

Data sheet

LIQUID LEVEL SWITCHES

HBSO1 Oil Level Switch

HBSR Refrigerant Switch (NH₃, HFC, Brine, water)

HBSC2 Liquid CO₂ Switch

SPECIFICATIONS:

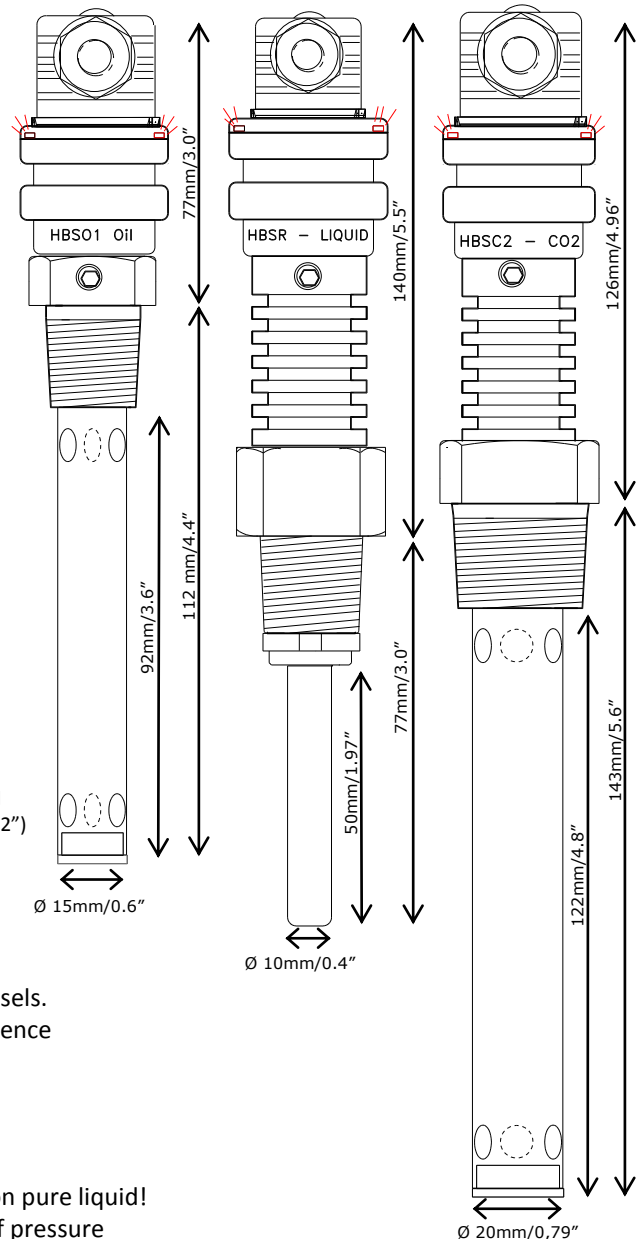
Power supply:	24V DC ±10%
Output:	PNP/NPN
Output function:	NO/NC (ON/OFF)
Output current:	Max 50mA
Indication:	Red LEDs
Media temp.:	-50* to +100°C / -58* to +212°F (HBSR/HBSC2)
Media temp. oil:	0 to +100°C / +32 to +212°F (HBSO1)
Ambient temp.:	-20 to +50°C / -4 to +122°F
Material:	Stainless / PTFE
Mech. Connection:	1/2", 3/4", NPT, BSP (check table below)
EMC test:	EN Industrial
Max operating pres.:	150 bar/2175 PSI (HBSO1/HBSC2) 100 bar/1450 PSI (HBSR)

*HBSR operations with media temp. below -30°C/-22°F it is required to mount a HBHE heating element.

High Temp (HBSO1-HT) available on request (media temp. +150°C/302°F)

ORDERING CODE:

HBS	-	/	/	
				Thread type/size: 1-7: 1 = 1/2" NPT # 2 = 3/4" NPT 3 = 1/2" BSPT ("R") 4 = 3/4" BSPT 5 = 1/2" BSPP ("G") 6 = 3/4" BSPP 7 = 1 1/8" UNEF # not illustrated (length 90mm/3.5" Ø26mm/1.02")
				Output function: NO = Normal open NC = Normal closed
				Output PNP / NPN
	C2	=	CO ₂	
	O1	=	Oil	
	R	=	NH ₃ , HFC, brine, water	
				# HBSR and HBSC2 not available in thread size 1,3,5,7



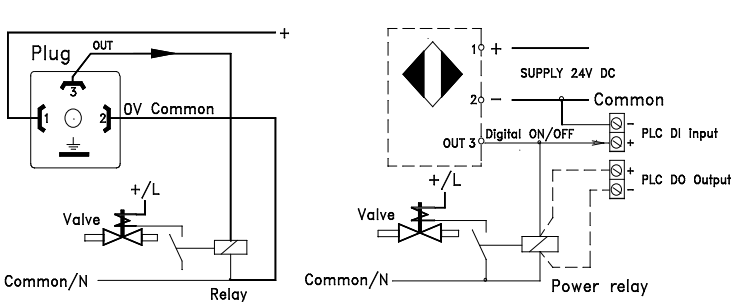
PRINCIPLE/OPERATION:

For level detection, indication and/or flow control on pressurized vessels. Switches operate according to the capacitive principle detecting presence of any kind of conductive/non conductive liquid. Supply and output DC isolated from ground with a 500V Capacitor.

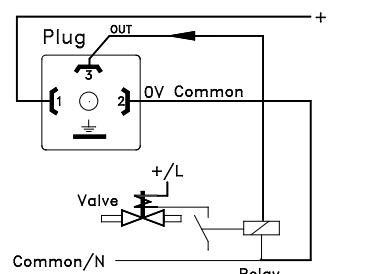
KEY FEATURES:

Unaffected by pressure, foam, splashing and coating. Switches only on pure liquid!
 Split design for easy mounting and testing without drainage or loss of pressure
 Significant LED indication when liquid is present.
 HBSR: Distinguishes between oil and NH₃

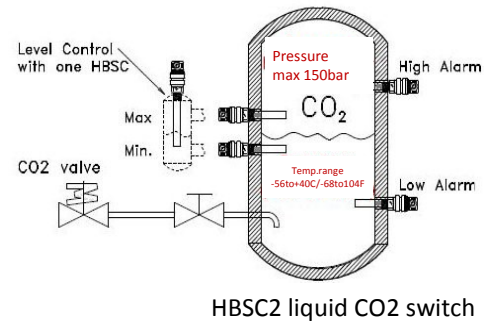
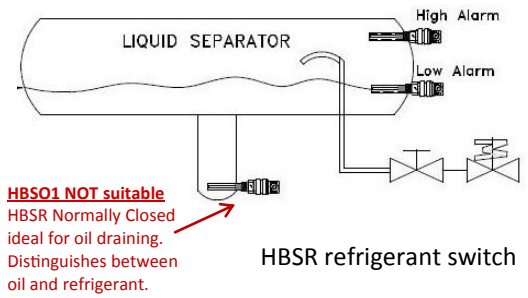
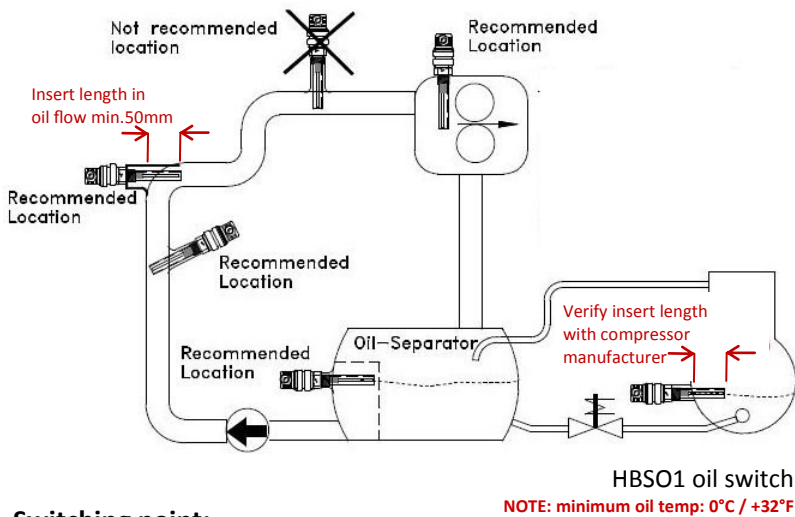
ELECTRICAL CONNECTION - PNP:



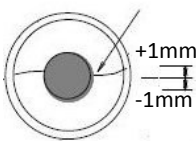
ELECTRICAL CONNECTION - NPN: (opposite current flow on pin 3)



Mounting possibilities:



Switching point:



The switching point has been factory calibrated to 50% That is if the sensor is half covered by pure liquid. Typically the switches are mounted horizontal, this means the switching point is in the centre of the rod (± 1 mm)

NOTE: minimum oil temp: 0°C / +32°F

Label code:

E.g.

Prior Q3/11:

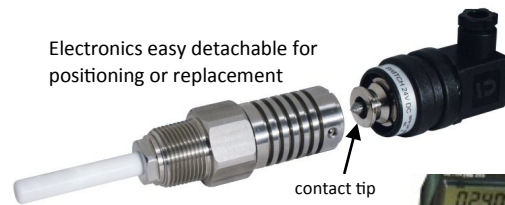
HBSO1 OIL SWITCH 24VDC PNP 3/4"NPT NO R Vyyxx

As of Q3/11:

HBSO1 OIL SWITCH 24V DC PNP NO VByyxxx

Thread size code is hammered into the mechanical part (1-7)

B: Bayonet/quick joint type
Reverse compatible on older mechanics



Troubleshooting:

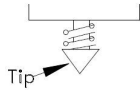


All below steps can be carried out WITHOUT depressurizing or emptying the vessel! The easiest way to trouble shoot is to have a spare mechanical part on site. By mounting the suspected malfunctioning electronics on this spare mechanical part it can easily be determined if the electronics work or not. Just dip the sensor into a pot of oil (HBSO and HBCS2) respectively water (HBSR).

In case a replacement sensor is needed just change the electronics!

LEDs always switch ON when liquid is surrounding the switch no matter output type (NPN/PNP) or function (NO/NC)! All terminals are protected against reverse/incorrect connection however voltage higher than 40V DC will destroy/burn off the electronics!



Problem	Suggestion/what to check	Solution/next step
(1) No function	Check supply voltage on terminal 1 and 2 (+ on 1 and 0V on 2) 24V DC $\pm 10\%$ required	If supply voltage is correct check the output function
(2) No output	Check the output voltage between terminal 2 and 3 <u>Output function according to type:</u> PNP: output voltage should be equal to supply voltage (wet=ON) NPN: output voltage should be 0V (-)(wet = ON) Note: NC: Normal Closed. The output is normally ON (wet=OFF) LED indication should switch ON when wet (no matter output function or type)	If the output is incorrect check the contact tip
(3) No contact	Separate the electronic part from the mechanical part by loosening the two fixing screws (by hand if it is a bayonet/quick joint type, label states "VB") Clean the "contact tip" by grinding the surface Note: on the HBCS2 and HBSR it is important to add silicone grease again after cleaning to avoid condensing problems.	Check step (2) again 
(4) Delay in switching	Can be caused by gas and bubbles in the system	Check if mounted on the right location