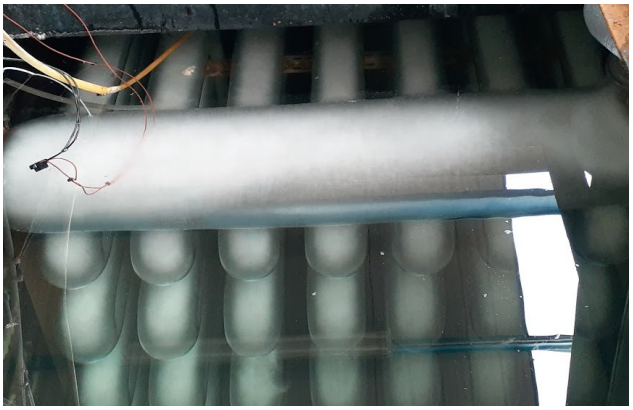
Installation and Calibration Manual

HBIB Ice Bank Sensor



Introduction

The HBIB sensor measures the ice thickness in an ice bank. The output is an analog signal 4-20 mA which increases linear to the ice thickness up to 40 mm and higher on request.

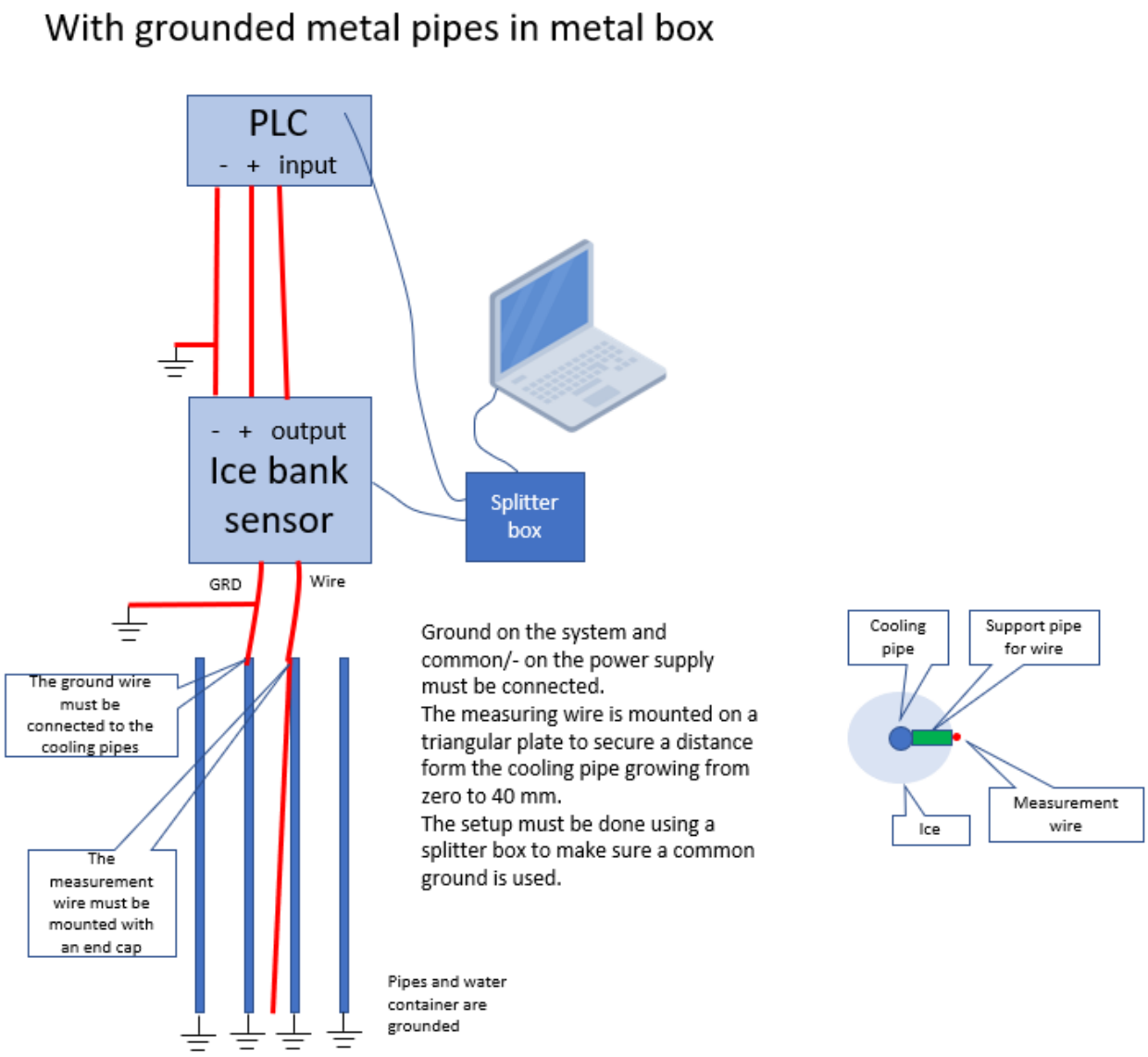
The sensor has a standard M12 interface like other HB-product sensors and is configured by the HB tool. For ice banks with metal pipes a splitter box is needed for setup. The product consists of a box and two steel wires where one is connected to ground. The active wire length is 2 times 1000 mm and fixed to a triangular plastic plate which secures a distance from the cooling pipe growing from 1 to 40 mm over the length.

The latest version has a connection from measuring wire to COAX wire which makes the sensor independent of the water level in the ice bank. This connection must be below the water level.

The sensor is based on the capacitive measurement principle and reacts on the amount of ice surrounding the measuring wire

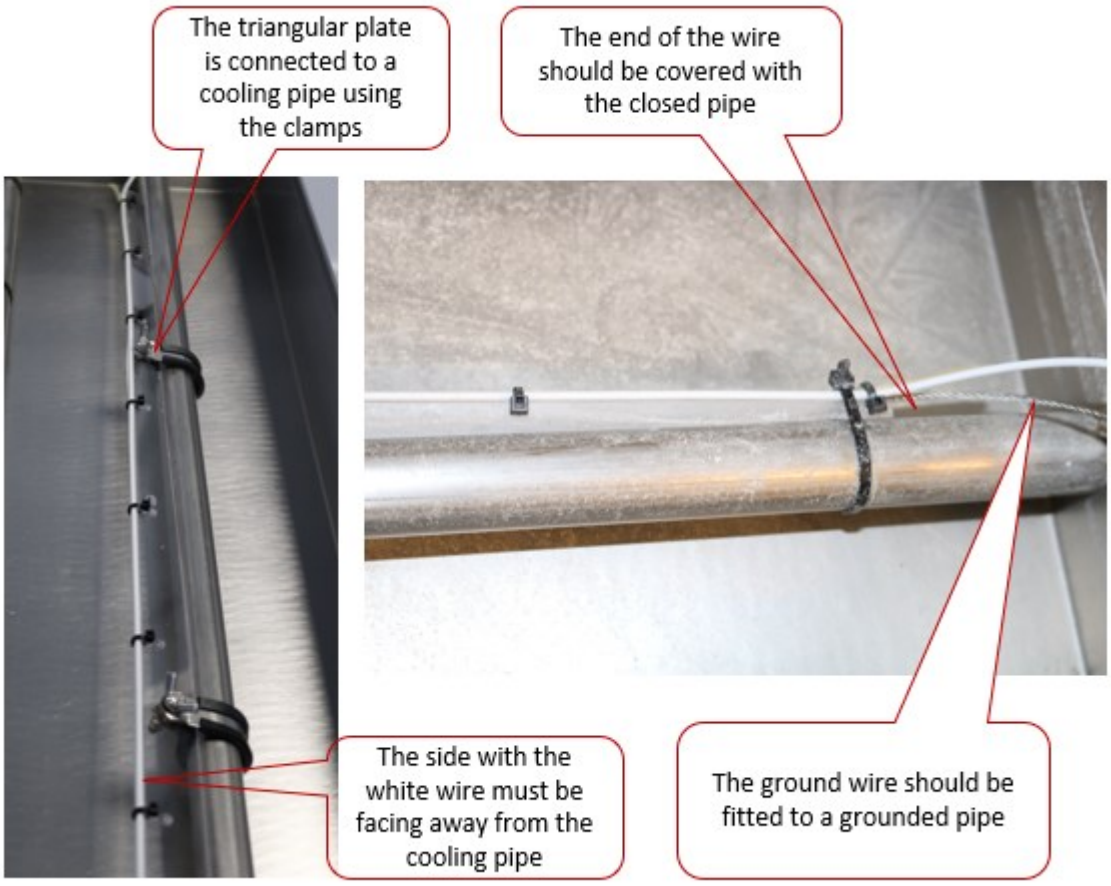
The sensor is based on a wire level sensor. The sensor measures the part of the wire which is surrounded by ice.

Installation



The sensor consists of a double measuring wire mounted on a triangular plastic plate. The plastic plate is kept in place by metal clamps and cable ties. The sensor element is connected to the electronic box.

How to install the sensor element



The connection between the COAX and the white measuring wire must be in the water. If it is above the water level the sensor will detect the water level in the ice bank

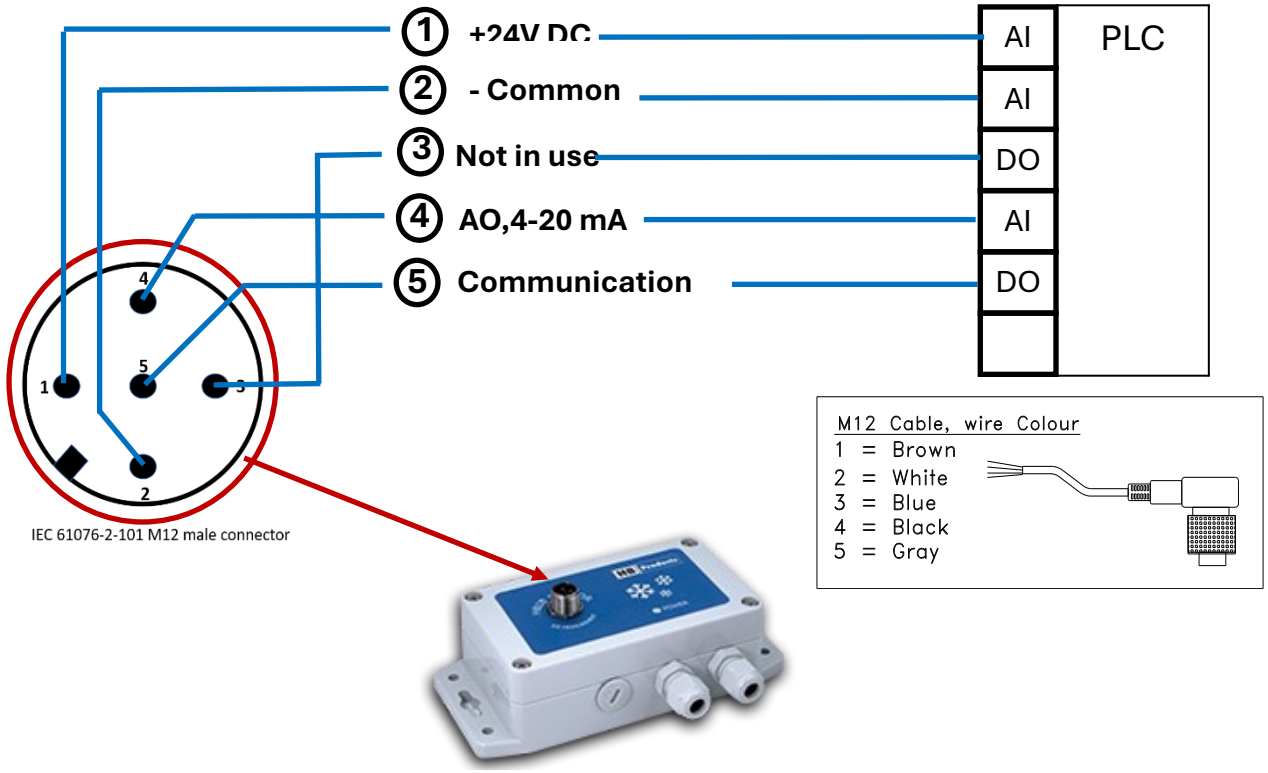
How to install the sensor – electrical connections

1) The electronic box is mounted on the ice bank less than 2m from the sensor element.
2) The screw terminal named “GND” ground is connected to the naked steel wire which is connected to the hose and another cooling pipe.
3) The other named “wire” is connected to the wire coming from the sensor element.
4) The first 300 mm of wire from the sensor element must be covered by the PTFE and steel mesh hose.

5) The connection between the box and a PLC can normally be installed with a standard unshielded cable. If the EMC is higher than described in EN 61326, a shielded cable must be used.

Wiring the sensor

After the wires are mounted in the ice bank they are connected in the box. The picture shows the inside of the box and it should be straight forward. Remember to remove the thin insulation from the wire ends before connecting.



The connection to the PLC is done according to the diagram above using a cable with a M12 Female connector. Stop start pin3 and Digital input for calibration pin5 is not relevant for the ice bank.

Inside the sensor

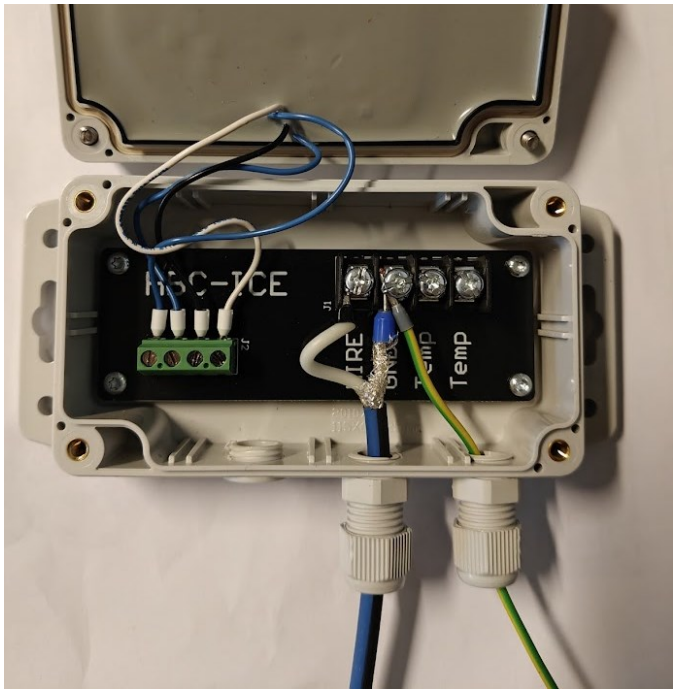
The two wires from the mechanical part in the ice bank are mounted like shown on the picture. The center wire in the COAX is connected to the “wire” connector.

The COAX shield and all ground wires are connected to ground (GND).

An additional wire between ground and the mechanical system or the water tank wall to secure good grounding.

The two terminals named “Temp” are not used in the ice bank sensor.

If the sensor is installed in areas with risk of condensation the glands need to be tight and firm to avoid problems with moisture.

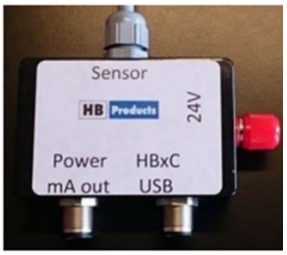


Sensor configuration

The sensor is preconfigured to deliver min. 4 mA when in water and max. 20 mA when the wire is fully covered with ice. Not all ice banks are identical and if you like to get 20 mA when it has maximum ice level and 4 mA when it is in water you need to make a calibration.

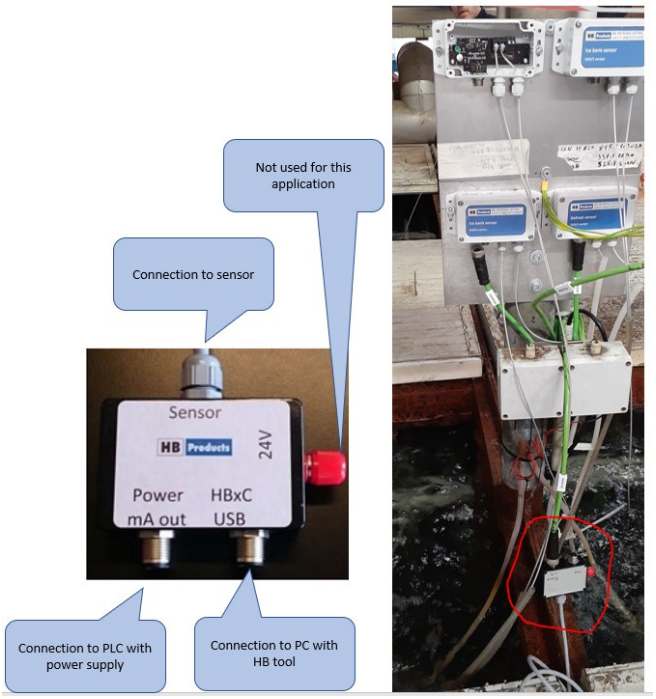
All HB-product sensors can be configured using a laptop and a “M12-USB” cable and a splitter box. The software can be downloaded freely on the HB products web page. The configuration data can be stored in the sensor and will be there until erased even without power connection—just like you store data on a memory stick. When you change a value/setting there will be put a check mark next to it and that indicates you have changed something and need to store the data in the sensor.

The splitter box is needed for setting up the sensor and only during setup. The box makes sure the power supply is coming from the PLC with the correct grounding. If the splitter box is not used the sensor will be powered from the pc and the sensor will be affected by improper grounding.



Calibration of the sensor

1. Install the sensor as described with the wires in cold water.
2. Connect the sensor to a laptop where HB tools are installed using the USB cable (a splitter box might be needed).
3. Click on “start scan” to get into the setup tool
4. The tool will show the window to the right.
5. When the sensor is in water click on “water calibration”
6. Start the refrigeration system and wait until maximum ice level is reached.
7. Click on the “Ice calibration” button on the screen. Now the zero calibration should be equal to the measurement you have with the frozen sensor.



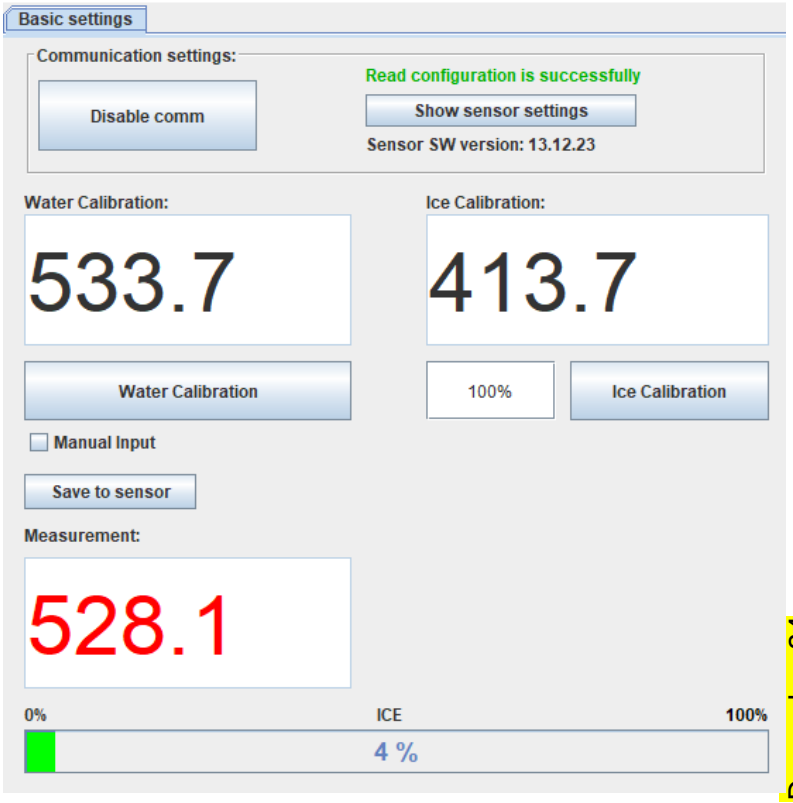
Now the sensor will be ready for use and send you a signal from 4 mA when the is only water and 20 mA for maximum ice level.

Alternative calibration

If you can’t reach maximum ice level, you can type in the percentage of ice before clicking the ice calibration

If you have more than one ice bank with the same configuration you can copy the data from the first one into the next one by

1. clicking on the “Manual Input” box
2. type in the values
3. click on “Save to sensor”



Support

LED display

The green LED should be flashing when power in on

Note! All terminals are protected against improper termination for a supply voltage up to 40 V. If the supply voltage is higher than 40 V, the electronics will

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

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

HB Products A/S
Bøgekildevej 21
DK-8361 Hasselager
Phone: +45 87476200
www.hbproducts.dk