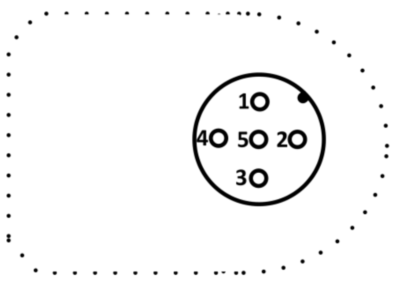
Electrical connection:

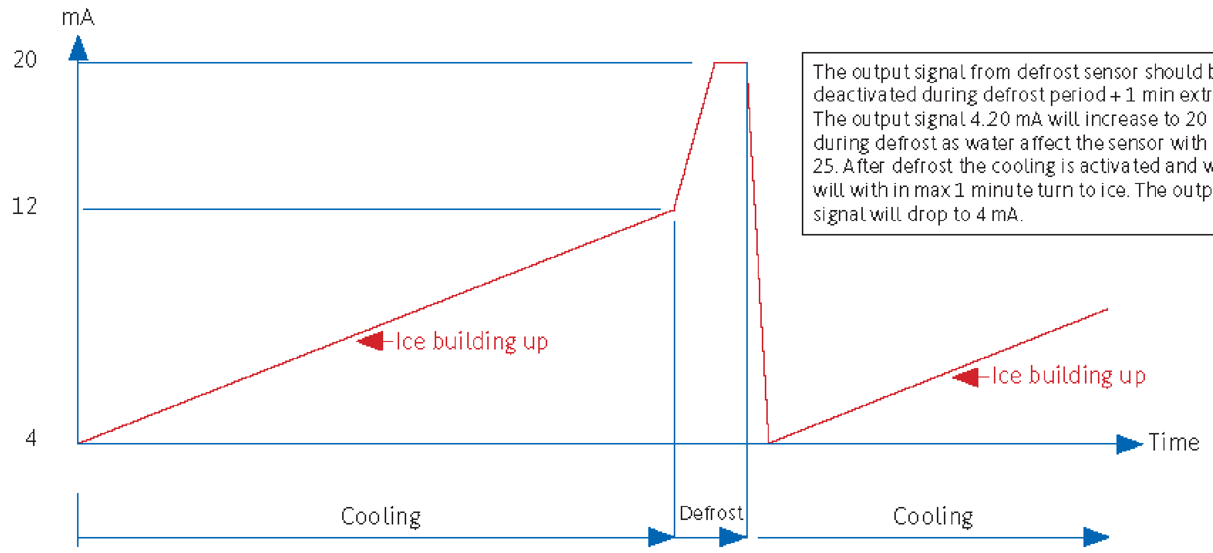
The sensor comes with a 5m connection cable as well as a programming cable. Supply and analog output are connected according to the diagram below:



1 = Brown [Supply + 24 V AC/DC]
2 = White [Supply – 24 V AC/DC]
3 = Blue [not in use]
4 = Black [AO, analoge output 4-20 mA]
5 = Gray [DI, Calibration Signal (5 to 24V DC)]

Pin 1 (brown) & Pin 2 (white): 24 V supply
Pin 2 (brown) & Pin 4 (blue): 4-20 mA output
Pin 3: Not in use
Pin 5 & Pin 2: Calibration from main PLC. Activate 7 sec. Wait 2 sec and then activate 2 sec again.

Sensor output signal:



The output signal from defrost sensor should be deactivated during defrost period + 1 min extra. The output signal 4.20 mA will increase to 20 mA during defrost as water affect the sensor with factor 25. After defrost the cooling is activated and water will with in max 1 minute turn to ice. The output signal will drop to 4 mA.

The time before defrost is based on visual inspection on set-up of defrost sensor.
Defrost time is as well set-up based on inspection on set-up of defrost sensor.

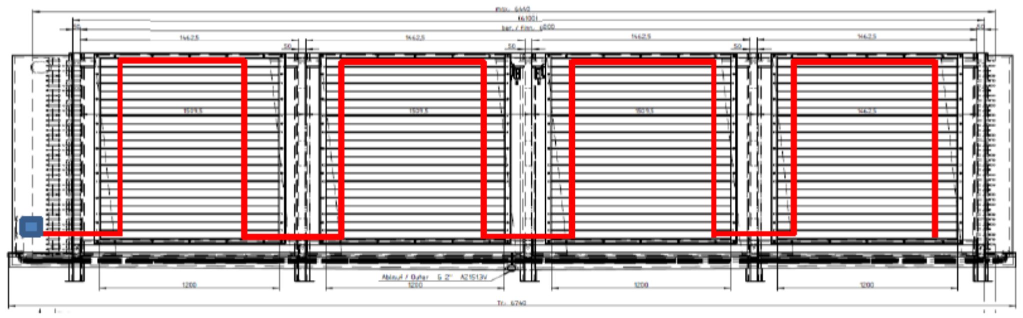
Quick Guide

HBDF Defrost Sensor

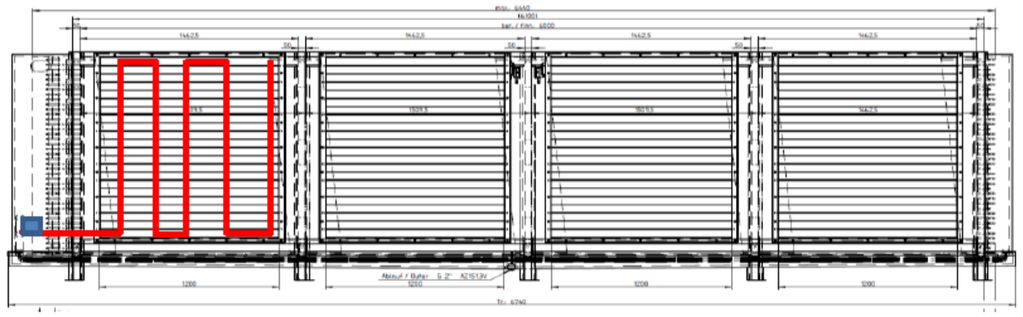
Defrost on demand

For installation on evaporators:

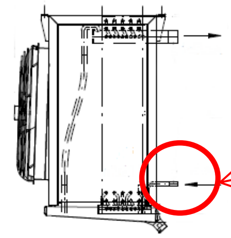
A



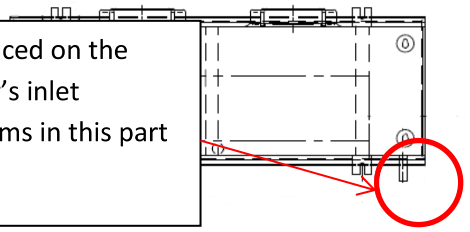
B



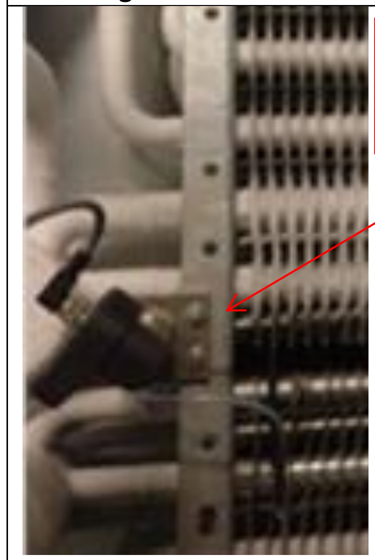
Placement of the electronics



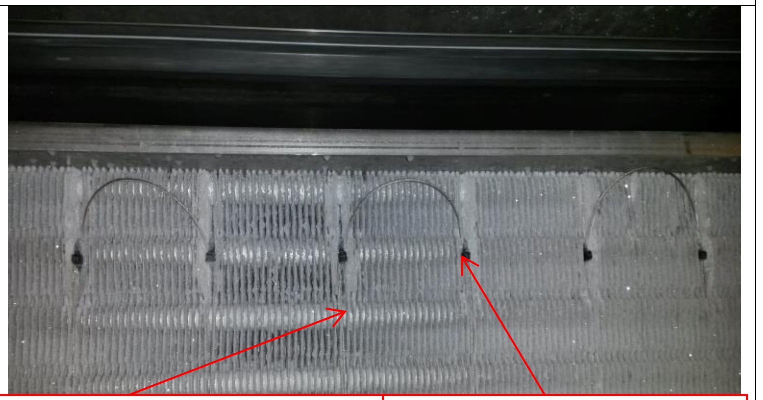
The electronic part is placed on the frame by the evaporator’s inlet connection, since ice forms in this part of the evaporator first.



Installing the electronics and wire along the ribs



The electronics are mounted on the frame

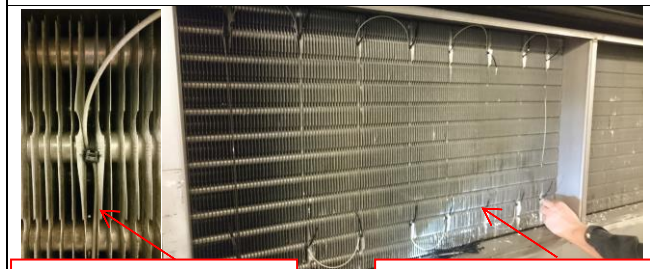


The wire must be placed between the ribs on the evaporator.

The wire is secured to the evaporator pipe with plastic strips.

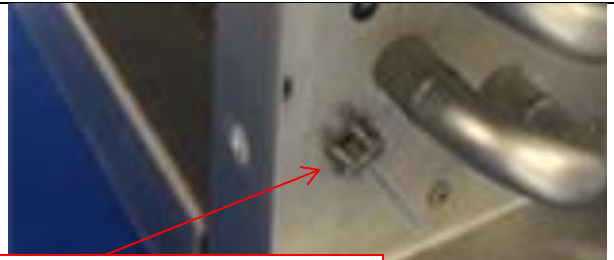
Mount the electronic part on the evaporator frame (by the evaporator’s inlet connection) so the wire can be freely connected parallel to the ribs

The wire with Teflon is installed parallel with the ribs in a distance of 100-200 mm. Secure the wire with plastic strips, so the wire is not moving when the fan is running. Be sure to place the wire between the fins. Be sure to mount the wire on the evaporator tubes where the ice is build up.



Keep the wire away from sharp edge.

Wire mounting example.



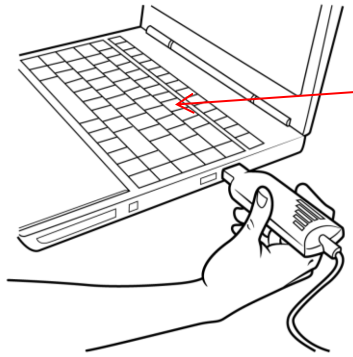
The wire end is terminated with wire termination cap.

The wire shall be placed between the ribs and it must be kept away from sharp edge.

The wire could be mounted as shown in the example. It shall always be mounted where there are ice.

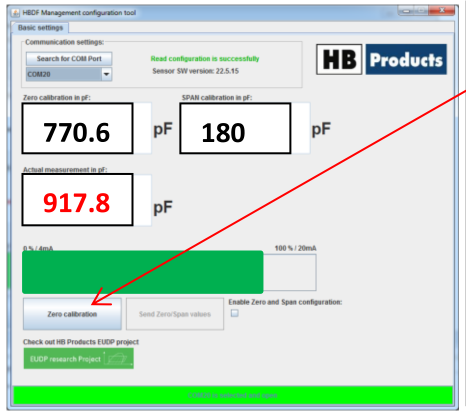
The wire is terminated with a wire clip in a pre-drilled hole so that the wire is kept under tension.

Calibration and setup of the defrost sensor



1) Install the HBP Tool software on the computer.
2) Connect the USB/M12 cable to a PC`s USB port.
3) Press scan for sensor and the HBDF tool opens up

Make zero calibration



HBDF Management configuration tool
Basic settings
Communication settings:
Search for COM Port
COM20
HB Products
0 % / 4mA
100 % / 20mA
Zero calibration
Send Zero/Span values
Check out HB Products EUDP project
EUDP research Project

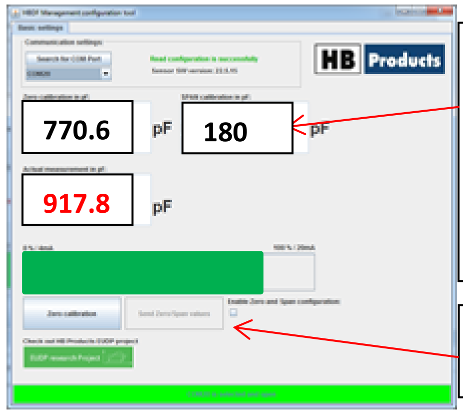
Read configuration is successfully
Sensor SW version: 22.5.15
Zero calibration in pF: 770.6 pF
SPAN calibration in pF: 180 pF
Actual measurement in pF: 917.8 pF
Enable Zero and Span configuration: ☐
COM20 is selected and open

Enable the zero calibration function and push on the button ”Send Zero/Span values” to file the entered values.

The sensor can as well be calibrated with the digital input on pin 5. The procedure for this is:

1) Activate the input signal in minimum 7 sec.
2) Wait 2 sec and then activate the signal once more for 2 sec.

Set SPAN value



HBDF Management configuration tool
Basic settings
Communication settings:
Search for COM Port
COM20
HB Products
0 % / 4mA
100 % / 20mA
Zero calibration
Send Zero/Span values
Check out HB Products EUDP project
EUDP research Project

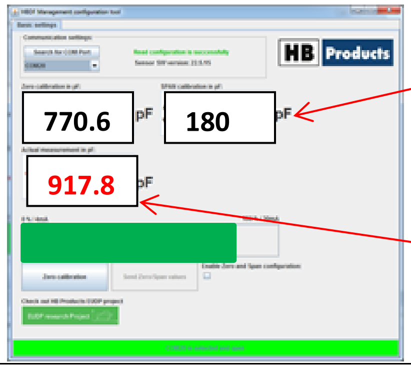
Read configuration is successfully
Sensor SW version: 22.5.15
Zero calibration in pF: 770.6 pF
SPAN calibration in pF: 180 pF
Actual measurement in pF: 917.8 pF
Enable Zero and Span configuration: ☐
COM20 is selected and open

The SPAN should be set to 180 pF. The optimal SPAN setting will be influenced by the length of the wire and how it is mounted. **Start with factory settings - a SPAN of 180.**

Sensor sensitivity depends on the SPAN setting. A lower SPAN setting will increase the output signal.

Push the button ”Send Zero/Span values” to file the entered values. Disconnect the programming cable and install the sensor electronic.

Increase of SPAN value



HBDF Management configuration tool
Basic settings
Communication settings:
Search for COM Port
COM20
HB Products
0 % / 4mA
100 % / 20mA
Zero calibration
Send Zero/Span values
Check out HB Products EUDP project
EUDP research Project

Read configuration is successfully
Sensor SW version: 22.5.15
Zero calibration in pF: 770.6 pF
SPAN calibration in pF: 180 pF
Actual measurement in pF: 917.8 pF
Enable Zero and Span configuration: ☐
COM20 is selected and open

If the output signal 4-20 mA shows 20 mA at limited ice thickness, the SPAN should be adjusted to a higher value.

The output signal from the sensor corresponds to the ice thickness build-up. 4 mA is equal to no ice build-up and 20 mA is equal to max ice build-up based on the programmed SPAN area.
This example shows an actual value which correspond to an ice thickness of 2mm. We recommend defrosting by an ice thickness of 1 to 1.5mm.