



Hydro-Probe BX Mechanical Installation Guide



To re-order quote part number:	HD1029
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The customer in applying the product described in this documentation accepts that the product is a programmable electronic system which is inherently complex and which may not be completely free of errors. In doing so the customer therefore undertakes responsibility to ensure that the product is properly installed commissioned operated and maintained by competent and suitably trained persons and in accordance with any instructions or safety precautions made available or good engineering practice and to thoroughly verify the use of the product in the particular application.

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Hydronix welcomes comments and suggestions relating to the product and this documentation

ACKNOWLEDGEMENTS

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If your feedback is concerning an Atex certified product or associated service it would be very helpful for you to give us your contact details and the model number and serial number of the product if possible. This will enable us to contact you with any relevant safety advice should this be necessary. It is not obligatory to leave your contact details and any information will be treated as confidential.

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Revision history

Revision No	Software Version	Date	Description of Change
1.0.0		July 2022	First Revision
1.1.0		Oct 2023	Updated mounting orientation and flow direction
1.2.0		Nov 2023	Updated dimension and sensor cleaning information

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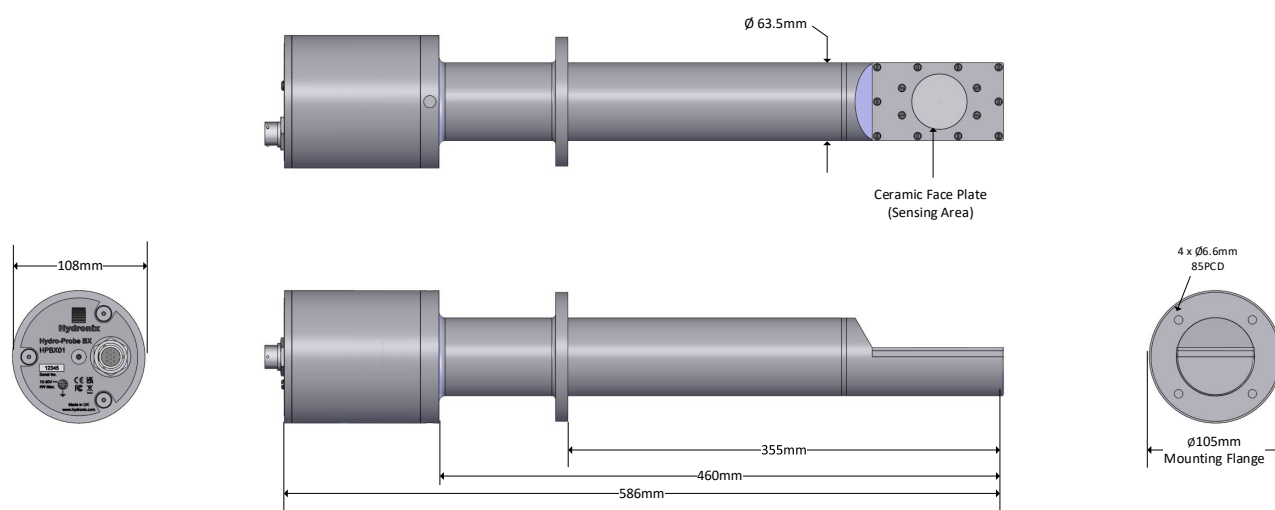


Figure 1: The Hydro-Probe BX

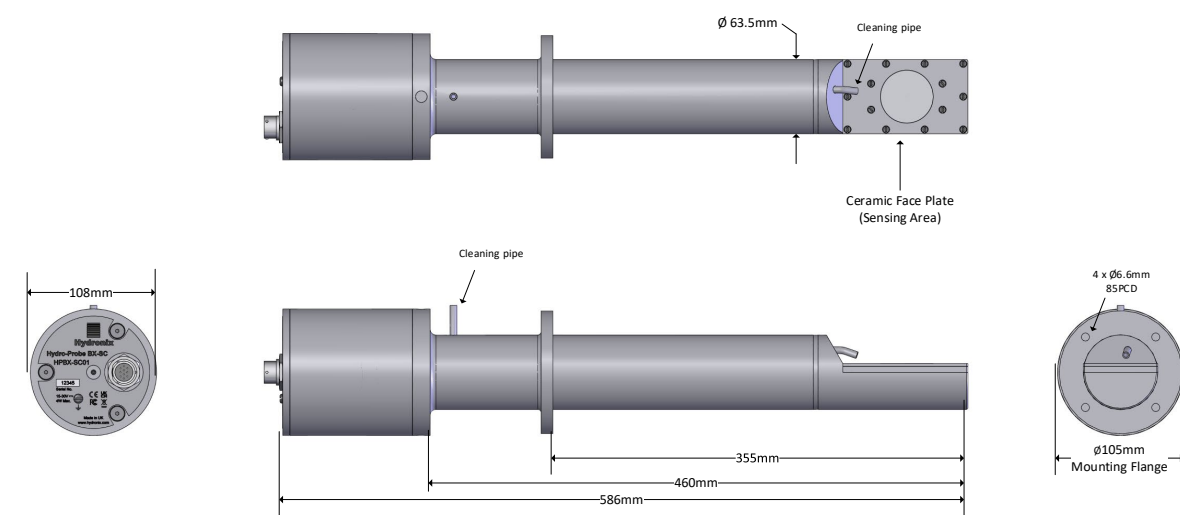


Figure 2: The Hydro-Probe BX-SC

Available Accessories:

0975A	4m sensor cable
0975A-10m	10m sensor cable
0975A-25m	25m sensor cable
0116	Power supply – 30 Watt for up to 4 sensors
0067	Terminal box (IP65, 10 terminals)
0049A	RS232/485 converter (DIN rail mounting)
0049B	RS232/485 converter (9 pin D type to terminal block)

SIM01A	USB Sensor Interface Module including cables and power supply
SIM02A	USB Sensor Interface Module. For use with Hydro-Com 2.3.0 onwards
EAK01	Ethernet Adapter Kit
EPK01	Ethernet Power Adapter Kit
3010	Mounting Boss
3020	Gasket (1 supplied with sensor)

Hydro-Com configuration and diagnostics software is available for free download from www.hydronix.com

1 General to all Applications

Follow the advice below for good sensor positioning:

- The 'sensing area' of the sensor (ceramic face plate) should always be facing the moving stream of material.
- The sensor should not obstruct the material flow.
- Avoid areas of severe turbulence. The optimal signal will be obtained where there is a smooth flow of material over the sensor.
- Position the sensor so that it is easily accessible for routine maintenance, adjustment and cleaning.
- To prevent damage to the sensor, position it as far as reasonably practical from sources of vibration.

2 Installing the Sensor

The Hydro-Probe BX is fitted to the vessel using the Mounting Boss (Part number 3010). A suitable hole will need to be cut to permit the installation of the Mounting Boss, **see Figure 3 for dimensions**. The Mounting Boss should be pressure tight welded to the vessel by a competent person in accordance with the local regulations and manufacturers' recommendations. The rubber gasket, supplied with the sensor, is installed between the Mounting Boss and the Mounting Flange on the sensor to ensure that a pressure tight seal is created, see Figure 4.

Due to variations in the design of vacuum vessels it is necessary to consult the manufacturer or a qualified person before any holes are cut or welding is attempted. During welding the sensor must be removed to protect the electronic circuitry within it.

The optimum location for the sensor varies depending on the type of installation – a number of options are detailed on the following pages.

Care should be taken to ensure that the Hydro-Probe BX has been correctly installed and in such a manner to ensure representative sampling of the material concerned. It is essential that the sensing part of the unit is fully inserted into the main flow of the material. It must not be installed in stagnant material or where a build-up may occur.

2.1 Mounting Arrangement

An optional Hydronix manufactured Mounting Boss (Part Number 3010) is available to assist with the installation of the Hydro-Probe BX in pressure vessels (Figure 3). The Mounting Boss will need to be pressure-tight welded to the Vessel.

It is important to note that the material must flow over the sensing faceplate of the Hydro-Probe BX, and that the flow must be as consistent as possible with minimal turbulence. If installed in a pressurised environment, the Mounting Boss must be installed by a competent person in accordance with best practice. All welds should be checked for integrity.

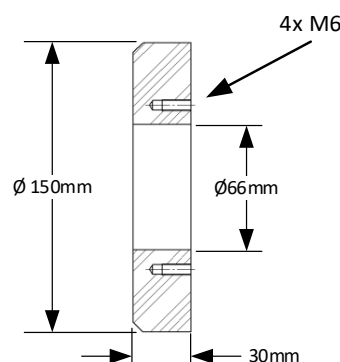


Figure 3: Mounting Boss (part number 3010)

2.1.1 Mounting in a Vessel

The Hydro-Probe BX can be installed in a vessel.

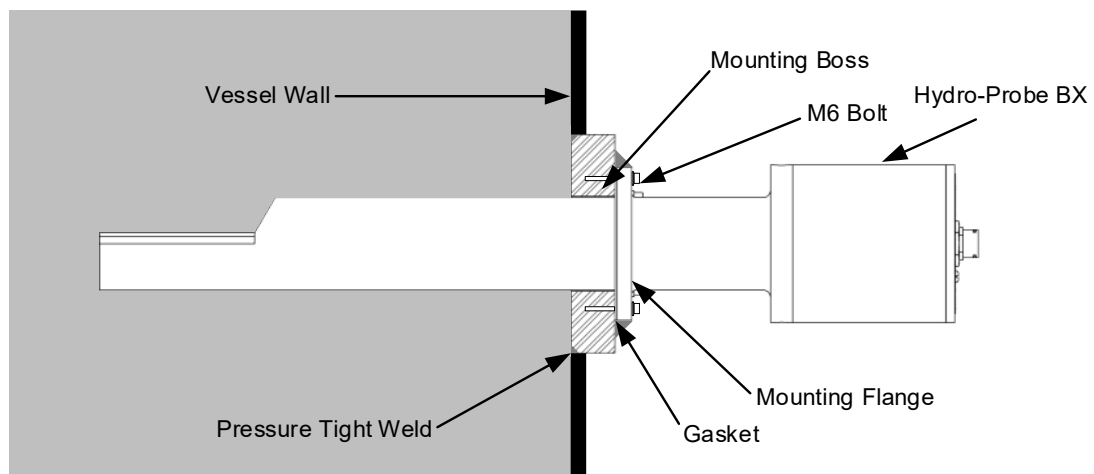


Figure 4: Mounting in a Pressure Vessel

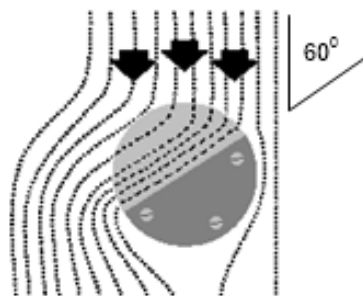


Figure 5: Sensing head orientation

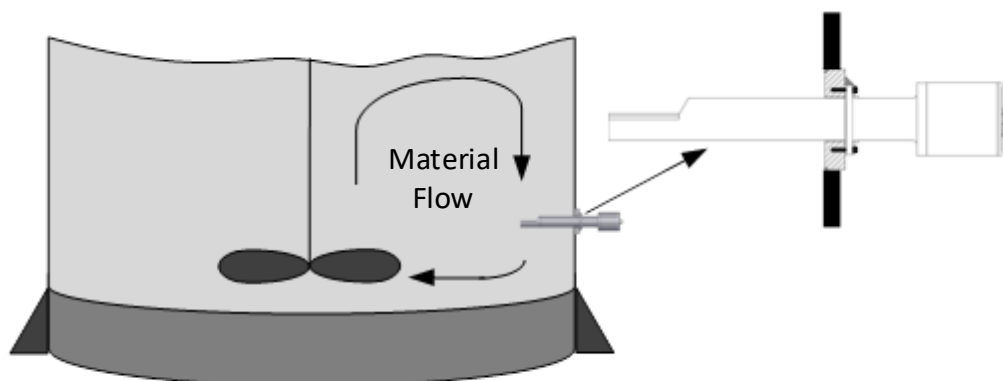


Figure 6: The Sensor Installed in Storage Tank

2.1.2 Mounting in a Pipeline

If the Hydro-Probe BX is to be installed in a measurement chamber in-line with a pipeline the chamber must remain completely full at all times to achieve reliable results. A bypass line should be installed to facilitate any maintenance of the sensor (Figure 7).

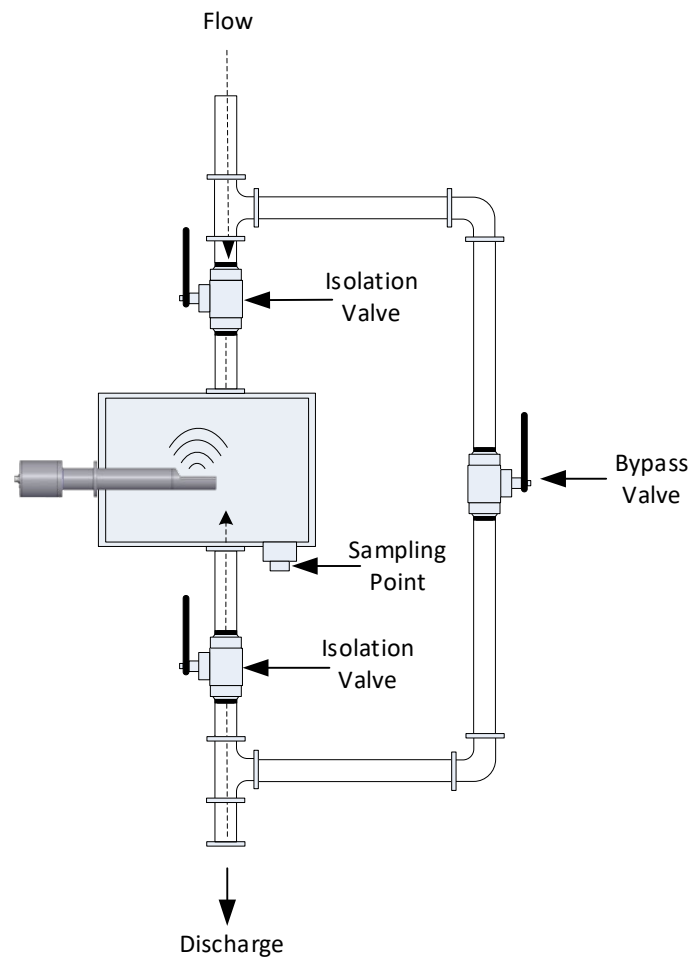


Figure 7: Measurement Chamber In-line with Pipeline

3 Maintenance

The sensor should be inspected regularly to ensure material is not building up on the ceramic faceplate. If material is encrusted on the ceramic face plate, the ability of the sensor to measure the moisture/Brix will be impaired. In most cases, the build-up will be removed during routine cleaning of the vessel.

Routine cleaning systems can be used to remove encrusted material from the sensor. The maximum temperature should be 120°C for short periods only.

A weak acid solution of Hydrochloric acid (0.5% @60°C) or an alkaline solution of Sodium Hydroxide (15%) can be used to remove excessive material on the ceramic face plate.

3.1 Hydro-Probe BX-SC

The Hydro-Probe BX-SC features an internal pipe allowing water to be flushed over the ceramic faceplate to remove built-up material. This can be connected to the plant water system using standard 6mm fittings.

Before the steam cleaning process starts, the HPBX-SC faceplate must be flushed with process water, delivered via the internal pipe, to prevent the material residue from crystallising during steaming. Use clean process water (maximum temperature of 100°C, pressure range 1-3 bar).

The installer is responsible for controlling suitable water pressure and flow to ensure adequate cleaning.

1 Technical Specification

1.1 Dimensions

Diameter:

Sensing head: 63.5mm

Mounting Flange: 105mm

Electronic body: 100mm

Length: 447mm

1.2 Construction

Body: Stainless steel 316

Screws: Stainless steel 304

Faceplate: Silicon Nitride (Ceramic)

'O' Ring: EPDM (Food Grade)

1.3 Penetration of Field

Approximately 75 -100mm dependent upon material

1.4 Range of Moisture

For moisture in bulk materials the sensor will measure up to the point of saturation, typically 0-20% for most materials.

For Brix, the sensor will measure between 101 Brix and approximately 50 Brix

1.5 Operating Temperature Range

Faceplate: 0 – 100°C (32 - 212°F)

120°C (248°F) for short periods (i.e. clean in place cycles)

Electronics: 0 – 60°C (32 - 140°F). The sensor will not work in frozen materials

1.6 Operating Pressure

The Hydro-Probe BX will operate from 1 bar Vacuum to 5 bar pressure.

1.7 Power Supply Voltage

15 - 30 VDC. 1 A minimum required for start-up (normal operating power is 4W).

1.8 Connections

1.8.1 Sensor Cable

Six pairs twisted (12 cores total) screened (shielded) cable with 22 AWG, 0.35mm² conductors.

Screen (shield): Braid with 65% minimum coverage plus aluminium/polyester foil.

Recommended cable types: Belden 8306, Alpha 6373

500 Ohm resistor – The recommended resistor is an epoxy sealed precision resistor of the following specification: 500 Ohm, 0.1% 0.33W)

Maximum cable run: 200m, separate to any heavy equipment power cables.

1.9 Digital (serial) Communications

Opto-isolated RS485 2 wire port – for serial communications including changing operating parameters and sensor diagnostics. Contact Hydronix for read/write access to sensor parameters and values

1.10 Analogue Outputs

Two configurable 0 – 20mA or 4-20mA current loop outputs available for Unscaled, moisture, Brix and temperature. The sensor output may also be converted to 0-10Vdc.

1.11 Digital Inputs/Output

One configurable digital input 15-30 V DC activation

One configurable digital input/output – input specification 15 – 30 V DC, output specification: open collector output, maximum current 500mA (over current protection required)

1.12 Measurement Modes

Mode F, Mode V and Mode E

1.13 Brix Measurement Output

Yes

1.14 Grounding

The sensor body is connected to the cable shield. Ensure equipotential bonding of all exposed metalwork. In areas of high lightning risk, correct and adequate protection should be used. Contact Hydronix support for recommended lightning protection.

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