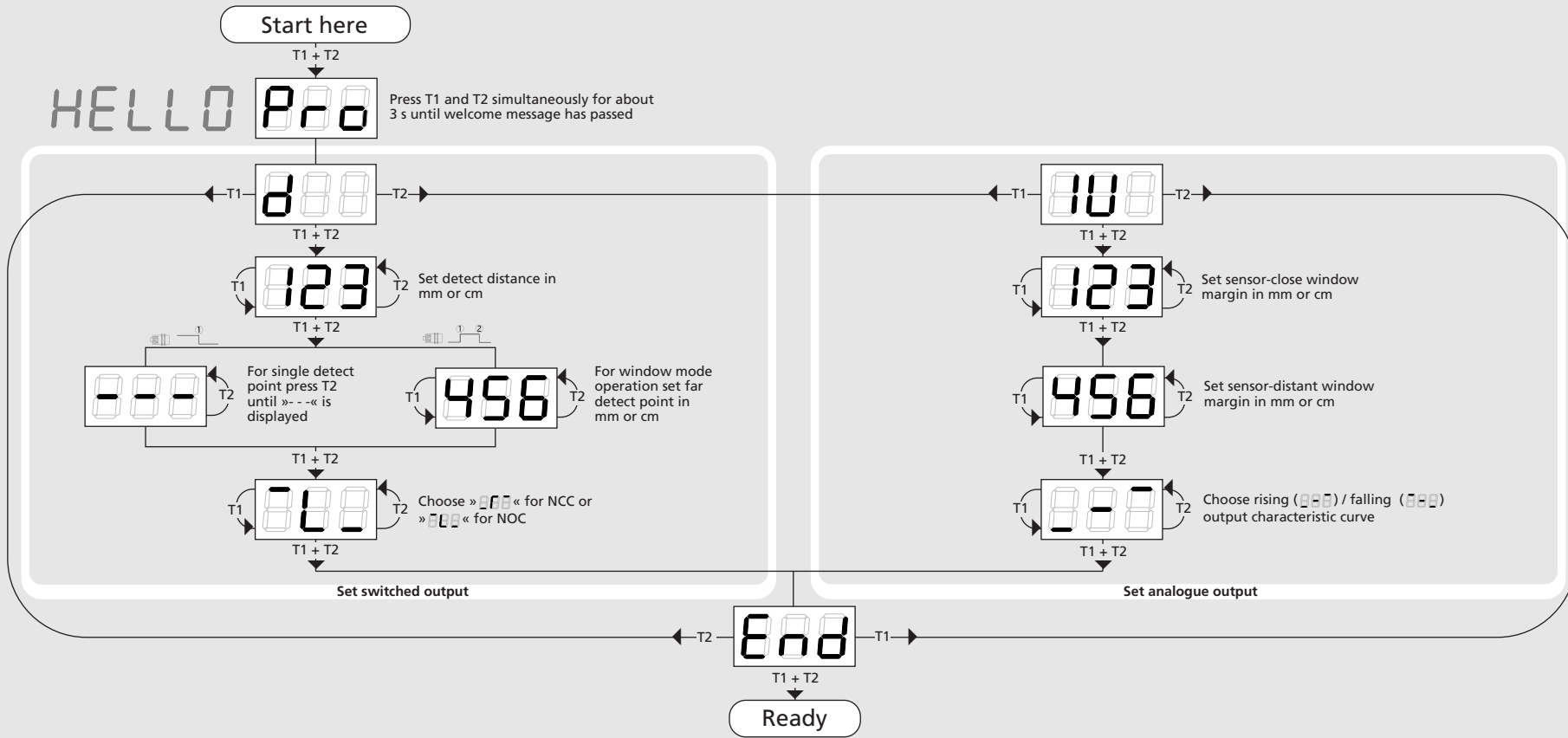
Note

- The hps-sensors work best from 1 bar overpressure on. In applications under 1 bar the maximum operating range may be limited. In this case the maximum operating range has to be determined in a test.
- 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.
- If an object is within the set window margins of the analogue output, then LED D1 lights up green, if the object is outside the window margins, 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, a yellow LED D2 signals that the switched output has connected.
- During normal mode operation, the measured distance value is displayed on the LED-indicator in mm. Alternatively a percentage scale may be set in the add-on menu. In this connection 0% and 100% correspond to the set window margins of the analogue output.
- During Teach-in mode, the hysteresis loops are set back to factory settings.
- If no objects are placed within the detection zone the LED-indicator shows »--«.
- If no push-buttons are pressed for 20 seconds during parameter setting mode the made changes are stored and the sensor returns to normal mode operation.

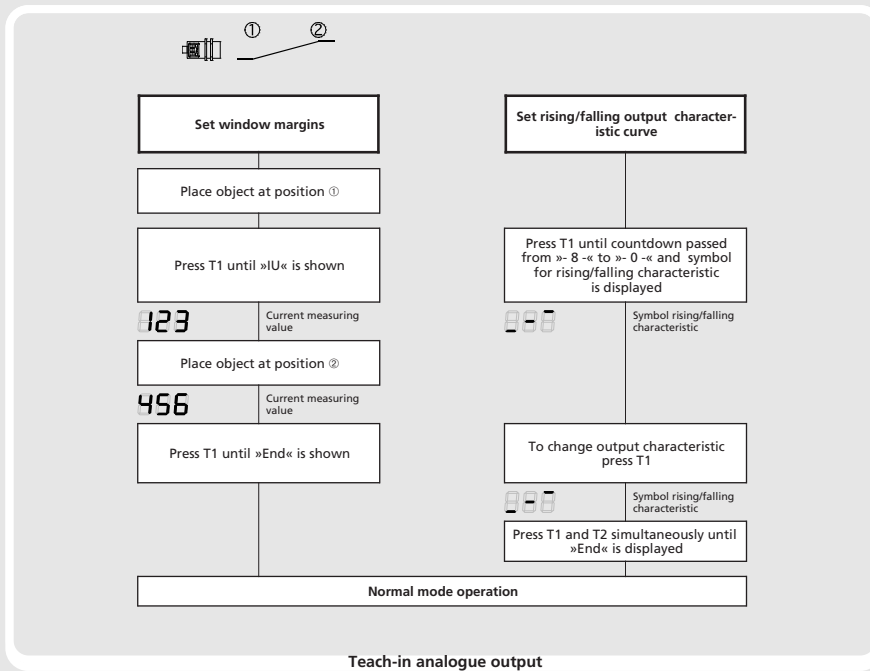
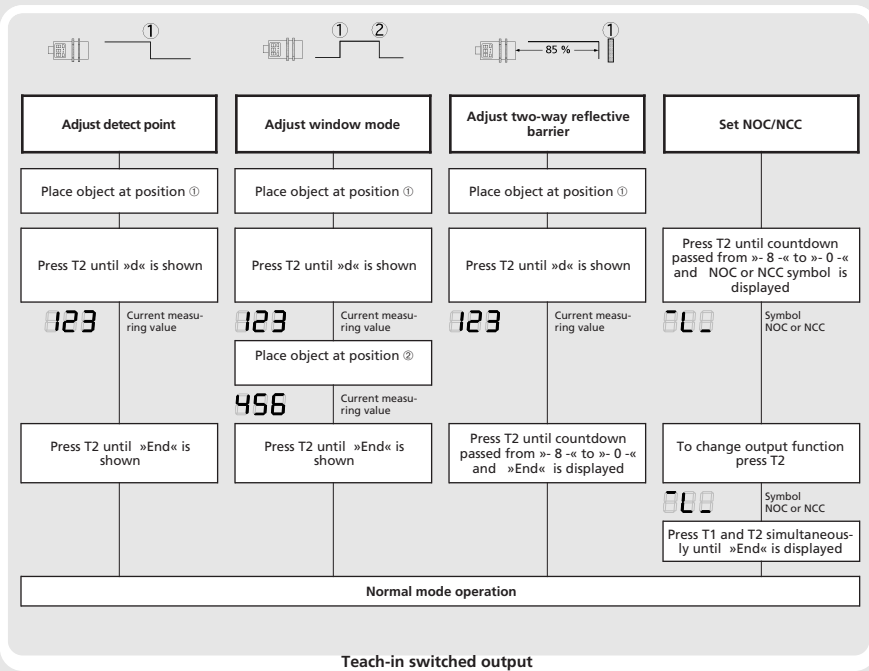
Show parameters

Tapping push-button T1 shortly during normal mode operation shows »PAR« on the LED-display. Each time you tap push-button T1 the actual settings of the analogue output and the switched output are shown.

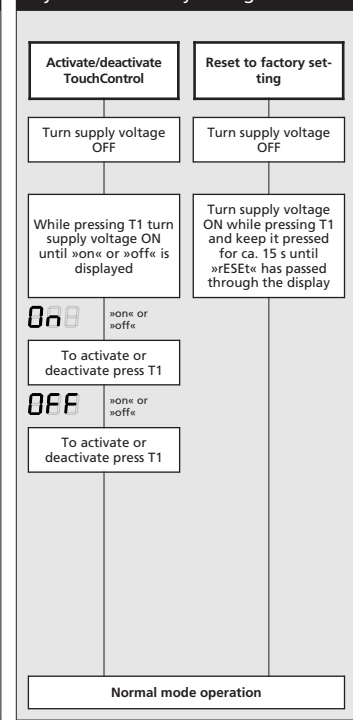
Set sensor parameters alternatively numerically using LED-display...



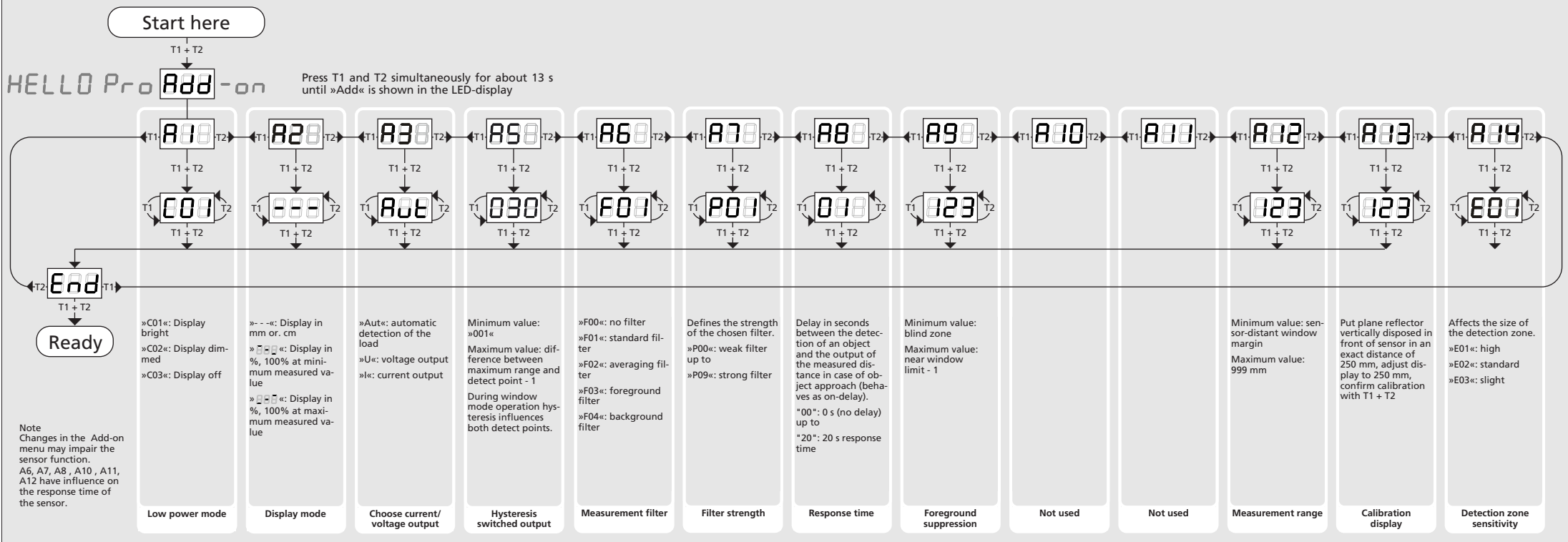
...or with the Teach-in procedure



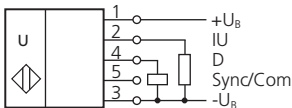
Key lock and factory setting



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



Technical data



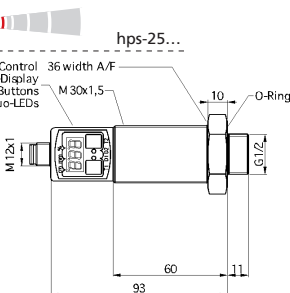
1 pnp switched output + analogue output

Blind zone	0 to 30 mm
Operating range	500 mm
Maximum range	700 mm
Angle of beam spread	Please see detection zone
Transducer frequency	320 kHz
Resolution, sampling rate	0,18 mm
Reproducibility	± 0,15 %
Accuracy	Temperature drift internal compensated, ≤ 2 % may be deactivated ¹⁾ (0,17%/K without compensation)

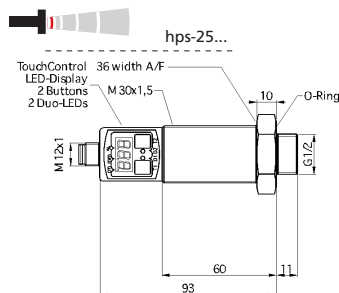
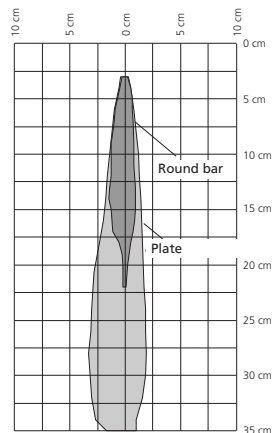
Detection zones

for different objects:
The dark grey areas are determined with a thin round bar (10 mm dia.) 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.

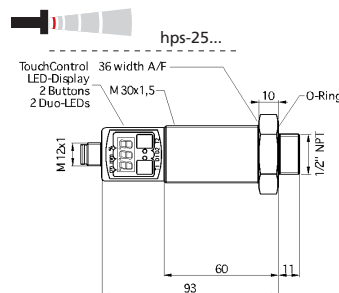
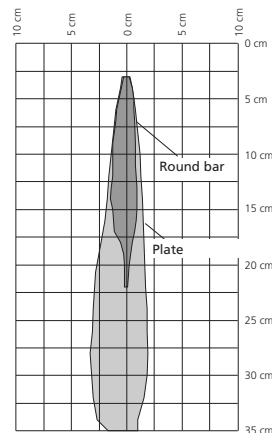
Displayed is the detection zone at standard pressure. At 1 bar overpressure the sensitivity of the sensor will increase 5 times.



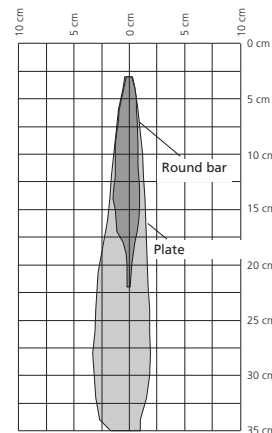
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Operating voltage U_B	9 V to 30 V DC, short-circuit-proof
Voltage ripple	±10 %
No-load supply current	≤ 80 mA
Ambient pressure	1,0 to 6,0 bar
Housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
Process connection	G1/2
Class of protection to EN 60529	IP 67
Norm conformity	EN 60947-5-2
Type of connection	5-pin initiator plug, PBT
Controls	2 push-buttons (TouchControl)
Indicators	3-digit LED-display, 2 three-colour LEDs
Programmable	Yes, with TouchControl and LinkControl
Operating temperature	-25°C to +70°C
Storage temperature	-40°C to +85°C
Weight	185 g
Switching hysteresis¹⁾	3 mm
switching frequency¹⁾	3 Hz
Response time¹⁾	180 ms
Time delay before availability	< 300 ms

Order No. hps-25/DIU/TC/E/G1_2

Switched output
pnp, U_B - 2 V, I_{max} = 200 mA
switchable NOC/NCC, short-circuit-proof
R_L ≤ 100 Ω at 9 V ≤ U_B ≤ 20 V;
R_L ≤ 500 Ω at U_B ≥ 20 V

Voltage output 0 – 10 V
R_L ≥ 100 kΩ at U_B ≥ 15 V, short-circuit-proof
Rising/falling output characteristic

Operating voltage U_B	9 V to 30 V DC, short-circuit-proof
Voltage ripple	±10 %
No-load supply current	≤ 80 mA
Ambient pressure	1,0 to 6,0 bar
Housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PTFE film, Viton O-ring
Process connection	G1/2
Class of protection to EN 60529	IP 67
Norm conformity	EN 60947-5-2
Type of connection	5-pin initiator plug, PBT
Controls	2 push-buttons (TouchControl)
Indicators	3-digit LED-display, 2 three-colour LEDs
Programmable	Yes, with TouchControl and LinkControl
Operating temperature	-25°C to +70°C
Storage temperature	-40°C to +85°C
Weight	150 g
Switching hysteresis¹⁾	3 mm
switching frequency¹⁾	3 Hz
Response time¹⁾	180 ms
Time delay before availability	< 300 ms

Order No. hps-25/TF/DIU/TC/E/G1_2

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pnp, U_B - 2 V, I_{max} = 200 mA
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Operating voltage U_B	9 V to 30 V DC, short-circuit-proof
Voltage ripple	±10 %
No-load supply current	≤ 80 mA
Ambient pressure	1,0 to 6,0 bar
Housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PTFE film, Viton O-ring
Process connection	1/2" NPT
Class of protection to EN 60529	IP 67
Norm conformity	EN 60947-5-2
Type of connection	5-pin initiator plug, PBT
Controls	2 push-buttons (TouchControl)
Indicators	3-digit LED-display, 2 three-colour LEDs
Programmable	Yes, with TouchControl and LinkControl
Operating temperature	-25°C to +70°C
Storage temperature	-40°C to +85°C
Weight	150 g
Switching hysteresis¹⁾	3 mm
switching frequency¹⁾	3 Hz
Response time¹⁾	180 ms
Time delay before availability	< 300 ms

Order No. hps-25/TF/DIU/TC/E/NPT

Switched output
2 x pnp, U_B - 2 V, I_{max} = 2 x 200 mA
switchable NOC/NCC, short-circuit-proof
R_L ≤ 100 Ω at 9 V ≤ U_B ≤ 20 V;
R_L ≤ 500 Ω at U_B ≥ 20 V

Voltage output 0 – 10 V
R_L ≥ 100 kΩ at U_B ≥ 15 V, short-circuit-proof
Rising/falling output characteristic

1) Can be programmed with TouchControl and LinkControl

