![MOORE INDUSTRIES WORLDWIDE logo]

HTZ
Smart HART® Humidity and Temperature Transmitter

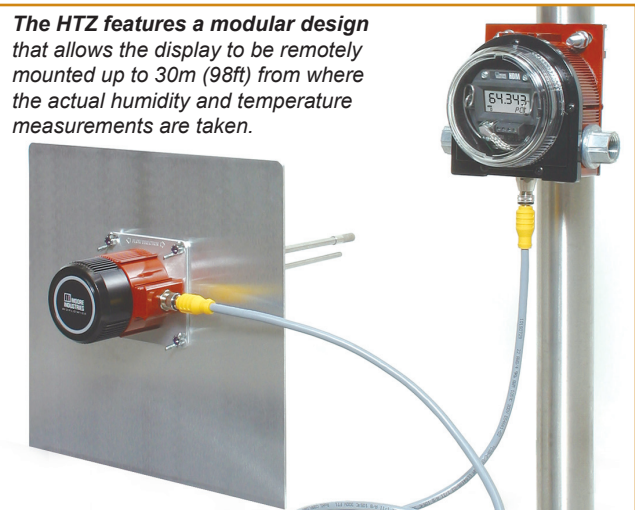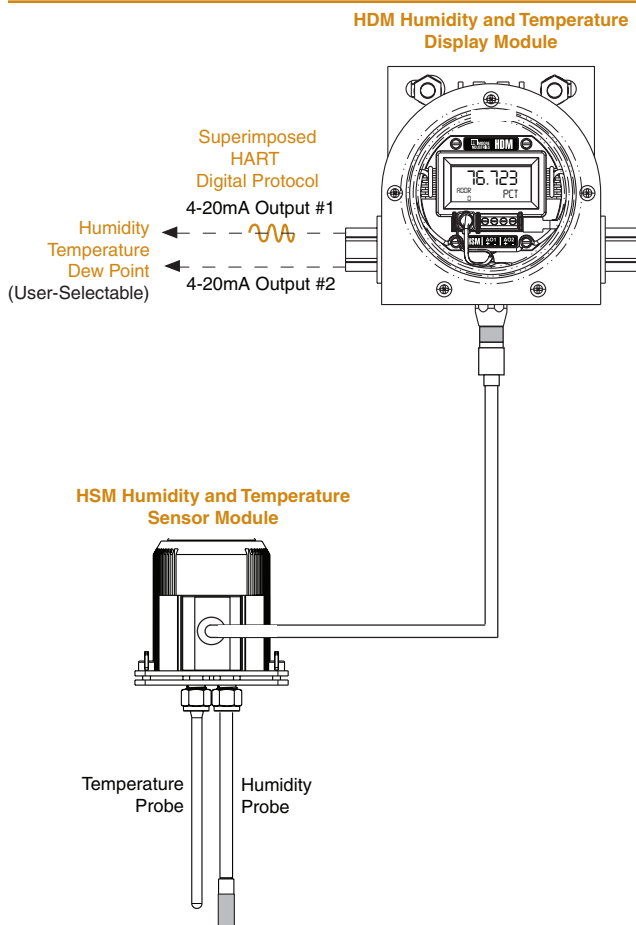## ▶ Description

The HTZ Smart HART® Transmitter simultaneously measures humidity and temperature in industrial, commercial, manufacturing, and HVAC applications. Based on the humidity and temperature values, the HTZ also provides a dew point measurement as a calculated variable.

The 2-wire (loop-powered) HTZ features dual isolated and scalable 4-20mA outputs proportional to two of the following (user-selectable): relative humidity (RH), ambient temperature or dew point calculation. The analog output signals are ready for direct interface with HART or non-HART based DCS, PLC and other host systems.

Figure 1. The HTZ consists of two components: The HSM Humidity and Temperature Sensor Module and the HDM Humidity and Temperature Display Module.

HDM Humidity and Temperature Display Module

Superimposed HART Digital Protocol

4-20mA Output #1

Humidity
Temperature
Dew Point
(User-Selectable)

4-20mA Output #2

HSM Humidity and Temperature Sensor Module

Temperature Probe
Humidity Probe

The HTZ features a modular design that allows the display to be remotely mounted up to 30m (98ft) from where the actual humidity and temperature measurements are taken.

▶ Features

- **The HTZ delivers exceptional measurement accuracy.** The HTZ's high accuracy humidity, temperature and dew point measurements make it ideal for precision applications.

- **Versatile programming options allow setup with a HART communicator, a HART-based system or a PC** on-site or from any point (with HART communications) on the 4-20mA wires of Analog Output #1.

- **Simple maintenance is provided** by humidity and temperature probes, as well as a RH sensor itself, that can be quickly removed for cleaning or replacement.

- **Set input failure mode** using the Intelligent Configuration Software for each 4-20mA output to drive upscale, downscale or hold the last value, should there be a sensor failure, or if the cable between the modules is disconnected.

- **The HDM display module shows** real-time status of relative humidity, temperature, dew point, analog output #1, analog output #2 or scrolls between all variables in four second intervals.

- **The FLEX120 flexible extended sensor option** gives you sensor access to locations where you can't place the connection head such as suspended ceilings and to obtain mid-room readings.

- **A wide ambient temperature operating range** of -40°C to +85°C (-40°F to +185°F) allows installation in most all environments, indoors and outdoors.

Certifications

CE Conformant – EMC Directive 2014/30/EUEN 61326

UKCA Conformant - EMC Regulation 2016 EN61326: Electrical Equipment (Safety) Regulations 2016 EN61010-1

HTZ
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Modular and Flexible Design

The HTZ Smart HART® Humidity and Temperature Transmitter consists of two components connected by a cable:

HSM Humidity and Temperature Sensor Module

Designed to mount on a surface (such as in duct ventilation systems) at the measurement site, the HSM has temperature and humidity probes that accurately collect and transmit real-time ambient conditions to the HDM Humidity and Temperature Display Module. Both probes can be removed for service and/or replacement. In addition, the RH sensor itself can be removed for replacement by unscrewing a removable, sintered filter at the end of the probe. The HSM comes in a rugged, NEMA 4X (IP66) enclosure that can be safely mounted outdoors and in wash-down areas.

An optional HSM Weather Shield protects the unit against solar radiation and precipitation (See Figure 4).

HDM Humidity and Temperature Display Module

The surface-mount or pipe-mount HDM can be installed at the measurement point, or as far away as 9 meters (30ft) from the HSM. The HDM features a programmable display that can be set to indicate humidity, temperature, dew point, analog (current) output #1, analog (current) output #2, or scroll between the five values at four second intervals. A custom engineering unit (EGU) can also be assigned to the displayed temperature variable. The HDM provides two loop-powered, isolated 4-20mA signals. Each output can be programmed to represent relative humidity, temperature or dew point.

Selectable Input Failure Mode—Each 4-20mA output can be set to drive upscale (selectable between 20.0-23.6mA), downscale (selectable between 3.6-4.0mA) or hold the last value should there be a sensor failure or if the cable between the HSM and HDM is disconnected.

The HDM comes in a field-mount, NEMA 4X (IP66) enclosure that can be mounted outdoors and in wash-down areas.

Connection Cable

The HSM connects to the HDM via a quick-connect IP66 cable that is available in 1m (3ft), 3m (10ft), 6m (20ft), 9m (30ft), 15m (49ft), 25m (82ft) or 30m (98ft). 30m is the maximum allowable length.

Figure 2. HSM Humidity and Temperature Sensor Module.

Figure 3. HDM Humidity and Temperature Display Module.

Figure 4. HSM Weather Shield (-WS Option).

Flexible Sensor Cable Extension

The -FLEX120 option provides a flexible extension for your humidity and temperature sensors. Attached at the sensor connection head, it extends the sensor placement to locations as far as 120 inches (3.48 meters) away. This gives you access to locations where the connection head can't be placed such as hung ceilings, and allows the sensors to be suspended to obtain readings mid-room at lower than ceiling heights. Being flexible, the sensors won't break when bumped during facility changes in the rooms where they are placed.

FREE Intelligent PC Configuration Software with Versatile Programming Options

Our FREE Intelligent PC Configuration Software allows you to set up all transmitter settings from one PC window, in about one minute.

For programming from any access point on the loop, a HART-to-RS232 Smart Interface Cable (modem) can be purchased separately (see Ordering Information for details) to access the HTZ programming options. The HART modem can also be connected directly to the transmitter.

Once a configuration is created, it can be downloaded to multiple transmitters. The HTZ software also lets you save, E-mail, and print copies for documentation purposes. Just a few of the time saving and performance enhancing features include:

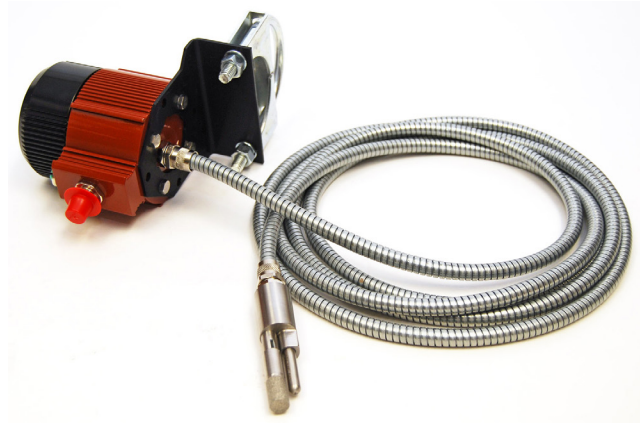**Set Up Safeguards—**It is nearly impossible to make incompatible configuration selections.

Transmitter/Configuration Auto Recognition—
The program software automatically recognizes the transmitter model and its configuration parameters.

Toolbar for Frequently Used Commands—
A conveniently located toolbar provides quick access to often used configuration functions.

Real-Time Process Readout—The process measurement and the communication status between the transmitter and PC is continually shown on the software window.

Figure 5. Flexible Sensor Cable Extension (-FLEX120 Option).

Precise Digital Output Trimming—This essentially eliminates the impact of measurement errors introduced by inaccurate readout devices.

Selectable Under Range, Over Range and Sensor Failure Values—By setting different default values for each condition, you can distinguish between the failure modes when they occur.

Store and Print Files—The configuration record you've created may be downloaded to any number of transmitters, stored for recordkeeping or printed.

Figure 6. PC Configuration Software

HTZ

Smart HART® Humidity and Temperature Transmitter

Figure 7. The HTZ Smart HART Humidity and Temperature Transmitter programs to provide dual 4-20mA signals proportional to relative humidity, temperature or dew point (user-selectable).
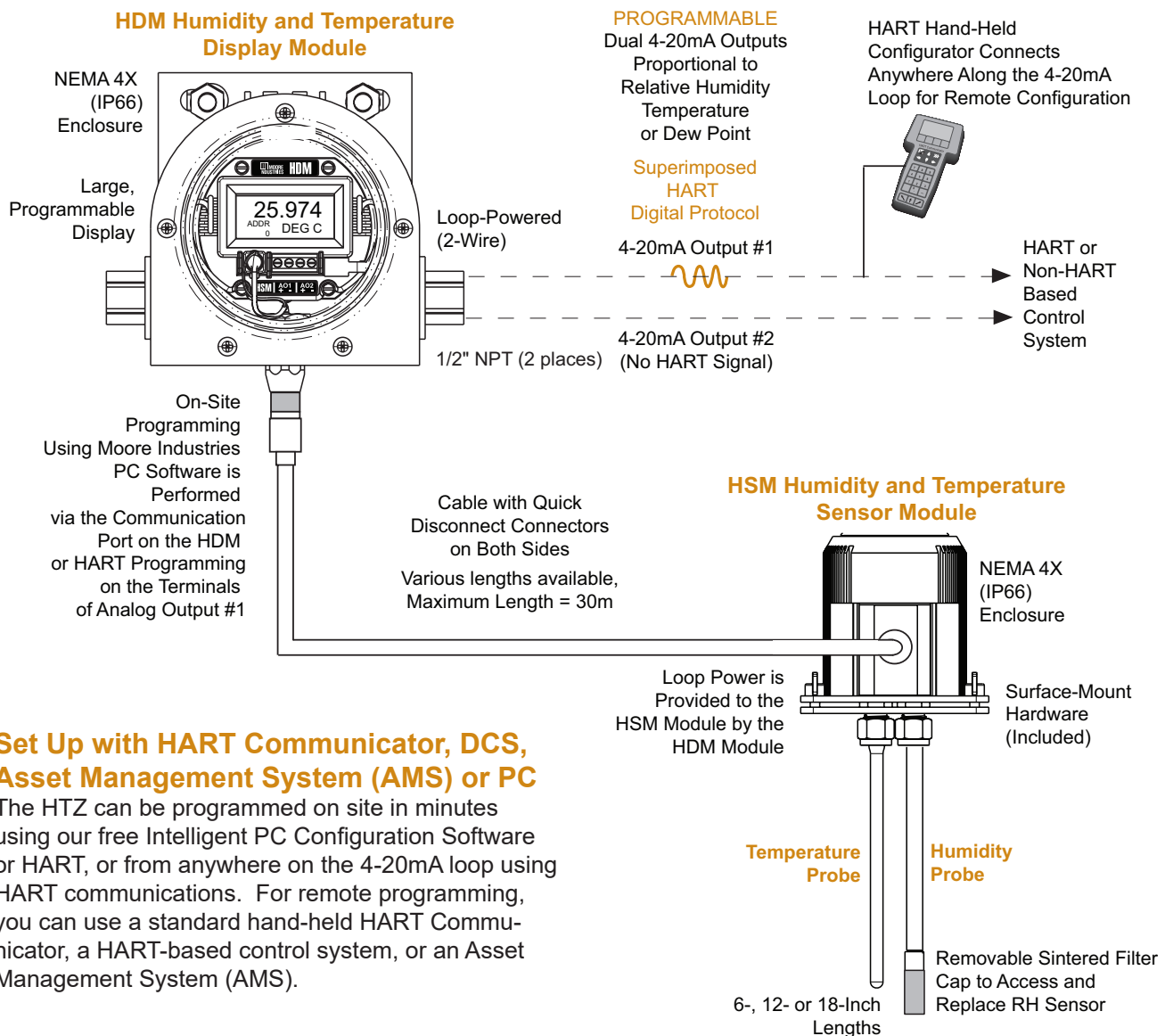

HDM Humidity and Temperature Display Module

NEMA 4X (IP66) Enclosure

Large, Programmable Display

25.974 ADDR 0 DEG C

Loop-Powered (2-Wire)

1/2" NPT (2 places)

On-Site Programming Using Moore Industries PC Software is Performed via the Communication Port on the HDM or HART Programming on the Terminals of Analog Output #1

PROGRAMMABLE
Dual 4-20mA Outputs Proportional to Relative Humidity Temperature or Dew Point

Superimposed HART Digital Protocol

4-20mA Output #1

4-20mA Output #2 (No HART Signal)

HART Hand-Held Configurator Connects Anywhere Along the 4-20mA Loop for Remote Configuration

HART or Non-HART Based Control System

Cable with Quick Disconnect Connectors on Both Sides

Various lengths available, Maximum Length = 30m

HSM Humidity and Temperature Sensor Module

NEMA 4X (IP66) Enclosure

Loop Power is Provided to the HSM Module by the HDM Module

Surface-Mount Hardware (Included)

Temperature Probe

Humidity Probe

Removable Sintered Filter Cap to Access and Replace RH Sensor

6-, 12- or 18-Inch Lengths

Set Up with HART Communicator, DCS, Asset Management System (AMS) or PC

The HTZ can be programmed on site in minutes using our free Intelligent PC Configuration Software or HART, or from anywhere on the 4-20mA loop using HART communications. For remote programming, you can use a standard hand-held HART Communicator, a HART-based control system, or an Asset Management System (AMS).

HTZ Device Description (DD)

Moore Industries' HTZ Device Description (DD) is the device-specific programming information that is loaded into a standard HART Communicator. It allows access to all of the unit's programming functions.

How to Determine if Your HART Communicator Has a HTZ Device Description

Hand-held HART Communicators typically feature a list of companies in a DD library. The Moore Industries HTZ will appear if you have the proper DD installed. If the hand-held does not have the proper DD, contact the Moore Industries Interface Solu-

tion Center nearest you. If you are using a Emerson Process Management Model 375 HART Communicator, the DD can be found on the configuration tools CD that comes free with the HTZ, or you may download the latest HTZ DD from our web site at: www.miinet.com

Also Programs with the Generic HART DD

Even if your communicator is not up to date, most of the important programming features can be accessed without the HTZ DD by using the "Generic" HART DD available on HART Communicators.

▶ Specifications

Performance

Humidity Input
Measurement Range:
0-100% RH; Min. span is 10%
Calibrated Accuracy*: ±0.75% RH between 33-75% RH; ±1% below 33% RH and above 75% RH (with -VTRH calibration option); Nominal accuracy without -VTRH calibration is ±1.8% between 20-80% RH
Ambient Temperature Effect: 0.005%/°C
Long Term Stability: ±1% RH/year
Response Time: 10 seconds to 90% of final value on a step input change @25°C, 1m/s air

Temperature Input
Measurement Range:
-40°C to +110°C
(-40°F to +230°F)
Min. span is 10°C (18°F)
Calibrated Accuracy*: ±0.036°C at trim points (with -VTB calibration option); Nominal Accuracy without -VTB calibration is ±0.1°C
Ambient Temperature Effect: 0.003°C/°C
Long Term Stability:
1 year: 0.1°C
3 years: 0.17°C
5 years: 0.24°C
Response Time: 200msec maximum for the output to change from 10% to 90% of its scale for an input step change of 0% to 100%

Dewpoint
Range: -45°C to +100°C
(-49°F to +212°F) (calculated from temperature and RH inputs)
Minimum span is 10°C (18°F)
Accuracy*: Typical @25°C, ±0.5°C between 40-95% RH; ±1-2°C between 10-40% RH
Ambient Temperature Effect: 0.005°C/°C
Long Term Stability:
± 0.5°C RMS over 1 year
Response Time:
10 seconds to 90% of final value

Dew Point Calculation:
EW * RH / 100 (refer to Equation 1 for explanation)

Analog Output
Output Range: 4-20mA
Linear Region:
3.8-21.4mA
Hardware Limits:
3.6-23.6mA
Accuracy: ±2 microamps
Ambient Temperature Effect: 0.009% of span (16mA)/°C
Long-Term Stability:
1 year: 0.012%
3 years: 0.020%
5 years: 0.026%
Rise Time: 100msec maximum for the output to change from 10% to 90% of its scale for a step change of the sourcing variable of 0% to 100%
Damping: User-set between 0-30 seconds
Power Supply Requirements:
12-42Vdc at output terminals
Power Supply Effect: ±0.002 of span per 1V change
Load Effect: Negligible within specified power limits
Load Capability:
(500 ohms@24V)

$$\frac{\text{Supply Voltage - 12V}}{0.024A} = \text{Ohms}$$

Ripple: 10mVpp, frequencies up to 120Hz, measured across a 250 ohm load resistor
Start up Time: <5sec
(trimming disabled)
Isolation: 500Vac between each output and between outputs and case
Overall Accuracy: Sum of input and output accuracy, ambient temperature effect and long term stability
Analog Output Response Time:
500msec from step input until the analog output reaches 90% of its final value

Ambient Conditions
Operating Range:
-40°C to +85°C
(-40°F to +185°F)
HDM Storage Range:
-40°C to +85°C
(-40°F to +185°F)
HSM Storage Range: Recommended 10-50°C,
(50-122°F), 20-60%RH; Maximum 0-80°C, (32-176°F), 0-95%RH
Humidity Sensor Temperature Limits:
-40°C to +110°C (-40°F to +230°F)
Humidity Sensor Maximum Pressure:
125psia
Relative Humidity:
0-95% relative humidity,
non-condensing
RFI/EMI Protection:
20V/m@80-1000MHz, 1kHz AM, when tested to IEC61326, 1998

Adjustments
All adjustments made using Moore Industries' Intelligent PC Configuration Software or HART-enabled hand-held or host

Indicators
LCD: 2x5 14-segment characters, alphanumeric readout accurate to the nearest digit.
Range: -99999 to 99999; Decimal point can be user-set

Weight
HDM: 918g (32.4 oz)
HSM: 601g (21.2 oz)
Cable:
1m - 82g (3oz)
3m - 196g (7oz)
6m - 368g (13oz)
9m - 1100g (2.4lbs)
15m - 908g (2lbs)
25m - 1100g (2.4lbs)
30m - 1100g. (2.4lbs)

* High accuracy relative humidity measurements are achieved within a RH range of 33-75% using the trimming feature of Moore Industries' Intelligent PC Configuration Software with the RH sensor calibrated against a controlled RH environment (See the -VTRH option under "Sensor Length/Calibration" in Ordering Information). High accuracy temperature measurements are achieved using the trimming feature of the Intelligent PC Configuration Software with the temperature sensor immersed in a temperature calibration bath (Sensor-to-Transmitter matching factory calibration; See the -VTB option under "Sensor Length/Calibration" in Ordering Information). High accuracy dew point measurements are achieved using the trimming feature of the Intelligent PC Configuration Software at 25°C, between 40-90% RH. Stated accuracies do not include ambient temperature effects.

Equation 1. *Dew Point Calculation*

$EW = 10^{\wedge} (0.66077 + (7.5 * T / (237.3 + T)))$ ◄——— This is the saturation vapor pressure over water

$EW\_RH = EW * RH / 100$ ◄——————— Multiply EW with RH

Dew Point (Dp)= $((0.66077 - \log10 (EW\_RH)) * 237.3) / (\log10 (EW\_RH) - 8.16077)$

HTZ
Smart HART® Humidity
and Temperature Transmitter

▶ Ordering Information

IMPORTANT: Specify **ONE** HSM Humidity and Temperature Sensor Module and **ONE** HDM Humidity and Temperature Display Module for each HTZ system. HSM and HDM modules cannot be used independently of one another, but can be ordered separately as replacement modules.

Unit	Input	Output	Power	Sensor Length/Calibration and Options	Housing
HSM Humidity and Temperature Sensing Module **(One HSM is required per installation)**	**PT-RH** One Temperature (RTD) input and one Relative Humidity input	**HDM** Signal outputs to the HDM Smart HART Display Module	**HDM** Loop-power supplied by the HDM Module	**EITHER-CL6, -CL12 OR -CL18 ARE REQUIRED** **-CL6** and RH probes **-CL12** and RH probes **-CL18** and RH probes **-CL3.75** 3.75" Sensor and RH probe (requires –FLEX120 option and LH4P housing) **OPTIONS** **-WS** Weather Shield for outdoor installation. Requires -CL6 and LH3P housing. **-FLEX120** 120-inch flexible sensor extension. Requires -CL3.75 and -GRIP1 with LH4P housing. **-GRIP1** Optional grip for FLEX sensor when mounting on a ceiling surface **CALIBRATION** **-VTB** Factory temperature sensor calibration using Sensor-to-Transmitter Trimming with NIST traceable test report; available customer-specified ranges: -20°C to +110°C (-4°F to +230°F); default, 50-100°F **-VTRH** Factory relative humidity calibration using RH Sensor-to-Transmitter Trimming against a controlled 33-75% RH range	**LH3P** Surface or pipe-mount enclosure (NEMA 4X, IP66) includes 2-inch pipe-mount hardware **LH3Z** Surface or duct-mount enclosure (NEMA 4X, IP66) **LH4P** Pipe-mount enclosure (NEMA 4X, IP66) for use with -FLEX120 option. Includes 2-inch pipe-mount hardware.

To order, specify: Unit / Input / Output / Power / Sensor Length / Options [Housing]
Model Number Example: HSM / PT-RH / HDM / HDM / -CL12 -VTB [LH3Z]
HSM / PT-RH / HDM / HDM / -CL3.75 -FLEX120-GRIP1 [LH4P]

Unit	Input	Output	Power	HSM-HDM CABLE (Only 1 cable must be selected)	Housing
HDM Humidity and Temperature Display Module **(One HDM is required per installation)**	**HSM** Signal input from the HSM Module	**2X4-20MA** Dual isolated, scalable 4-20mA outputs user-selectable for two of the following: Relative Humidity Temperature Dew Point	**12-42DC**	**-1M** 1m (3ft) **-3M** 3m (10ft) **-6M** 6m (20ft) **-9M** 9m (30ft) **-15M** 15m (49ft) **-25M** 25m (82ft) **-30M** 30m (98ft)	**D3LCP** Surface/pipe-mount enclosure (NEMA 4X, IP66) includes 2-inch pipe-mount hardware **HP** Replacement HDM electronics display in Hockey-Puck housing with spring clips (do not specify a cable option)

To order, specify:
Unit / Input / Output / Power / Connection Cable Length [Housing]
Model Number Example:
HDM / HSM / 2X4-20MA / 12-42DC / -3M [D3LCP]

Programming Accessories:

P/N 803-040-26–Non-Isolated PC Configuration Cable
P/N 803-039-26–Isolated PC Configuration Cable
P/N 235-829-02–PC-Programming Kit includes one copy of our Intelligent PC Configuration Software and one HART-to-RS232 Cable with HART modem
P/N 804-021-26–HART-to-USB Smart Interface Cable with HART Modem
P/N 804-030-26–Fuse Protected, Non-Isolated USB Communication Cable

Replacement Parts and Accessories:

P/N 238-801-34*–Temperature (RTD) Probe (6-Inch)
P/N 238-801-04*–Temperature (RTD) Probe (12-Inch)
P/N 238-801-24*–Temperature (RTD) Probe (18-Inch)
P/N 238-801-36*–Humidity Probe (6-Inch)
P/N 238-801-06*–Humidity Probe (12-Inch)
P/N 238-801-26*–Humidity Probe (18-Inch)
P/N 801-880-75–Humidity Sensor (SHT75)
P/N 803-866-26–Replacement 1m (3ft) Connection Cable
P/N 803-847-26–Replacement 3m (10ft) Connection Cable
P/N 803-862-26–Replacement 6m (20ft) Connection Cable
P/N 803-863-26–Replacement 9m (30ft) Connection Cable
P/N 803-868-26–Replacement 15m (49ft) Connection Cable
P/N 803-870-26–Replacement 25m (82ft) Connection Cable
P/N 803-873-26–Replacement 30m (98ft) Connection Cable

* Return to the Factory for replacement and recalibration.

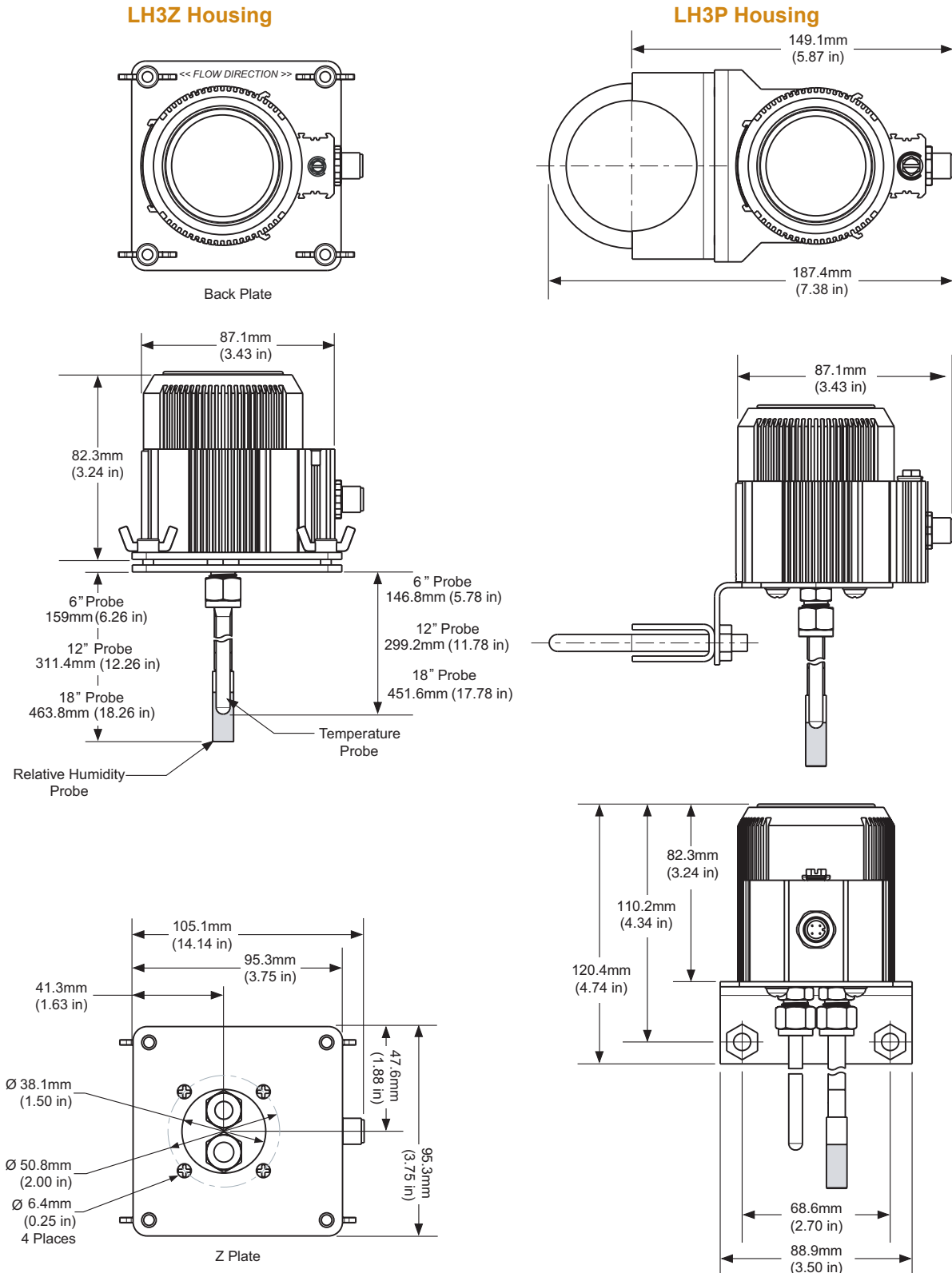**Figure 8.** *HSM Humidity and Temperature Sensor Module Dimensions.*

LH3Z Housing

Back Plate

87.1mm
(3.43 in)

82.3mm
(3.24 in)

6" Probe
159mm (6.26 in)

12" Probe
311.4mm (12.26 in)

18" Probe
463.8mm (18.26 in)

Relative Humidity
Probe

6" Probe
146.8mm (5.78 in)

12" Probe
299.2mm (11.78 in)

18" Probe
451.6mm (17.78 in)

Temperature
Probe

105.1mm
(14.14 in)

95.3mm
(3.75 in)

41.3mm
(1.63 in)

47.6mm
(1.88 in)

95.3mm
(3.75 in)

Ø 38.1mm
(1.50 in)

Ø 50.8mm
(2.00 in)

Ø 6.4mm
(0.25 in)
4 Places

Z Plate

LH3P Housing

149.1mm
(5.87 in)

187.4mm
(7.38 in)

87.1mm
(3.43 in)

82.3mm
(3.24 in)

110.2mm
(4.34 in)

120.4mm
(4.74 in)

68.6mm
(2.70 in)

88.9mm
(3.50 in)

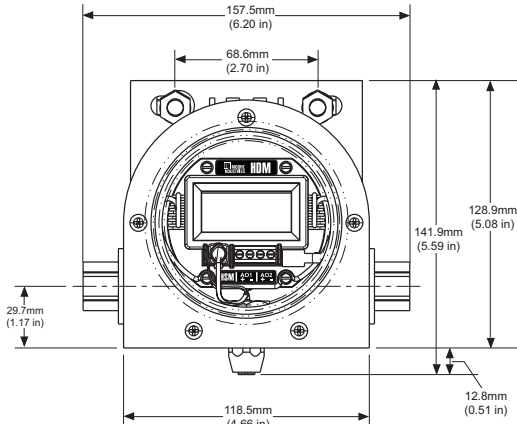**Figure 9.** *HDM Humidity and Temperature Display Module Dimensions.*

Figure 10. *HSM Weather Shield (-WS Option) Dimensions.*
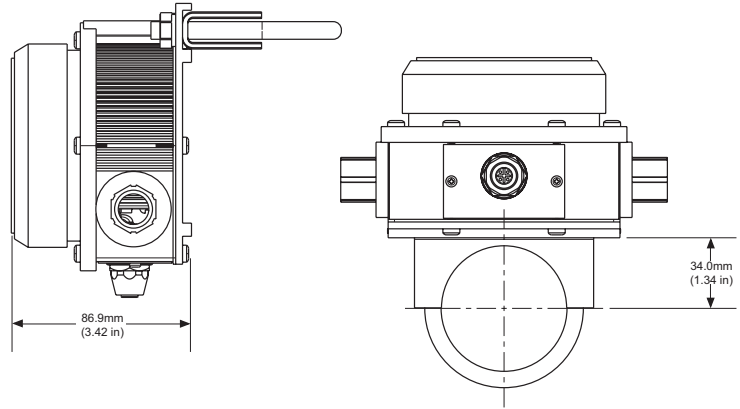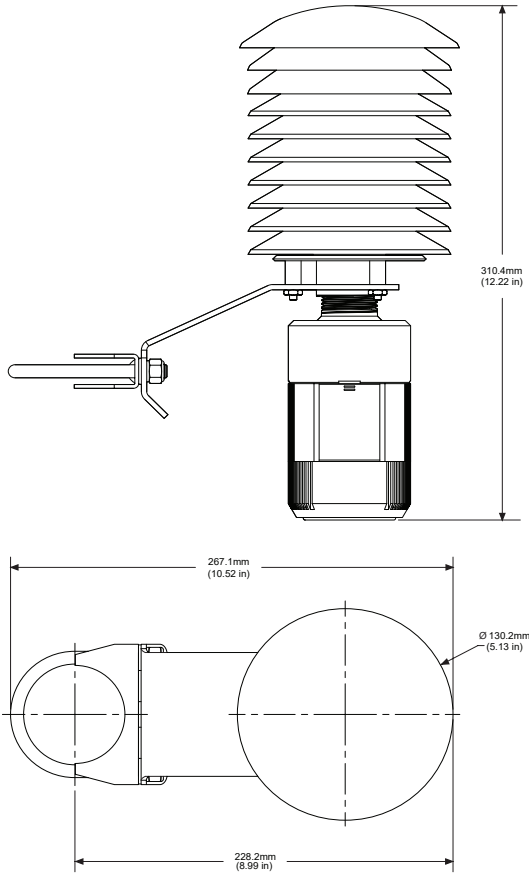

Figure 11. *HSM Flex 120-inch flexible sensor extension (-FLEX120 Option) Dimensions.*

Specifications and information subject to change without notice. Printed in the U.S.A.