24 V AC/DC liquid switches

Liquid temperature Recommended liquid temperature and IP class Specified temperature range is typically wider	24V AC/DC		Liquid in gas			Oil in ammonia or water
	PAO oil Mineral oil	POE oil PAG oil	R744 CO2 R600 Butane R600a Isobutane R290 Propane	R507, R410a, R407c R404a, R22, R32, R134a, R1234yf, R1234ze Other HFC/HFO/CFC	R717 NH3, Water Alcohols	Oil - all types
Cold and cold ambient conditions IP66	**HBSO-LT** -30-40°C (-22-104°F)		**HBSC2-SSR-1/IP** -55-30°C (-67-86°F)	**HBSR-HFC-SSR-1/IP** -55-30°C (-67-86°F)	**HBSR-SSR-1/IP** -55-30°C (-67-86°F)	**HBOR/C-U** -60-80°C (-76-176°F)
Normal dry conditions IP54	**HBSO1** 0-60°C (32-140°F)	**HBSO2** 0-60°C (32-140°F)	**HBSC2** -40-50°C (-40-122°F)	**HBSR-HFC** -40-50°C (-40-122°F)	**HBSR** -40-50°C (-40-122°F)	**HBOR & HBOR/C** -60-80°C (-76-176°F)
Normal but wet and condensing applications IP66	On request	On request	**HBSC2-U** -40-50°C (-40-122°F)	**HBSR-HFC-U** -40-50°C (-40-122°F)	**HBSR-U** -40-50°C (-40-122°F)	**HBOR/C-U** -60-80°C (-76-176°F)
Warm IP54	**HBSO1-MT** 40-100°C (104-212°F)	**HBSO2-MT** 40-100°C (104-212°F)	**HBSC2** 50-80°C (122-176°F)	**HBSR-HFC** 50-80°C (122-176°F)	**HBSR-HP** 50-80°C (122-176°F)	On request
Hot IP54	**HBSO-SSR-1-HT** **90-145 °C** **(194-293 °F)**		On request	On request	On request	N.A.

Indicate the switch is available in a special ATEX/IECEx version

90-240 V AC liquid switches

Liquid temperature Recommended liquid temperature and IP class Specified temperature range is typically wider	90-240V AC		Liquid		
	PAO oil Mineral oil	POE oil PAG oil	R744 CO2 R600 Butane R600a Isobutane R290 Propane	R507, R410a, R407c R404a, R22, R32, R134a, R1234yf, R1234ze Other HFC/HFO/CFC	R717 NH3, R718 Water, Alcohols
Cold and cold ambient conditions and wet conditions IP66	HBSO-SSR-2-LT -30-40 °C (-22-104 °F)		HBSC2-U-SSR2 -55-80 °C (-67-176 °F)	HBSR2-U-SSR2 -55-80 °C (-67-176 °F)	HBSR2-U-SSR2 -55-80 °C (-67-176 °F)
Normal and warm dry conditions IP54	HBSO1-SSR-2 0-60 °C (32-140 °F)	HBSO2-SSR-2 0-60 °C (32-140 °F)	HBSC2-SSR-2 -30-80 °C (-22-176 °F)	HBSR-SSR-2 -30-80 °C (-22-176 °F)	HBSR-SSR-2 -30-80 °C (-22-176 °F)

IP class - which to choose

IP54 is suited for indoor use with limited condensation and no water jet cleaning.
IP66 is suited for outdoor use where condensation occur. If high-pressure water cleaning with aggressive cleaning agents is used the sensor need further protection.

Product ordering codes and thread connections

HBSR-PNP/NC-1

- Main product code
- Output type PNP or NPN
- Switching type Normally closed or normally open
- Thread code

Other commonly used codes

U: union connection instead of V track with set screws (standard)
L: Long version
IP: ice proof (low temperature version)
LT: Low temperature version
MT: Medium temperature version
HT: High temperature version
HP: Heat pump version
HFC: suited for HFC,HFO,CFC and other synthetic refrigerants
/C: Built in controller for modulating valve
/S: Built in controller for stepper motor valve
/PWM: Built in controller for pulse width modulating valve
SSR-1: Solid state relay output for 24V DC/AC supply
SSR-2: Solid state relay output for 90-240 V AC supply

Thread codes (stamped on the sensor)

1 = ½" NPT
2 = ¾" NPT
3 = ½" BSPT
4 = ¾" BSPT
5 = ½" BSPP
6 = ¾" BSPP
7 = 1 1/8" UNEF
8 = 1" BSPP
9 = 1" NPT
10 = 1 ¼" BSPP
11 = 1 ½" BSPP
12 = 1 ½" NPT
13 = ¼" BSPP
14 = ¼" NPT
15 = 3/8" NPT
16 = 1 ¼" UNF

NPT (National Pipe Taper)
BSPT (British Standard Pipe Taper ("R"))
BSPP (British Standard Pipe Parallel ("G"))
UNEF (Unified National Extra Fine)
UNF (Unified National Fine)

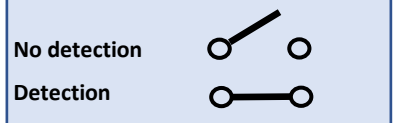
Settings and connections

NO/NC what is the difference?

You can order the sensor as NO or NC and it is a question about what fits your system.
A NO switch provides no output until liquid is detected. A NC switch provide an output until liquid is detected.
NC is common for fail safe systems where you like to get an indication if the wire is broken.

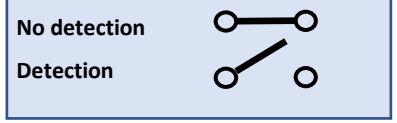
NO

Contact is <u>normally open</u> and closes when liquid is detected



NC

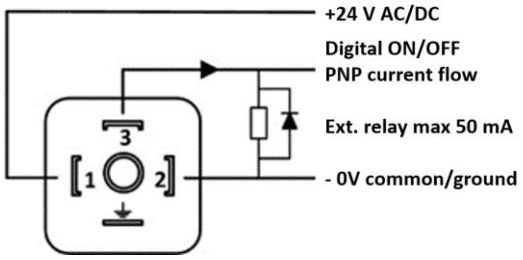
Contact is <u>normally closed</u> and opens when liquid is detected



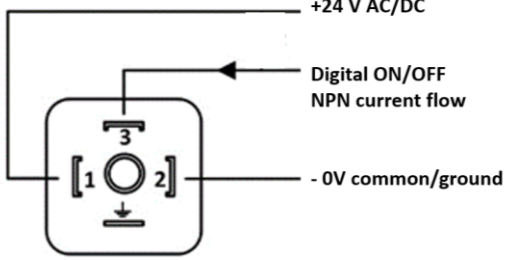
24 V - NPN or PNP output ISO 4400/DIN 43650 plug

A PNP switch is common in Europe and provide a positive signal on pin 3 when switching.
A NPN switch is common in America and provide a ground signal on pin 3 when switching.

Source / PNP



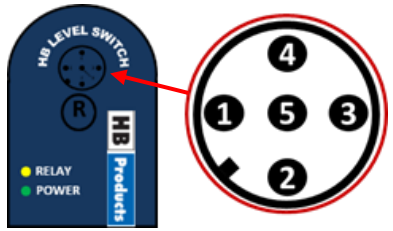
Sink / NPN



Solid state relay (SSR) IEC 61076-2-101 M12 plug

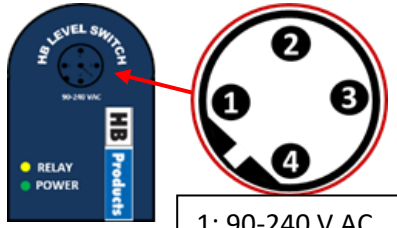
The large electronic units has a potential free relay output.
When switching there will be connection between pin 3 and pin 4

24V versions



1: +24 VDC or 24VAC
2: - common or 24VAC
3: Output potential free
4: Output potential free
5: Communication

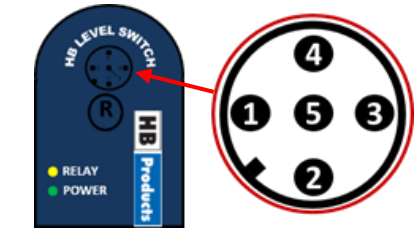
90-240V versions

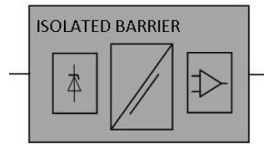


1: 90-240 V AC
2: 90-240 V AC
3: Output potential free
4: Output potential free

ATEX/IECEx approved switches with IEC 61076-2-101 M12 plug

All the 24V switches are available in an ATEX/IECEx approved version. The switch has a two-wire analog output which will be either 4 or 20 mA. The switch can be changed between NO and NC when connecting it to the HB-tool. The sensor is used together with a barrier to comply with ATEX/IECEx requirements.





1: +24 VDC
2: not used
3: not used
4: Analog output
5: not used