SAFETY SOLUTIONS

PH – GAS – STG SENSORS

HB Products

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INTRODUCTION

•This presentation is about our safety solutions including Gas Alarm, PH Sensor, and STG Sensor

• Please note that we constantly improve and modify our presentations. This is our latest version, 2022.

• If you have comments or suggested improvements, please contact:
Henrik Kudsk, product manager, hk@hbproducts.dk

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PH SENSOR

How to use pH sensor for detection of Ammonia leakage into brine

When ammonia leak into brine the pH value will increase and this can be detected by the pH sensor. The sensor is suitable for surveillance of the pH value of most brines used in chillers and refrigeration systems.

Different chemical additions are used to lower the freezing point of the water, but they will also impact the pH value when ammonia leak into the brine. Salt like NaCl and potassium salts will act as a buffer and slow down the reaction, whereas glycol and ethanol have no impact on the pH development.

The sensor cannot be used in systems without water like hydrocarbon liquids. For other liquids please contact the supplier of the brine or HB Products for more information.

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PH SENSOR

In fresh water and mixtures of water, ethanol, methanol, and glycol, a leakage of 1ml ammonia/It will increase the pH value rapidly from 7 to 10.

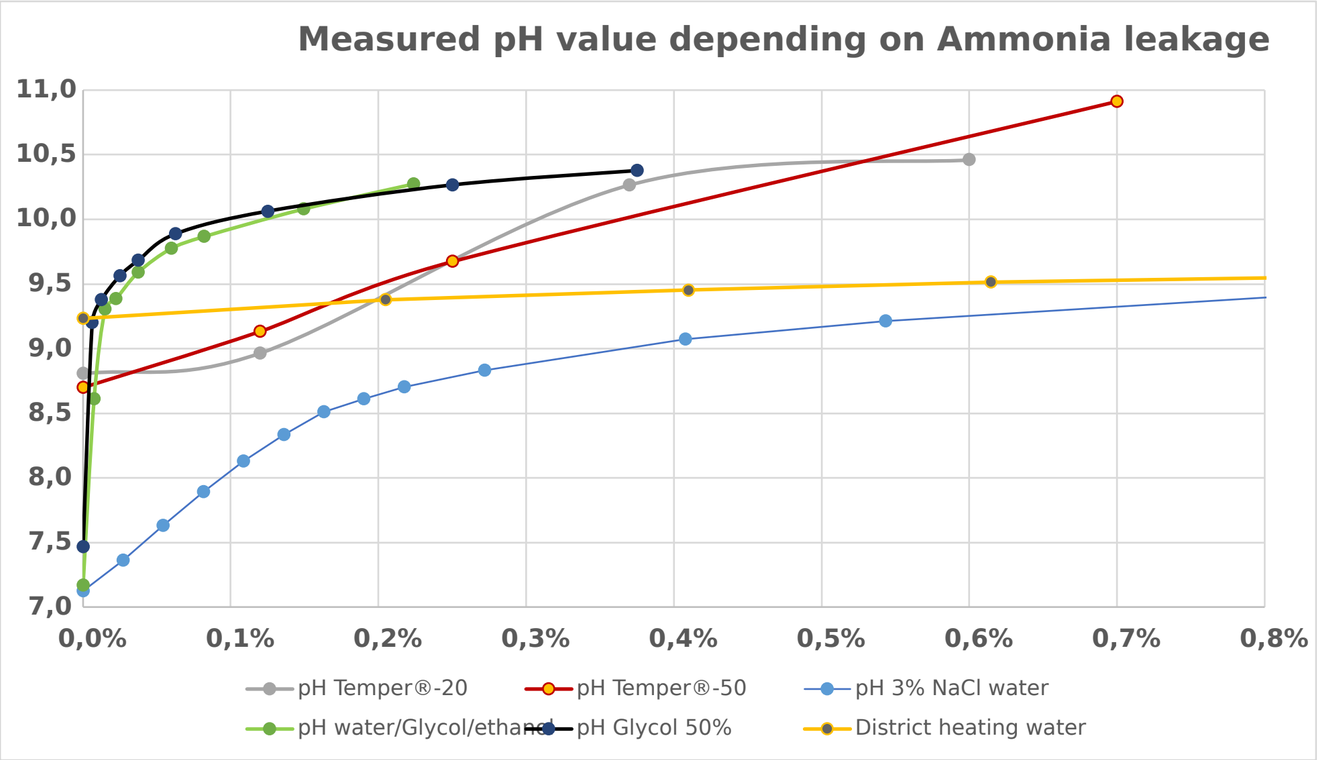
Brines using NaCl will still start at around pH7, and react slower than pure water, but there is still a clear reaction. For brine systems using potassium formate or potassium acetate, the pH value is above 8 to start with and the reaction is similar to brines with NaCl.

The diagram shows measured values for how the pH value develops when ammonia is added to different brines.

Freshwater has the same curve as the glycol/ethanol/water mixtures.

Temper® is a brine from Temper Technologies which use potassium formate or potassium acetate to lower the freezing point and the have a pH value be- tween 8.5 and 9.

PH SENSOR



The HBPH is a two wire sensor with an 4-20mA analog output. The sensor is suited for temperatures down to –15°C {5F). For temperatures below this the sensor need to installed in a bypass where you have to heat the brine passing the sensor.

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PH SENSOR - ALARMS AND WARNINGS

A pH sensor will change calibration over time depending on the fluid it is operating in. If you like to get a warning when the sensor has drifted in calibration you can set up a two-level warning/alarm system.

A two-level warning /alarm system provides a warning when you need to check your sensor calibration and a second level where you stop due to leakage. If you have a base pH value of 7 it will make sense to use a warning for pH above 8 and pH below 6 .

The second level can then be an alarm at pH=9. With such a system it is not necessary to make frequent checks and calibrations, however, we recommend an annual check of the calibration.
For other brine systems like those using NaCl, potassium formate, or potassium acetate it is more complicated and the limits have to be different.

Alarm settings for water, and glycol brines

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THE NEED FOR CALIBRATION

When delivered the sensor will have a basic calibration. This means that the sensor has to be calibrated if you need a precise and accurate output.

If you like to use the sensor for detecting ammonia leakage into freshwater of mixtures between water and ethanol/methanol/glycol a calibration is normally not needed.

If you like to use the sensor in other brines with a higher pH value or in NaCl brines, we strongly recommend a calibration. The reason is that an ammonia leakage will not impact the pH value as much in these fluids, because they act as a buffer.

HOW TO CHECK FUNCTIONALITY

If you like to check the functionality in pure freshwater or fresh water mixed with ethanol/methanol/glycol it is simple - you can just dip the sensor into a 0.1% solution of ammonia into the water.

GAS ALARMS

HBGS fulfills the requirements for gas leakage measurement in accordance with F-GAS regulation EU/517/2014.

HBGS detects NH3 (R717) in different ranges from 0-100 ppm up to 0-15 % and CO2 (R744) in a range of 0-10000 and 0- 20000 ppm.

It is an independent unit that must be supplied with 24 V DC. It has 3 built-in digital alarm outputs and one analog 4-20 mA output.

You can adjust the alarm using a PC with the HB Configuration Tool and a special USB cable and an adapter

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DESIGN AND FUNCTION

The NH3 sensor versions up to 5000 ppm use a sensor head that has a lifetime of two years in severe conditions and longer if no NH3 is present during normal operation.

The CO2 sensor versions and the NH3 15 % have a lifespan of more than 5 years. All sensor elements can easily be replaced and do not require a new calibration.

-4 integrated LEDs for display of the supply (green)

-3 alarm levels (red, orange, and yellow).

-R button is used for resetting after an alarm and putting the sensor in service mode used when doing maintenance with controlled gas leakage.

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CALIBRATION

The sensor is factory calibrated and does only require additional calibration in special applications.

The sensor comes with a calibration certificate as well as with pre-configured alarm limits.

ENVIORMENT

The sensor is optimized for use in machine rooms and similar environments. The built-in heating element ensures operation in ambient temperatures down to -30 ° C.

LOCATION FOR INSTALLATION

A. At the safety valve and valve stations
B. In the machine room
C. At the pump separator
D. At the evaporators
E. At condensers when mounted indoor

GAS ALARMS FOR AMMONIA AND CO2

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Gas Alarms for Ammonia and CO2

Ammonia	CO2
0-100 ppm	0-10000 ppm
0-300 ppm	
0-1000 ppm	
0-5000 ppm	
0-15 % (1-100% LEL)	

3 configurable alarms and 4-20 mA measurement output

ALARM RESET

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 RESETTING, THERE IS STILL A GAS LEAK IN THE ROOM.

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STG SENSOR

- It signals the escape of refrigerant gas, avoiding its dispersion in large quantities
- Suitable for any type of refrigerant
- Retrofit on any type of system
- It can be interfaced with the most common plant control systems
- Visual alarm signaling
- Easily installable
- Long duty cycle
- Reusable even after your surgery
- It reduces intervention and maintenance costs in case of opening one or more safety valves
- Increases safety for people operating nearby
- It does not generate pressure drops

STG SENSOR

The STG sensor has the function of detecting any leakage or opening of the safety valves in industrial refrigeration systems, operating with any type of refrigerant gas.

When the alert or alarm value of the presence of refrigerant gas is exceeded (threshold values set by the user), the device will signal the alarm to the control and activate a visual signal locally.

Furthermore, using the MODBUS protocol, it is possible to view values such as % Gas Presence, % Alert Gas Presence, % Alarm Gas Presence and set the related thresholds.

STG SENSOR

The STG sensor is available in 2 different versions:

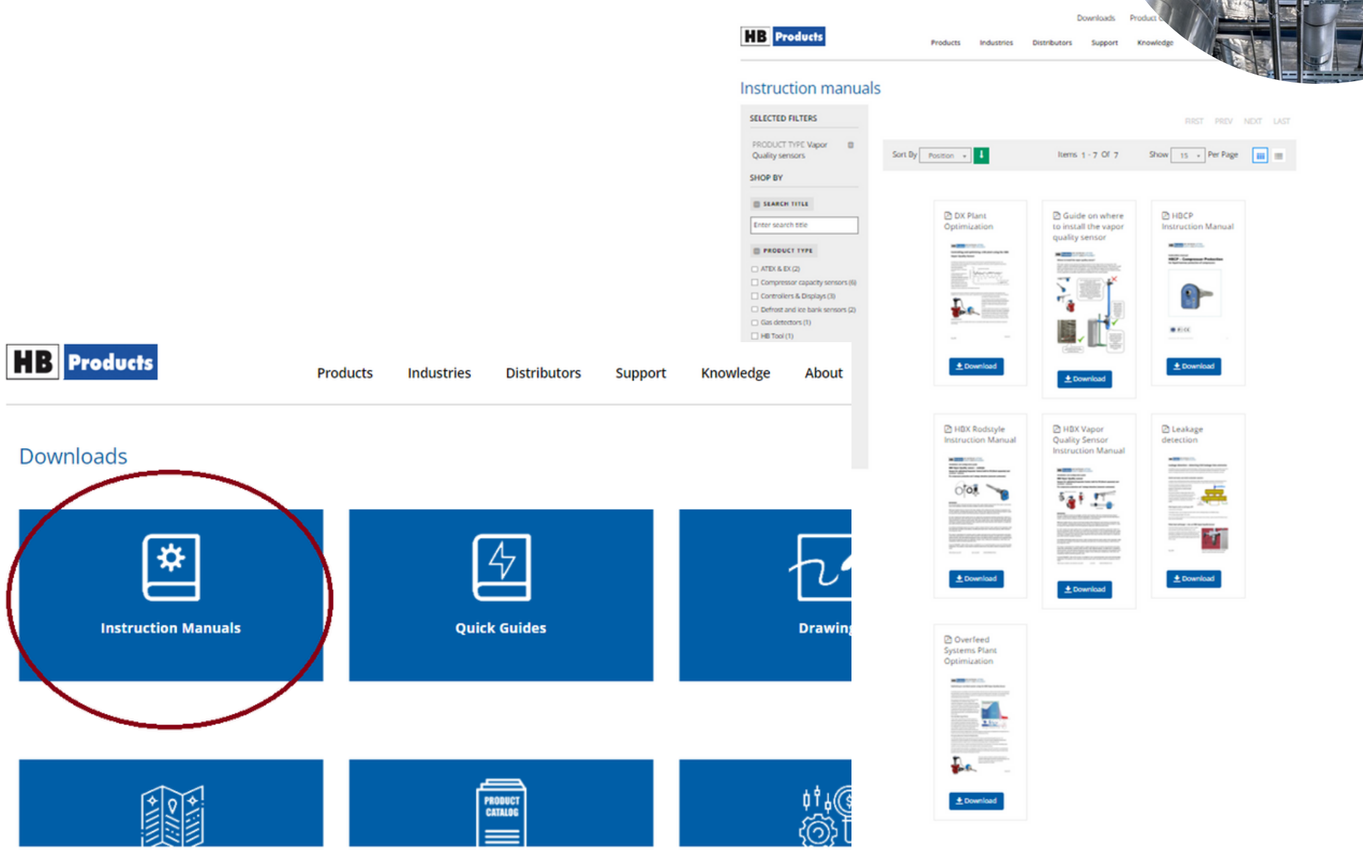
STG – B: Equipped with a relay with three contacts (C- NO - NC), a Modbus RS-485protocol, and powered by 24 V DC.

STG – F: Equipped with a relay with three contacts (C- NO - NC), a Modbus RS-485 protocol, two analog outputs 0-10V / 4-20 mA, and powered by 24 V DC.

In addition, both versions will be equipped with a local visual alarm signal that also allows the display of the status in real-time.
Thanks to its 1" threaded connection, the STG sensor can be easily installed on an outlet pipeline of one or more safety valves in the system. It can be used in stand-alone applications or connected through the analog, and digital outputs or through the RS485 Modbus serial link to a control system (electronic controllers, PLC or third-party devices), capable of performing any alarm procedures.

DOWNLOAD MATERIALS

Find under "Downloads" and "Knowledge" Including;
Instruction manuals - Brochures - Whitepapers - Case studies



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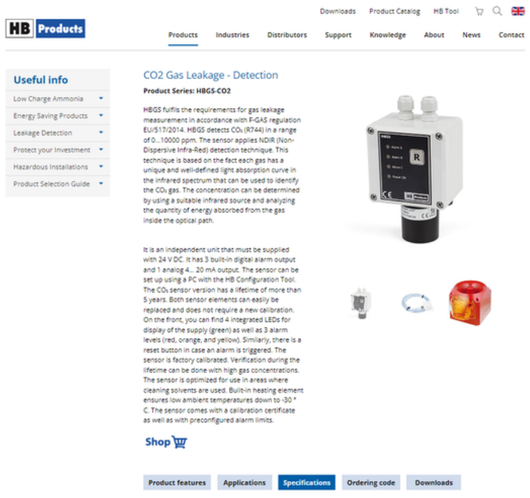
IF YOU LIKE MORE INFORMATION, FIND OUR INSTRUCTION MANUALS AND PRODUCT SPECIFICATIONS AVAILABLE ON OUR WEBSITE

WWW.HBPRODUCTS.DK

PRODUCT SPECIFICATIONS



INSTRUCTION MANUALS

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ADDITIONAL INFO

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