Instruction manual

Oil and leakage detection for CO2/Ammonia cascade systems

HBAC - For oil level control as well as detection of leakage of CO2 into NH3

Introduction

This switch can be used both to detect oil and a leakage of CO2 when installed in a low location in liquid ammonia. Anyone who designs and operates CO2/NH3 Cascade systems should be aware of the fatal consequences a leaking heat exchanger may have. If CO2 leaks into ammonia ammonium carbamate will be formed.

Ammonia carbamate is a salt which crystalizes as a chemical reaction between Ammonia and CO2. The salt is corrosive, becomes solid and may cause system breakdown and possible damage to the entire system if not stopped.

Contents

Installation instructions

Ammonia carbamate has a higher density than liquid ammonia which means it will sink to the bottom of the vessel like oil. The sensor must be positioned as low as possible to get fast detection. The flow of liquid might move the salt around.

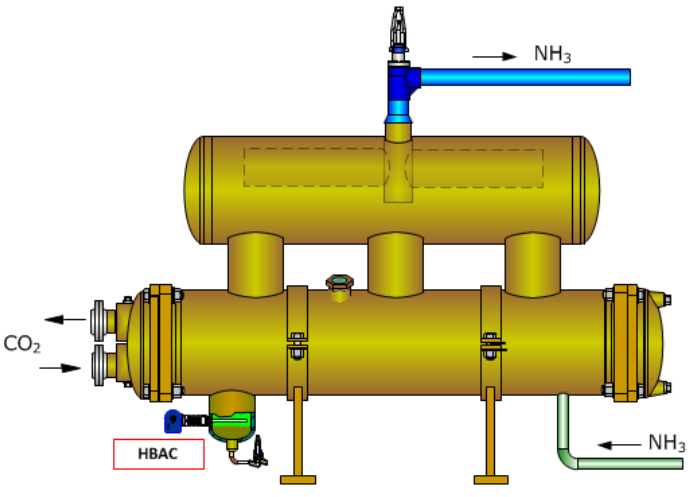
The detection will be delayed if covered by oil, but it can detect oil via the analog output to avoid this happening.

The following applies during installation:

1)The sensor must be installed in a threaded sleeve/pipe stub, this should be welded in a Horizontal position.

2)The installation length of the sensor must be considered since there must be at least 20 mm between the sensor's mechanical part and other fixed or moving parts.

3) The sensor must be placed in the NH3 section in a position where the leakage



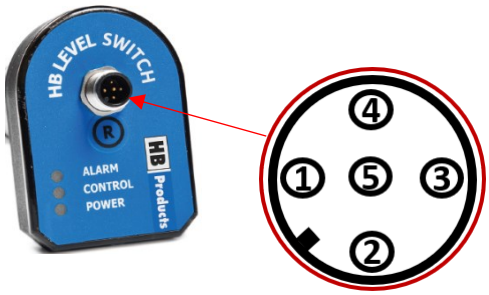
Cascade heat exchanger

will appear. preferably as close to the bottom of the cascade heat exchanger, as the salty crystal will sink to the bottom.

4) If the sensor should be used for oil level control it must be installed in the reservoir for oil collection at the bottom of the vessel

Power connection

HBAC can be delivered with a NO or NC output. The setting can be changed in the HB tool which can be downloaded from the HB products webpage
The sensor can provide two types of alarm depending on the device connected to the sensor.



1 brown	**+24 VDC or 24 V AC**
2 White	**- common or 24 V AC**
3 Blue	**Digital Alarm Output**
4 Black	**Analog Output 4-20 mA**
5 Grey	**Communications**

It can provide a digital alarm on pin 3, when a leak occurs and at the same time the mA signal exceeds 16mA. Both or one of the two alarm outputs can be used.

When the sensor is used for both oil detection and CO2 leakage it must be installed at the bottom of a shell and plate or shell and tube vessel where the oil is collected.

The analog output on pin4 is used when oil is detected

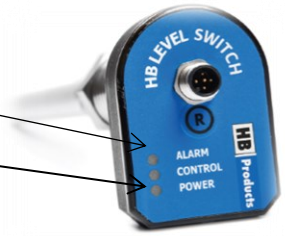
- When the sensor is in oil it will deliver less than 8 mA
- When the sensor is in liquid ammonia it will deliver between 8 mA and 16 mA
- When there is leakage, it will deliver more than 16 mA

When there is leakage there will alarm output on pin3 as well.

LED indication

Irrespective of the output function NO/NC, Alarm LED is activated at a leakage.

Alarm LED is activated when sensor detects leakage
Power LED flash green when the power is on



Sensor repair

The sensor electronics are completely sealed and cannot be repaired.
In case of faults with the sensor, it will typically only be necessary to replace the electronics.

Complaint cases are handled by the HB Products dealers/distributors.
Their complaints procedures must be followed before returning the sensor

For any inquiries or further information, please don't hesitate to contact us at support@hbproducts.dk.

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