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UPTIME AND EFFICIENCY
IN THE REFRIGERATION INDUSTRY

Instruction Manual

HBGS – NH3 Leakage Sensor

Table of Contents

Safety Instructions

CAUTION! Always read the instruction manual before commencing work! Read all warnings to the letter! Installation of the sensor requires technical knowledge of both refrigeration and electronics. Only qualified personnel should work with the product. The technician must be aware of the consequences of an improperly installed sensor and must be committed to adhering to the applicable local legislation.

If changes are made to type-approved equipment, this type approval becomes void. The product's input and output, as well as its accessories, may only be connected as shown in this guide. HB Products assumes no responsibility for damages resulting from not adhering to the above.

Explanation of the symbol for safety instructions. In this guide, the symbol below is used to point out important safety instructions for the user. It will always be found in places in the chapters where the information is relevant. The safety instructions, and the warnings in particular, must always be read and adhered to.

	CAUTION! Refers to a possible limitation of functionality or risk in usage. NOTE! Contains important information about the product and provides further tips. The person responsible for operation must commit to adhering to all the legislative requirements, prevent accidents, and do everything to avoid damage to people and materials.

Intended use, terms of use. The NH3 leakage sensor is designed for leakage measurement in and around industrial refrigeration systems. If the sensor is to be used in a different way and if the operation of the product in this function is determined to be problematic, prior approval must be obtained from HB Products.

Prevention of collateral damage Make sure that qualified personnel assess any faults and take necessary precautions before attempting to make replacements or repairs, so as to avoid collateral damage.

Disposal instructions: The sensor is constructed so that the modules can easily be removed and sorted for disposal.

Introduction

HBGS fulfils the requirements for gas leakage measurement in accordance with F-GAS regulation EU/517/2014. HBGS detects NH3 (R717) in a range of 0… 500 ppm. It is an independent unit that must be supplied with 24 V DC. It has 3 built-in digital alarm outputs and 1 analogue 4… 20 mA output. The sensor can be set up using a PC with the HB Configuration Tool – Requires HBGS-NH3-ServiceKit.
Note:
Before testing and start-up, the sensor must be connected with power supply for a minimum of 24 hour

Design and Function

The sensor differentiates itself from other sensors on the market by having a measuring head that remains stable for a longer period (thick film metal oxide semiconductor type). The sensor element can easily be replaced.
On the front, you can find 4 integrated LEDs for display of the supply (green) as well as 3 alarm levels (red, orange, and yellow). Similarly, there is a reset button in case an alarm is triggered. The sensor is factory calibrated and does only require additional calibration in special applications with high gas concentration. The sensor is optimized for use in areas where cleaning solvent are used. Built-in heating element ensures low ambient temperatures down to -20 ° C.
The sensor comes with a calibration certificate as well as with preconfigured alarm limits.

Technical Data

Supply voltage:	24 V DC – Power consumption max 3watt
Connection:	Screw terminals
Cable glands:	2 x PG7
Alarm:	Can be configured with HB-tool and the HBGS-NH3-ServiceKit
Alarm limits:	25 to 500 ppm

Standard alarm configuration:

Alarm A:	400 ppm NO/NC (Main alarm acc. to EN378)
Alarm B:	250 ppm NO/NC (Pre-alarm acc. to EN 378)
Alarm C:	100 ppm NO/NC (Pre-alarm acc. to EN 378)

Output:

Analogue output:	4-20 mA
Max load:	500 ohm
Alarm output:	3 x SPDT, 0,5A

Installation conditions:

Ambient temperature:	-20…+50°C
Waterproof rating:	IP20, box IP65

Certifications:

EMC Emission:	EN61000-6-4
EMC Immunity:	EN61000-6-2

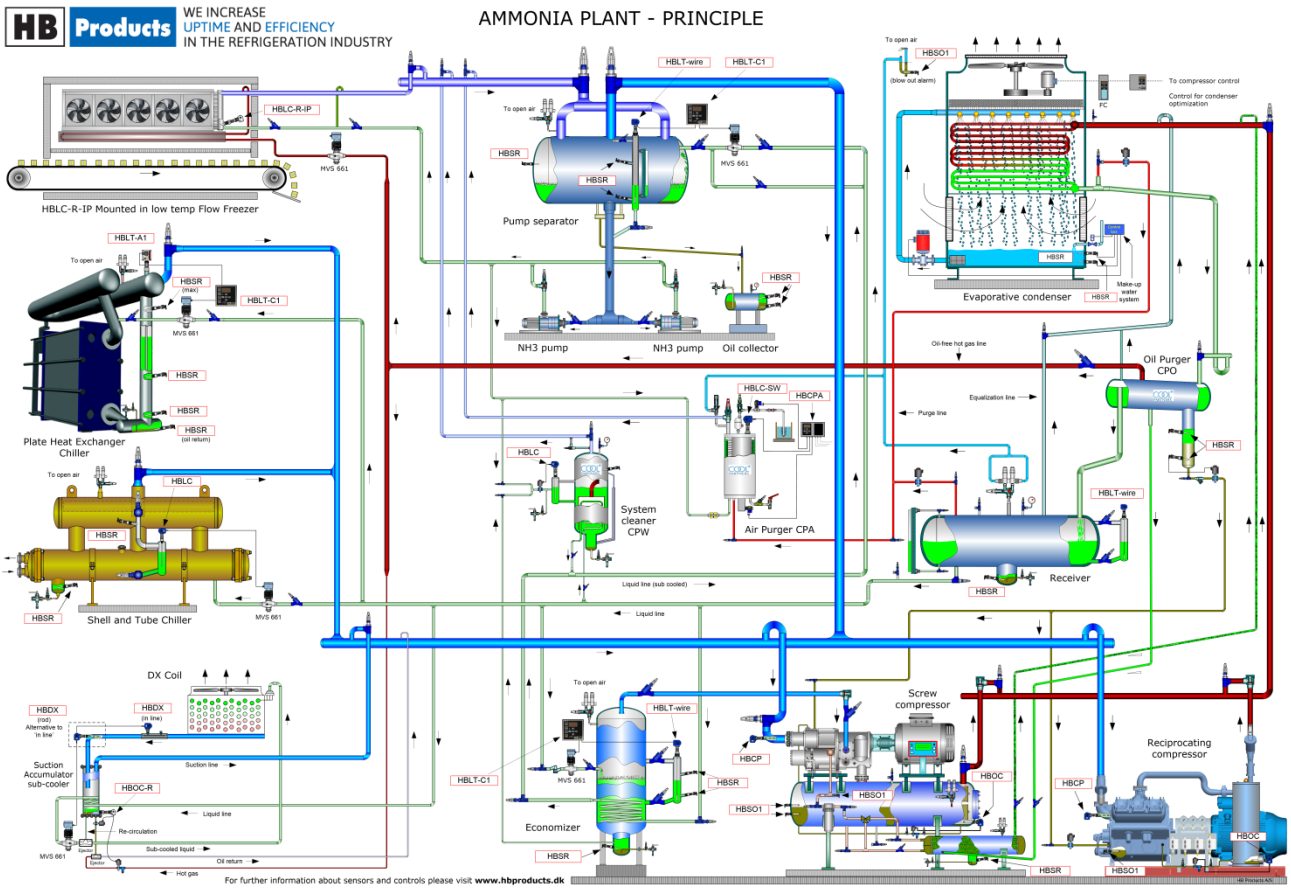
Mechanical specifications:

Dimension:	82 x 59 x 126 mm
Material:	Plastic
Mounting:	On walls with screws

Application Examples

The sensor is designed for leakage measurement of NH3 refrigerant in industrial refrigeration systems. It can be installed in/by:

- The machine room
- The cold storage room
- The air conditioning system
- The chiller system



Installation Instructions

The following applies to system design:

1) The sensor may be installed and supplied with a standard unshielded cable. If the EMC is higher than described in EN 61326, a shielded cable must be used.
2) The sensor must be mounted at a distance of at least 20 cm from the ceiling, walls, and other elements.
3) The sensor must be mounted at a distance of at least 150 cm from the floor.

For ammonia refrigeration systems, HB Products recommends sensor installation at the following locations:

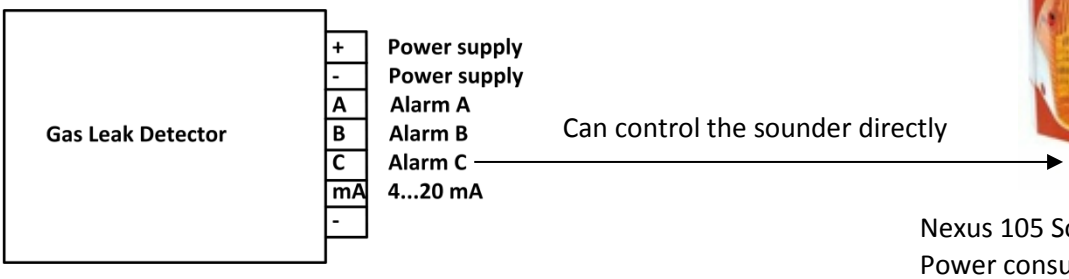
A. At the safety valve and valve stations
B. In the machine room
C. At the pump separator
D. At the evaporators

The following also applies:

- The sensor must be mounted where it is most likely that a leak will occur.
- Ammonia is lighter than oxygen at refrigeration temperatures, but at freezing temperatures, ammonia is heavier than oxygen.
- Leaks are most likely to occur at pumps, compressors, flange connections, and valves.
- If a ventilation system is installed, it would make sense to place a sensor in front of the intake points.
- For pressurised containers, the sensor should not be mounted right next to the container since the pressure will create a cloud formation with dead zones.
- By safety valves, the sensor must be placed 1-2 m over the outlet of the valve to attain the fastest sensor reaction.
- It is recommended to install the sensor in stairways and other places where gas pockets can form.

Electrical Connection

The sensor is supplied with 24 VDC.



Nexus 105 Sounder w. orange flash
Power consumption max 1.6watt

LED Indication
On the front of the sensor, LED indication is integrated for power supply ON and alarm indication A, B, & C.

Alarm LED (3 alarm levels) is activated in case of a leak

Power LED is activated when the sensor is being connected to power.

Alarm Reset
In case of a leak, an alarm is triggered. The alarm can be reset by holding down "R" for a few seconds. If the alarm activates again after reset, there is still an ammonia leak in the room.

Sensor function test

Note: Before testing and start-up, the sensor must be connected with power supply for a minimum of 24 hours.

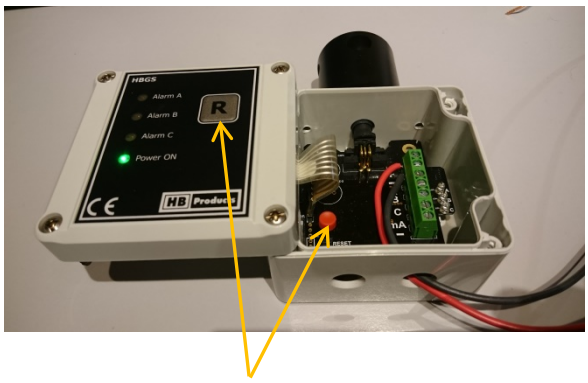
Use Ammonia calibration gas to be sure your gas detection instrumentation is functioning properly.
Since the sensor is a safety unit, we recommend testing it according to applicable legislation and standards, at a minimum rate of once a year. HB Products provides a test kit as an accessory, test gases must be purchased locally as they are subject to restrictions during shipment with various concentrations: 100, 250, and 500 ppm. The sensor should normally not be calibrated since the sensor head is stable for long-term, If necessary calibration can be done as a one point calibration with 250ppm test gas.
The sensor can be set in service mode to check alarm limits with test-gas without switching on the alarm.

1. Service mode ON: Push and hold the Reset button for 20 seconds, when Alarm-A LED light it`s ON.
2. Service mode OFF: Push and hold the Reset button for 10 seconds, when Alarm-A LED light it`s OFF.

Sensor Calibration:

One-point calibration:
Put the lid on as shown on the picture so it`s possible to push both buttons at the same time.
Mount the HBGS-Test adaptor as shown on the sensor head and connect test gas.
Press and hold both buttons for approximately 5 seconds. (Internal and outside “R” button), low Alarm B LED on the front turns on and it is now in calibration mode.
After 1 min in calibration mode, the analogue output starts to show the gas concentration in mA.
Apply test/calibration gas for 5 to 10 minutes or until mA output stabilizes.
Calibration data/value is saved by pushing one of the buttons.
Alarm B turns off and data is stored.
After approximately 30 seconds the sensor will restart and then after 1 minute mA output shows gas concentration in mA.
Now the sensor is in service mode press the “R” button for 10 or 15 seconds to bring it back to normal mode.
* The sensor is in service mode to allow time to remove the test gas without activating the alarms.

Analogue output signal:
0-25 ppm = 4,0mA
100 ppm = 7,2mA +/-10%
200 ppm = 10,4mA +/- 15%
250 ppm = 12,0mA +/-20%
500 ppm = 20mA +/- 25%



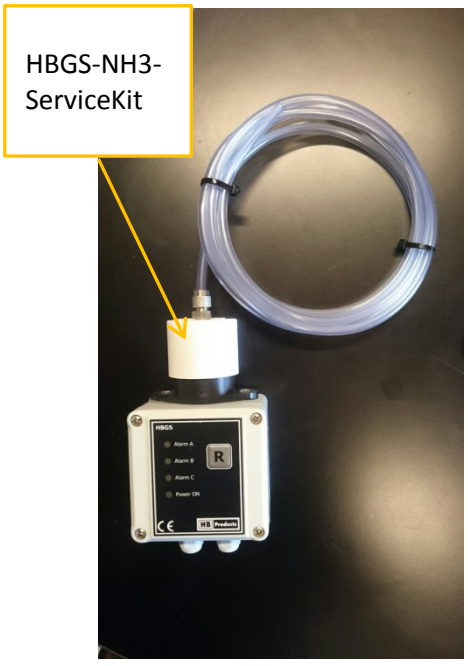
Push buttons used for calibration

Accessory for test and Calibration:

HBGS-NH3-Service Kit

Part no. Complete:	HBGS-NH3
Part no. Sensor Part:	HBGS-NH3-Detect-Unit
Part no. Service kit:	HBGS-NH3-ServiceKit
Part no. Sounder/light:	Sounder Beacon

HBGS-NH3-ServiceKit includes HBxC-USB (Cable) and HBGS Adaptor



Sensor Repair

A separate sensor head can be ordered with product no.
HBGS-NH3-Detect-Unit (NH3-HEAD). The sensor head can be replaced directly and requires no calibration.

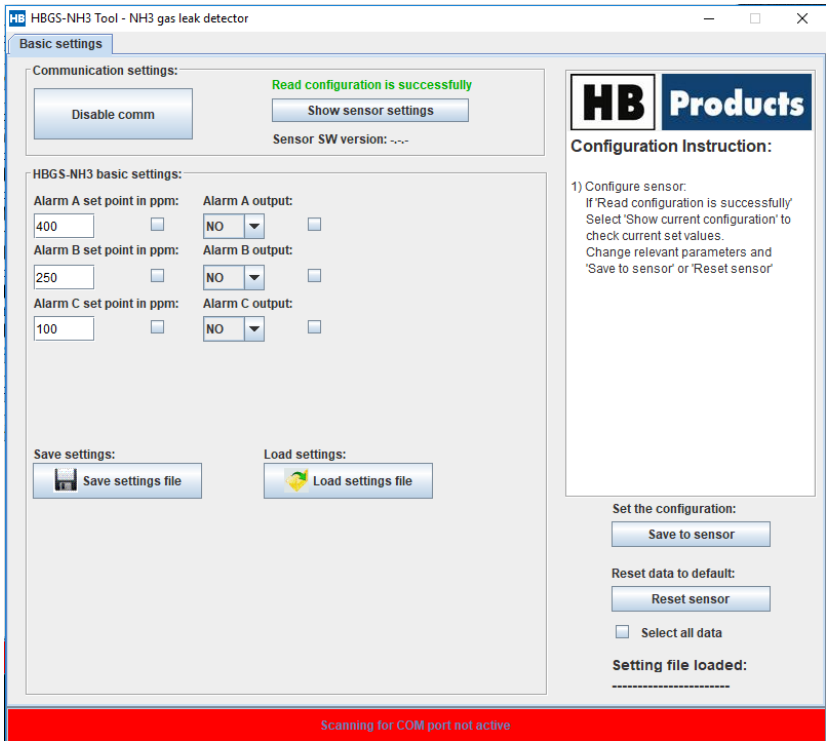
Complaints are processed by HB Products’ dealers/distributors. Please consider their complaint procedures before returning the sensor.

Configuring the sensor

The HB Products PC-Tool can be found at: https://www.hbproducts.dk/en/software1/hb-tool.html

Unscrew the two Philips screws on the top and connect the HBxC-USB to the HBGS-USB-ADAPTOR. Connect the HBGS-USB-ADAPTOR to the M12 circular connector of the main unit. Supply the sensor with 24VDC.

The senor will only be able to connect to the PC during power-up.



History:
26.04.2019, tolerance for mA output is change (page 7).

Further Information

For further information, please visit our website, www.hbproducts.dk, or send an email to: support@hbproducts.dk.
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