

Hydro-Mix XT

Mechanical Installation Guide

To re-order quote part number:	HD0773
Revision:	1.1.0
Revision date:	January 2020

Copyright

Neither the whole or any part of the information contained in nor the product described in this documentation may be adapted or reproduced in any material form except with the prior written approval of Hydronix Limited, hereinafter referred to as Hydronix.

© 2020

Hydronix Limited
Units 11 - 12,
Henley Business Park
Pirbright Road
Normandy
Surrey GU3 2DX
United Kingdom

All rights reserved

CUSTOMER RESPONSIBILITY

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.

ERRORS IN DOCUMENTATION

The product described in this documentation is subject to continuous development and improvement. All information of a technical nature and particulars of the product and its use including the information and particulars contained in this documentation are given by Hydronix in good faith.

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

ACKNOWLEDGEMENTS

Hydronix, Hydro-Probe, Hydro-Mix, Hydro-Skid, Hydro-View and Hydro-Control are Registered Trade Marks of Hydronix Limited

Hydronix Offices

UK Head Office

Address: Units 11 - 12,
Henley Business Park
Pirbright Road
Normandy
Surrey GU3 2DX
United Kingdom

Tel: +44 1483 468900

Email: support@hydronix.com
sales@hydronix.com

Website: www.hydronix.com

North American Office

Covers North and South America, US territories, Spain and Portugal

Address: 692 West Conway Road
Suite 24, Harbor Springs
MI 47940
USA

Tel: +1 888 887 4884 (Toll Free)
+1 231 439 5000

Fax: +1 888 887 4822 (Toll Free)
+1 231 439 5001

European Office

Covers Central Europe, Russia and South Africa

Tel: +49 2563 4858
Fax: +49 2563 5016

French Office

Tel: +33 652 04 89 04

Revision history

Revision No	Date	Description of Change
1.0.0	March 2017	First Release
1.0.1	April 2017	Minor format update
1.1.0	January 2020	Address Change

Table of Contents

Chapter 1 Hydro-Mix XT Installation	11
1 Introduction.....	12
2 General to Flowing Material Applications.....	12
3 General to Mixer Applications	12
4 General Mounting Advice	13
5 Organic Material Mixers	14
6 Screw Conveyor	15
7 Integration of Hydro-Mix XT in Ducting	15
8 Installing the Sensor.....	17
Chapter 2 Corrosion Protection.....	21
1 Corrosion Protection.....	21
Chapter 3 Technical Specification	23
1 Technical Specifications.....	23
Appendix A Document Cross Reference	25
1 Document Cross Reference.....	25

Table of Figures

Figure 1: The Hydro-Mix XT	11
Figure 2: Flat Surface Installation	13
Figure 3: Curved Surface Installation.....	13
Figure 4: Twin Shaft Organic Mixer Installation	14
Figure 5: Single Shaft Organic Mixer Installation.....	14
Figure 6: Screw Conveyor Installation	15
Figure 7: Screw Conveyor Material Level.....	15
Figure 8: Ducting Systems (DSA and DSV).....	15
Figure 9: Hydro-Mix XT Integrated into an Overflowing Ducting System	16
Figure 10: Sensor Installation (Fixing Plate flush mounted)	17
Figure 11: Hydro-Mix XT Mounting Components.....	17
Figure 12: HMXT Fixing Plate Attached to a Hydro-Mix XT	18
Figure 13: Hydro-Mix XT Installed Flush.....	18
Figure 14: Flush Mounted Fixing Plate	18
Figure 15: Flush Mounted Sensor.....	19
Figure 16: Jacking Holes.....	19
Figure 17: Hydro-Mix XT Installed with a Drip Loop	21
Figure 18: Hydro-Mix XT with Protection Cover Installed	21

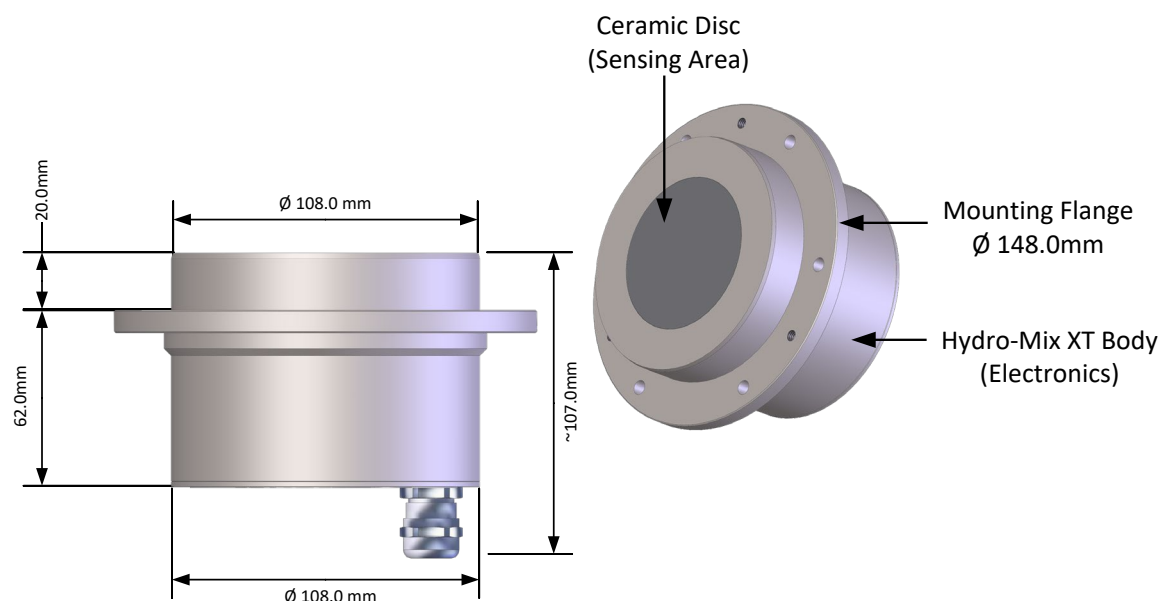


Figure 1: The Hydro-Mix XT

Available accessories:

Part No	Description
5010	HMXT Fixing Plate Kit (Fixing Plate, O Ring and Bolts), required
5015	HMXT Fixing Plate including Bolts
5020	HMXT Fixing Plate O Ring FDA Approved
5025	HMXT Fixing Plate Bolts
0116	Power Supply – 30 Watt for up to 4 sensors
0049A	RS232/485 converter (DIN rail mounting)
0049B	RS232/485 converter (9 pin D type to terminal block)
SIMXX	USB Sensor Interface Module including cables and power supply
EAK01	Ethernet Adapter Kit including Power Supply
EPK01	Optional Ethernet Power Adapter Kit
DSAXX	Ducting System Angled
DSVXX	Ducting System Vertical

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

1 Introduction

The Hydro-Mix XT is a flush mounted digital microwave moisture sensor designed for measuring in flowing organic materials in ducting, mixers, and conveyors. The sensor is manufactured from food safe materials and can be installed in both pressurised and vacuum environments. It reads at 25 times per second, which enables rapid detection of changes in moisture content in the process, including determination of homogeneity in mixing processes. The Hydro-Mix XT can be easily connected to any control system and may be configured remotely when connected to a PC using dedicated Hydronix software. A large number of parameters are selectable, such as the type of output and the filtering characteristics.

2 General to Flowing Material Applications

For accurate moisture measurement the Hydro-Mix XT should be installed in a location where the material is in contact with the Ceramic Disc at a controlled consistent flow rate.

Follow the advice below for good sensor positioning:

- Locate the sensor where the material flows at a consistent rate.
- When installing the sensor in a curved surface, ensure that the centre of the Ceramic Disc is flush with the radius of the internal wall.
- A sampling point has to be available close to the sensor for calibration purposes.
- Avoid areas of severe turbulence in the material flow.
- Ensure the sensor is located where the material is not allowed to build up on the Ceramic Disc.
- Position the sensor away from any electrical interference (See Electrical Installation Guide HD0678).
- Position the sensor so that it is easily accessible for routine maintenance, adjustment and cleaning.

3 General to Mixer Applications

A significant benefit of the Hydronix system is that only one sensor is required in the mixer. However, it is important that it is positioned correctly in relation to the mixer type, material and water inlets, and other moving parts such as blades and paddles. Although paddles or scraper blades can be a useful mechanism to keep the sensor free from material build up, they could cause damage to an incorrectly positioned sensor. It will be necessary to periodically check the position as the mixer blades, paddles and floor wear away. In all installations, it is recommended that the sensor is fitted in an area where it is away from any possible collection of 'sitting' water.

As the mixer floor wears the HMXT Fixing Plate will occasionally need to be adjusted downwards in the mixer to maintain the correct position in relation to the mixer floor. Additionally the blades will need to be adjusted to maintain the efficiency of the mixing action and cleanliness of the Ceramic Disc.

If the sensor is allowed to protrude into the mixer it will be susceptible to damage from the mixer blades/paddles as well as from abrasive materials becoming trapped between the paddles, mixer floor and exposed side wall of the sensor.

NOTE: Damage caused under these circumstances will not be covered by warranty

For accurate and representative moisture measurement the sensor must be in contact with the moving stream of material. It is equally important that no material can build up over the Ceramic Disc to obscure the sensor readings.

Follow the advice below for good sensor positioning:

- It is a good idea to provide a small inspection lid in the mixer cover, so that during mixing, and when the mixer is empty, the Ceramic Disc may be observed without having to raise the main cover plate.

- Ensure that the sensor is fitted away from the water and material inlets. Particular care should be taken in keeping the sensor clear of heavy falling objects.
- When installing the sensor in a curved surface, ensure that the centre of the Ceramic Disc is flush with the radius of the internal wall
- Avoid areas of severe turbulence. The best signal will be obtained where there is a smooth flow of material over the sensor.
- The sensor should be positioned where it will see a continuous sample of the flowing material and where the sweeping action of the blades ensures no build-up of material on the face of the sensor.
- Position the sensor away from any electrical interference (See Electrical Installation Guide HD0678).
- Position the sensor so that it is easily accessible for routine maintenance, adjustment and cleaning.

4 General Mounting Advice

For installation in flat surfaces, the top of the sensor must be flush with the internal wall surface.

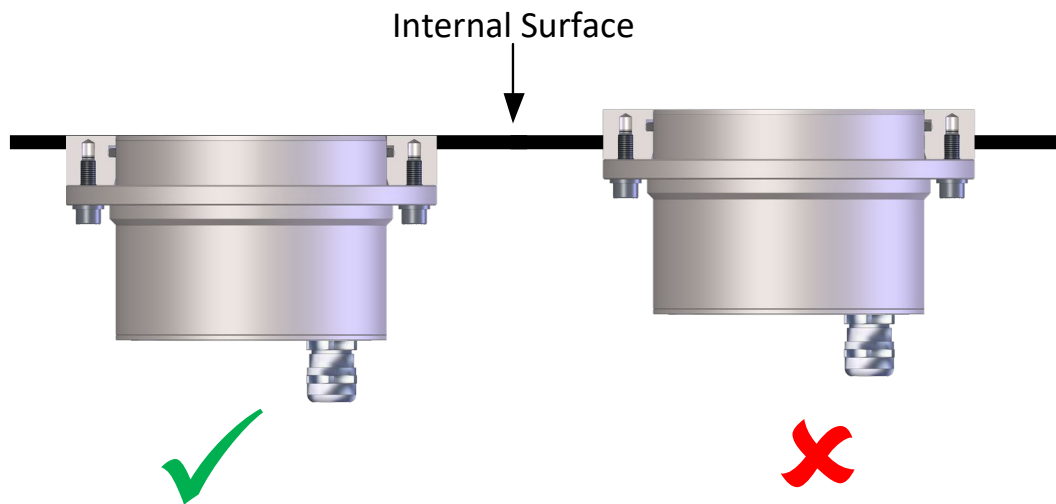


Figure 2: Flat Surface Installation

When installing the sensor in a curved surface, ensure that the centre of the Ceramic Disc is flush with the radius of the internal wall

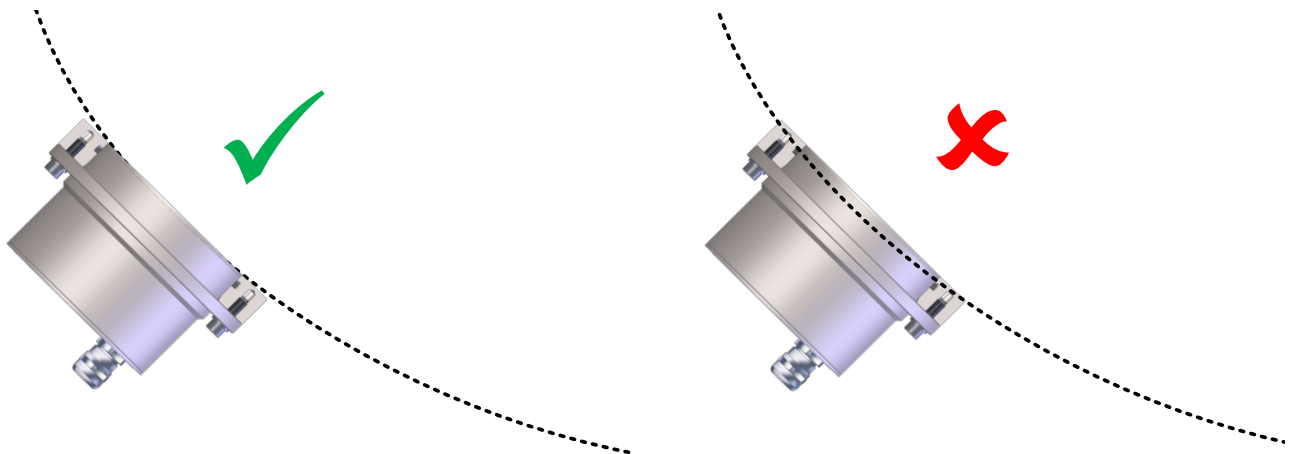


Figure 3: Curved Surface Installation

5 Organic Material Mixers

When installing in a mixer it is important that the end wall scraper arm is adjusted to ensure that the Ceramic Disc is kept clean to avoid material build up. A build-up of material on the end wall will indicate that the scraper arm is not correctly adjusted and this will affect the sensor reading.

5.1 Twin Shaft

It is recommended that the Hydro-Mix XT should be located in the end wall between the two shafts. The sensor should be located at a level lower than the shafts to maintain complete coverage of the Ceramic Disc.

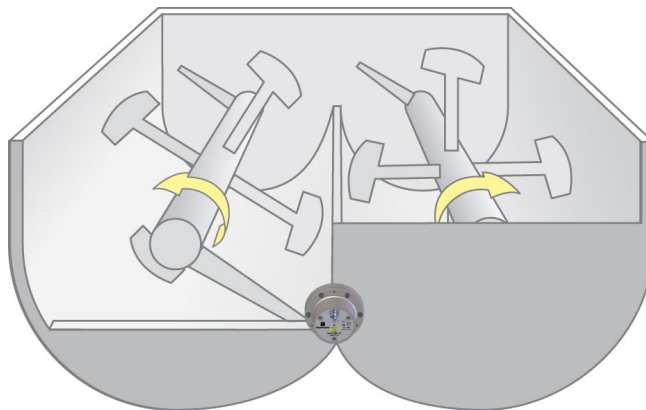


Figure 4: Twin Shaft Organic Mixer Installation

5.2 Single Shaft

Single shaft mixers should have the sensor installed in the end wall at 30° from the centre.

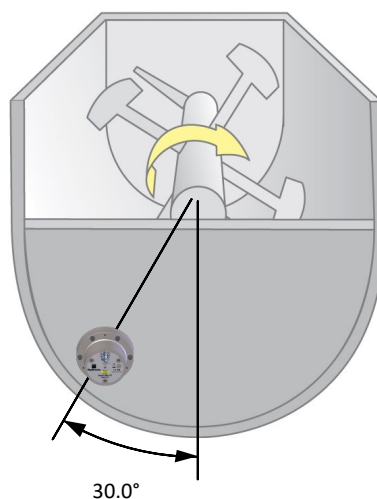


Figure 5: Single Shaft Organic Mixer Installation

6 Screw Conveyor

It is recommended that the sensor is installed at 30° above the base (See Figure 6).

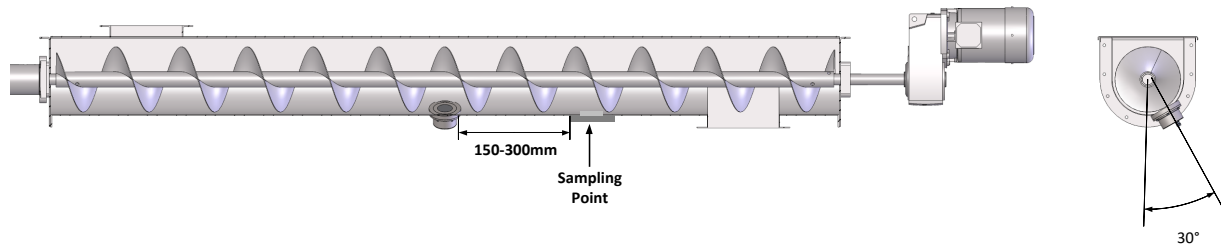


Figure 6: Screw Conveyor Installation

It is essential that the sensor is located so that the Ceramic Disc is continuously covered by at least 100mm of material (Figure 7).

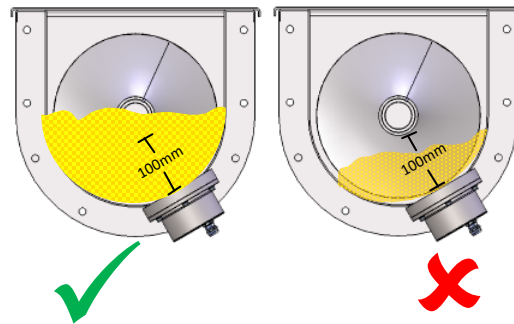


Figure 7: Screw Conveyor Material Level

7 Integration of Hydro-Mix XT in Ducting

The Hydro-Mix XT can be integrated into ducting. Modifications to the ducting might be required to achieve consistent results.

Hydronix recommends the use of the Hydronix Ducting System (DSV or DSA) when installing the Hydro-Mix XT into ducting (Figure 8). The systems are designed for use in vertical (DSV) or angled ducting (DSA).

Contact Hydronix for further details about the available ducting systems.

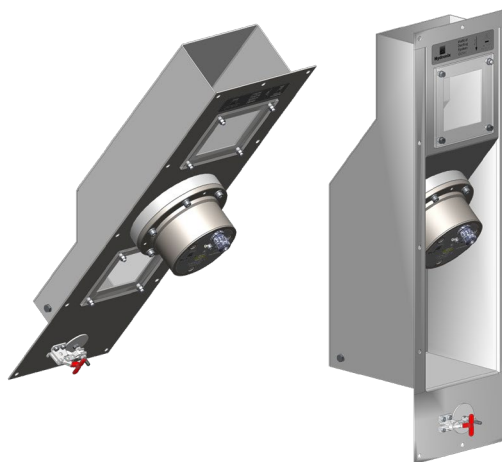


Figure 8: Ducting Systems (DSA and DSV)

Any material in the duct must be free flowing for the sensor to be able to measure accurately.

Best results are achieved when:-

- The sensor head is at 40° from the material flow.
- Material flow above the sensor is ducted to provide a smooth, constant flow.
- Flow rate is controlled down-stream of the sensor thus allowing material to back-up over the sensor and provide a constant material depth of at least 100mm.
- All ducting is smooth with no edges where the flow can be interrupted.
- A material flow rate of minimum 1kg/sec (3.54 ton/hour (long)) is used.

Figure 9 shows the Hydro-Mix XT integrated into a duct. The outlet dimensions will need to be adjusted to suit each application to provide a suitable flow rate and a minimum of 100mm of material above the sensor.

To achieve the required 100mm of material above the sensor and a stable flow the Hydro-Mix XT should be installed in an overflow ducting system. This allows any additional material not required to maintain 100mm in front of the sensor to overflow, reducing the possibility of a blockage.

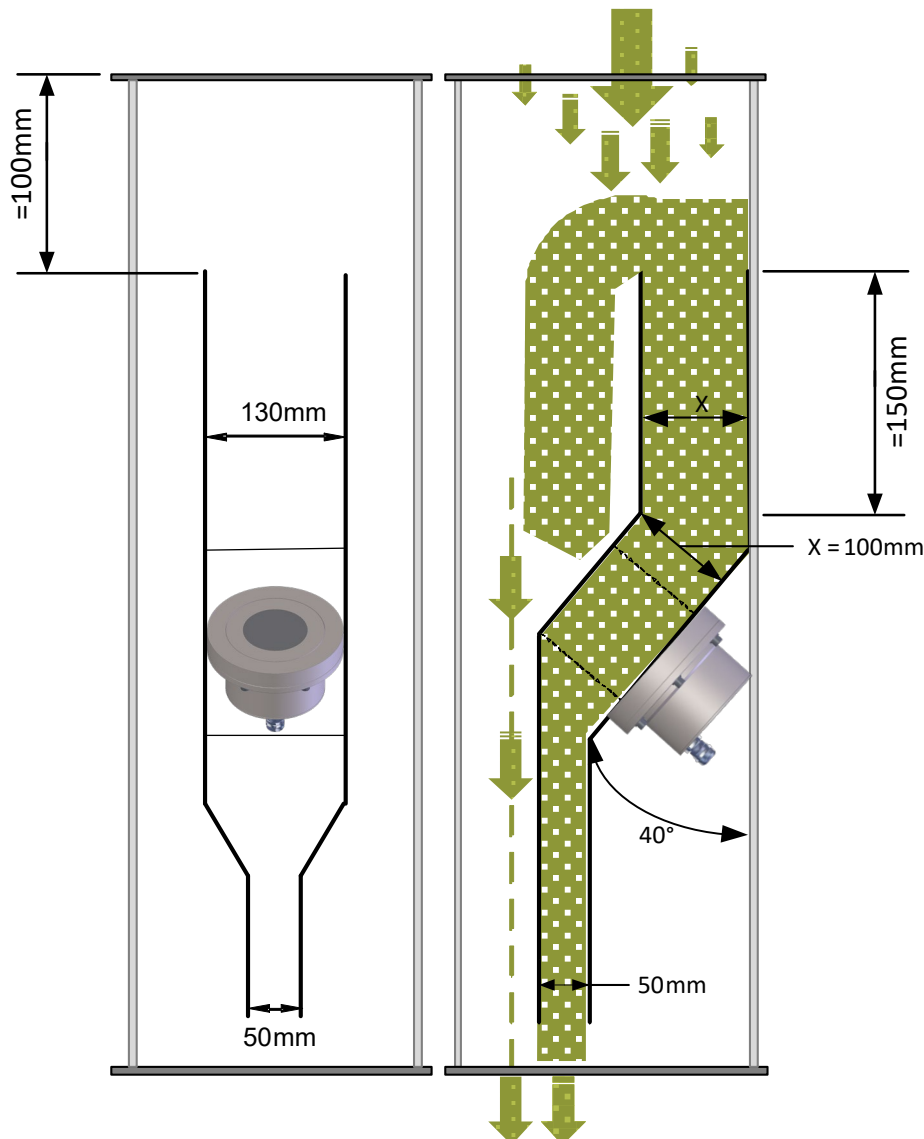


Figure 9: Hydro-Mix XT Integrated into an Overflowing Ducting System

8 Installing the Sensor

These instructions refer to installing the Hydro-Mix XT on a flat surface; all other installation locations use the same mounting arrangement.

The Hydro-Mix XT has an integral Mounting Flange which allows the sensor to be connected to the Fixing Plate which is welded flush to the floor or wall of the installation location.

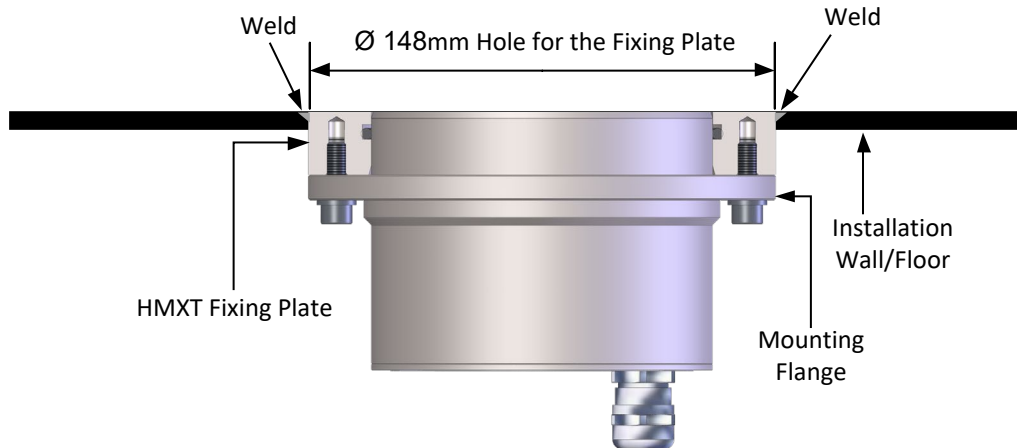


Figure 10: Sensor Installation (Fixing Plate flush mounted)

8.1 Cutting the Hole for the Sensor and Installing the Fixing Plate

8.1.1 Mounting the Fixing Plate

To enable the HMXT Fixing Plate to be installed flush with the internal wall of the installation location it is necessary to cut a 148mm hole through the external wall and any internal wear plates.

Depending on the installation requirements, the fixing plate can be welded either from the inside or the outside. Ensure that the fixing plate is flush with the internal wall.

Do not weld with the sensor attached to the fixing plate as this will cause damage to the sensitive electronics.

8.2 Attaching the Sensor to the HMXT Fixing Plate

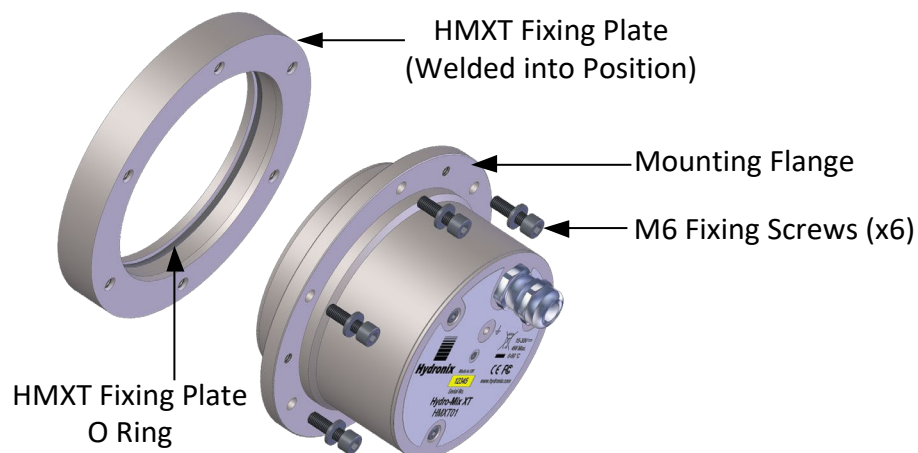


Figure 11: Hydro-Mix XT Mounting Components

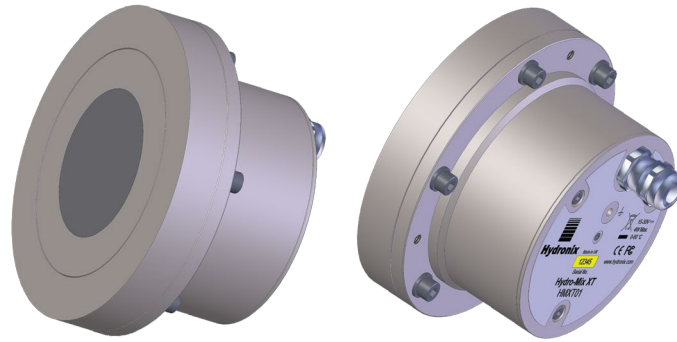


Figure 12: HMXT Fixing Plate Attached to a Hydro-Mix XT

8.3 Mounting the Sensor



NEVER HIT THE CERAMIC DISC

THE CERAMIC IS VERY HARDWEARING BUT IS BRITTLE AND WILL CRACK IF STRUCK

When installing the Hydro-Mix XT it is imperative that the Ceramic Disc is flush with the internal wall (Figure 13).

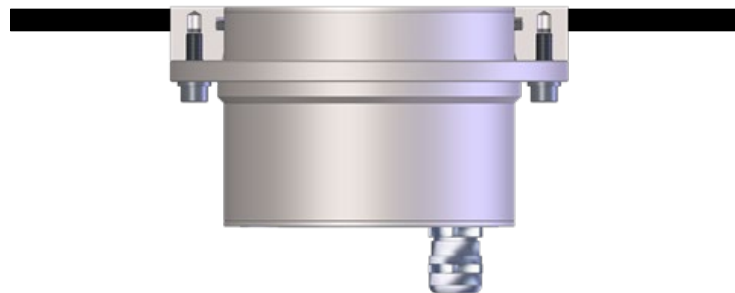


Figure 13: Hydro-Mix XT Installed Flush

8.4 Installing the Sensor on to the Fixing Plate

8.4.1 Flush Mounted Fixing Plate

1. When the fixing plate has been welded in to position ensure that it is flush with the internal surface (Figure 14).

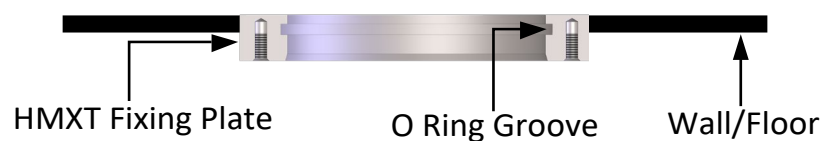


Figure 14: Flush Mounted Fixing Plate

2. Ensure the supplied O ring is in position and grease with an appropriate non petroleum lubricant.

Note: No grease is supplied with the sensor

3. Insert the sensor into the fixing plate and attach using the 6 M6 Fixing screws.
4. Confirm that the sensor is flush with the internal wall of the installation location.

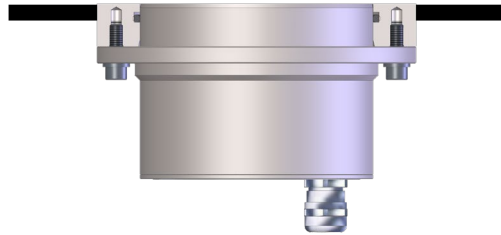


Figure 15: Flush Mounted Sensor

8.5 Removal of the Sensor

To remove the Hydro-Mix XT clean out any compacted material or sealant from around the sensor.

Remove the 6 Fixing Plate screws. If the sensor will not remove easily screw 3x M6 screws into the provided Jacking Holes on the Mounting Flange to separate the sensor from the Fixing Plate.

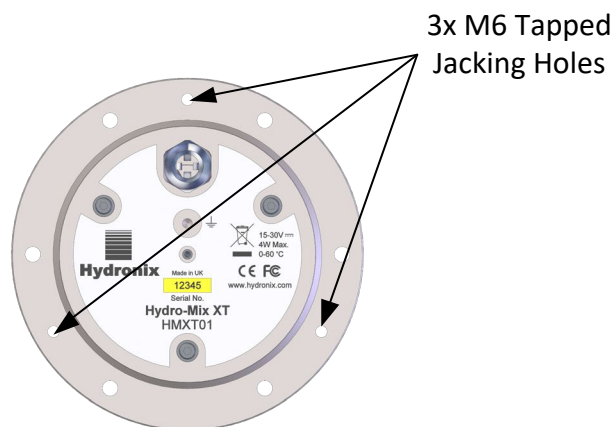


Figure 16: Jacking Holes

Warning: Do not hit the sensor or the Ceramic Disc when removing the sensor.

1 Corrosion Protection

In situations where corrosive materials are in use, there is potential for the cable connector to be damaged. Protection from this corrosion is possible with a few simple adjustments to how the sensor is installed.

1.1 Sensor Position

Position the sensor so no material comes into contact with the connector.

The sensor must remain in the main flow of the material at all times to produce accurate measurements of the moisture.

1.2 Drip Loop

Although the connector is specified to withstand water ingress it is recommended to install the sensor with a drip loop in the cable. See (Figure 17).

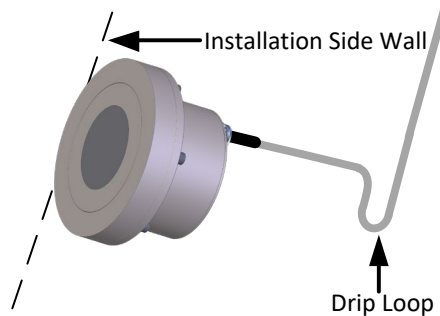


Figure 17: Hydro-Mix XT Installed with a Drip Loop

1.3 Protection Cover

Install a cover over the top of the sensor to deflect the material away from the connector. (See Figure 18). Self-amalgamating tape can also be used to seal the connector

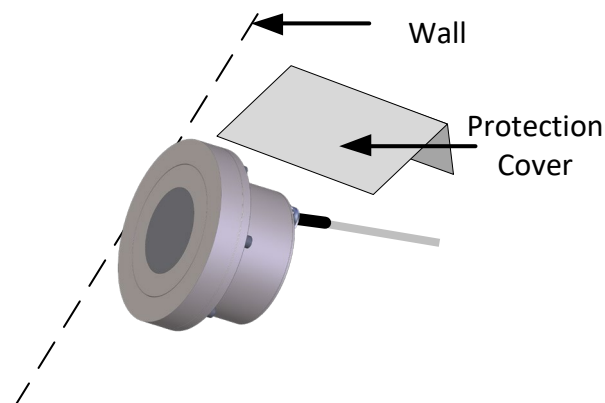


Figure 18: Hydro-Mix XT with Protection Cover Installed

1 Technical Specifications

1.1 Dimensions

Diameter: 108mm (Sensing Head)
Length: 107mm (Including Cable Gland)
Fixing: 148mm Diameter Hole for Fixing Plate

1.2 Construction

Body: 316 Stainless Steel (Food Safe)
Faceplate: Ceramic (Food Safe)
Internal O Ring: EPDM (FDA Food Grade Approved Non-User Serviceable)
Fixing Plate O Ring: EPDM (FDA Food Grade Approved)

1.3 Penetration of Field

Approximately 75 -100mm dependent upon material

1.4 Range of Moisture

For bulk materials the sensor will measure up to the point of saturation.

1.5 Operating Temperature Range (Process Temperature)

0 – 60°C (32 – 140°F) The sensor will not measure in frozen material

1.6 Operating Pressure

The Hydro-Mix XT will operate from 1 bar Vacuum to 5 bar pressure (using the supplied Fixing Plate O ring)

1.7 Power Supply Voltage

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

1.8 Analogue Outputs

Two configurable outputs 0 – 20mA or 4 – 20mA current loop outputs available for moisture and temperature. The sensor outputs may also be converted to 0 – 10 V DC.

1.9 Measurement Modes

Mode F, Mode V and Mode E

1.10 Brix Measurement Output

No

1.11 Digital (Serial) Communications

Opto-isolated RS485 2 wire port – for serial communications including changing operating parameters and sensor diagnostics.

1.12 Digital inputs

- 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 500 mA (over current protection required).

1.13 Connections

1.13.1 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: 100m, separate to any heavy equipment power cables.

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.

The sensor cable shield is connected to the sensor body. To prevent earth loops the shield must not be connected at the control panel

1 Document Cross Reference

This section lists all of the other documents that are referred to in this User Guide. You may find it beneficial to have a copy available when reading to this guide.

Document Number	Title
HD0678	Hydronix Moisture Sensor Electrical Installation Guide
HD0679	Hydronix Moisture Sensor Configuration and Calibration Guide

Index

Ceramic		Cutting Hole	17
Disc Care	18	Mounting	17
Corrosion Protection		Grounding	24
Cover	21	Installation	
Drip Loop	21	Adjustment	18
Prevention	21	Advice	12
Sensor Position	21	Flush Mounting.....	13
Ducting		Organic Single Shaft Mixer	14
Controlled Flow Rate.....	16	Organic Twin Shaft Mixer.....	14
Hydronix Ducting Systems	15	Position	12
Integration in Ducting	15	Screw Conveyor	15
Overflow	16	Maintenance	12
Electrical Interference	13	Material	
Fixing Plate		Build Up.....	12
Attaching the Sensor	17	Technical Specifications	23