





# Engineering Manual

Includes technical specifications, guidelines, and options for selection and application of MHTC / MHB Evaporative humidifiers / air coolers



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# The MHTC/MHB Evaporative Humidifier / Air Cooler

The MHTC / MHB is an evaporative type humidifier / air cooler that provides humidifier and cooling adiabatically. The MHTC/MHB uses evaporative media that is placed in the air stream of an air handler or duct. The media is wetted with potable, RO, or DI water. The energy in the air passing through the media evaporates some of the water. The result is an increase in the humidity of the air and a decrease in the temperature of the air.

The main applications of MH series humidifiers / air coolers are either humidification of buildings which have a high humidification load and which can also benefit from the adiabatic cooling effect or simply the adiabatic cooling of air for building temperature control. Since the MH depends on the energy in the air passing through the evaporative media to evaporate water, the MH requires inlet air that is warm and dry for most efficient operation.

#### **MH Media**

One of the most unique features of all MH series humidifiers / air coolers is their patented synthetic v-profile evaporative media which does not break down over time and release microscopic fibers which could be a health hazard. In addition the MH media is treated with an antimicrobial agent and meets UL900 Class 1 flame and smoke in the USA, ULC-S111-07 Class 2 in Canada making it the best media available for evaporative humidification / air cooling.

## How the MH works



Figure 1: MHTC Reflow Schematic



Figure 2: MHTC Flow / MHB Schematic

## Humidification / Cooling

• When a demand is received, the MH will;

**MHTC Reflow** - turn on its pump and UV light and after a short delay activate staging valves as required to meet demand. Water will flow through the UV light, staging manifold, open staging valves, and spray bar lines to the spray bars.

**MHTC Flow / MHB** – Activate staging valves as required to meet demand. Water will flow through the staging manifold, open staging valves, and spray bar lines to the spray bars.

- Each spray bar has a series of holes which allow water to flow out over a section of evaporative media. As Water runs down the evaporative media some of it is evaporated by air passing through the media. As a result of the evaporation the humidity of the air is increased and the temperature of the air is decreased.
- Any water that is not evaporated collects in the drain pan and;

**MHTC Reflow** - flows back to the hydraulic unit reservoir to be recirculated. As water is evaporated the water level in the reservoir decreases and the float opens. The MH then refills until the float is closed.

**MHTC Flow / MHB** – flows down to drain. The MHTC Flow / MHB does not have a reservoir or pump and water simply flows through the staging valves when they are open using supply water pressure to generate flow.

• During operation the controller responds to changes in demand by opening and closing staging valves. This allows the MH to match its output to demand.

• When demand is satisfied the MH will;

MHTC Reflow – turn off all staging valves and after a delay turn off the UV light and pump. MHTC Flow / MHB – turn off all staging valves.

## Water Management (MHTC Reflow only)

- During the evaporation process minerals are left behind by the evaporated water resulting in an increase in concentration in the remaining water. To prevent minerals from collecting in and fouling the evaporative media more water is supplied to the media than can be evaporated. The unevaporated water carries the minerals left by evaporated water to the reservoir.
- To prevent the mineral concentration from increasing to the point where excess water can no longer dissolve minerals left in the media by evaporated water, the MH will periodically flush the reservoir. The method used to determine when to flush the tank is configured using display and keypad. Two triggers can be set.

Trigger 1

Time – The MHTC flushes the tank at a specific time every day.

Periodic – The MHTC flushes the tank after a fixed number of operating hours.

**Demand** - The MHTC flushes the tank after a fixed number of weighted hours ( weighted hours = hours of operation x demand% )

### Trigger 2

Cycle – The MHTC flushes the tank after a fixed number of fill cycles.

**µSSensor (requires optional conductivity sensor)**– Flushes the tank when the conductivity sensor indicates the concentration of minerals exceeds a configured maximum value.

• In general more frequent drains result in less maintenance. The amount of water drained to control mineral concentration in the recirculating water can be configured in the MHTC's software.

## Pressure Equalization Line (MHTC Reflow only)

In order to ensure that water flows properly from duct module's drain pan to the MHTC Reflow's reservoir a pressure equalization line must be installed between the reservoir and the duct down stream of the duct module. The line ensures pressure in the reservoir and duct are equal and water flows properly from the drain pan to the reservoir.

## **UV Light**

A UV light is standard on the MHTC Reflow and optional on the MHTC Flow / MHB. The UV light prevents bacteria in the supply water or reservoir from being introduced into the evaporative media. It does not kill bacterial that may be introduced into the media in the air stream.

## Box Drying / Box Washing

In order to prevent bacteria from growing in the evaporative media the MH includes a box drying cycle that allows the media to dry out. The MH will periodically close all staging valves and allow the media to dry out regardless of demand.

In order to wash minerals from and prolong media life the MH includes a wash cycle which turns on all staging valves regardless of demand or control status and rinses the media.

# **MH Models**

The MH2 is available in three models (see Figure 3: MH Models and Table Table 3: MH Specifications).

- MHTC Reflow provides state of the art control technology with staged output to match demand. The Reflow model also includes a hydraulic unit that provides maximum water conservation by recirculating unevaporated water.
- MHTC Flow provides the same state of the art control technology including staging of output to match demand but without the hydraulic unit for recirculating water.
- MHB provides basic operation without any user configurable features.



Figure 3: MH Models

Each MH model is coupled with a duct module that contains the evaporative media used for humidifying / cooling the duct air. The duct module is basically the same for each model with the exception of the number of spray bars which are used for staging output.

## **MHTC Reflow vs MHTC Flow and MHB**

All units run a small excess of water over the media during operation to wash minerals away and prolong media life. The MHTC Flow and MHB direct this water directly to drain, while the MHTC REflow recaptures and reuses the water. The REflow is the most water efficient model and recommended for good quality potable water and treated water types. Flow models are recommended for areas with hard potable water, or where a central wastewater recovery strategy is being used. See Table 1: MHTC Reflow / MHTC Flow / MHB Features for a listing of the additional features provided by the MHTC Reflow.

## **MHTC Flow vs MHB**

The main difference between the MHTC Flow and the MHB model is in their controls and user interface. The MHTC model's Total Controller provides a graphic LCD screen and keypad, accepts additional control signals and has optional building management system connectivity (BACnet, Lonworks, Johnson N2, and Modbus). The MHB controls provide the basic functionality required for operation. See Table 1: MHTC Reflow / MHTC Flow / MHB Features for a listing of the two control systems features. Figure 4 shows the differences in the MHTC's and MHB's user interface.



Figure 4: MHTC and MHB User Interfaces

**The MHTC LCD screen and keypad** - allow easy configuration of all features of the MHTC humidifier such as control signals, box washing / drying, tank flushing, maintenance reminders, and others. The LCD screen also provides status information indicating current status and configuration, service and fault messages, and troubleshooting information. One of the key features of the MHTC controller is tracking operation and providing information about service requirements to make it easy to service and maintain the MHTC.

# **MH Humidifier Features**

From their patented evaporative media and modular design to the MHTC's advanced control system with optional internet based monitoring capability to the MHTC Reflows advanced water conservation technology all MH models include many advanced features that set them apart from other evaporative humidifiers / air coolers. The following list outlines some of the MH series key features.

General	MHTC Reflow	MHTC Flow	МНВ
Patented synthetic V-profile evaporative media	X	Х	Х
Stainless steel duct / media box frames, and drain pan	X	Х	Х
Operates on DI/RO, Potable, Softened Water	X	Х	Х
Optional low pressure drop mist eliminator	Optional	Optional	Optional
Recirculating water system	X		
Direct water system		Х	Х
Wash cycles and box drying	Configurable	Configurable	Factory Set
Step-Control 1,2, or 3 stage	X	Х	Х
Ultra violet water treatment	X	Option	Option
Installation / Maintenance			
All electrical components outside of duct	X	Х	Х
Modular easy to change media boxes	X	Х	Х
Programable maintenance settings	X	Х	
Wide range of water management options	X		
Electronics			
Graphic display screen with keypad input	X	Х	
LED status indicators	X	Х	(2 lights)
Remote status via dry points	X	Х	
Staged output based on modulating signal	1-3 Stages	1-3 Stages	1 stage
Proportional and integral internal control from humidity sensor inputs	X	Х	
Manual capacity adjustment	X	Х	
On/Off operation	X	Х	Х
Compatible with all standard Industrial controls	X	Х	
BMS (Lonworks, BACnet, Johnson, Modbus)	Option	Option	
Other			
UL900 Class 1 Flame and Smoke USA	X	Х	Х
ULC-S111-07 Class 2 Flame and Smoke Canada	Х	Х	Х

Table 1: MHTC Reflow / MHTC Flow / MHB Features

## **MH Components**



**Figure 5: MH Humidifier Components** 

# **Description of Components**

Component	Function of Component
Check Valve	Provides back flow protection for supply water line.
Conductivity Sensor /Transmitter	Sensor measures conductivity of water in the reservoir. Transmitter sends measured value to control box for use in water quality control.
Control Box / Display and Keypad	Controls all functions of the humidifier's operation and provides user interface for configuration of the humidifier.
Drain Pan	Collects unevaporated water from media for recirculation or draining.
Drain Pan Drain	Drain pan connection to hydraulic unit reservoir.
Drain Outlet	Drain connection from the hydraulic unit.
Drain Overflow	Provides protection from overfilling the drain pan.
Drain Valve	Drains water from the reservoir.
Duct Seal	Prevents duct air flow from bypassing the humidifier.
Fill Valve	Controls makeup water flow to humidifier based on float level.
Float	Measures water level in reservoir to prevent over filling.
Fuse Block	Overcurrent protection for pump and UV light.
High Voltage Terminal Block	Primary voltage connection on hydraulic unit and in control box.
Hydraulic Unit	Collects water from the drain pan and pumps, treats with UV light, and stages water to media. Fills and drains reservoir to control water quality.
Intermediate Member	Structural member supports media boxes.
Low Voltage Terminal Block	Hydraulic Unit – connects control box inputs to the hydraulic unit. Control Box – provides connection for control signals and safety loop.
Media Boxes	Surface from which water is evaporated for humidification/cooling. Available in 8 in. (20 cm) or 12 in. (30 cm) thickness.
Mist Eliminator	Captures any water droplets that are carried off the media boxes with air flow in high duct speed applications.
On/Off Switch	Turns power On/Off to humidifier controller. Note: Turn off humidifier disconnect to shut off primary power to the humidifier.
Pressure Equalization Line	Balances pressure in hydraulic unit reservoir with pressure in duct to ensure proper water flow to reservoir from drain pan.
Pump	Pumps water from the reservoir to the media boxes.
Pump and UV Light Relay	Turns on power to the UV light and pump based on signal from the control box.
Reservoir	Collects water from the drain pan for recirculation / draining.
Side Panel, Right	Structural member supports media boxes and spray bar cap.
Spray Bar Cap/ Spray Bars	Distributes water to the media boxes and prevents water from spraying anywhere else.
Staging Manifold / Valve(s)	Controls flow of water to media boxes based on demand.
Transformer	Steps primary voltage down to 24 VAC for the controller and internal components such as the fill valve and drain valve.
UV Light	Eliminates any bacteria in the water being pumped to the media boxes.
Water Lines	Supply water lines from hydraulic unit to spray bars.

#### **Table 2: Humidifier Components**

# **MH Specifications and Dimensions**

	МНВ	MHTC Flow	MHTC Reflow	
Voltage	120 VAC / 60 Hz	120 VAC / 60 Hz	120 VAC / 60 Hz	
Control signals	On/Off Dry set of points	VDC 0-5, 1-5, 0-10, 2-10, 0-16, 3.2-16 mA 0-20, 4-20	VDC 0-5, 1-5, 0-10, 2-10, 0-16, 3.2-16 mA 0-20, 4-20	
Max No. of Stages	3	3	3	
Water supply	3/4 in. BPP, 1/2 in. NPT adapter provided	1/2 in/ FPT	3/4 in. BPP, 1/2 in. NPT adapter provided	
Water drain	2 in. (50.8 mm) OD tube	2 in. (50.8 mm) OD tube	2 in (50.8 mm) ID hose	
Control accuracy	Depends on air conditions, number of stages, and control setup			
Supply water pressure		30-145 psi (2-10 Bar)		
Supply water temperature	41-113 °F (5-45 °C)			
Water quality	Tap water, reverse osmosis, softened or fully demineralized water.			
Max. allowable air velocity through media	750 fpm (3.8 m/s) 1100 fpm (5.5 m/s) with mist eliminator.			
Pressure drop	Typically 0.44 IWC (250 Pa) @ 500 fpm (2.5 m/s) and 90% RH			
Ambient conditions (control unit)	34 -104 °F (1-40 °C) Max 75% RH			
Fire classification of evaporative media	UL900 Class 1 USA, ULC-S111-07 Class 2 Canada			

#### **Table 3: MH Specifications**











Figure 8: MH Duct Module Dimensions







Figure 10: MHTC Flow/MHB Multi Stage Hydraulic Unit Dimensions



Figure 11: MHB Single Stage Hydraulic Unit

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# **MH Specification Checklist**

The following checklist can be used to specify the MH Series Humidifier / Air Cooler. A description of each selection is provided later on in this section.

Unit Tag: Z	lone	
Location or Elevation		
MH Model		
MHTC Reflow	MHTC Flow	☐ MHB
Duct Module Size		
in. Cm		
Duct Width	_ Duct	Height
Number of Stages		
	3	
Humidification		
Air Before Humidification	Temp	_ RH
Air After Humidification	Temp	_RH
Required Effectiveness		
Air Cooling		
Air Before Cooling	DB Temp	_WB Temp
Air After Cooling	DB Temp	-
Required Effectiveness		
Media Box Thickness		
Duct Velocity	8 in. (20 cm) Eff	12 in. (30 cm) Eff
🗌 Use 8 in. (20 cm) Media	a 🗌 Use :	12 in. (30 cm) Media
Control		
Humidity		
Demand	Transducer	On/Off Signal Type
By Others	By Nortec,	Part No
or		
Temperature		
Demand	On/Off	By Others
Additional Options (Mist Eliminato Accessories)	r, Links XPS, Air proving	See Table 6: Options and

# **MH Model**

The decision of which MH model to use depends primarily on the application, the need for advanced control capabilities, and the need to minimize water usage. Table 4 provides an overview of the items to consider when selecting the MH Model for your application.

MH Model	MHTC Reflow	MHTC Flow	МНВ
Minimize water	X		
usage			
Treated water	Best	X	X
Potable water	X	X	X
Hard water	X	X	Best
BMS Control	X	X	
Humidification	Best	Best	
Cooling			Best
Low Cost			X

Table 4	4: MH	Model	Selection

## **Duct Module Size**

In order to minimise the air velocity through the media the duct module should be sized to match as closely as possible the cross section of the duct. Specifying a smaller duct module and blanking off large area of the duct will result in poor performance.

The MH duct module is available in sizes ranging from 24 W x 24 H to 144 W x 144 H. Duct modules are supplied in width increments of 4 inches and height increments of 3 in. See Figure 8: MH Duct Module Dimensions for duct module dimensions.

To provide installation clearance the duct width should be at least 1.5 in. (38 mm) wider and 0.5 in. (13 mm) taller than the specified duct module.

Max Module Unit Width = Duct Width - 1.5 in. (38 mm)

Max Module Unit Height = Duct Height - 0.5 in. (13 mm)

# **Number of Stages**

Staging provides a means for the MH unit to match its output to demand and is primarily used in humidification applications. Both the MHTC Reflow and the MHTC Flow are available with between 1 and 3 stages. The MHB has only one stage available.

# **Media Boxes Thickness**

The MH duct module is available with either 8 in. (20 cm) or 12 in. (30 cm) thick evaporative media boxes. The maximum effectiveness in humidification and cooling is dependent on the thickness of the media boxes and the velocity of the air through the boxes as shown in Figure 12: Maximum MH Effectiveness vs Air Velocity. The media box thickness that should be used depends on the effectiveness required to meet either the humidification or cooling load.

The effectiveness of the MH is defined as;

Effectiveness = (RH after – RH before)/(100% - RH before)

Where RH before and RH after are the relative humidity before and after the MH duct module.

#### Note:

- See Required Media Box Thickness for Humidification on page 18 for an explanation of how to determine the required media box thickness for humidification.
- See Example Direct Cooling on page 19 for an explanation of how to determine the required media box thickness for air cooling applications..



Figure 12: Maximum MH Effectiveness vs Air Velocity

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# **Specifying for Humidification**

## **Humidification Load**

Although Nortec's Humidifier Engineering and Load-sizing Program (HELP) does not currently allow selection of MH technology the Atomizing Nozzle selection can be used to calculate the humidification load. Figure 13: Mixed Air System Humidity Load shows a schematic from HELP calculating the load for an application in Chicago. The software can be downloaded from www.humidity.com. Nortec Publication 2553856 - Humidification Load Calculation also provides information on selecting a humidity setpoint, the effects of relative humidity, and methods for manually calculating the humidification load.

#### Example: Mixed Air System

Chicago Illinois, Mixed air system, room design conditions of 72°F 50% RH, Air Volume of 50,000 cfm, makeup air volume of 7,500 cfm, 10 x 10 ft duct.



Figure 13: Mixed Air System Humidity Load

- A) Outdoor Air = -1 °F (-18 °C) 53% RH 7,500 cfm
- B) Return air = Room Design = 72 °F (22 °C) 50%RH, 42,500 cfm.
- C) Mixed Air = Outdoor Air + Return Air = 61 °F (16 °C) 63% RH, 50,000 cfm
- D) Preheated Air (before humidification) = 90 °F (32 °C) 24% RH
- E) After Humidification = 85 °F (29 °C) 33% RH,

Based on these conditions the HELP software calculates a humidification load of 223 lb/hr.

### Example: Makeup Air System

Figure 14: Makeup Air System Humidity Load shows the above system in Chicago if it were a makeup air system instead of a mixed air system.



Figure 14: Makeup Air System Humidity Load

- A) Outdoor Air = -1 °F (-18 °C) 53% RH
- B) Preheated Air (before humidification) = 90 °F (32 °C) 1% RH
- C) After humidification = 54 °F (12 °C) 91%
- D) Room Design = 72 °F (22 °C) 50% RH

Based on these conditions the HELP software calculates a humidification load of 1723 lb/hr.

## **Required Media Box Thickness for Humidification**

Once the humidification load has been determined the correct media thickness must be chosen and the ability of the MH to satisfy the load confirmed. Except for makeup air systems or in cases of high makeup air volumes an 8 in (20 cm) thick media will usually be sufficient and should be used because of its lower pressure drop and lower cost. For the examples above;

**1** Calculate the required effectiveness

Mixed Air System	
Required Effectiveness	= (RH after - RH before)/(100% - RH before) = (33 - 24) / (100 - 24) = 12%
Makeup Air System	
Required Effectiveness	= (RH after - RH before)/(100% - RH before) = (91 - 1) / (100 - 1) = 91%
alculate the air velocity	
V= 50,000 cfm / (10 ft )	( 10 ft) = 500 fpm
	Mixed Air System Required Effectiveness Makeup Air System Required Effectiveness Calculate the air velocity V= 50,000 cfm / (10 ft )

**3** Use Figure 12: Maximum MH Effectiveness vs Air Velocity along with the calculated velocity to determine the required media box width and confirm the MH can satisfy the load.

Mixed Air System –	12% effectiveness required, therefore use 8 in. (20 cm) media box
Makeup Air System –	91% effectiveness required, Maximum effectiveness of 8 in. (20 cm) media box at 500 fpm is 84% so use 12 in. (30 cm) media box

# **Specifying for Air Cooling**

## **Direct Air Cooling**

Direct air cooling is normally used to cool the makeup air in an air handling system because trying to cool return air which has a high RH due to previously being cooled is not very effective. The easiest way to determine the maximum cooling which can be achieved is to calculate the maximum effectiveness of the MH and then use a psychrometric chart to determine end conditions. Since the maximum cooling will always be achieved with the 12 in. (30 cm) media it is normally used. The maximum cooling that can be achieved is;

Max. Cooling = (outdoor dry bulb- outdoor Wet bulb) x Max effectiveness

#### Example Direct Cooling

Compare the maximum cooling of 12 in. (30 cm) and 8 in. (20 cm) thick media, Los Angeles California, Air volume = 50,000 cfm, Duct size =  $10 \times 10$  ft. (Figure 15)



Figure 15: Direct Cooling, Los Angeles

1 Calculate the Air Velocity

V= 50,000 cfm / (10 ft x 10 ft) = 500 fpm

2 Determine the maximum effectiveness - Use Figure 12: Maximum MH Effectiveness vs Air Velocity along with the calculated velocity to determine maximum effectiveness of each media.

12 in. (30 cm) Media = 94% 8 in. (20 cm) Media = 84%

3 Determine the supply air conditions

ASHRAE cooling design conditions in Los Angeles California are DryBulb (DB) = 88.9 °F, Wet Bulb (WB) = 61.6 °F.

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- Calculate the Maximum Cooling = (outdoor dry bulb outdoor Wet bulb) x Max effectiveness Max Cooling 12 in. (30 cm) Media = (88.9°F – 61.6°F) x 94% = 25.7 °F Max. Cooling 8 in. (20 cm) Media = (88.9°F – 61.6°F) x 84% = 22.9 °F
- **5** Calculate the conditions of the air leaving the MH duct module by subtracting the maximum cooling from the supply dry bulb temperature and by using the psychrometric chart.

12 in. (30 cm) Media =  $88.9^{\circ}F - 25.7^{\circ}F = 63^{\circ}F$  < RH of cooled air is 89% (from chart) 8 in. (20 cm) Media =  $88.9^{\circ}F - 22.9^{\circ}F = 66^{\circ}F$  < RH of cooled air is 76% (from chart)

### **Indirect Air Cooling**

Indirect cooling is an efficient way to reduce the air temperature of supply air without significantly increasing its relative humidity. In Indirect cooling the MH is used to cool a secondary air stream that then passes through a heat exchanger and cools a primary (supply) air stream. The secondary air stream is then exhausted. The maximum cooling that can be achieved depends on the efficiency of the heat exchanger, the maximum effectiveness of the MH, and the outside air conditions.

Supply DB = DB Primary - (DB Primary – DB Secondary) x Heat Exchanger Efficiency

#### Where

DB Secondary = DB Outdoor - (DB Outdoor - WB Outdoor) x MH Effectiveness

#### Example Indirect Air Cooling

If the air stream in the direct cooling example above is used to cool a secondary air stream in an indirect cooling system, calculate the maximum cooling that can be achieved. Assume the primary and secondary air streams have equal volume and the secondary air stream is 74°F (40% RH) before cooling.



Figure 16: Indirect Air Cooling, Los Angeles

- Calculate Dry Bulb of Secondary Air Stream From the example above using 12 in. media; DB Secondary = 63°F
- **2** Calculate DB Supply using the equation above.

DB Supply = DB Primary - (DB Primary – DB Secondary) x Heat Exchanger Efficiency DB Supply =  $74 - (74 - 63) \times 0.8 = 65^{\circ}F$ 

## **MH Controls**

See Nortec Controls on page 36 for a listing of controls offered by Nortec and installation requirements. MHTC models can be operated with one modulating input. The MHB does not have a modulating input. Both the MHTC and MHB can be operated as On/Off. Controls can be supplied by Nortec or by others. MH humidifiers /air coolers are compatible with the following control inputs.

Tab	e 5: MH	l Series	Control	Signals	

<b>Control Signal</b>	МНТС	МНВ
0-10 V	Demand and Humidity Transducer	Demand
2-10 V	Demand and Humidity Transducer	
0-5 V	Demand and Humidity Transducer	
1-5 V	Demand and Humidity Transducer	
On/Off	Dry Contact 24 VAC	Dry Contact 24 VAC

MHTC control signal type can be configured by Nortec at the factory or can be user configured. Configuration is done with the MHTC'sLCD and keypad.

## **MH Series Options and Accessories**

Nortec provides a complete line of options and accessories for every humidification application. Table 6: Options and Accessories lists options available for the MH Series with a brief description of their function.

Option / Accessory	Used For
Mist Eliminator	Mist eliminators are available for all MH models. At higher velocities there is a chance that water droplets can be picked up by the air flowing through the media and carried into the air duct. The mist eliminator acts a barrier to the droplets and prevents them from entering the duct. Mist eliminators should be used in applications where duct velocity is higher than 750 fpm (3.8 m/s). Order together with MH Duct Module or specify MH Duct Module size to order separately.
Conductivity Sensor	A conductivity sensor is available for the MHTC Reflow which provides the ability to better control the amount of minerals that are suspended in the recirculating water. With the conductivity sensor installed the controller will flush the water only when the conductivity rises above a user configurable limit. This results in less waste water and longer media life. 2557295 – MH Conductivity Sensor Kit

#### Table 6: Options and Accessories

Table 6: Options and Accessories (Continued)	Table	6: (	Options	and	Accessories	(Continued)
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Option / Accessory	Used For
UV Light	A UV light is standard on the MHTC Reflow. A UV light can be ordered as an option for the MHTC Flow / MHB. The UV light prevents bacteria in the supply water from being introduced into the evaporative media. It does not kill bacterial that may be introduced into the media in the air stream.
	2544952 - UV Light Kit
On/ Off Humidistats	On/Off Humidistats are used to turn the humidifier on and off based on sensed RH. They can be mounted in the space being humidified or in the return air duct. The digital humidistat provides an LCD screen and keypad for setting the RH setpoint and displaying sensed RH.
	(See On/Off Controls on page 36)
Modulating Humidistats	Modulating Humidistats are used to control the output of the humidifier based on sensed RH. They can be mounted in the space being humidified or in the return air duct. The digital humidistat provides an LCD screen and keypad for setting the RH setpoint and displaying sensed RH. They can be used for either controlling humidity or for high limit control. Modulating humidistats can only be used with MHTC models, not MHB.
	(See Modulating Humidistats on page 36 )
Humidity Transducers	Digital Humidity Transducers communicate RH in a space or duct to the humidifier. When used with an MHTC (not MHB) the humidifier displays the sensed RH on its LCD display screen, setpoints are entered using the humidifier keypad and the humidifier's software calculates required output based on setpoint and sensed RH. Transducers are available for room or duct installation.
	(See Humidity Transducers on page 37)
Outdoor Temperature Sensor	The outdoor temperature sensor is used in conjunction with Nortec's Digital humidistats to provide a humidity setpoint reset when outdoor temperature is very low. The setpoint is reduced to prevent condensation on windows and other parts of a buildings structure.
	2520263 - Duct Mount Outdoor Temperature Sensor
Air Proving Switches	Air proving switches are used to ensure humidification only occurs when air is moving in a duct. The air proving switch is installed in series with all other On/Off devices on the humidifier's On/Off/security loop. 1329203 - Air Proving On/Off Duct Mounted
	(See Un/UIT Controls on page 36)

Table 6: Options and Accessories (C	Continued)
-------------------------------------	------------

Option / Accessory	Used For		
High / Low Humidity Alarm Packages	Various alarm packages are available for indicating when humidity is outside of required limits. The packages include a mechanical humidistat and display panel with a light.		
	2533363 – High Duct Humidity Alarm Package 2533365 – Low Duct Humidity Alarm Package 2533364 – High Room Humidity Alarm Package 2533366 – Low Room Humidity Alarm Package		
Control Setting at Factory	MHTC models can be factory ordered configured for the type of controls that will be used. Factory configuration eliminates the need to configure the MHTC in the field and makes it plug and play with respect to software configuration. Part numbers are available for each available control configuration.		
	(See Control Acceptance Configured at Factory on page 38)		
Nortec Links XPS	Nortec Links II provides connectivity to BACnet, Lonworks, Johnson N2, or Modbus building management systems. A separate part number must be selected to specify the type of building management system. (MHTC only)		
Ethernet	Nortec Links XPS for MHTC, BACNET/IP Nortec Links XPS for MHTC, BACNET/MSTP Nortec Links XPS for MHTC, LONWORKS Nortec Links XPS for MHTC, N2 (Consult Factory) (See Nortec Links XPS (Optional MHTC Only)on page 41)		
Double Check Valve	The MHTC models include a check valve in their hydraulic units to prevent back flow to the supply water system. The double check valve can be used as additional protection or on the MHB model.		
In Line Water Filter and replacement Filters	The inline water filter can be used for supply water which		
In Line Water Filter and replacement Filters	contains a large amount of sediment that could block the MH fill valve or collect in the MH evaporative media.		
	1329505 - In-Line Water Filter 5 Micron Filter 1329561 - Replacement Water Filters 1 Micron 1329506 - Replacement Water Filters 5 Micron		
Condensate Pump	The condensate pump can be used for pumping drain water from the MH where gravity feed to a drain is not possible.		
	1429527 - Drain Water Sump Pump (High Temperature)		



Note: All illustrations of options / accessories are provided strictly for the purpose of describing them. Actual appearance of each option accessory may differ from that shown.

# Sample Specification

#### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. NORTEC In-duct/AHU Evaporative Humidifier / Cooler, MH Series humidifier[s] as indicated on drawing[s] and as indicated on schedule[s].
- B. Complete and operable humidification/cooling system [which is designed to meet applicable building codes].
- C. Equipment start-up and project inspection by qualified factory trained representative.

#### **1.2 QUALITY ASSURANCE**

- A. Manufacturer: For each product specified, provide components by same manufacturer throughout.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authority having jurisdiction, and marked for intended use.
- C. Comply with ARI 640, "Standard for Commercial and Industrial Humidifiers."
- D. Products shall be supported with a warranty that ensures the product will be free from defects in materials and workmanship for a period of two years after shipment. Excluding the media boxes, as they are a serviceable item whose effective operation life depends on the water quality and air filtration being supplied.
- E. Commissioning of a system or systems specified in this section is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's operation and maintenance personnel, is required in cooperation with the Commissioning Authority. Project Closeout is dependent on successful completion of all commissioning procedures, documentation, and issue closure. Refer to Project Closeout, Section 01700, for substantial completion details. Refer to Section 01810, Commissioning, for detailed commissioning requirements.
- F. Products specified below are to be manufactured is an ISO 9001-2000 certified facility.

#### **1.3 SUBMITTALS**

- A. Submit product data under provisions of Section 15010. Include product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes. Include rated capacities, furnished specialties, and accessories.
- B. Submit manufacturer's installation instructions.
- C. Submit operation and maintenance data.

- D. Submit coordination drawings. Detail fabrication and installation of humidifiers. Include piping details, plans, elevations, sections and details of components. Detail humidifiers and adjacent equipment.
- E. Submit wiring diagrams including power, signal, and control wiring.
- F. Submit minimum water quality requirements and water pressure requirements.

#### **1.4 EXTRA MATERIALS**

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for shipping and identified with labels describing contents.

#### **1.5 REFERENCES**

- A. ANSI/NFPA 70 National Electrical Code.
- B. UL 900 Standard for Air Filter Units.
- C. NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems.

#### **1.6 COORDINATION**

A. Coordinate location and installation of humidifiers in ducts and air-handling units. Revise locations and elevations to suit field conditions and to ensure proper humidifier operation.

## **PART 2 - PRODUCTS**

#### 2.1 IN-DUCT/AHU EVAPORTIVE HUMIDIFIER/COOLER - MH SERIES REFLOW and FLOW A. General.

- 1. Adiabatic humidifier provides humidification and air-cooling using the principle of surface evaporation over a media. Designed for direct HVAC installation for air-handling systems or ductwork. Air downstream of humidifier is free of aerosols, cooler, and more humid.
- 2. Humidifier shall accept potable, softened, reverse osmosis and de-ionized water.
- 3. The packaged humidifier is designed around the patented UL 900 Class 1 V-Profile humidification boxes, which uses impregnated polyester as the humidifying medium. The V-Profile ensures a more efficient evaporation by improving the exchange between air and water.
- 4. The MH series uses an intuitive electronic controller, which monitors the operation of the system, controls output levels and initiates self-cleaning flushing cycles to ensure hygiene and a long life span of the media.
- 5. The humidifier shall be powered by 120 volts single phase power supply with low power consumption ranging from 0.20-0.60 kW.
- 6. Improved water conservation (Reflow model only) through either performing drains based on operating time and water added or optionally by monitoring conductivity of recalculating water to maintain a programmable maximum mineral concentration.
- 7. Optional building management system integration using Modbus, BACnet, LonWorks protocols.
- 8. Optional Internet based monitoring and control.
- B. Evaporative Media:
  - 1. Media is made of a durable V-shaped polyester material, which absolutely free of fibreglass and is packaged in a stainless steel casing. The media design ensures that the air is not contaminated with glass fibre particles that are detrimental to health.

- 2. The V-profile of the humidifier box guides air flow over the complete surface of the media which promotes efficient evaporation and ensures low pressure loss.
- 3. The material has a flame retardant coating and fire protection is in compliance with UL 900 Class 1 Flame and Smoke.
- 4. Evaporative media shall be easily removable for replacement or cleaning by simply lifting out the stainless steel media casings which are hooked into the humidifier frame. No tools are required for media removal.
- The rate of evaporation shall depend on the air volume, air temperature, cross sectional area of the humidifier and the media depth. The depth of the evaporative media shall dictate the maximum effectiveness of up to 85% (8" media) or 95% (12" media).
- C. Mist Eliminator
  - 1. A patented integral mist eliminator shall be used to prevent water droplets in cases where the face velocity across the media exceeds 750 ft/s (3.8 m/s). The mist eliminator allows face velocities operation up to 1080 fpm (5.5 m/s).
  - 2. Material used in the mist eliminator must meet UL 900 Class 1 requirements.
  - 3. See section B for more detail. Both the media and mist eliminators are engineered from the same specifications.
- D. MH Total Control (TC) Management System
  - 1. Unit includes an electronic control cabinet with NRTL-c approval to include electrical fuses, main switch, microprocessor control (MHTC models only) using a proportional-integral method for interpreting analog signals from a humidistat and or the building control systems.
  - 2. The controller (MHTC models only) determines which stages should be activated to meet humidification loads. The controller activates self-maintenance cycles. This includes controlled flushing of the water tank in conjunction with filling cycles, and scheduled drain cycles to prevent bacteria growth in the water tank.
  - 3. The controller (Reflow models only) activates self-maintenance cycles. This includes controlled flushing of the water tank in conjunction with filling cycles, and scheduled drain cycles to maintain cleanliness of the water tank.
  - 4. The controller (MHTC models only) will manage programmable self-wash cycles. This cycle reduces scaling on the media and ensures clean hygienic operation. In addition the controller must flushing water lines after a period of inactivity.
  - 5. The full function control panel with back-lit graphic display (MHTC models only) shall feature the following user settings and features:
    - a) Control panel powder coated with On/Off switch, auto drain switch, LED fault indicator, LED service indicator and LED power on
    - b) Easy scroll through keypad with back-lit graphic display
    - c) Display of relative humidity and setpoint
    - d) Display of operating hours
    - e) Capacity output
    - f) Real-time date and time
    - g) Error history indication
    - h) Clean mode and media drying
    - i) Limited capacity adjustment
    - j) Inlet flush, drain time and drying cycles
    - k) Adjustable maintenance intervals
    - I) Remote relay testing
    - m) Modbus standard host protocol

- n) Terminal block installed for easy field connection of low voltage 24Vac control cable from prewired hydraulic unit with 30 feet (10M) of cabling included.
- 6. The control panel (MHTC models only) shall be capable of accepting the following humidity control methods:
  - a) Humidistat/thermostat or BMS control
  - b) 0-10Vdc, 0-5Vdc, 1-5Vdc, 2-10Vdc, 0-16Vdc, 0-20mA, or 4-20mA control signal
  - c) On/Off 24 Vac safety loop for On/Off control, air proving or high limit
  - d) Accepts Nortec Humidity Sensors or Controllers or Controls by others via DDC or BMS.
  - e) Integral timer programmable On/Off
- E. Hydraulic Assembly (REflow model only)
  - 1. For REflow models only a packaged pump hydraulic assembly will be included for recirculating water.
  - 2. Air cooled electric sealed motor pump shall be powered by a 120 V 1phase 60 Hz connection.
  - 3. Pump shall have stainless steel shaft and plastic housing to minimize corrosion and provide long service life. Pump shall be capable of running dry for short periods without damage.
  - 4. Manifold block shall be configured to accept staging valves 1, 2, or 3 stages up to five banks of evaporative media. MHTC models only.
  - 5. Adjustable volume control valves to provide even flow is always present to all media.
  - 6. 24 Vac pressure regulated water inlet valve with a <sup>3</sup>/<sub>4</sub>" BSPP connection shall operated between 30-80 psi operating pressure.
  - 7. Level control float for indication to control electronics when water tank is full and when tank needs to be refilled. then
  - 8. Drain connection is a 1.25" (3.175 cm) ID.
  - 9. Overflow protection in case of a level control or fill valve failure allows water to flow directly to drain.
- F. Aerosol Breakdown and Hygiene Control
  - 1. The Management System must be cable of real-time flushing, washing and drying cycles to be programmable via the control panel of the Management System. In the event of no call for humidity, the humidifier shall drain the tank and remain empty until a demand is present.
  - 2. A multi-sided gradient in the base pan ensures complete water tank draining and drying.
  - 3. The humidifier shall provide aerosol-free operation and is guaranteed by the hygroscopic properties of the humidifier media.
  - 4. Optional UV lamp that continually sterilizes all water flowing to evaporative media with UV-C radiation.
  - 5. Optional conductivity monitoring sensor ensures water quality is maintained at an optimal level and maximum life of the media is achieved.
- G. Available Options and Accessories
  - 1. UV water treatment
  - 2. Conductivity monitoring sensor (REflow models only)
  - 3. Pressure reduction valve (building side) consult factory
  - 4. P/N 1329505 In-Line Water filter c/w 5 micron filter

Nortec On/Off Controls:

- 5. P/N 2520273 On/Off Dig. Duct Humidistat pkg
- 6. P/N 2520259 On/Off Digital Wall Humidistat

7. P/N 1329203 - Switch Air Proving (duct airflow safety interlock) Nortec Modulating Demand Controls:

8. P/N 25202660 - 10V Dig. Duct Humidistat pkg

9. P/N 15101420 - 10V Digital Wall Humidistat

Nortec Transducer Sensor Controls:

10.P/N 1509858 - 2-10V Dig Wall Humidity Sensor

11.P/N 1509857 - 2-10V Duct Humidity Sensor

12.Nortec LINKS2 and Nortec Online please consult factory

H. Standard of acceptance: Nortec MH Series Evaporative Humidifier / Cooler.

## PART 3 - EXECUTION

### **3.1 EXAMINATION**

- A. Examine ducts, air-handling units, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before humidifier installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## **3.2 INSTALLATION**

- A. Install humidifiers per manufacturers' instructions.
- B. Install with required clearance for service and maintenance.

### 3.3 TESTING

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove malfunctioning units, replace with new units, and retest.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

## 3.4 TRAINING

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain humidifiers.
  - 1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
  - 2. Review data in maintenance manuals. Refer to Division 1 Section "Contract Closeout."
  - 3. Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
  - 4. Schedule training with Owner, through Architect, with at least seven days advance notice.

END OF SECTION

# MH Installation Requirements

- **30 Location Duct Module**
- 31 Location MHTC Reflow Hydraulic Unit
- 32 Plumbing
- 34 Electrical
- 35 MHTC/ MHB Controls
- **36 Nortec Controls**
- 36 On/Off Controls
- 36 Modulating Humidistats
- 37 Humidity Transducers
- 38 Outdoor Temperature Reset
- 38 Control Acceptance Configured at Factory
- 39 Control Location
- 39 Control Wiring

# 41 Nortec Links XPS (Optional MHTC Only)

### NOTE:

The following sections provide an outline of the installation requirements. For detailed installation instructions refer to MH Series Installation and Operation Manual.

# Location – Duct Module

The MH Duct Module is shipped disassembled. The duct module is designed to be assembled in place on the floor of a duct or air handler. Assembly involves bolting together frame pieces and securing to the duct, hanging media boxes onto frame with mounting tabs, assembling and installing optional mist eliminator, and sealing between the duct module and duct walls.

- Mounting surface must be strong enough to support the full weight of the duct module, mist eliminator and water in the evaporative media and drain pan (see Table 3: MH Specifications for approximate weights).
- To provide installation clearance the duct size should be min. 1.5 in. (38 mm) wider and 0.5 in. (13 mm) taller than the specified duct module.
- Provide a watertight section in the area of the duct module. If demineralised water is used use corrosion resistant materials.
- Air filters meeting ASHRAE 52.2 MERV 8 or 11 must be installed upstream of the MH.
- Ensure access door and space for replacing media boxes is provided downstream of the MH duct module. If installed, provide extra space for opening mist eliminator to access media.
- In case the outside of the duct or air handler walls are in contact with low ambient temperature insulate the outside of the duct to prevent condensation inside the duct.
- Clearance dimensions shown are for reference only and are the minimum required for maintenance. Consult local and national codes before final location and installation. Nortec does not accept responsibility for installation code violations.





Note:

- A P-Trap equal to duct static pressure plus 2 inches must be installed on the drain pan overflow. Insure sufficient space is available. Use a stand to raise the drain pan in the duct if necessary.
- The Duct Module requires regular maintenance including replacement of media boxes. Ensure access and sufficient space is provided downstream of the unit to remove and install new media boxes.

# Location – MHTC Reflow Hydraulic Unit

The MHTC Reflow Hydraulic Unit should be located adjacent to the duct or air handler containing the MH Duct Module. The Hydraulic Unit is designed to be floor mounted but can be installed on a stand or raised surface.

- Install the hydraulic unit as close as possible to the MH Duct Module to minimize length of drain and spray bar lines.
- Ensure the Hydraulic Unit is installed on a level surface.
- Install where there is sufficient access for removal of cover and servicing of unit.



Figure 18: MHTC Reflow Hydraulic Unit Installation Location / Clearance

# Plumbing

- All water supply and drain line connections must be installed in accordance with local plumbing codes.
- Install water shut off valve and union before humidifier to facilitate servicing.
- P Trap is required on the drain of the MHTC Flow / MHB and on the overflow of the MHTC Reflow. Min. height is 6 in. (15 cm) or duct static pressure + 2 in..
- Insure drain line and overflow line are min 1.25 in. (32 mm) ID.
- Spray bar elbows are provided over size so they can be cut down to required length.
- High hardness supply water will require increased maintenance and more frequent replacement of evaporative media.
- Unit damage caused by water quality outside of the specified ranges is not covered under warranty.

#### Note:

- Supply untreated potable water, reverse osmosis water, fully demineralised water or partly softened water. Do not treat water with corrosion inhibitors, disinfectants or other chemicals.
- If fully demineralised water is used then use plastic or stainless steel components for all plumbing connections.





Figure 19: MHTC Flow / MHB Plumbing Installation



Figure 20: MHTC Reflow Plumbing Installation

# **Electrical**

#### Note:

All MH models operate on 120 VAC, single phase, 60 HZ power. Refer to specification label for power requirements.



- Dedicated external fused disconnect must be installed.
   Fusing must not exceed max circuit protection as indicated on the specification label.
- 2 Ensure that adequate power is available to carry full MH amp draw as indicated on the specification label.
- **3** All wiring must be in accordance with national and local electrical codes.
- 4 For MHTC Reflow and Flow wire hydraulic unit as shown

MHPrimary Power





Hydraulic Unit

#### Figure 21: MHTC Reflow Electrical Primary Power and Hydraulic Unit Wiring



Connect labeled terminals in control panel to labeled terminals in hydraulic unit.

## **MHTC/ MHB Controls**

Humidification controls are available from Nortec as accessories or can be supplied by others. Temperature controls for cooling applications are not available from Nortec and must be supplied by others. The following information is relevant to all controls, factory supplied or otherwise.

- The MHTC can be operated with one modulating demand input or one transducer input.
- The MHB can be operated with one modulating input.
- Both the MHTC and MHB can be operated as On/Off.
- The MHTC humidifier control type can be configured via its LCD and keypad.
- Both the MHTC and the MHB include a 24 VAC safety input which must be made in order for the humidifiers to operate and which is used for controlling On/Off operation.

The MH humidifier can be configured to operate with the following control configurations.

Table 7: Humidifie	r Control	Configurations
--------------------	-----------	----------------

	Configurations	МНТС	МНВ	
Single	Modulating Demand On/Off Safety**	0-5*, 1-5, 0-10*, 2-10, 0*-16, 3.2-16 VDC 0-20*, 4-20 mA	0-10 VDC	
Channel	Transducer Control On/Off Safety**	0-5, 1-5, 0-10, 2-10, 0- 16, 3.2-16 VDC 0-20, 4-20 mA	N/A	
On/Off	On/Off Control** On/Off Safety**	24 VAC Dry Point	24 VAC Dry Point	

\* Transducer controls which have a possible 0 input are not recommended.

\*\* All On/Off controls must be wired in series and connected to terminal 2 of the control terminal strip.

*Note:* Regardless of selecting On/Off or modulating control method, Nortec humidifiers must have a closed circuit across their On/Off security loop control terminal to operate. Nortec highly recommends the use of a high limit humidistat and an air proving switch in series for this function.



# **Nortec Controls**

Nortec provides optional On/Off controls, modulating humidistats, or humidity transducers as shown in Figure 22, Figure 23, and Figure 24. Controls are available either wall mounted with integrated sensor, wall mounted with a remote sensor, or duct mounted with integral sensor.

## **On/Off Controls**

On/Off controls are used in all Nortec humidifier security loops. The digital humidistat can also be used as a space humidity controller, duct humidity controller, or duct high limit. These controls include:

- *Air Proving Switch* duct mounted, pressure differential switch, adjustable set point from 0.07 IWC to 12.0 IWC, good for positive, negative or differential pressure applications, stops MH if duct air pressure is not sensed. Turns MH off if air handler fails.
- Duct Mounted Digital Humidistat On/Off control based on setpoint, adjustable set point from 15-90% RH with accuracy fixed at ±3% at 25°C, operating range of 0-95% RH, closes on humidity drop and opens on rise.
- Wall Mounted Digital Humidistat On/Off control based on setpoint, adjustable set point from 15-90% RH with accuracy fixed at ±3% at 25°C, operating range of 0-95% RH, closes on humidity drop and opens on rise.
- **On/Off Controls Supplied by Others** Can be used as long as they have a dry set of contacts capable of passing a 24-VAC, 2-A maximum signal.



2548731 - On/Off Wall Humidistat 2548732 - On/Off Duct Humidistat 1329203 - Air Proving Switch Figure 22: Nortec On/Off Controls

## **Modulating Humidistats**

Modulating Controls are used to send a modulating demand signal to the MHTC. MHTC models can accept different signals (see Table 7: Humidifier Control Configurations) Nortec supplied controllers send a 0-10 VDC demand signal. The MH stages its output to follow the signal. These controls include:

- Wall Mounted Digital Humidistat with Integrated Sensor control of output, adjustable set point from 15-90% RH with accuracy fixed at ±3% at 25°C, outputs a 0-10 VDC signal.
- Wall Mounted Digital Humidistat Without Sensor control of output, adjustable set point from 15-90% RH with accuracy fixed at ±3% at 25°C, outputs a 0-10 VDC signal. Requires a remote transducer sensor supplying a 2-10 VDC signal.
- Duct Mounted Digital Humidistat With Sensor This package comes with both a remote sensor and a wall mounted controller without sensor. Control of output, adjustable set point from 15-90% RH with accuracy fixed at ±3% at 25°C, outputs a 0-10 VDC signal.



1510142 - Digital Wall Humidistat 2520261 - Digital Wall W/O Sensor 1509858 - Wall Sensor



2520266 - Digital Duct Humidistat Package

#### Figure 23: Nortec Modulating Humidistats

#### **Humidity Transducers**

Transducer send RH signals back to either a controller or back to the MH. The MHTC not the MHB can accept a direct transducer signal. The sensors include:

- Wall Mounted Humidity Transducer Sensor, output of 2-10 VDC, range of 0 to 95% RH.
- Duct Mounted Humidity Transducer Sensor, output of 2-10 VDC, range of 0 to 95% RH.
- Transducer Sensor By Others Humidity sensors that rise linearly with the sensed RH in the room.



1509858 - 2-10V Wall Humidity Transducer

1509857 - 2-10V Duct Humidity Transducer

Figure 24: Nortec Humidity Transducers

## **Outdoor Temperature Reset**

The outdoor temperature sensor is used to prevent condensation on windows or other surfaces that are adjacent to outdoor air. This sensor can be used in conjunction with the Nortec digital On/Off and modulating controllers. The sensor allows the controller to override the set point to prevent the humidifier from humidifying when condensation could be possible (see Figure 25). Install the temperature sensor near the fresh air intake.



Figure 25: Outdoor Temperature Reset





## **Control Acceptance Configured at Factory**

Nortec offers factory configuration of controls to match those that will be used at site. Factory configuration eliminates the need to configure the MHTC in the field and makes it plug and play with respect to software configuration

	Single Channel	Single Channel
Signal	Demand	Transducer
0-5 VDC	2523060	2523100
0-20mA	2523062	2523102
4-20 mA	2523064	2523105
0-10 VDC	2523066	2523110
0-16 VDC	2523090	2523112
1-5 VDC	2523092	2523114
2-10 VDC	2523094	2523116
0-20 VDC	2523096	2523118

#### **Table 8: Factory Configured Control Acceptance Part Numbers**

# **Control Location**

The humidity controls, whether controller or transducer, must be installed in a location which best represents the space that is being humidified. The preferred location for the humidity control is in the return air duct.

![](_page_41_Picture_2.jpeg)

#### Caution:

Failure to wire the MH in accordance with the wiring instructions could cause permanent damage. Such errors will void the warranty.

![](_page_41_Picture_5.jpeg)

#### **Figure 27: Control Location**

- **1** Air Proving Switch
- Locate so that it can sense air flow or lack of it.
- 2 Humidity / Temperature Control
- MHTC can be Modulating, On/Off, or a Humidity Sensor. MHB can be On/Off.
- Can be located either in return air duct (preferred) or in room being humidified / cooled.
- Mount in area representative of room humidity / temperature (draft, doorways, sunlight, or overhang such as a shelf can affect reading). Avoid placing near discharge diffuser of humidified / cooled air.

![](_page_41_Picture_13.jpeg)

*Note:* Regardless of selecting on/off or modulating control method, The MH must have a closed circuit across its On/Off security loop control terminal to operate. Nortec highly recommends the use of an air proving switch for this function.

# **Control wiring**

The MHTC control terminal strip is shown in Figure 28 along with a brief description of each of the inputs/outputs. The figure also shows the MHTC remote relay board. For wiring use minimum of 18 AWG and keep as short as possible.

![](_page_42_Figure_2.jpeg)

Figure 28: MH Humidifier Control Terminal Strip

# Nortec Links XPS (Optional MHTC Only)

Nortec LINKS XPS is an option that can be integrated with the MHTC. It allows a Building Management System to monitor and / or control the humidifier.

See Nortec publication Links XPS MHTC Installation and Operation Manual for detailed information about Nortec LINKS XPS and its operation and configuration.

Protocol	Signal Type	Polarity		<b>Recmended Cable</b>	Max. Recommended Distance
		Α	В		from Nortec Module
BACnet /MSTP	EIA-485,	Not	Not	18-24 AWG	2000 ft at 9,600 bps
Johnson N2	2-wire	inet +	Net-	Pair	2000 ft at 38,400 kbps
BACnet /IP	LAN Standard	N/A	N/A	CAT. 5E cable with RJ-45 termination	Depends on cable manufacturer
Lonworks	EIA-232, 2-wire	Tx	Rx	18-24 AWG Twisted Pair	Should not exceed 50 ft

Table 9: Nortec Links XPS Recommended Wire Types and Lengths

![](_page_43_Figure_5.jpeg)

Figure 29: Sample Network with Nortec Links XPS

# Warranty

Walter Meier Inc. and/or Walter Meier Ltd. (hereinafter collectively referred to as THE COMPANY), warrant for a period of two years after installation or 30 months from manufacturer's ship date, whichever date is earlier, that THE COMPANY's manufactured and assembled products, not otherwise expressly warranted (with the exception of the media), are free from defects in material and workmanship. No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulations.

THE COMPANY's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. THE COMPANY's factory, providing the defective part(s) is returned freight prepaid by the customer. Parts used for repairs are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer.

The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to THE COMPANY until said products have been paid for in full and then said liability shall be limited to the original purchase price for the product. Any further warranty must be in writing, signed by an officer of THE COMPANY.

THE COMPANY's limited warranty on accessories, not of the companies manufacture, such as controls, humidistats, pumps, etc. is limited to the warranty of the original equipment manufacturer from date of original shipment of humidifier.

THE COMPANY makes no warranty and assumes no liability unless the equipment is installed in strict accordance with a copy of the catalog and installation manual in effect at the date of purchase and by a contractor approved by THE COMPANY to install such equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for consequential damage or damage resulting directly from misapplication, incorrect sizing or lack of proper maintenance of the equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for damage resulting from freezing of the humidifier, supply lines, or drain lines.

THE COMPANY retains the right to change the design, specification and performance criteria of its products without notice or obligation.

U.S.A. Walter Meier (Climate USA) Inc. 826 Proctor Avenue Ogdensburg, NY 13669

CANADA Walter Meier (Climate Canada) Ltd. 2740 Fenton Road Ottawa, Ontario K1T 3T7

TEL: 1.866.NORTEC1 FAX: 613.822.7964

EMAIL: nortec@waltermeier.com WEBSITE: www.humidity.com

![](_page_47_Picture_4.jpeg)

![](_page_47_Picture_5.jpeg)