## **Electrical connections**

HBOC/C and HBOR/C can supply a magnetic valve, or it can be connected to the central control via the sensor's control/alarm output. See the diagrams below for the two

HBOC/C and HBOR/C - mk1

(DC version – DC supply and DC output on cable)

#### **DC** version



HBOC/C and HBOR/C - mk2

(AC version – AC/DC supply and AC/DC output on cable)

## AC version



The sensor controls the valve independent of other parts of the system. The function starts to work when the supply is connected. The control function can be activated/deactivated via an external run signal with "Run in" (pin 5) or work continuously



# **Quick guide for OIL MANAGEMENT SWITCHES**

Covers HBOC and HBOR both mk1 and mk2 versions.

Setup information is available in the manual which is available under download on www.hbproduct.dk

### Introduction

The sensors are designed for control of oil levels in gas **HBOC** and in Liquid ammonia **HBOR HBOR** will also be useable for measuring water in oil.

Both sensors can control a level based on a single switch. These sensors replace the common mechanical float and the two-switch solution where a minimum and maximum level switch is used for controlling the level.

The difference between mk1 and mk2 is the output on the cable.



- HBOC/C and HBOR/C has 24 VDC max 24 W output on the cable
- HBOC/C mk2 and HBOR/C mk2 has 24 V AC/DC max 24 W output on the cable

Mk2 version are labeled mk2. Mk1 versions are not labeled mk1

#### Installation

The sensor is mounted either on a compressor or an oil separator. On a compressor, an adapter flange can be provided as an accessory. The sensor is sealed with Teflon tape or liquid gasket before installation. Dependent upon the thread type, the gasket consists of:

- NPT thread = Teflon tape or liquid gasket
- BSPP & UNEF = Aluminum washer/gasket



#### LED indication:

- 1) 3 x green LEDs indicate oil level
- 2) Green Power LED constant light indicate sensor is standby not controlling Green Power LED flashes when the sensor is in control operation.
- 3) Yellow LED indicates supply is open to magnetic valve
- 4) Red LED indicates ALARM

LED signal	ON/OFF/Frequency	Functionality	
Green	ON	Oil detected	
(3x)	Flash	Turbulence in the compressor housing	
	OFF	Oil is not detected	
Green	ON	Standby power connected	
POWER	Flash	In operation or when the sensor is connected to HB Tool. (Red and yellow LED also flashes)	
	OFF	No supply	
Yellow	ON	Activation/supply to the magnetic valve	
	OFF	Magnetic valve is not being supplied	
Red	ON Alarm. Activated automatically acc a calculated time span if oil has not detected (oil cycle x alarm counter before alarm goes off). Output rela 4) is activated.		
	OFF	Oil level reached in accordance with the calculated time span / number of oil cycles.	
	Flash	Sensor is faulty	

## Calibration:

**HBOR** is pre-calibrated upon delivery and ready for use in ammonia systems only. If the sensor is used in other systems/applications, please contact HB products

**HBOC** is pre-calibrated upon delivery and ready for use in refrigeration systems using conventional mineral and PAO oils. If the **HBOC** is used in other oil types a calibration might be needed. This calibration is done by using the HB tool connected via an USB cable.

Calibration instructions:

Both a calibration in gas an oil must be done:

A zero calibration is performed when the switch is in gas. The calibration is done by clicking on the zerocalibration button in the tool.

A span/max calibration is done when the switch is covered with oil. The calibration is done by clicking on the span-calibration button in the tool.

#### HBOC/C and HBOR/C quick guide 001 EN

## Fault Detection

Fault	Reason	Correction of fault
No LED is on.	No supply to the sensor or	Check and find
	defective cable/plug	faults in the power
		supply. Change the
		supply cable.
Sensor does not	Quality/type of oil is different from	Recalibrate the
trigger even	that used during factory	sensor.
though there is oil.	calibration.	
Red alarm	Oil level has not been attained	Check system oil
	during the specified number of oil	return. Check oil
	cycles.	filter and magnetic
		valve if necessary.
3 x green flash	There is oil turbulence in the	Change "filter
	compressor housing.	func/time cons" to
		a higher value.
No output (3 x	Check the setup of the	Change the setup
green LED are on,	parameters/which contact	using the tool.
but the output	function has been selected, NC or	
signal is not active)	NO (Normally closed/Normally	
	open)	
Delay in sensor	May be caused by gas and foam	Check if the sensor
activation	bubbles in the system.	is placed optimally.
No detection	Fault in the electronics	Send the sensor to
		be repaired.
Red LED flash	Sensor is faulty	Contact supplier

## More information

For further information please download the full instruction manual from our homepage: <u>www.hbproducts.dk</u>. You find it under downloads and then instruction manuals