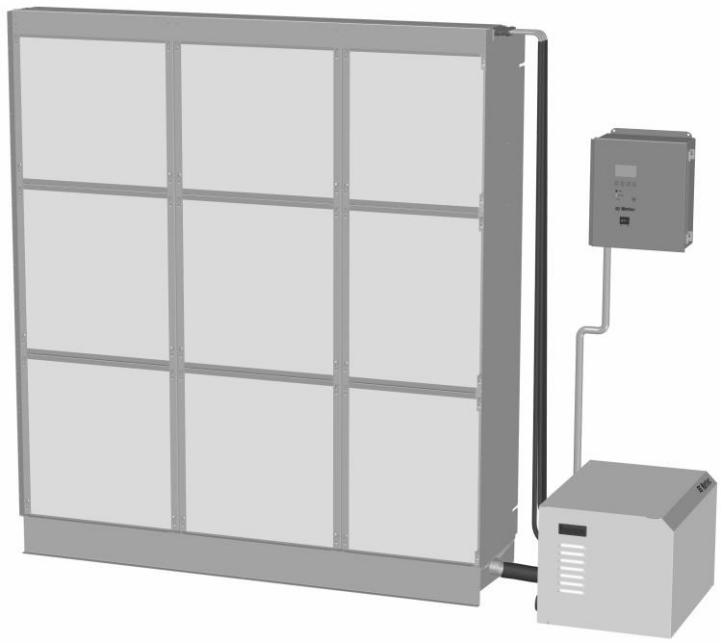
Important: **Read and save these instructions. This guide to be left with equipment.**



MH Series

Installation and Operation Manual

Includes installation, operation, maintenance, and troubleshooting information for your MHTC / MHB evaporative humidifier / cooler.

2558966-E | 27 NOV 2013

nortec
humidity.com

Thank you for choosing Nortec.

INSTALLATION DATE (MM/DD/YYYY)

MODEL #
SERIAL #

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Contents

1 Introduction

2 Receiving and Unpacking

3 MH Components

5 MH Models

6 Options and Accessories

11 Installation

12 Typical MH Installation

13 Location – Duct Module

14 Location – MHTC Reflow Hydraulic Unit

15 Duct Module Assembly and Installation

22 Plumbing

25 Electrical

27 External Controls

34 Options and Accessories

35 Start Up

36 Installation Check

37 MHTC User Interface

38 Start Up Procedure

39 MHTC Status Screens

41 Nortec Digital Controls

43 Start Up Checklists

45 Operation

46 MHTC LED Status Lights

46 MHB Status Lights

47 MH Schematic

47 How the MH Works

50 MHTC Humidifier Configuration

57 MHB Configuration

59 Maintenance and Servicing

60 Required Maintenance

62 Maintenance Schedule

68 Maintenance Shutdown and Extended Shutdown

69 Maintenance Checklist

70 Troubleshooting

72 General Troubleshooting

74 MHTC Warnings and Faults

78 Wiring Diagrams

83 Spare Parts

90 Warranty

Introduction



CAUTION: Servicing

- Every person working with the NORTEC MH Series must read and understand the installation and operating instructions before carrying out any work.
- Disconnect main power before any servicing.
- The control box and hydraulic unit contain high voltage components and wiring. Access should be limited to authorized personnel only.
- Poorly maintained humidifiers / coolers can endanger health of building occupants. If the MH is not properly maintained microbials may grow in it. If carried by air passing through the humidifier the germs can cause illness.
- The MH must be serviced in the intervals described in the maintenance section of this manual. Humidification boxes and mist eliminator media must be replaced after their service life has elapsed.



CAUTION: Electrical

- All electrical work should be done according to local electrical code.
- Electrical connection to be performed by a licensed electrician.



CAUTION: Plumbing

- Plumbing to be performed by a licensed plumber.
- All plumbing work should be done according to local plumbing code.
- Unit damage caused by water quality outside of the specified ranges is not covered under warranty.



CAUTION: Installation

- Do not mount control box or hydraulic unit on hot surfaces
- Do not mount hydraulic unit in area where freezing can occur
- Do not mount control box or hydraulic unit on vibrating surface
- Regardless of selecting On/Off or modulating control method, Nortec humidifiers must have a closed circuit across its 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 Humidity Ltd. does not accept any liability for installations of humidity equipment installed by unqualified personnel or the use of parts/components/equipment that are not authorized or approved by Nortec Humidity Ltd.

Receiving and Unpacking

1. Check packing slip to ensure ALL material has been delivered.
2. All material shortages are to be reported to Nortec within 48 hours from receipt of goods. Nortec assumes no responsibility for any material shortages beyond this period.

Note:
Each MH is shipped in multiple packages containing; 1) Control Box, 2) Hydraulic Unit, 3) Drain pan and duct manifold sheet metal, 4) Media Boxes, 5) Mist Eliminator (if ordered).

3. Inspect shipment for damage and note damages on shipping waybill accordingly.
4. After unpacking, inspect equipment for damage and if damage is found, notify the shipper promptly.
5. All Nortec products are shipped on an FOB factory basis. Any and all damage, breakage or loss claims are to be made directly to the shipping company.

Before Installation

1. Ensure that available voltage and phase corresponds with humidifier voltage and phase as indicated on humidifier's specification label.
2. Ensure sufficient clearances will be available for P-Trap on drain pan overflow and for proper slope of drain line from hydraulic unit.
3. Ensure sufficient clearances will be available as described in Location on page 13.
4. Ensure duct access will be available from downstream of duct manifold to install, maintain, and replace media boxes.
5. Report any discrepancy immediately to the site engineer.

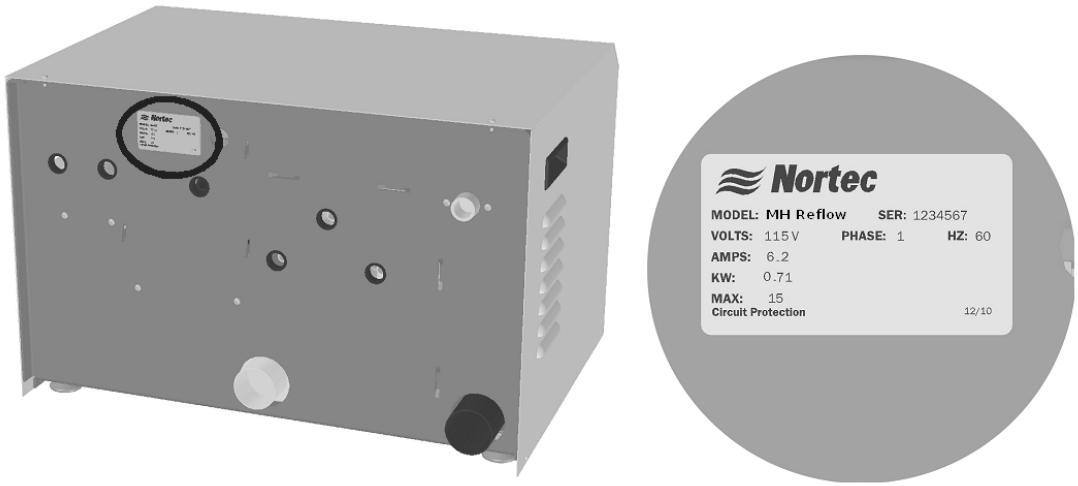


Figure 1: Specification Label Location

MH Components

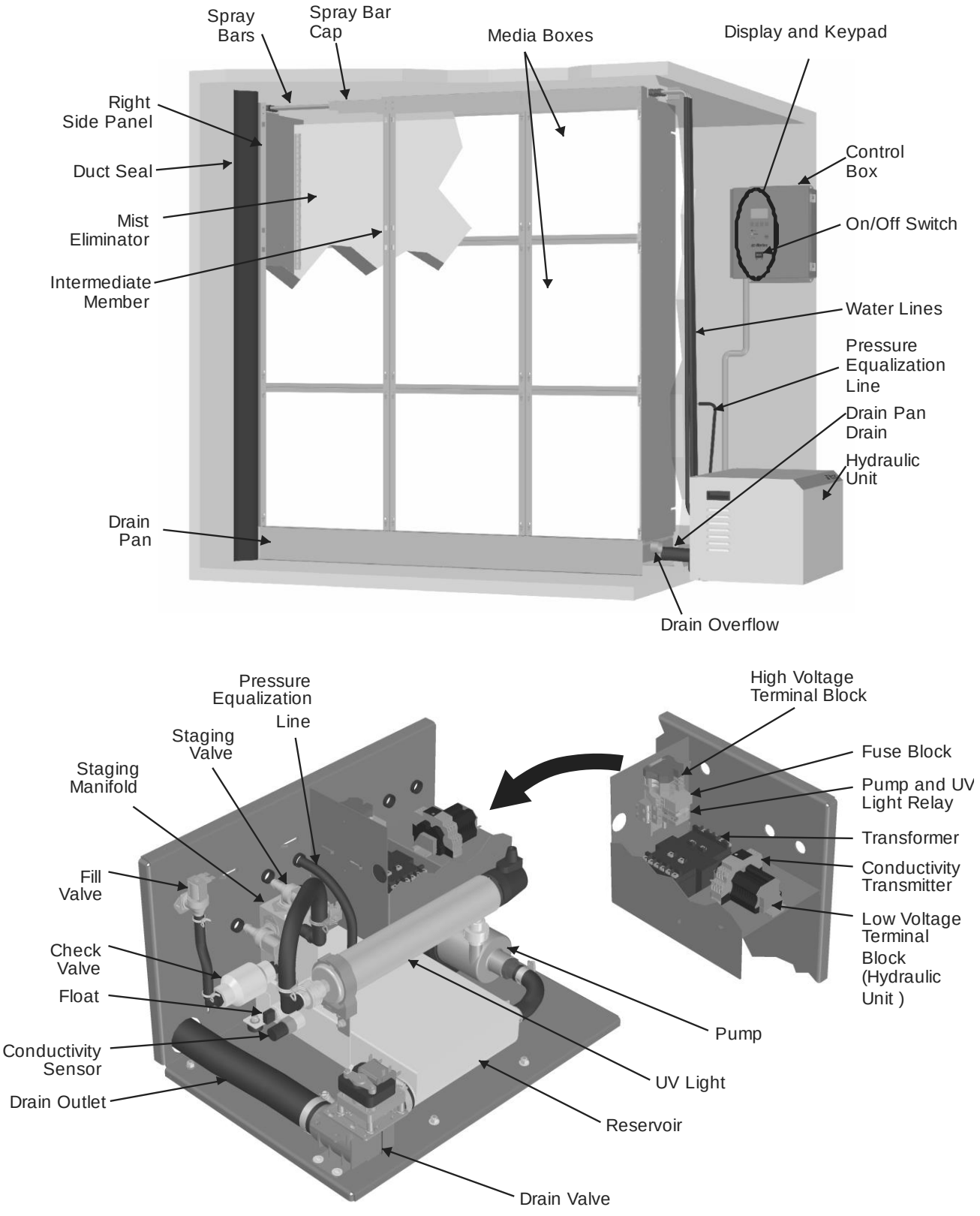


Figure 2: MH Humidifier Components

Description of Components

Table 1: Humidifier 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.
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.

MH Models

The MH2 is available in three models

(See Figure 3: MH Models and Table : 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 but without the hydraulic unit for recirculating water. The MHTC Flow can be multi stage for matching output to demand or single stage. Due to the aggressiveness of ultrapure DI water, potable or RO water is recommended for Flow systems.
- MHB - provides basic operation without user configurable settings. The MHB can be multi stage for matching output to demand or single stage. Due to the aggressiveness of ultrapure DI water, potable or RO water is recommended for MHB systems.

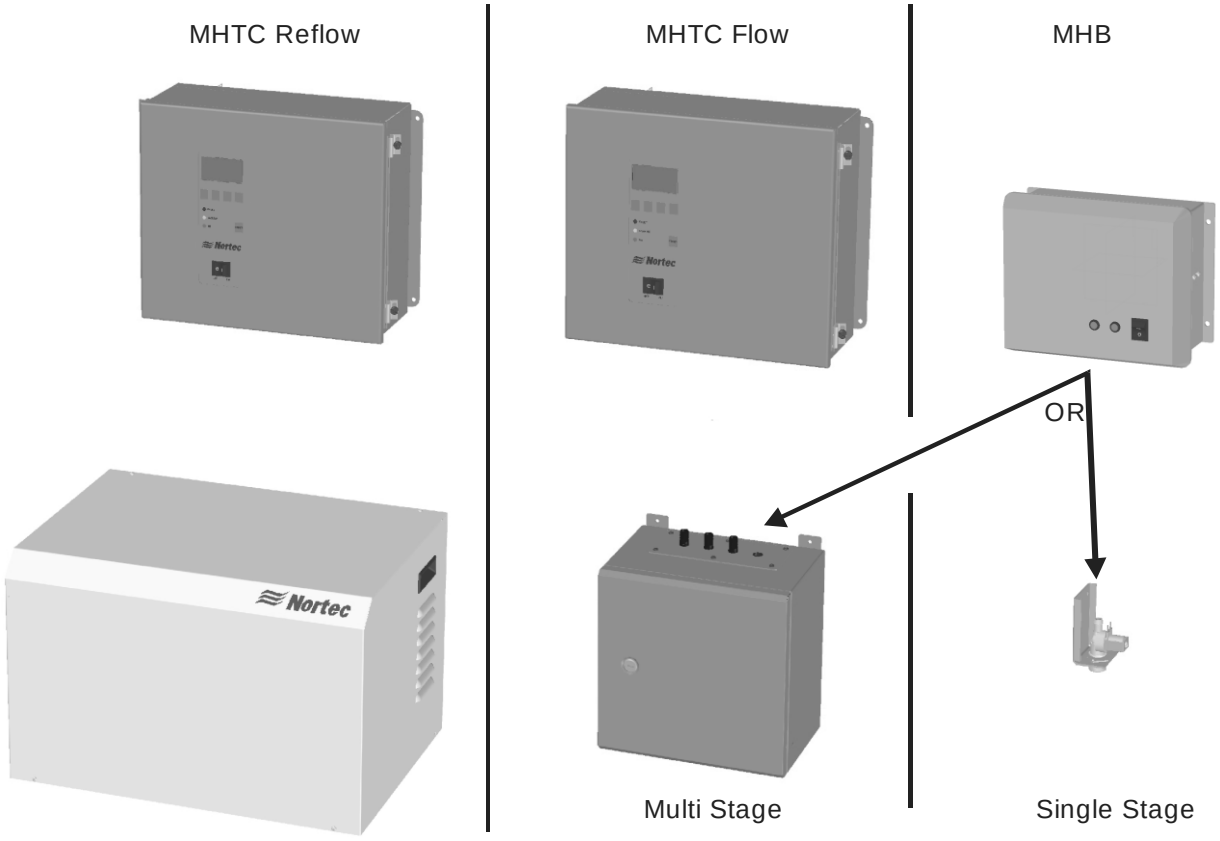


Figure 3: MH Models

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.

Options and Accessories

Nortec provides a complete line of options and accessories for every humidification application. The following options and accessories are available and may have been delivered with your MHTC humidifier/cooler. Refer to the installation instructions that came with the accessories for their proper installation and operation.

Table 2: Options and Accessories

Option / Accessory	Used For
Mist Eliminator	Removing water droplets that have been picked up by the air stream as it flows through the evaporative media.
Conductivity Sensor	Measuring water conductivity in the MHTC Reflow reservoir for improved water management.
Water Filters	Removing foreign particles from water supplied to the MH.
Water Pressure Regulators	Reducing supply line water pressure supplied to the MHTC Flow and MHB.
Digital or Analog Control Humidistats	Controlling the output of the humidifier based on sensed RH (can be mounted in the space being humidified or in the duct).
Digital RH Transducers	Communicating RH in a space or duct to the humidifier
Digital or Analog High Limit Humidistats	Preventing over humidification in a duct by shutting down or throttling down the humidifier when duct RH gets high.
Air Proving Switches	Insuring humidification only occurs when air is moving in a duct.
Nortec LINKS XPS (MHTC Only)	Connecting the humidifier to a building management interface. hardware allows control of the humidifier via BACnet, Lonworks, Johnson N2, or Modbus.

MH Specifications

Table 3: MH Specifications

	MHB Flow	MHTC Flow	MHTC Reflow
Voltage	120 vac / 60 hz	120 vac / 60 hz	120 vac / 60 hz
Control signals	VDC 0-10	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		
Allowable water supply pressure	30-80 psi (2-5.5 Bar)		
Allowable water temperature	41-104°f (5-40°c)		
Water quality	Tap water, reverse osmosis, softened or fully demineralized water. Note: Ultrapure DI water not recommended on MHB or Flow Systems.		
Max. allowable velocity through media	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		
Max. allowable air temp. through media	120 °F (48 °C)		
Fire classification of evaporative media	UL 900 Class 1 USA, ULC-S111-07 Class 2 Canada		

MH Dimensions

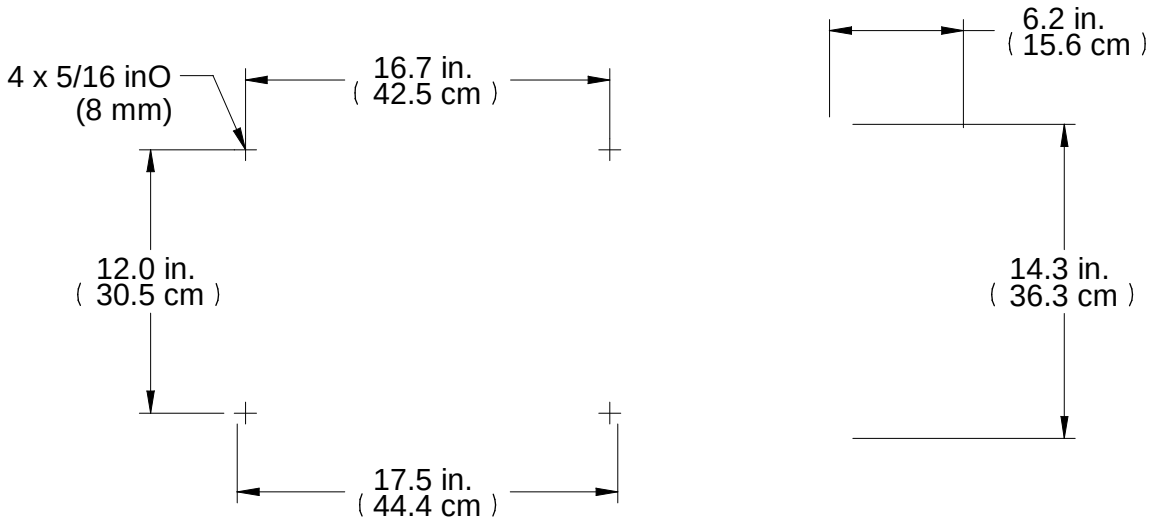


Figure 4: MHTC Reflow/Flow Control Box Dimensions

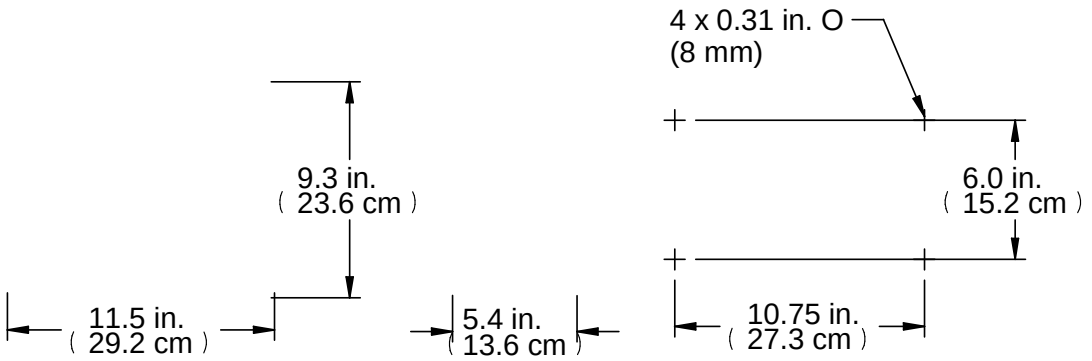


Figure 5: MHB Control Box Dimensions

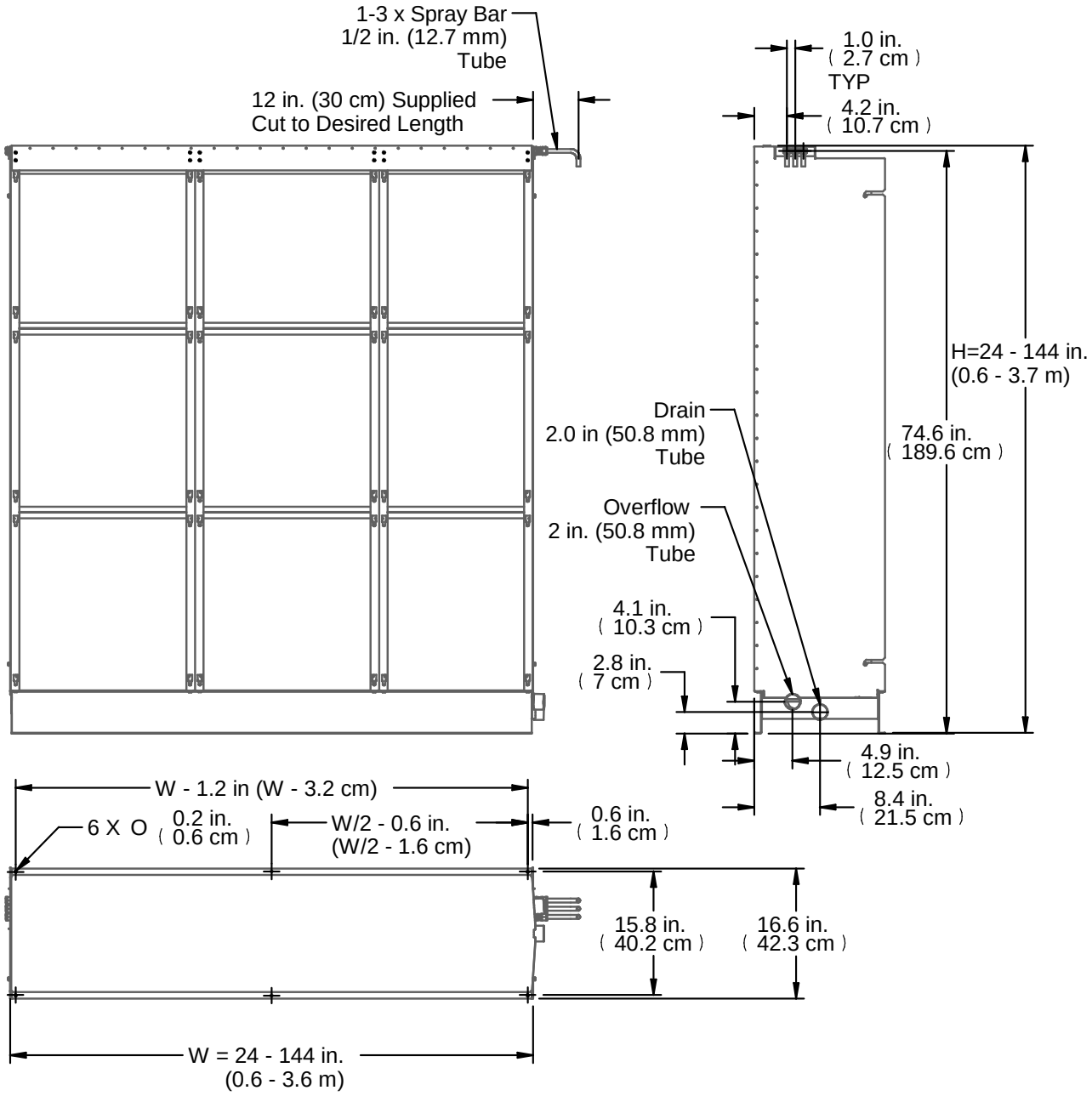


Figure 6: MH Duct Module Dimensions

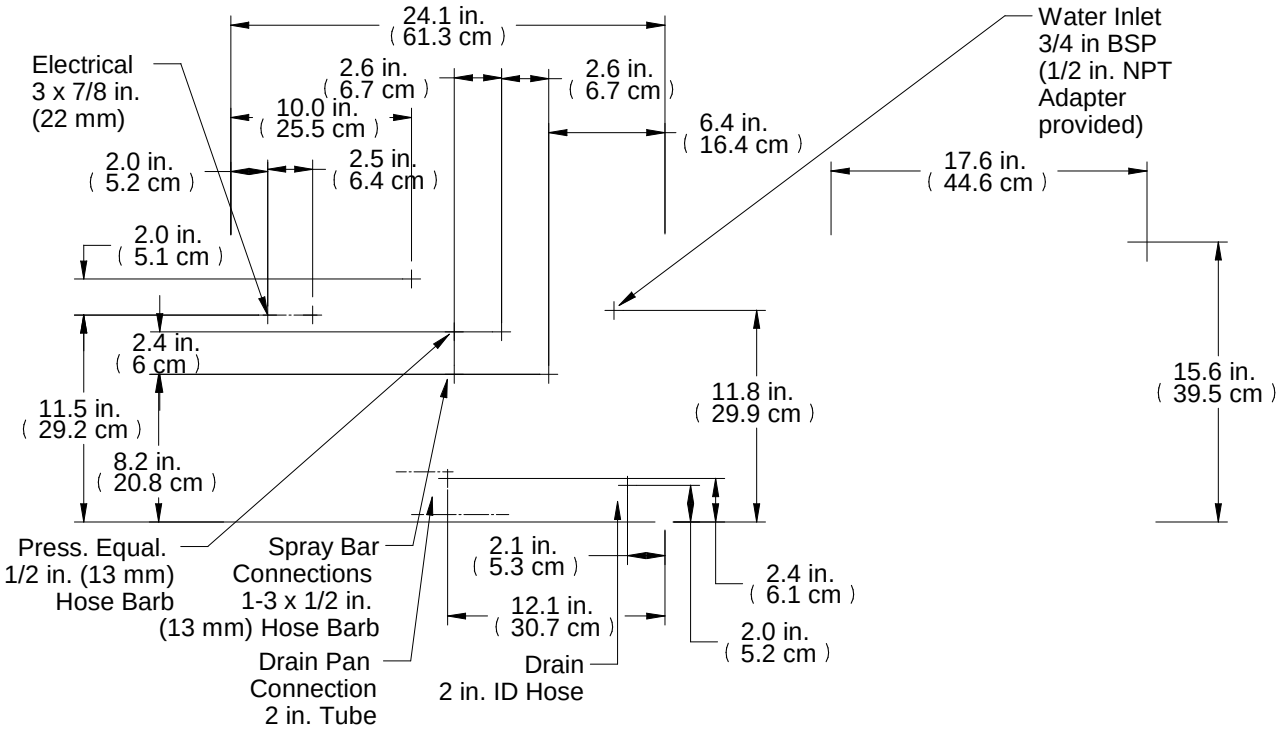


Figure 7: MHTC Reflow Hydraulic Unit Dimensions

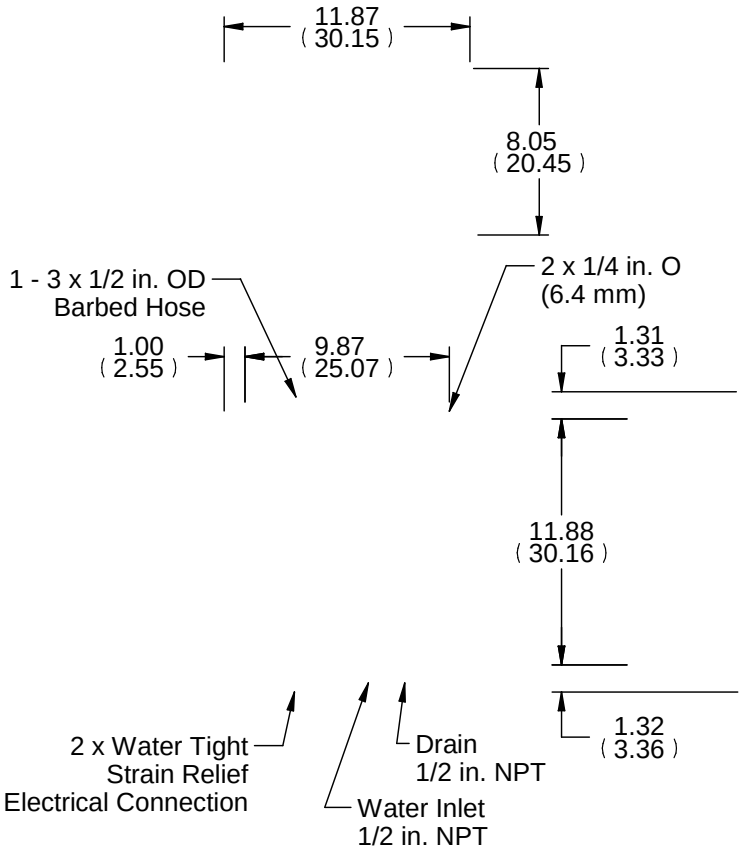


Figure 8: MHTC Flow/MHB Multi Stage Hydraulic Unit Dimensions

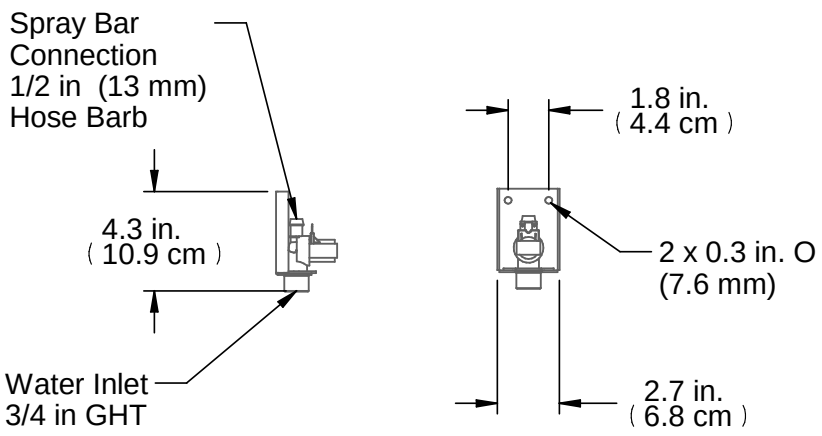


Figure 9: MHB Single Stage Hydraulic Unit Dimensions

Installation

Typical MH Installation

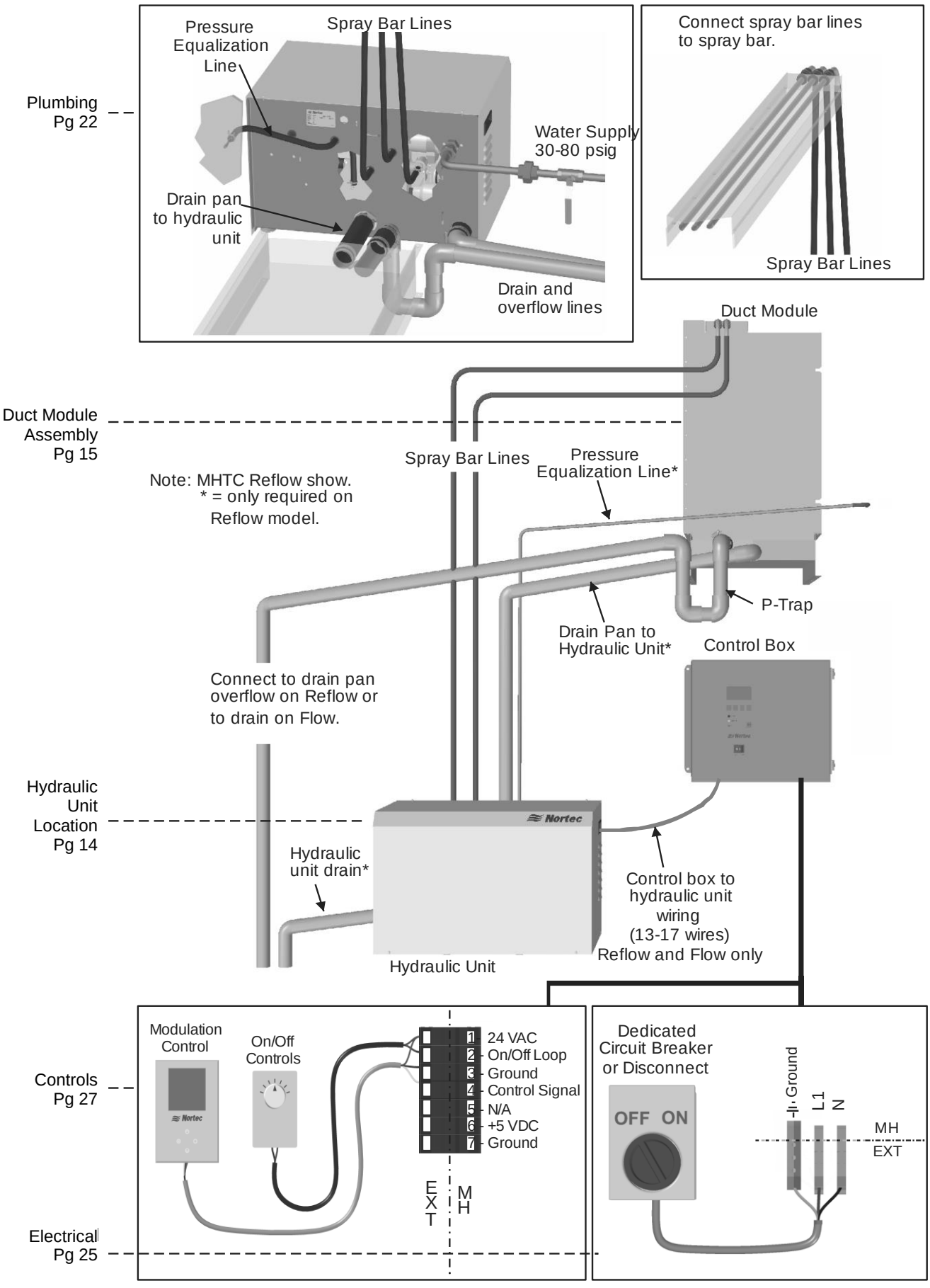


Figure 10: Typical MH Installation

Location – Duct Module

The MH Duct module is designed to be installed on the floor of a duct or air handler. Position the drain pan so that there is an equal gap between the pan and both side walls. The drain pan should be oriented so that the media boxes and overflow will be upstream of the drain pan outlet.

- Ensure mounting surface is strong enough to support the full weight of the duct module, mist eliminator and water in the evaporative media and drain pan (see MH Specifications
- Table 3: MH Specifications for approximate weights).
- Provide a watertight section in the area of the duct unit that extends a min. of 36 in (92cm) from the end of the duct module. If demineralised water is used use corrosion resistant materials.
- A mist eliminator is not required for media face velocities below 750 fpm; however as the media reaches its end of life, there is a risk of droplet carry over. A drain is required in the watertight section downstream from the duct module.
- Air filters meeting ASHRAE 52.2 MERV 8 or MERV 11 must be installed upstream of the MH duct module.
- Ensure an access door and sufficient space for replacing media boxes is provided downstream of the MH duct module. Provide extra space for opening /removing mist eliminator to access media boxes if mist eliminator is installed.
- 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 of the humidifier. Consult local and national codes before final location and installation. Nortec does not accept responsibility for installation code violations.

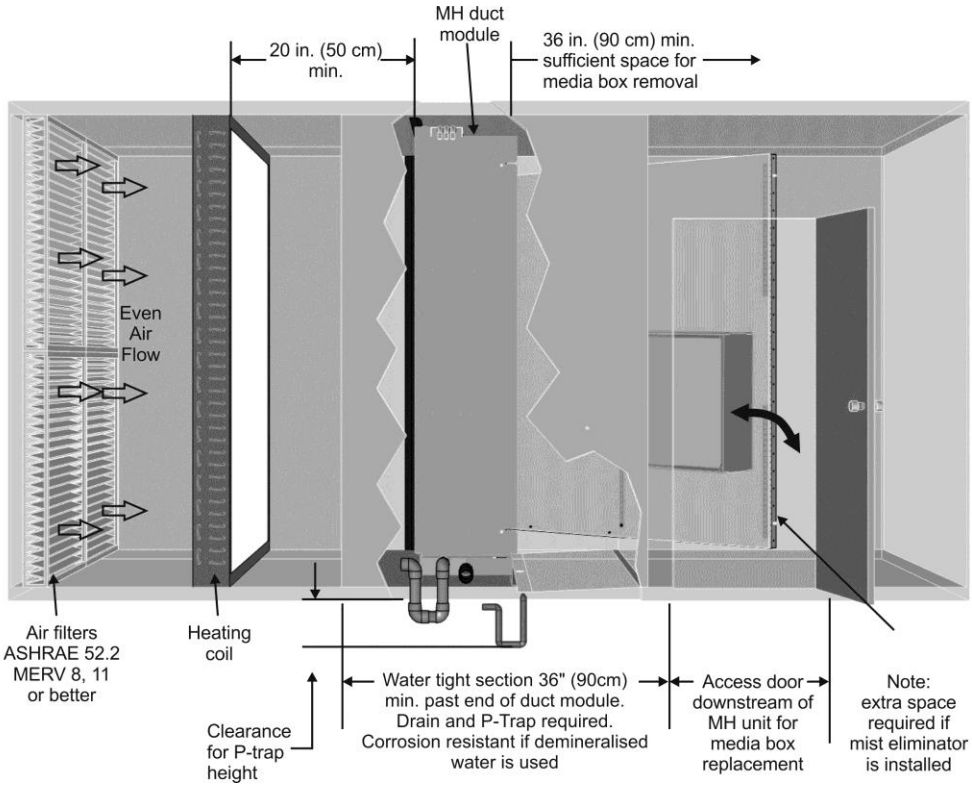


Figure 11: MH Duct Module Location

Location – MHTC Reflow Hydraulic Unit

Note:.
A P-Trap equal to duct static pressure plus 2 inches must be installed on the drain pan overflow. Ensure sufficient space is available. Use a stand to raise the drain pan in the duct if necessary.

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 Unit to minimize length of drain and spray bar lines.
- Ensure spray bar lines are no longer than 15 ft. vertically (equivalent length per spray bar). below the top of the duct module.
- Ensure the Hydraulic Unit is installed on a level surface.
- Install providing access for removal of cover and servicing of unit.

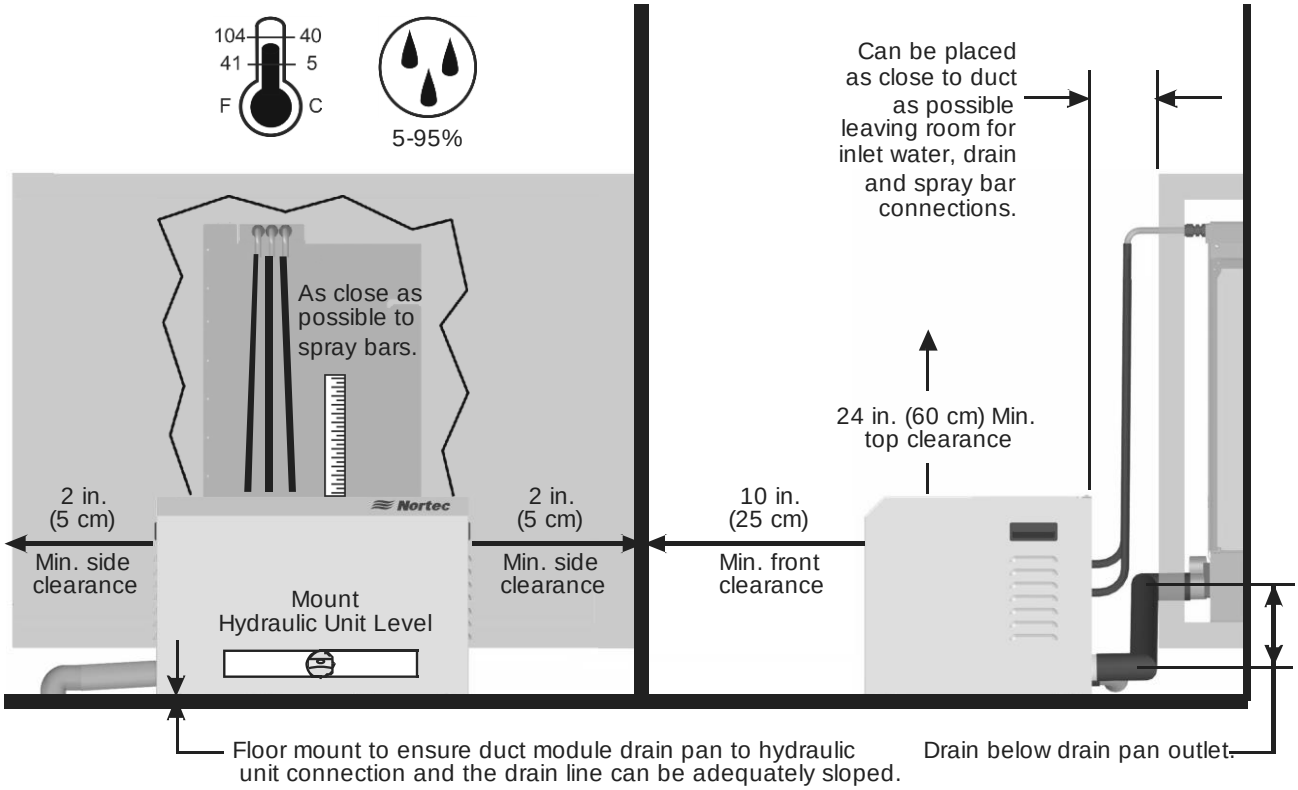


Figure 12: Installation Location / Clearance

Note:
The Duct Unit 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.

Duct Module Assembly and Installation

Usually, the design and dimensioning of the ventilation duct/air handler as well as the location of the Nortec MH inside the duct are determined, recorded and specified when planning the entire system. The following 8 steps provide a guide for assembling the duct unit. Assembly should only be carried out by qualified personnel familiar with duct and air handler construction.

The assembly shown shows the drain pan being mounted and fastened to the base of the duct. It may be necessary to raise the drain pan in the duct to achieve proper P-Trap height on the drain or overflow. Ensure proper height is available for a P-Trap equal to 6 in (15 cm) or duct static pressure + 2 in whichever is greater.

Step 1 - Drain Pan

- Install drain pan ensuring it is level.
- Orient the drain pan with respect to air flow so that the overflow outlet (higher) is upstream of the drain pan drain outlet.
- Leave an equal gap on both sides of the drain pan.
- Caulk around screws and any other openings used to fasten the drain pan to the base of the duct.
- Make a cutout in the side of the duct for drain connections and install hose cuffs of sufficient length to connect to hydraulic unit or drains.
- Seal duct wall around hose cuffs with cover plate (by others).

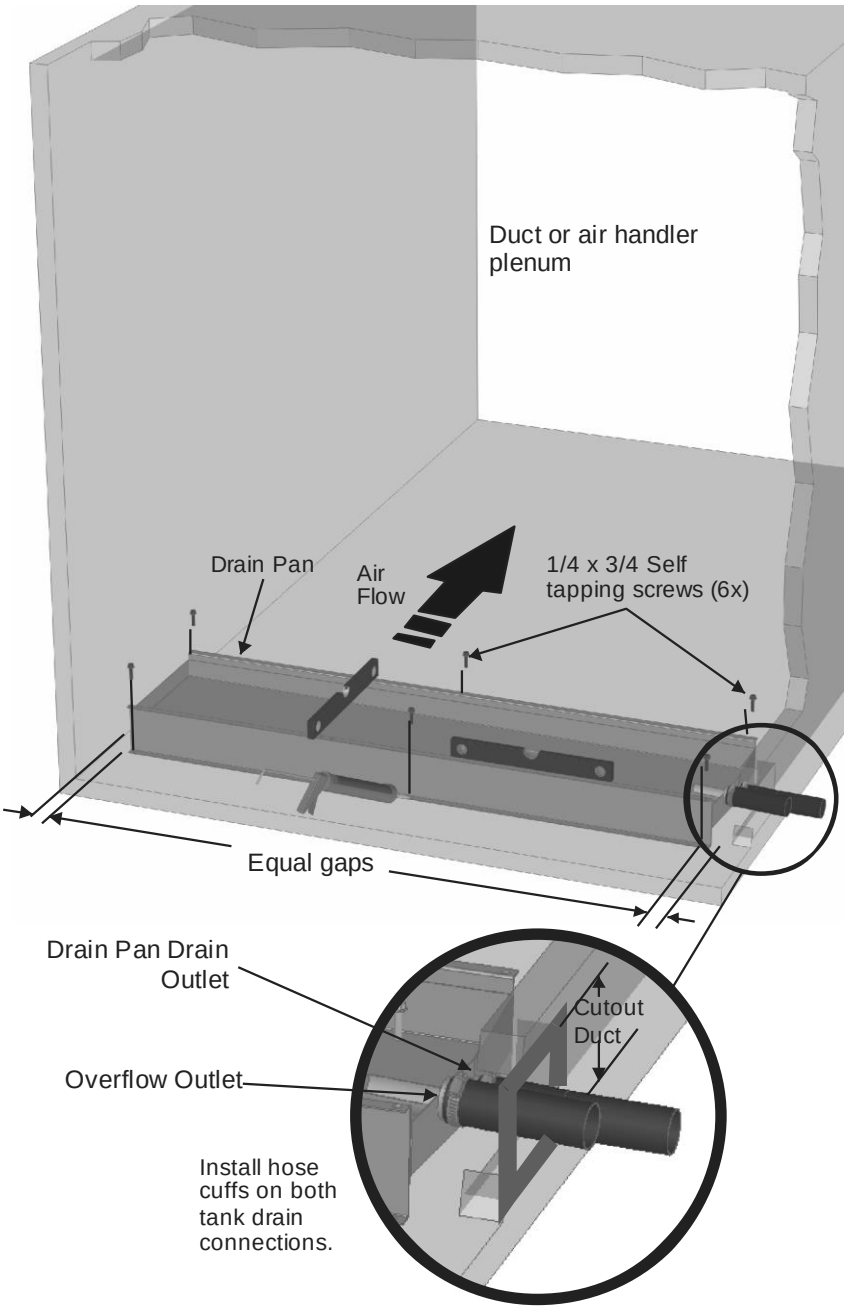


Figure 13: Drain Pan Installation

Step 2 – Side Panels

- Install side panels onto the drain pan using 1/4 UNC x 3/4 in. screws, washers, and ¼" UNC locknuts.
- Ensure flanges for mounting media boxes are upstream with respect to airflow.

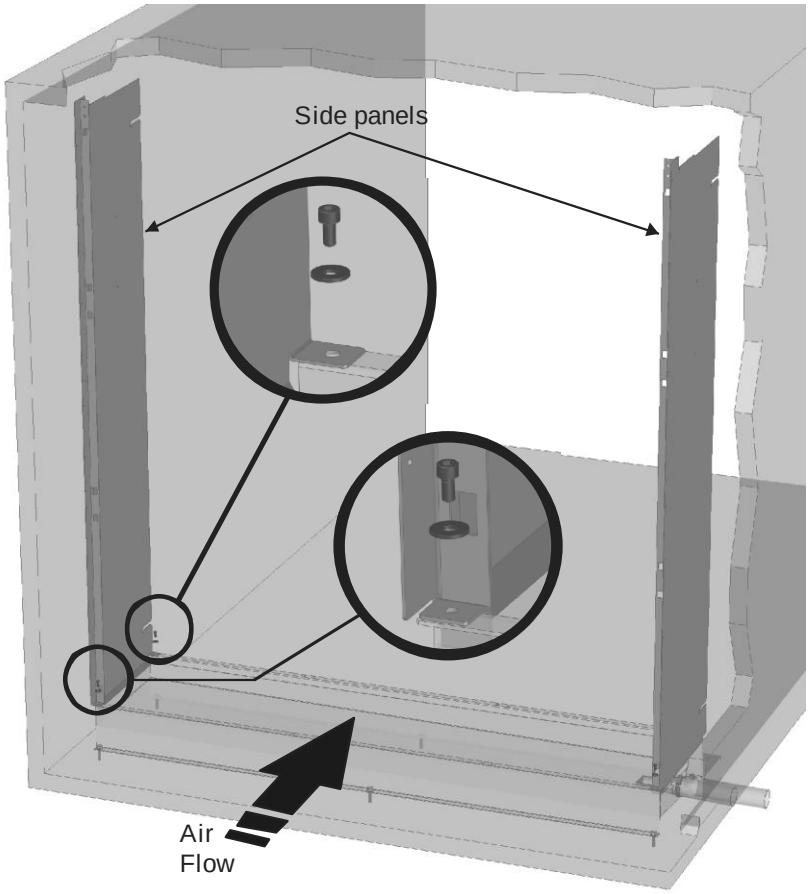


Figure 14: Side Panel Assembly

Step 3 – Top Bracket and Intermediate Members

- Install top bracket and intermediate members to side panels and drain pan using 1/4 UNC x 3/4 in. screws, washers, and ¼" UNC locknuts.
- Tighten screws finger tight for ease of assembly, tighten completely in step4.

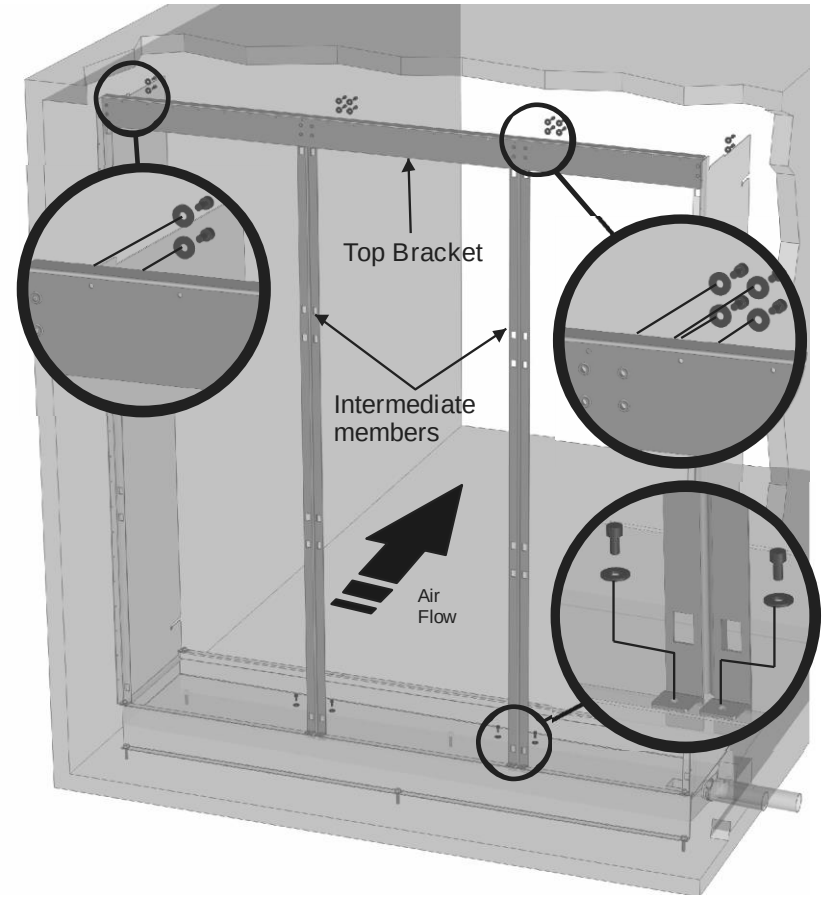


Figure 15: Top Bracket /and Intermediate Member assembly

Step 4 – Block Side Panels

- Ensure both side panels are square to drain pan edge.
- Insert blocks (by others) between side panel and duct wall to keep them in place. Shim as required.
- Secure blocking material to side panels with screws (by others) using holes provided in side panels.
- Tighten all previously installed screws.

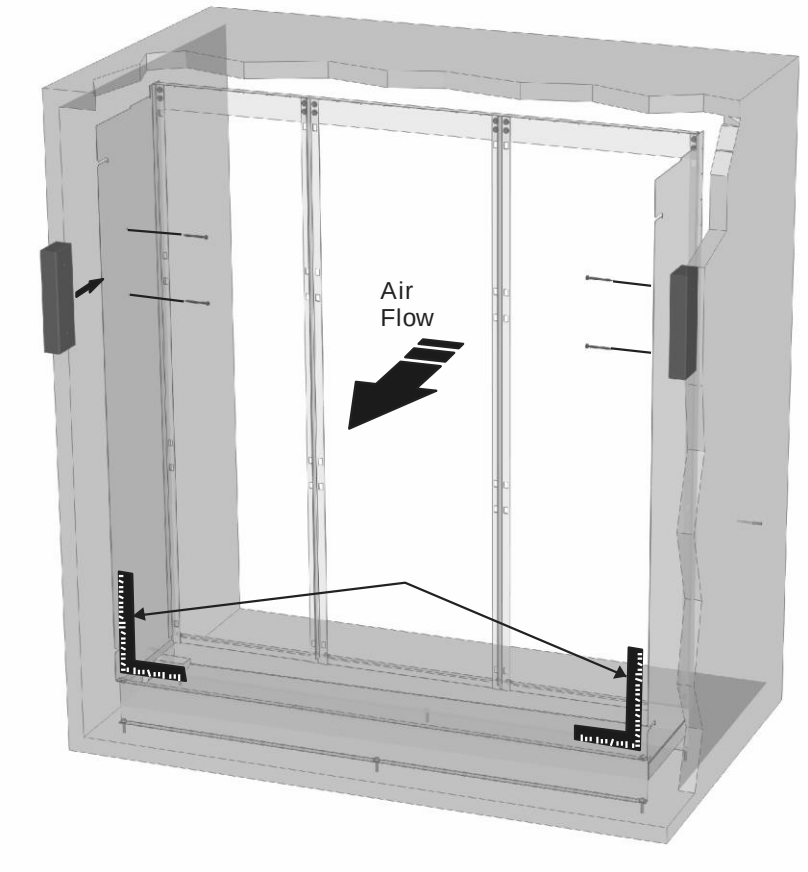


Figure 16: Square and Block Side Panels.

Step 5 - Seal Around Duct

- Seal air gap between side panels and duct walls as well as between top bracket and duct ceiling with either EPDM sealing profile (optional) or sheet metal angles (by others).
- To install sealing profiles cut to duct height and duct width plus allowance.
- Attach profiles to side panels and top bracket with clamping brackets and self-tapping screws #10 x 3/4" supplied.
- Trim profiles to fit and attach them to the duct walls and ceiling using brackets and screws

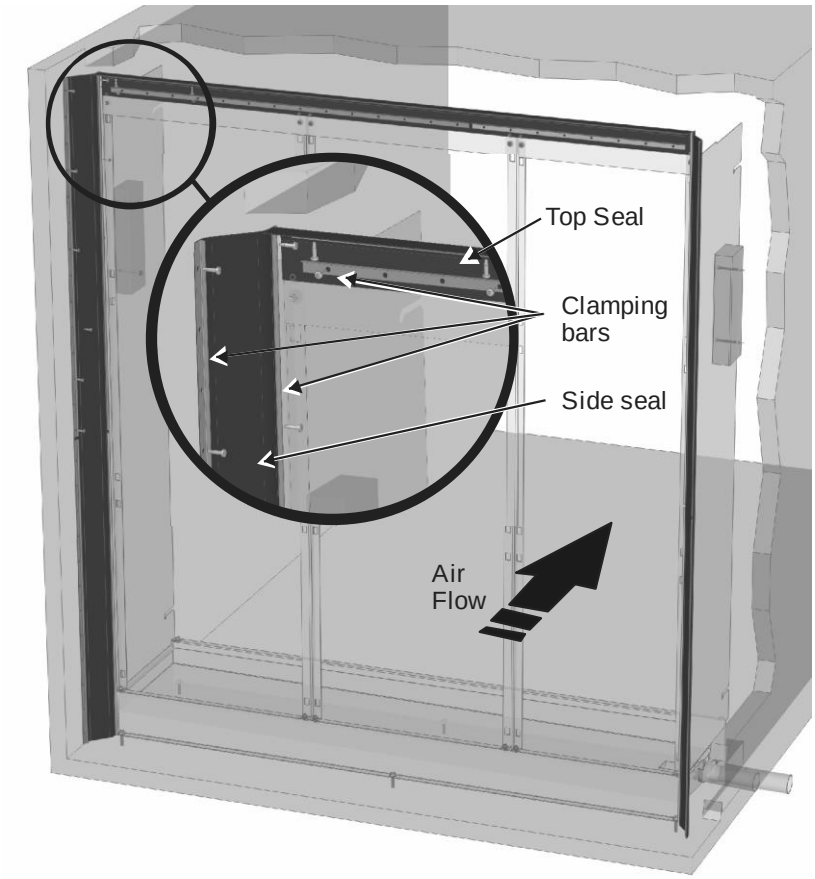


Figure 17: Seal Around Duct

Step 6 – Install Media Boxes

- Arrange media boxes according to the installation drawing included in the shipment.
- Starting from the bottom row hook the mounting clips of the boxes into the corresponding slots in the supports.
- Push the media boxes downwards until they come to a stop.

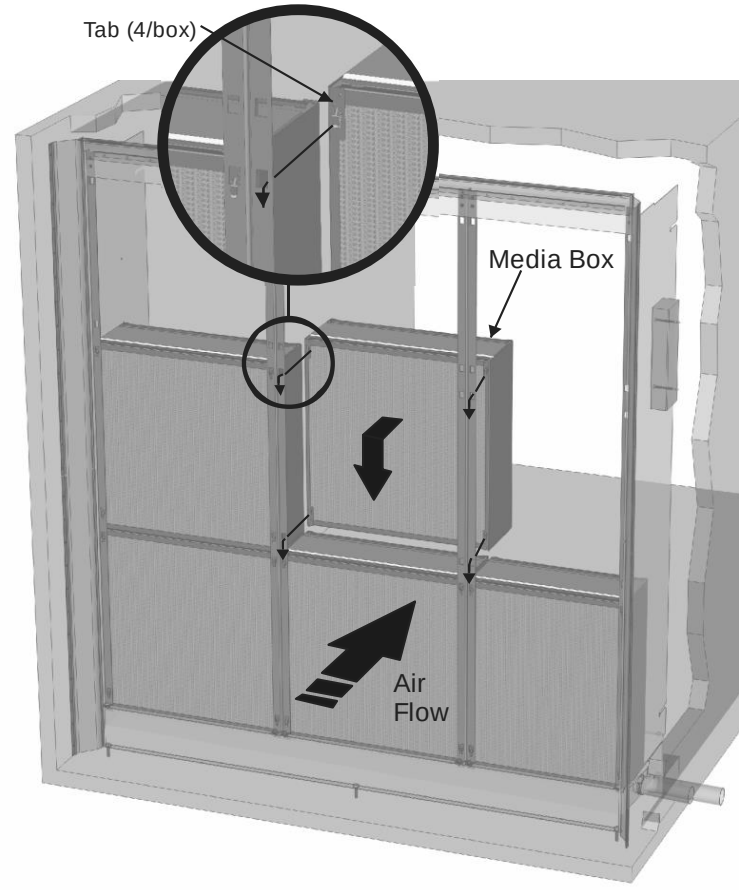


Figure 18: Install Media Boxes

Step 7 – Install Spray Bar

- Make a cutout in the duct wall for spray bar tubes.
- Insert spray bar assembly by hooking tab on side panels into opening of spray bar cap. Tip the spray bar cap forward to sit in notch of side panel.
- Cut the spray bar elbows to desired length and attach to spray bars using the swage fittings provided.
- Seal duct wall around spray bars with cover plate (by others).

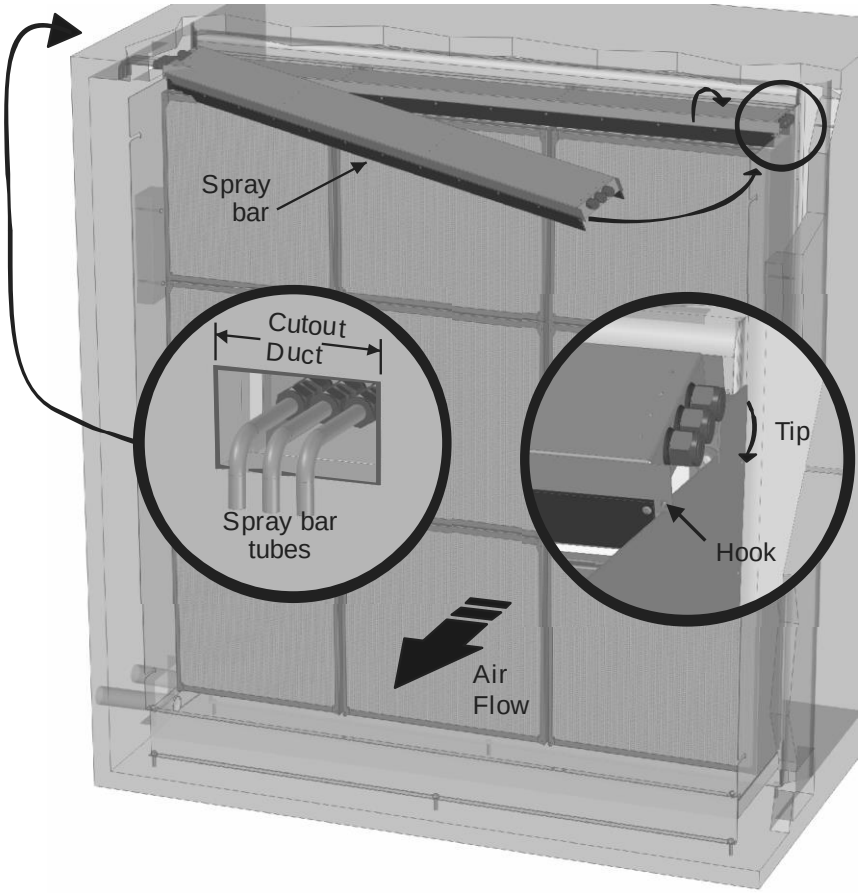


Figure 19: Install Spray Bar

Step 8 – Install Mist Eliminator

- If a mist eliminator (optional) is being installed first assemble it according to instructions provided with it.
- Install the mist eliminator by sliding the mounting screws extending from its sides into the slots of the side panels.

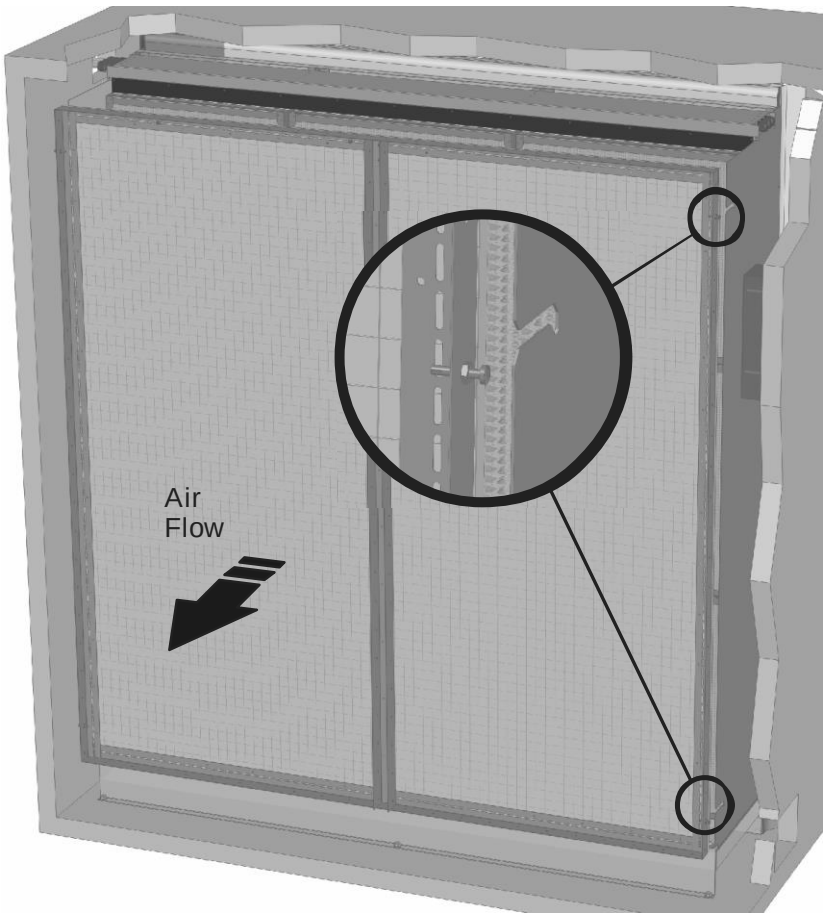
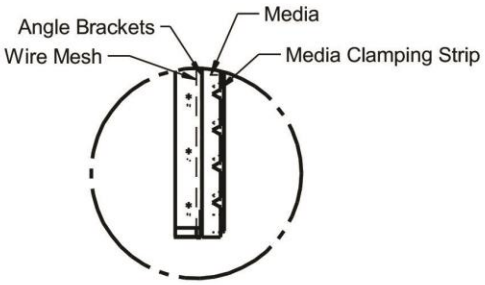
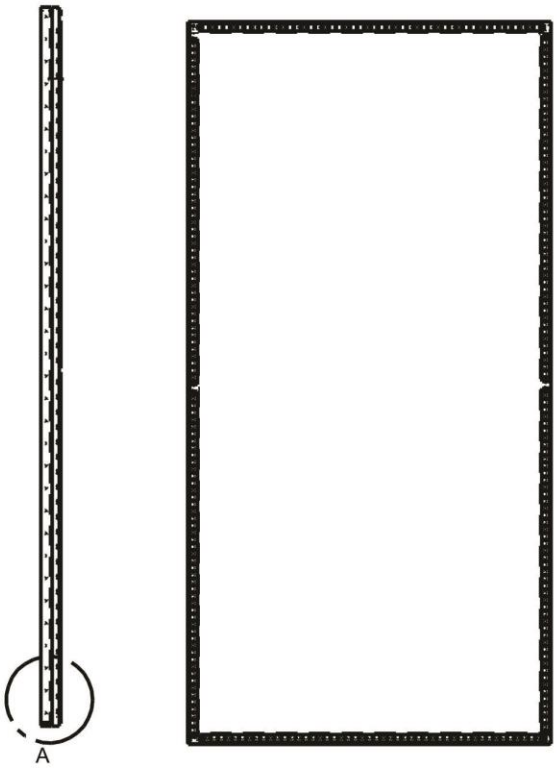


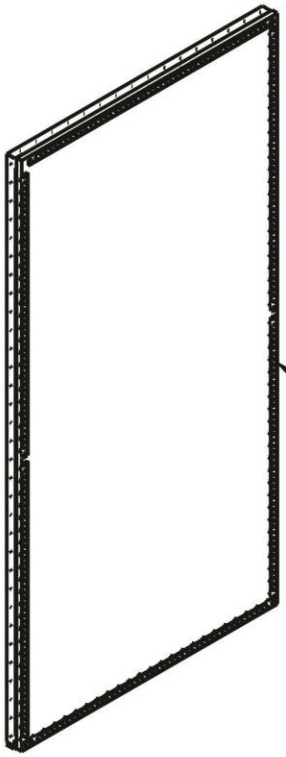
Figure 20: Mist Eliminator Installation



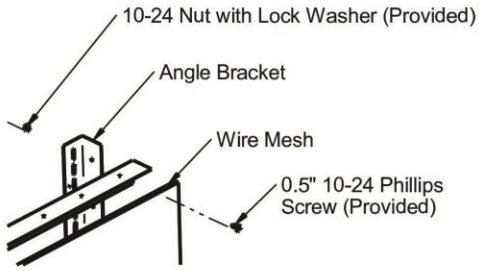
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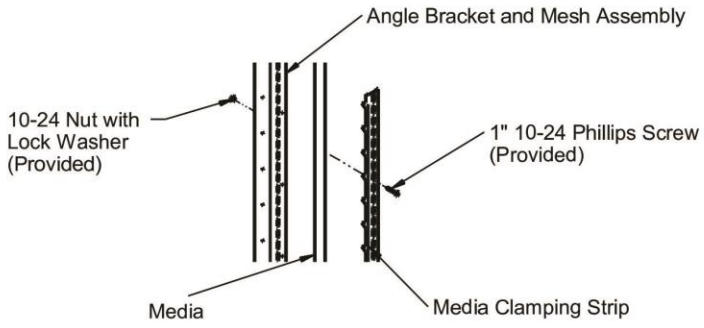
Angle Bracket and Mesh Assembly



Angle Brackets are to be cut to the required length. Ensure length and width are adequate for installation

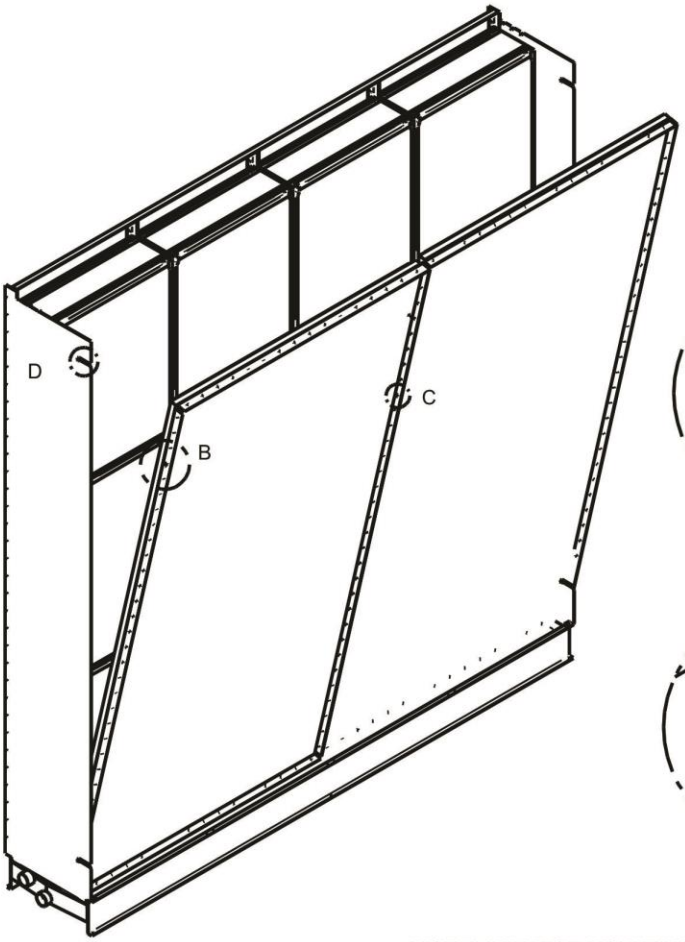


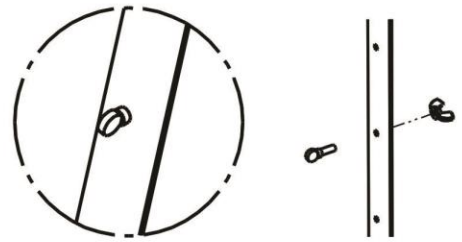
Media Mounting



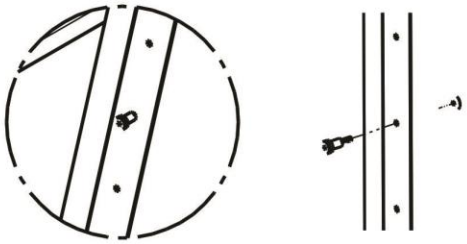
nortec humidity.com

Installation Instructions Page 1 of 2
Mist Eliminator Assembly, MH2
Diagram No. 2560422 Rev. A June 2, 2011

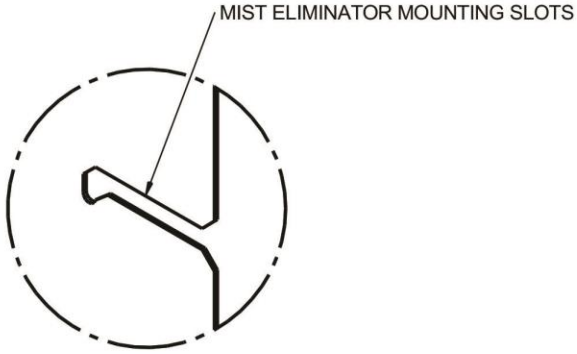




DETAIL C



DETAIL B



DETAIL D

Assembly Instructions

1. Add mounting shoulder screws as in Detail B ensuring they align with the mist eliminator mounting slots in Detail D.
2. Mount external 4ft sections of mist eliminator first.
3. Assemble mist eliminator sections using thumbscrew and wingnut as in Detail C.

Plumbing

General

- 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.
- Insure drain line and overflow line are min 1.25 in. (32 mm) ID. to provide draining.
- 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.
- Flush water lines thoroughly before connecting to the hydraulic unit.



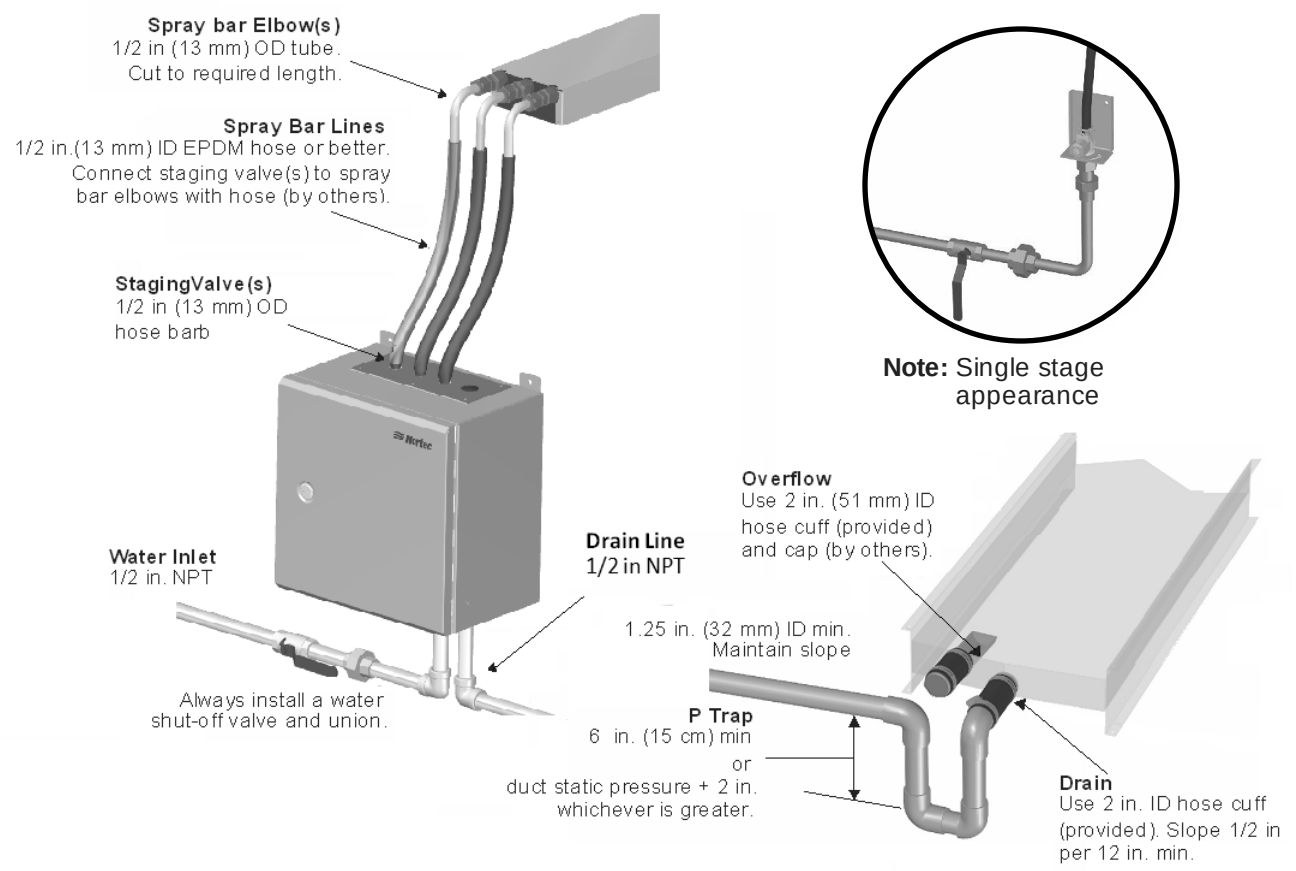


Figure 21: MHTC Flow / B Plumbing Installation

- On the MHTC Flow and B models the overflow connection on the drain pan is not used. Cap the connection using hose cuff (provided) and cap (by others).
- Install a P Trap on the drain pan drain. Minimum 6 in. (15 cm) or duct static pressure + 2 in. whichever is greater.
- If spray bar elbow(s) are longer than required remove them from spray cap, cut to desired length, and reinstall.
- Install spray bar lines ensuring hose has no dips or sags which could trap water.
- Install hose clamps on all hose connections.

MHTC Reflow Plumbing

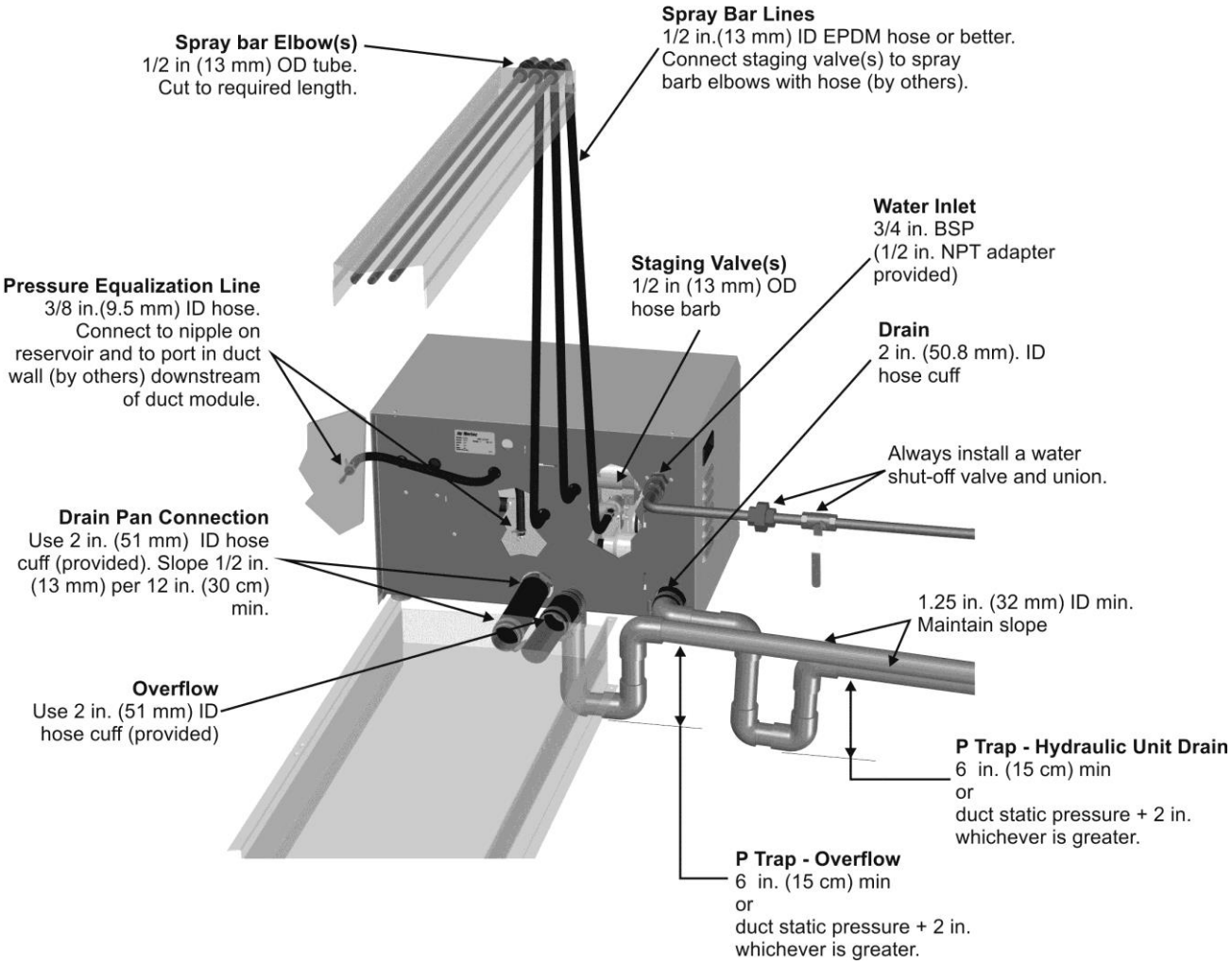


Figure 22: MHTC Flow / B Plumbing Installation

- On the MHTC reflow connect the drain pan's drain to the hydraulic unit's drain pan connection using 2 in. (51 mm) ID hose cuff (provided).
- Install a P Trap on the drain pan's overflow. 6 in (15 cm) in height or duct static pressure + 2 in. whichever is greater.
- Install a P Trap on the drain line from Reflow hydraulic unit. 6 in (15 cm) in height or duct static pressure + 2 in. whichever is greater.
- If spray bar elbow(s) are longer than required remove them from spray cap, cut to desired length, and reinstall. Connect to staging valves through openings in back of unit.
- Install spray bar lines ensuring hose has no dips or sags which could trap water.
- A pressure equalization line is required between the hydraulic units reservoir and the duct to ensure proper drain operation. Install a 3/8 in. (9.5 mm) port on the duct wall downstream of hydraulic unit. Connect to reservoir with hose ensuring hose has no dips or sags which could trap water.

Electrical

Caution:

- Wiring to be performed by a licensed Electrician.
- All MH models operate on 120 VAC, single phase, 60 HZ power. Refer to specification label for power requirements.

General

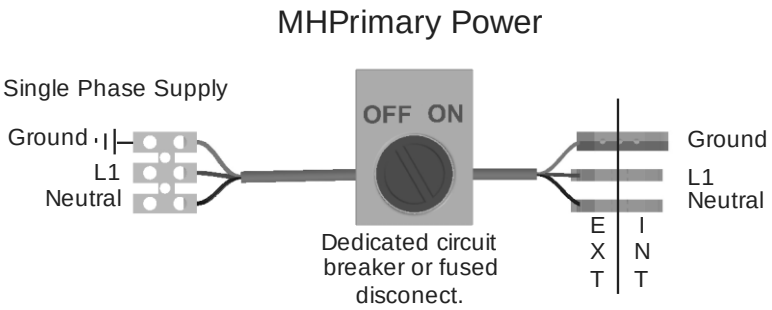
Note:

1 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 to be in accordance with national and local electrical codes.

4 For MHTC Reflow and Flow wire hydraulic units as shown in following illustrations.



MHTC Flow Electrical

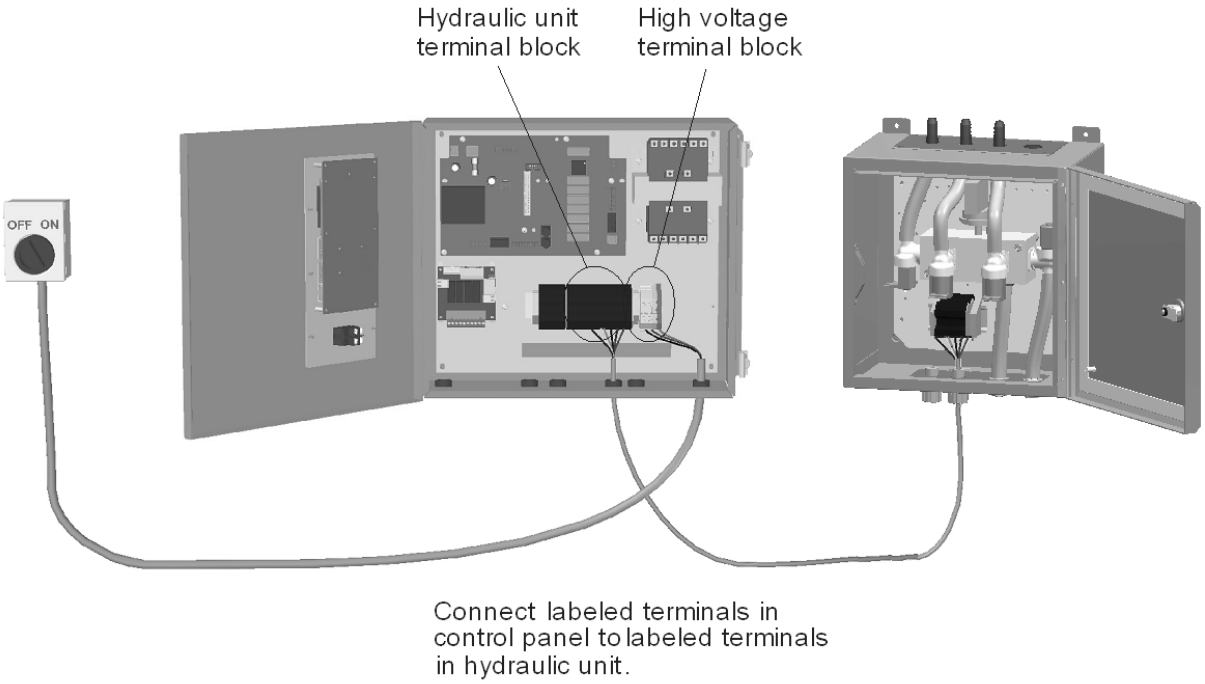


Figure 23: MHTC Flow Primary Power and Hydraulic Unit Wiring

MHTC Reflow Electrical

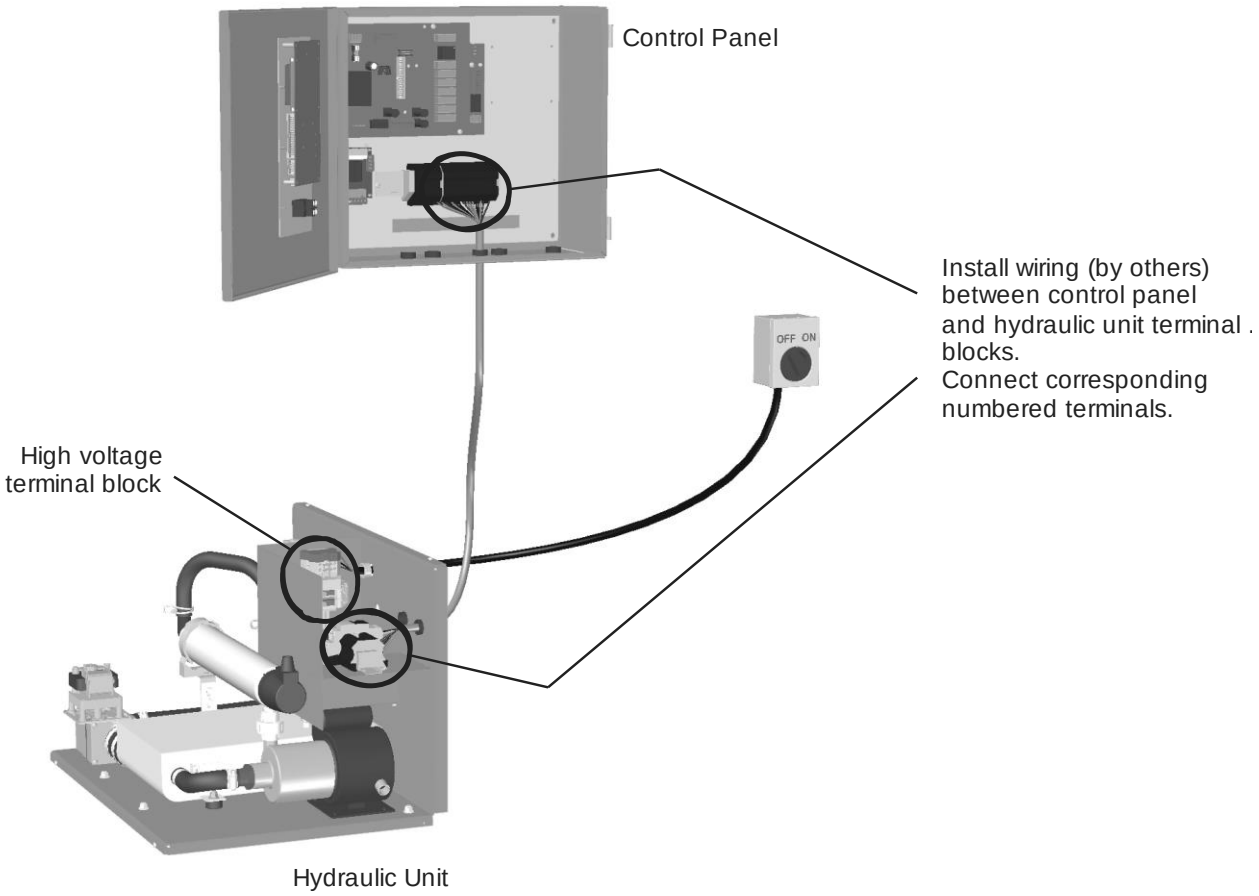


Figure 24: MHTC Reflow Primary Power and Hydraulic Unit Wiring

MHB Electrical

Connect primary power as shown above. For MHB models wiring must be installed from the control box to each staging valve.

External Controls

Control Wiring

Humidity controls are available from Nortec as accessories. When the MH is used for cooling, then controls must be supplied by others. If controls were not ordered with MH they must be supplied by others. The following information is relevant to all controls, factory supplied or otherwise. For wiring use minimum of 18 AWG and keep as short as possible.

The MHTC Reflow and Flow models can be operated with one modulating input for output control or they can operate as On/Off. The MHB operates as a Modulating or On/Off unit. See Controls on page 52 for MHTC control configuration.

Control Location

Caution:

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

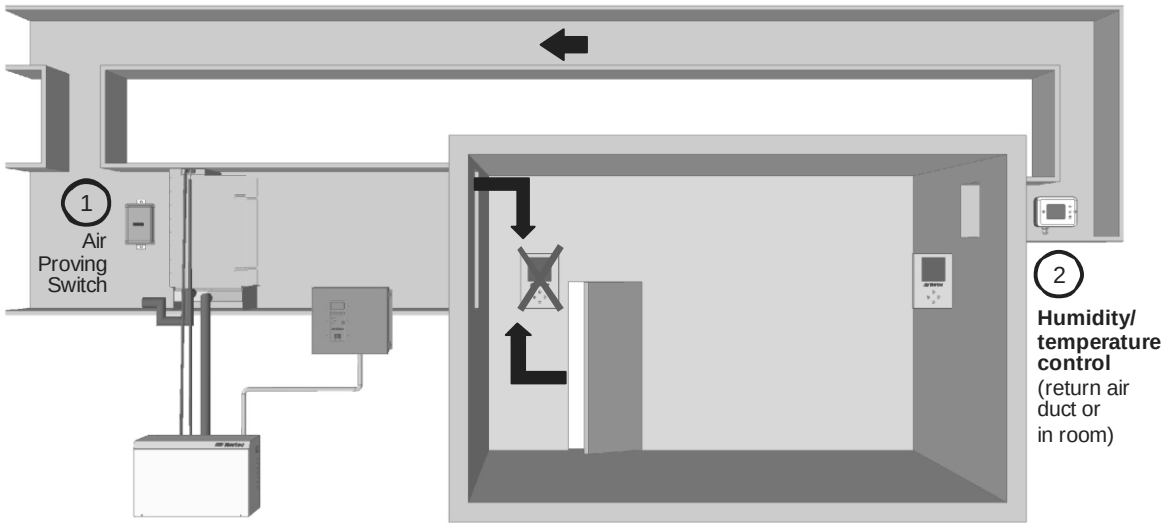


Figure 25: Control Location

1 Air Proving Switch

- Locate so that it can sense air flow or lack thereof.

2 Humidity / Temperature Control

- MHTC can be modulating, On/Off, or a humidity sensor. MHB can be modulating or 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.

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.

On/Off Control Wiring

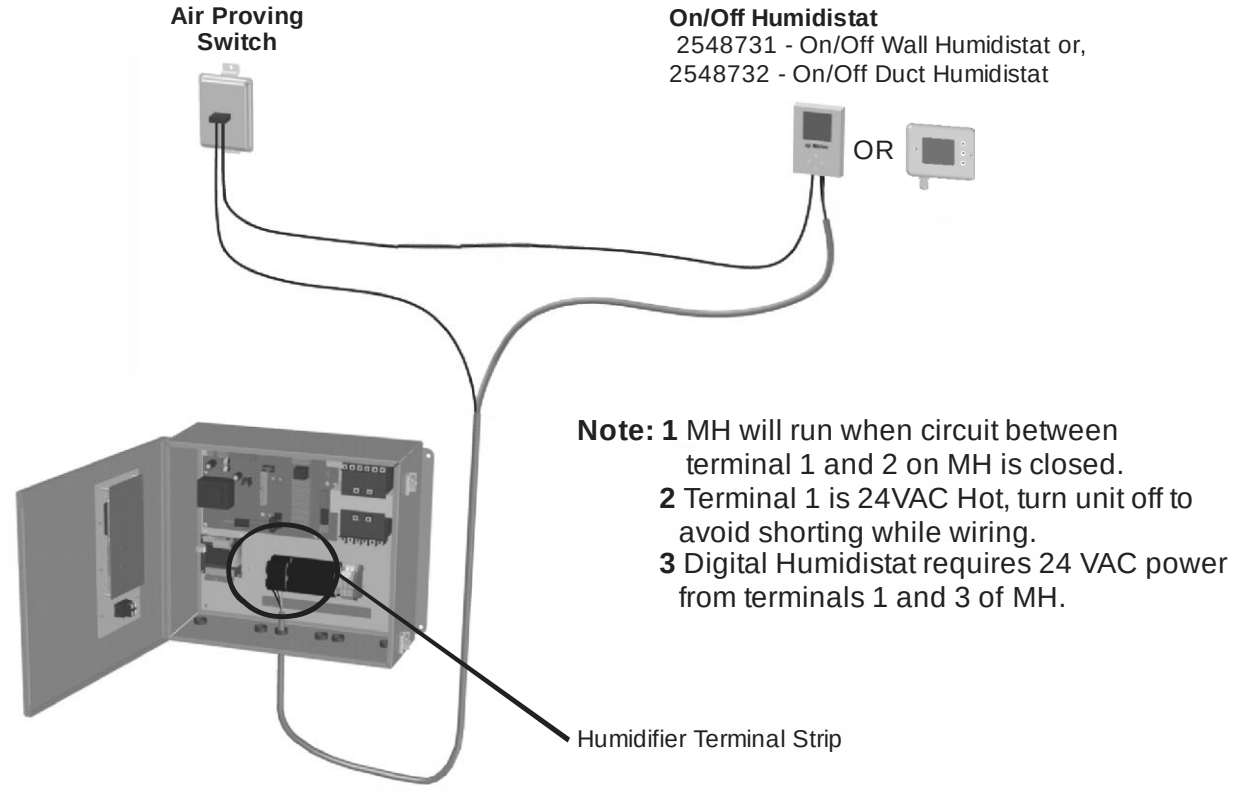


Figure 26: On/Off Controls

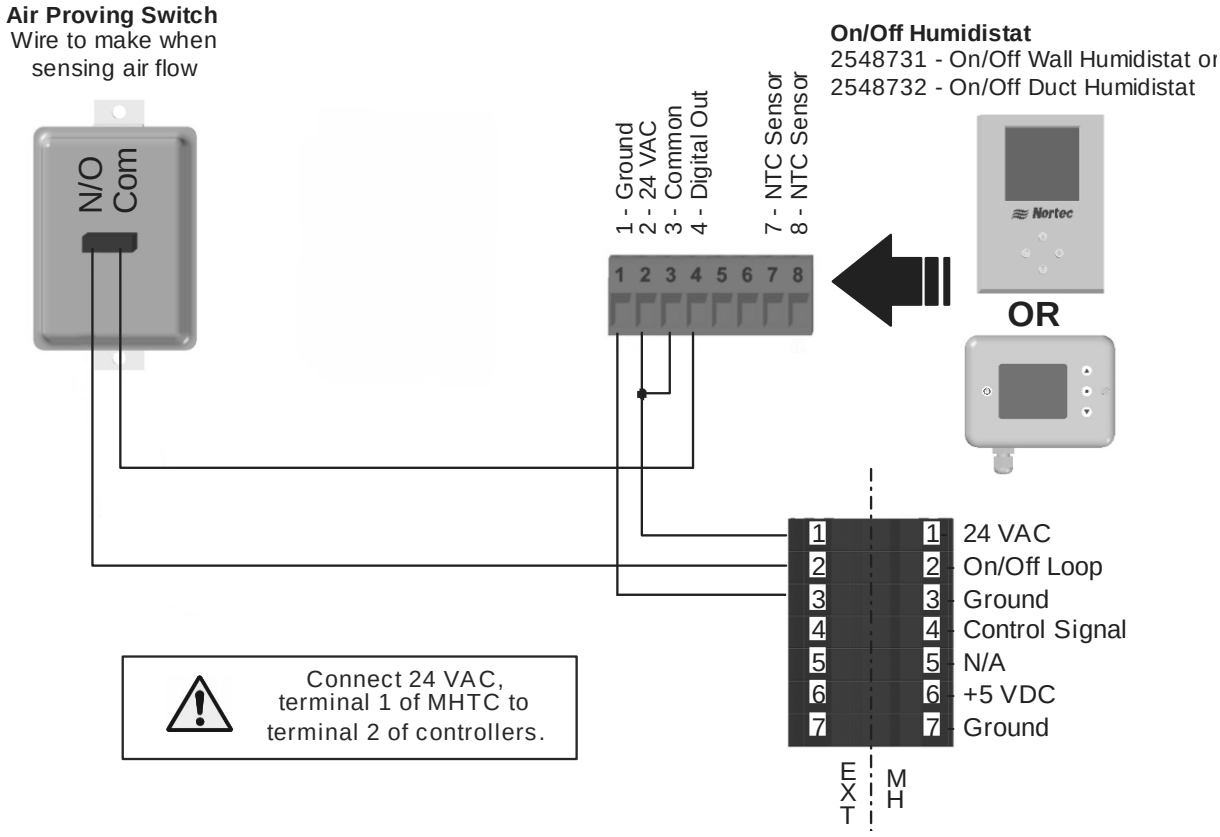


Figure 27: Digital On/Off Humidistat

Modulating Control Wiring

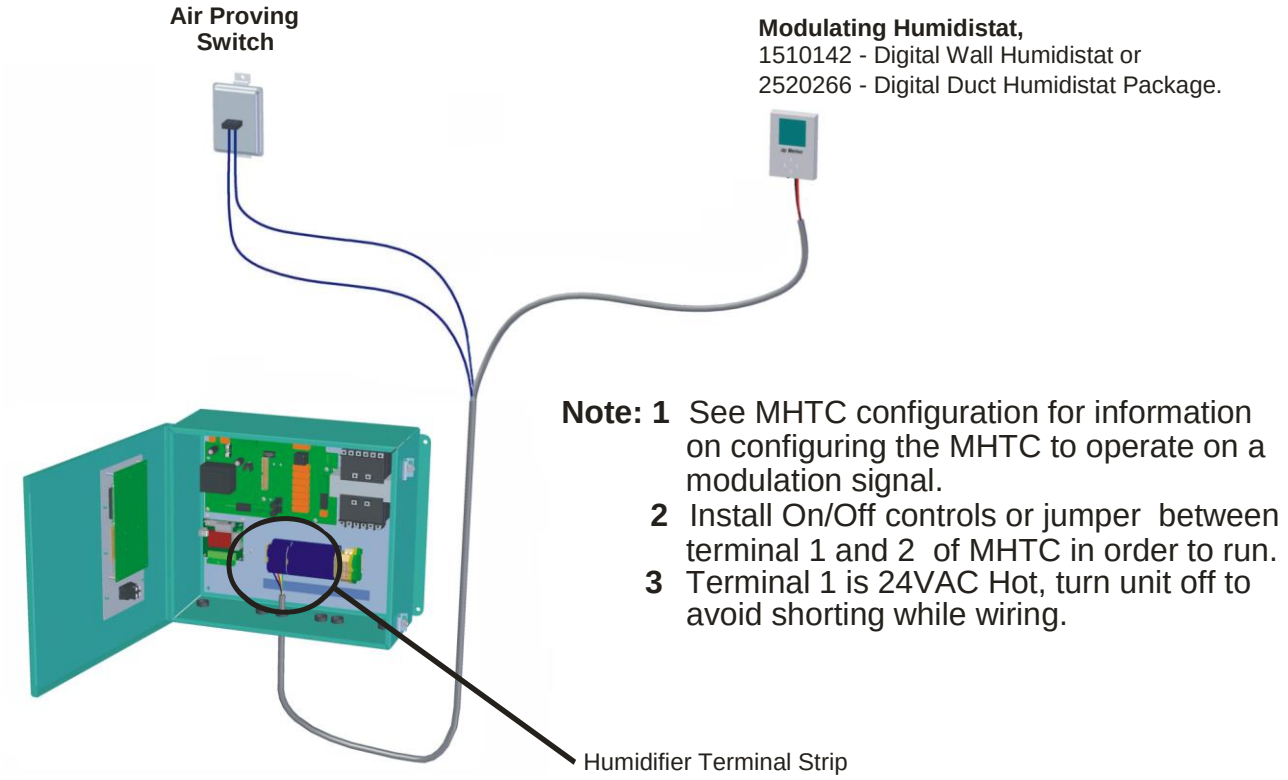


Figure 28: Modulating Controls

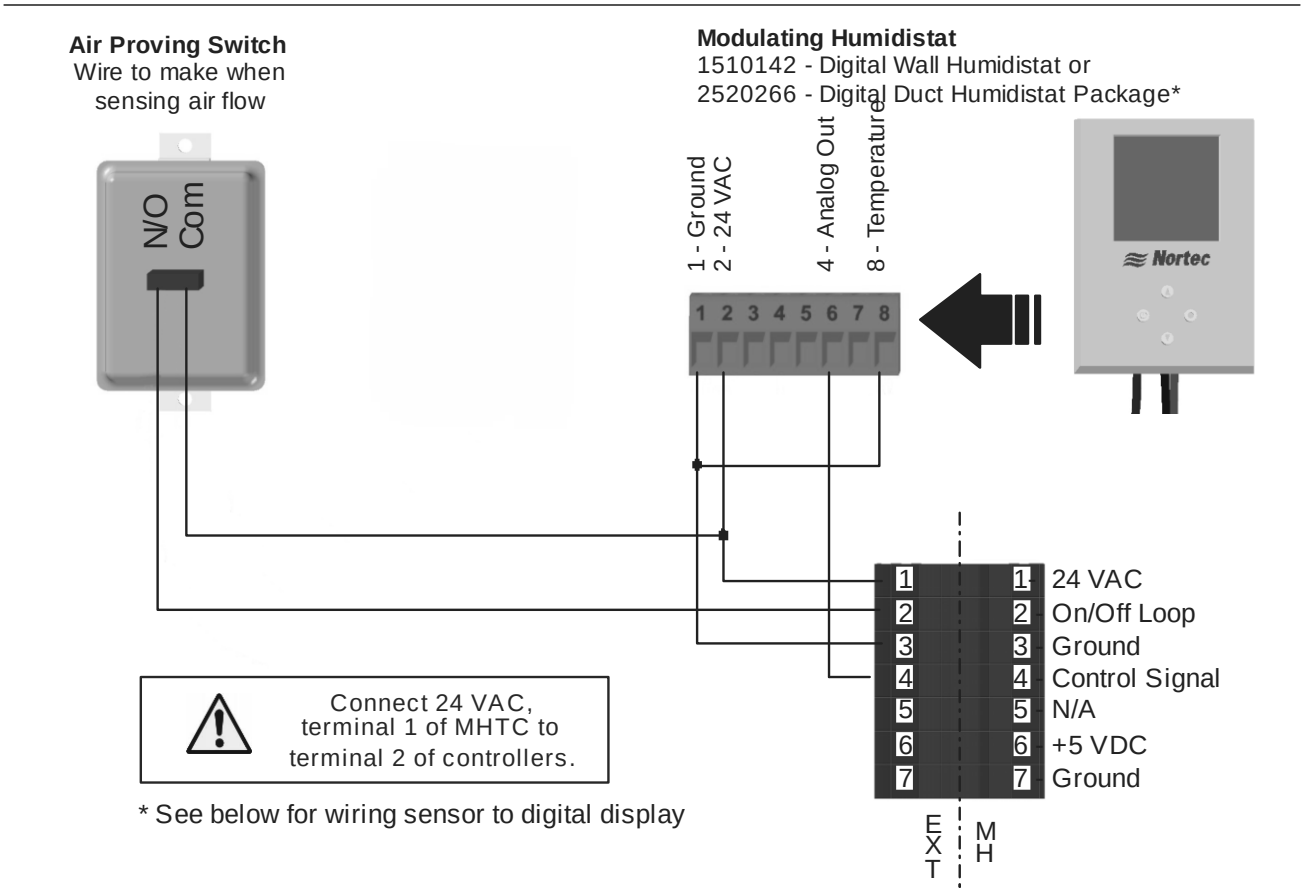


Figure 29: Digital Modulating Humidistat

2520266 - Digital Duct Humidistat Package
Wire remote sensor to digital display as shown below,
Wire digital display to MHTC as shown above.

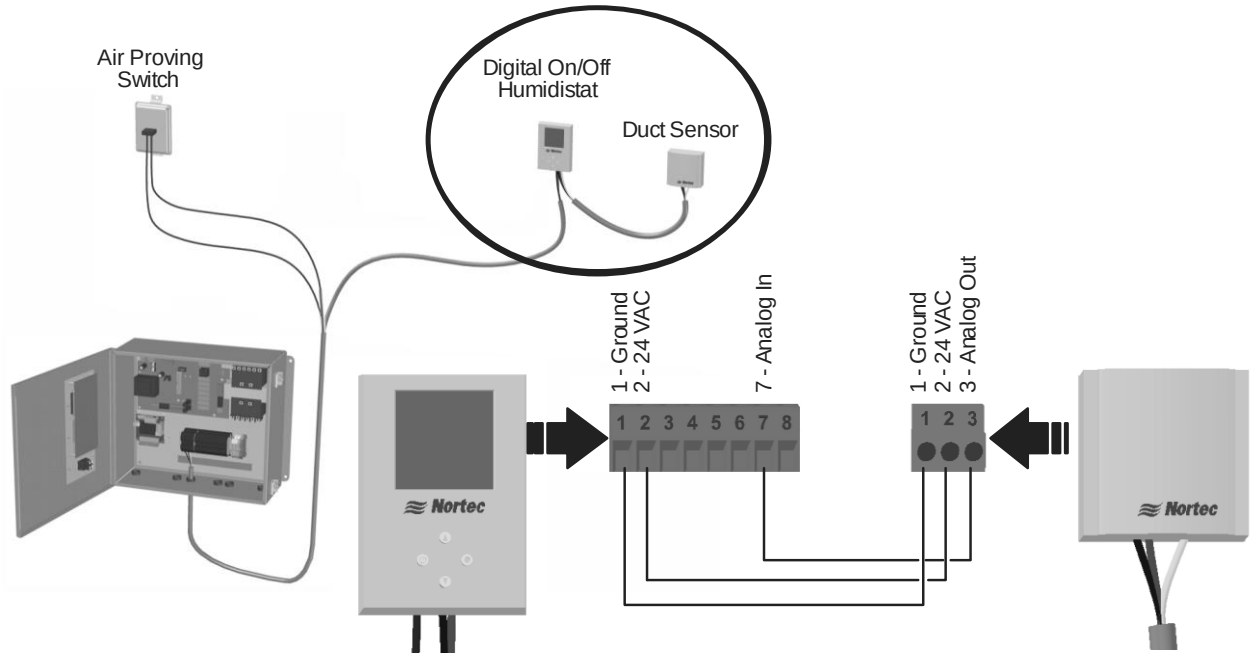
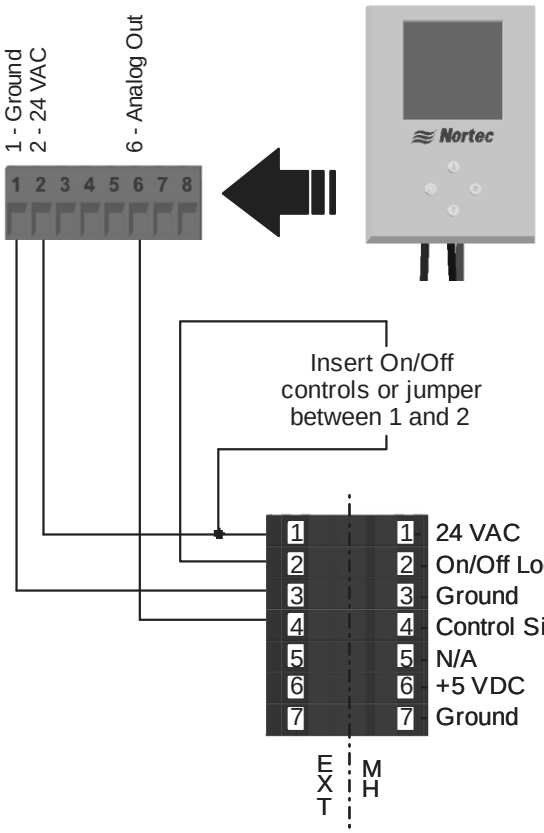


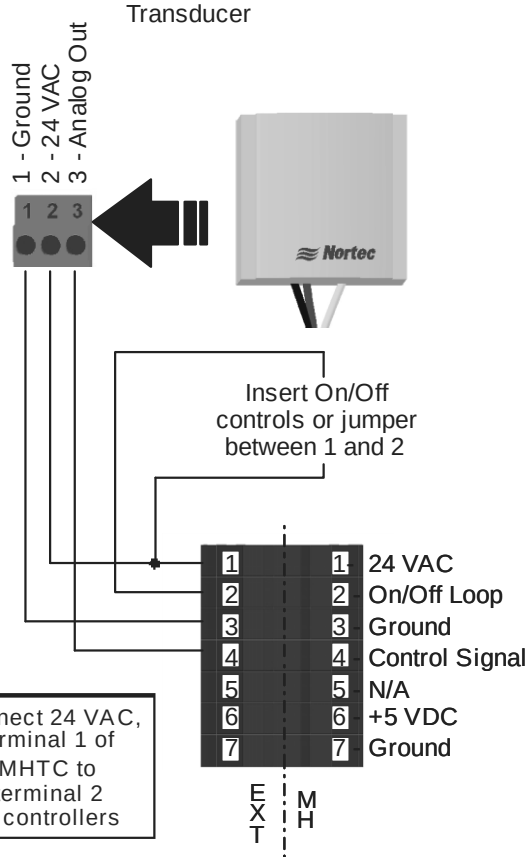
Figure 30: Remote Sensor to Humidistat Wiring

Transducer Control Wiring

1509858 - 2-10V Wall Humidity Transducer



1509857 - 2-10V Duct Humidity Transducer



Connect 24 VAC, terminal 1 of MHTC to terminal 2 of controllers

Figure 31: Transducer Wiring

Optional Outdoor Temperature Reset

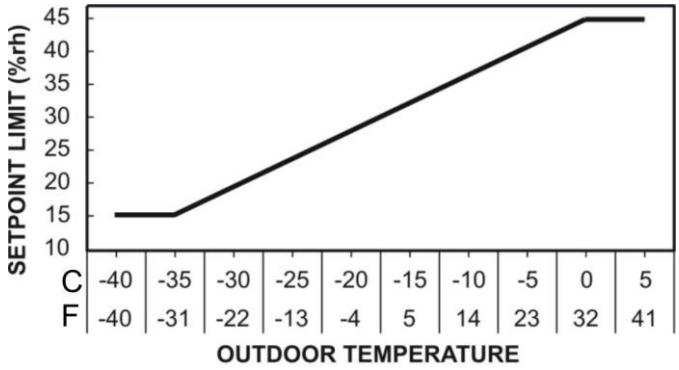


Figure 33: Outdoor Temperature Reset

- Each digital controller is equipped with an integrated reset function that can reduce the setpoint during cold weather operation. This will prevent condensation on windows and building structures. The above graph illustrates how the setpoint reset feature operates.
- On modulating humidistats this feature is enabled by removing the jumper from terminals 8 and 1 on the humidistat and wiring the outdoor temperature sensor to these terminals. On On/Off humidistats this feature must be activated with the humidistat's keypad.
- When the outdoor temperature setback feature is in effect, the humidistat will normally display the calculated setpoint limit based on the outdoor air temperature. A snowflake will also be displayed to indicate cold weather operation. When any key on the controller is pressed, the LCD screen will display the customer specified setpoint for a short duration.

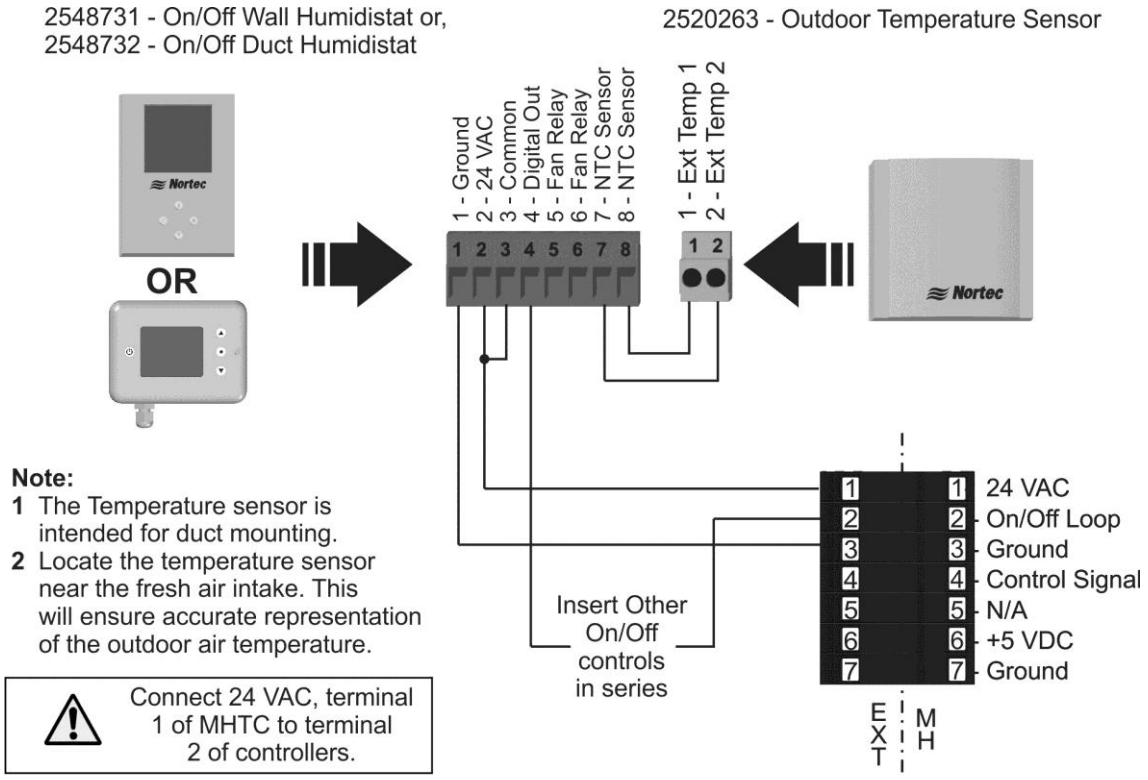


Figure 34: Outdoor Temperature Sensor (On/Off Controls)

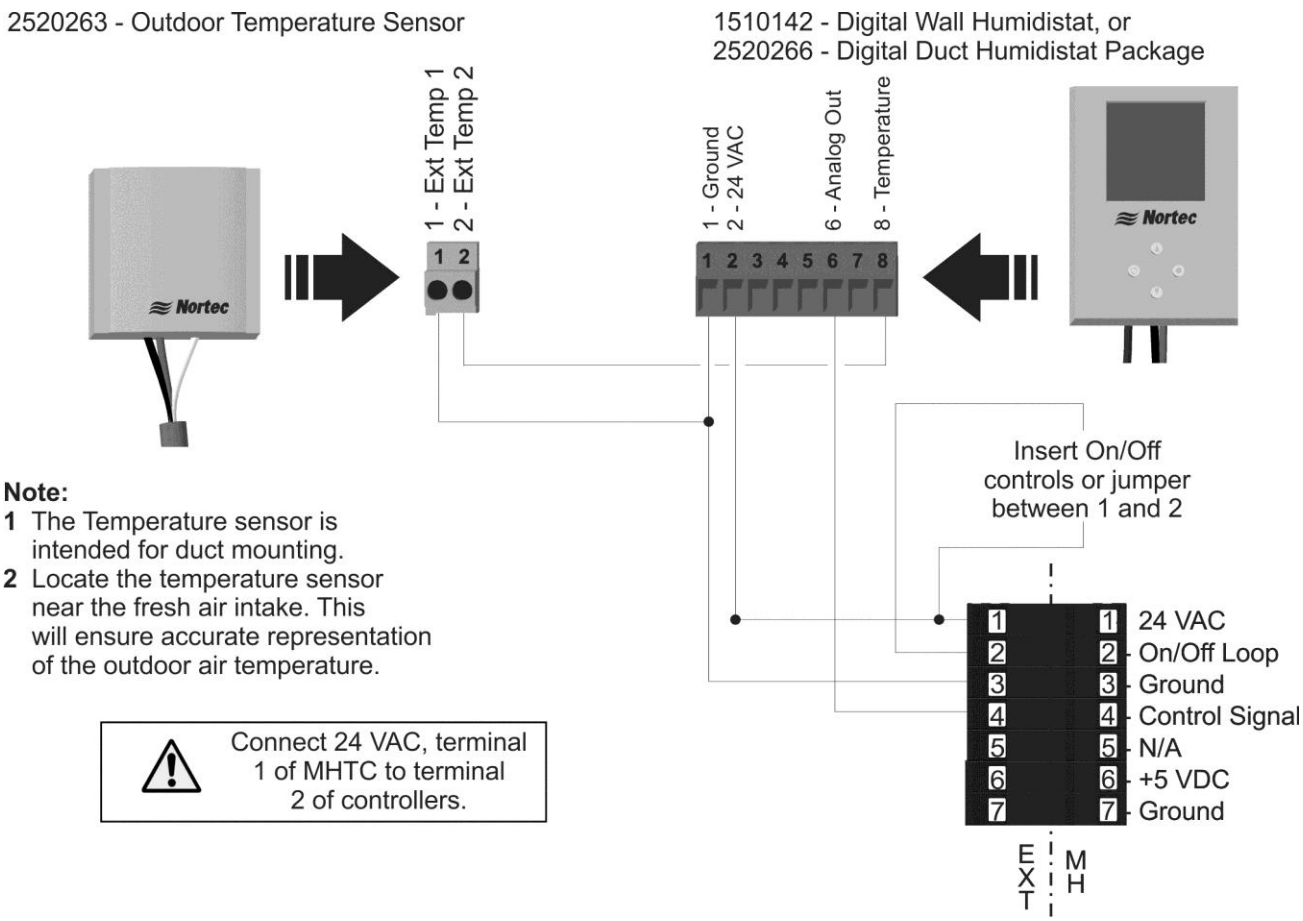


Figure 35: Outdoor Temperature Setback (Modulating Control)

Remote Relay Board Wiring

The MHTC (not MHB) remote relay board includes 4 relays that can provide remote status indication. The remote relay board is located as shown in Figure 36: Remote Relay Board Wiring. The PCB with the relays includes markings which indicate the function of each terminal on the board. The relays indicate the following status;

1. *Unit On* – The normally open relay is closed when the humidifier has power and the On/Off switch is set to on.
2. *Steam* – The normally open relay is closed when the control board activates at least one staging valve and water is being evaporated from the evaporative media.
3. *Service* – The relay can be wired to open (NC) or close (NO) when a warning is displayed on the MHTC display and the yellow service LED is illuminated.
4. *Error* – The relay can be wired to open (NC) or close (NO) when a fault is detected by the MHTC controls.

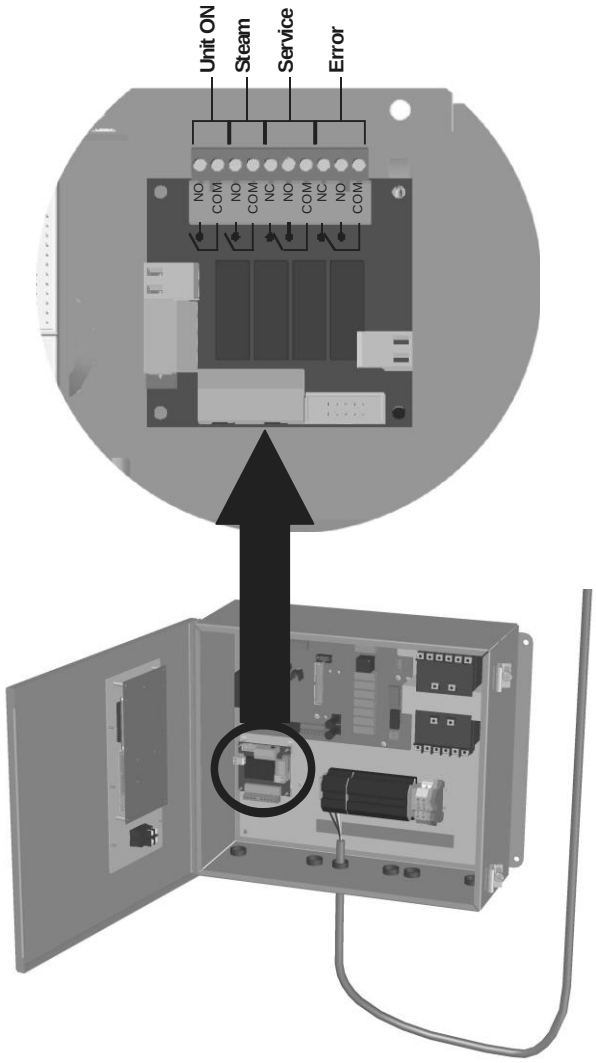


Figure 36: Remote Relay Board Wiring

Note:

MHTC units with Nortec Links XPS have the Links XPS board installed in place of the remote relay board.

Options and Accessories

Note:
For installation of options and accessories follow the instructions that are provided with them.



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).

To install a mist eliminator first follow the assembly instructions that are provided with it and then install it in the MH duct module as shown in Step 8 – Install Mist Eliminator on page 19.

Conductivity Sensor (MHTC Reflow Only)

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. Normally the MHTC controller will flush water from the reservoir based on operating time. 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.

The conductivity sensor can be installed at the factory or ordered as a field installed accessory. To install the conductivity sensor follow the instructions that come with it. See Clean Trg. 2 = µSSensor on page 54 for information on configuring the conductivity function of the MHTC controller.

Start Up

Installation Check

Before turning on power to the MHTC, inspect the installation to insure that it was carried out correctly. Refer to Figure 37: Installation Check, to the MHTC/B Pre-Start Up Checklist on page 43, and to the chapter on Installation that starts on page 11.

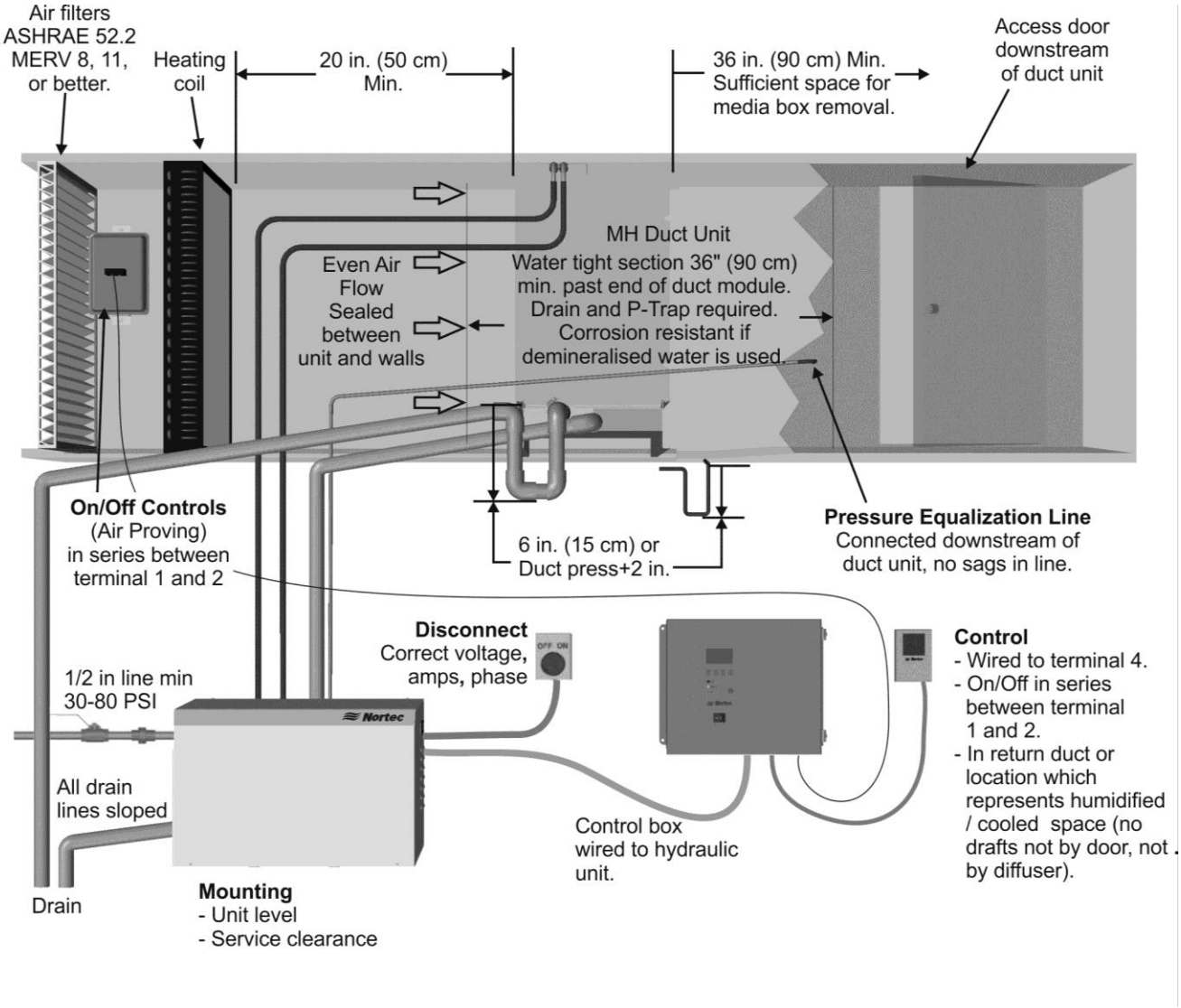


Figure 37: Installation Check (MHTC Reflow)

MHTC User Interface

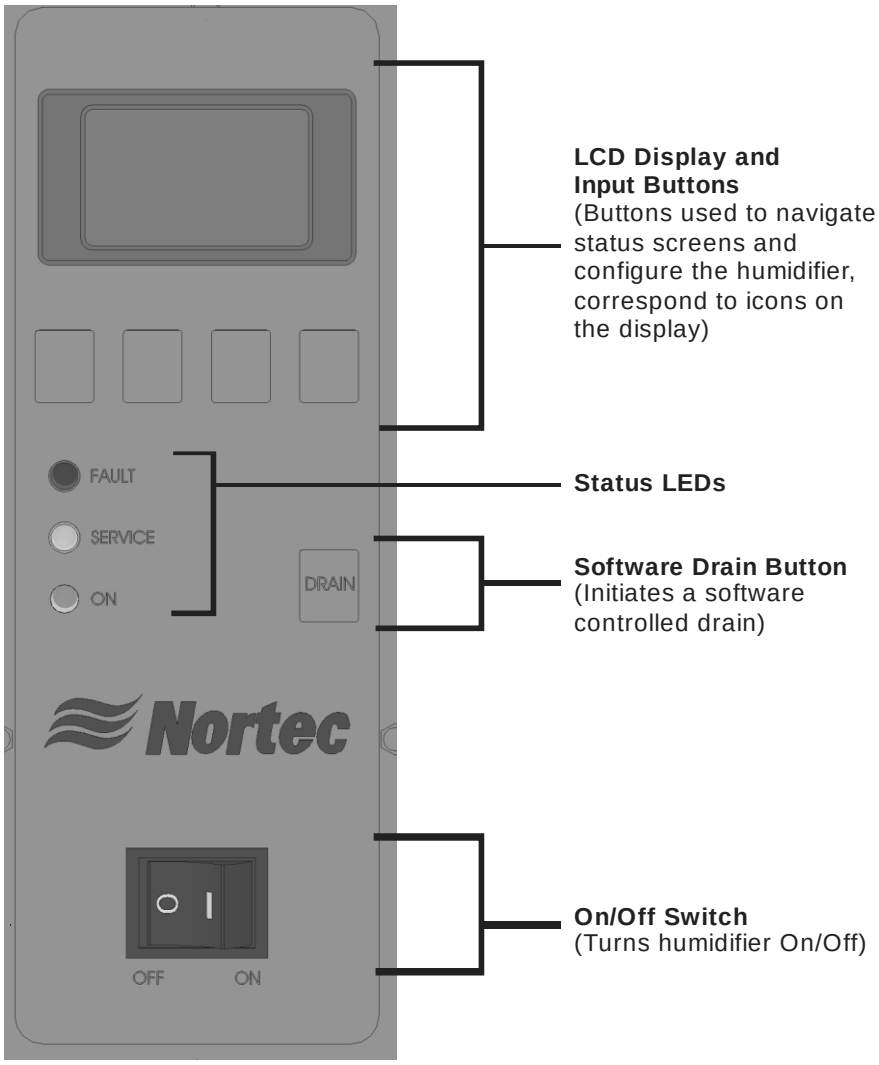


Figure 38: MHTC User Interface

MHB User Interface

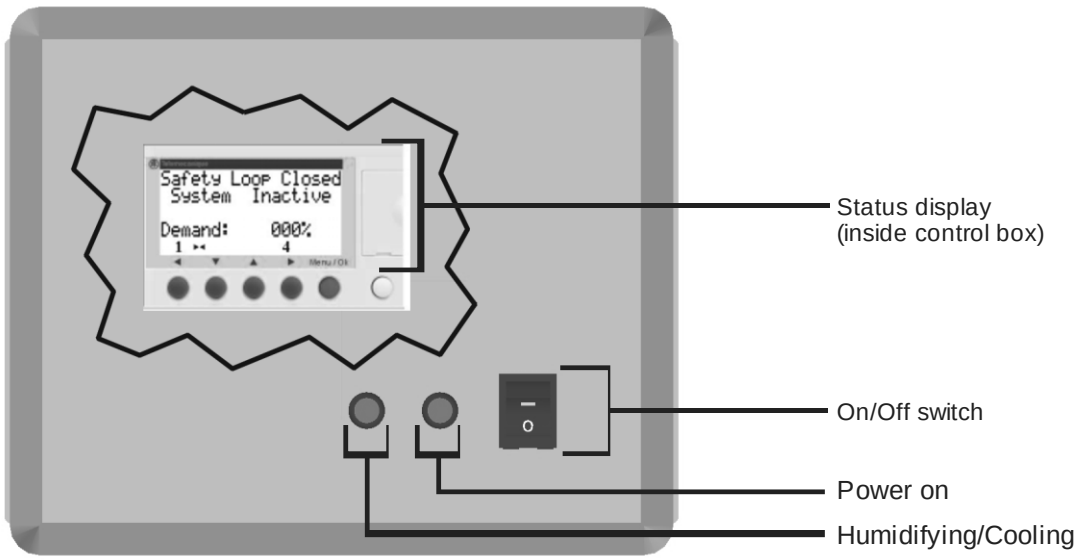


Figure 39: MHB User Interface

Start Up Procedure

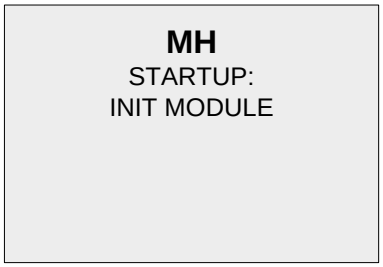
1 Examine the MH duct unit / hydraulic unit / control box installation for damage and or improper installation.

Warning:

Damaged units or improperly installed units must not be operated. Damaged or improperly installed units may present a danger to persons and property.

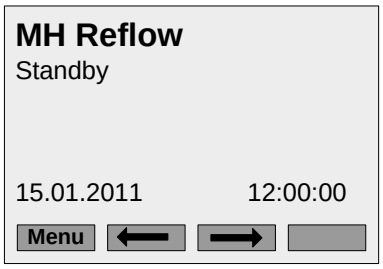
2 Open the supply water shut off valve.

3 Turn on the main power using the installed disconnect then turn the On/Off switch on the front of the control box to On.



On the MHTC the LCD display will illuminate and the humidifier will perform a self-diagnostic sequence during which the LED's and internal components will be momentarily activated.

On the MHB the green power on light will be on.



After the system test the control is in normal operation mode. The display shows the standard operating display.

Note:

- If an error is detected during the self-diagnostic sequence a fault will be displayed (MHTC only). See troubleshooting section for information on diagnosing and correcting faults.
- The information on the MHTC's LCD depends on the MHTC's configuration and actual operating conditions. It may vary from display shown.

4 If the demand is greater than the minimum operating demand (default=30%) and the safety loop is closed then:

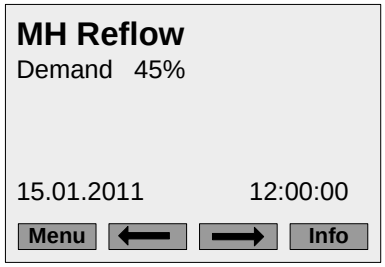
MHTC Reflow - the fill valve will activate and the tank will be flushed for 60 seconds by turning on the fill valve and leaving the drain open. The drain will then be closed and the unit will continue to fill until the float is closed. The pump and UV light will be activated and the system will wait 3 minutes.

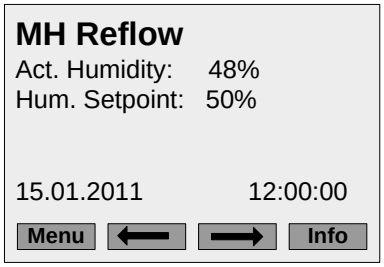
MHTC Flow – The UV lamp output will activate turning on the optional UV light if installed and the system will wait 2 seconds.

MHB – The staging valve will be activated.

5 If Soft Start (see Softstart on page 54) is on (MHTC only) the staging valve(s) will cycle on for 10 seconds and off for 10 seconds for 5 minutes. After the soft start has completed or if it is not set to on the stages required to meet the demand will remain continuously on.

6 The green On LED on the front of the humidifier will be on. On the MHTC the display will indicate either Demand or Actual Humidity and Setpoint depending on control configuration.





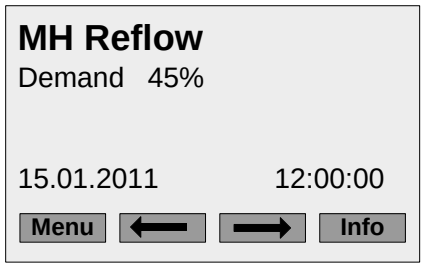
Note: During Operation

- The pump will stop for 4 seconds every 30 minutes to clear trapped air and staging valve(s) will close every 30 minutes for 2 seconds to prevent them from scaling open.
- Cleaning / Draining / Box Drying will occur based on configuration.

MHTC Status Screens

In addition to the main status screen the MHTC includes several status screens which provide additional information about the humidifier. The additional screens can be reached by pressing the buttons corresponding to the left and right arrow key on the LCD display.

Main Status Screen

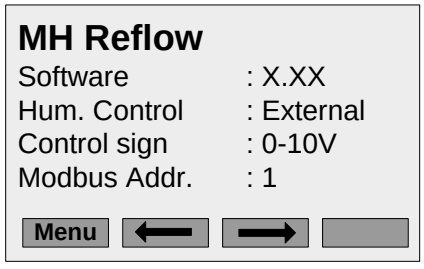


This screen reports the current request for humidity or actual humidity and setpoint depending on control configuration. It also displays the date and time.

Pressing a button corresponding to an **arrow** displays screens providing additional information on the status of the humidifier.

Pressing the **Menu button** displays a Main Menu screen which includes an Info selection to display

Settings Information Screen



Software = the installed software version.

Hum. Control = the type of control configuration (External, 24VonOff,Int. (P), or Int. (PI))

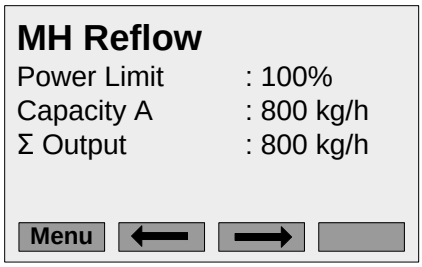
Control sign = the configured control signal range.

Modbus Addr = the configured Modbus Address.

Caution:

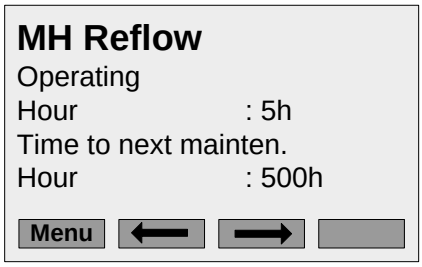
- Improper control configuration can result in over humidifying which can result in damage to property.
- See Advanced Control Configuration if the controls displayed in the Settings Information Screen do not match those connected to the MHTC.

Performance Data Screen



Power Limit = the manually configured capacity limit (see Power Limit on page 52).
Capacity A = the current output of the MHTC.
Σ Output = The current output of the MHTC (Note same as Capacity A).

Operating Hours Screen



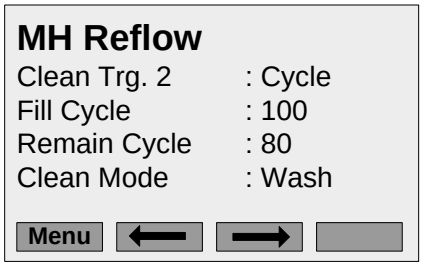
Operating Hour = total operating hours of the MHTC.
Time to next mainten. Hour = remaining operating hours before the next maintenance must be performed.

Clean Trigger 1 Screen



Displays the setting for the first trigger that will cause the MHTC to perform a cleaning cycle to clean the media. Information displayed depends on the setting of **Clean Trg. 1**.
Timer = clean at specific time of day
Periodic = clean after a fixed number of operating hours
Demand = clean after fixed number of weighted hours
Off = First trigger turned off.
(See Cleaning Triggers on page 53 for more information)

Clean Trigger 2 Screen



Displays the setting for the second trigger that will cause the MHTC Reflow to flush the reservoir to control mineral buildup. Information displayed depedns on the setting of **Clean Trg. 2**.
Cycle = Flush after fixed number of fill cycles.
µSSensor = clean when conductivity measurements exceeds a configured limit (requires optional conductivity sensor).
Off = Second trigger turned off (not recommended).
(See Cleaning Triggers on page 53 for more information)

Box Drying Screen



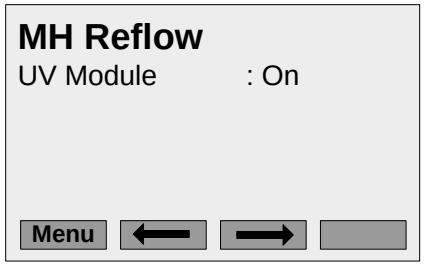
Displays the setting for when the media boxes will be dried. Information displayed depends on the setting of Stage Drying:
Timer = Box drying will occur at specific time of day.
Periodic = Box drying will occur after a fixed number of operating hours.

Startup Information Screen



Displays the setting of the Inlet Flush and Softstart parameters. Inlet flush On = flush tank for 60 seconds on startu. Softstart On = cycle staging valves 10 sec. On / 10 sec. Off for first 5 minutes of operation.

UV Module Screen



Displays if the UV light is set to turn on.

Nortec Digital Controls

Nortec provides optional On/Off, Modulating, or Transducer digital humidity controls. Figure 40 and Figure 41 show the function and meaning of the Digital Control's display and buttons. Wall controls and the duct mounted On/Off controls come with a built in humidity sensor. The modulating control for duct installation consists of a display and a remote sensor for duct mounting.

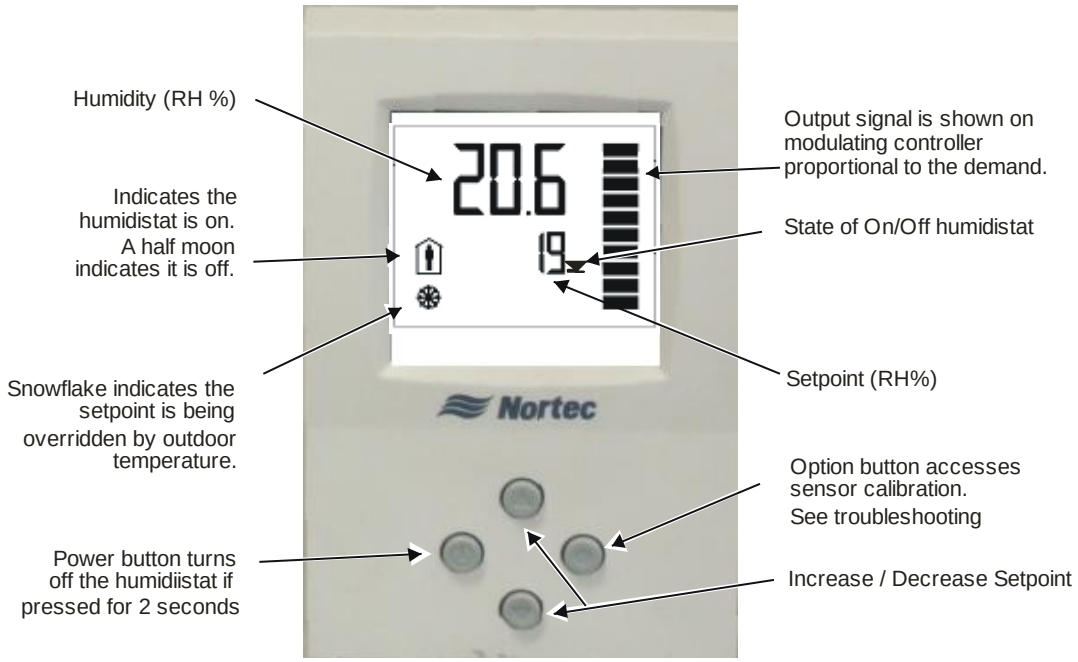


Figure 40: Modulating and On/Off Digital Control Operation

Modulating Control
The modulating controls use a PI control algorithm to transmit a 0-10V control signal to the humidifier. Adjust the setpoint to the desired setting by using the up/down arrow buttons on the controller.

On/Off Control
The On/Off controls use a PI control algorithm to open and close a relay that opens and closes the humidifier's On/Off loop. Adjust the setpoint to the desired setting by using the up/down arrow buttons on the controller.

Transducer Control
The transducer controls transmit a 2-10V control signal proportional to the sensed relative humidity to the humidifier. Humidity setpoint is not set at the transducer. The setpoint is set on the MHTC's display and keypad.

Note: It is possible to field calibrate Nortec Digital controls if the displayed humidity is found to be different than a known trusted source. See Digital Humidistat on page 73 .

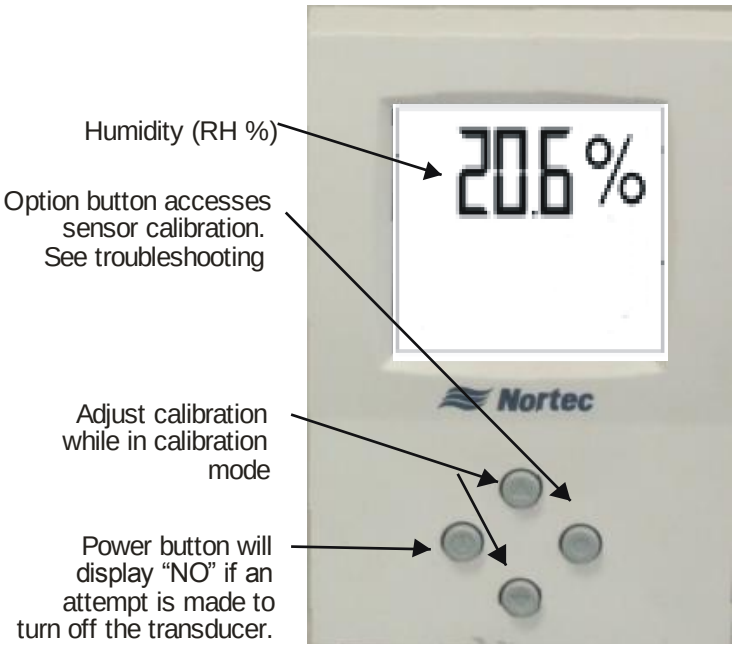


Figure 41: Transducer Control Operation

Nortec LINKS XPS (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 MHTC. For complete information about Nortec LINKS XPS and its operation and configuration, go to www.humidity.com and look up the Nortec LINKS XPS manual.

MHTC/B Pre-Start Up Checklist

Unit Serial #: _____ Tag: _____

Model: MHTC Reflow ☐ MHTC Flow ☐ MHB ☐
Customer/Job:_____Address: _____

Water Quality:
- Potable ☐ RO ☐ DI ☐

Air Conditions
- Air Filters (MERV 8, 11 or better) ☐ Uniform air flow ☐
- Air Velocity _____ Duct static pressure _____
- Air temperature before duct unit _____

Duct Unit Mounting:
- 20 in.+ (50 cm)+ from heaters ☐
- Access door for media removal ☐ Space for media removal ☐
- Drain pan edges Level ☐ Side panels fastened to walls ☐
- Sealed between duct wall and unit ☐
- Water tight section min. 3 ft. past duct module ☐ Corrosion resistant if DI water used ☐
- Drain downstream from duct module ☐
- Mist Eliminator if > 750 fpm (3.8 m/s) _____ (yes/no)

MHTC Reflow Hydraulic Unit Mounting:
- Level ☐ Front/Top Clearance ☐ Reservoir below drain pan ☐

Water / Drain Line:
- Water line size (min. 1/2 in.) Water pressure: 30-80 psig ☐
- Drain Ø (min. 1 1/4 in. (32 mm) ID Drain lines sloped ☐

MHTC Reflow Plumbing
- P Trap 6 in. (15 cm) or duct static pressure +2 in. on overflow ☐ Hydraulic unit drain ☐
- Spray bar lines connected to correct staging valves ☐ No low points ☐
- Pressure equalization hose connected ☐ No dips/sags in press. equalization hose ☐
- All hose connections clamped ☐

MHTC Flow / MHB Plumbing
- P Trap 6 in. (21 cm) or duct static pressure +8 in. on Pan Drain ☐
- Overflow capped ☐
- Spray bar lines connected to correct staging valves ☐ No low points ☐
- All hose connections clamped ☐

Wiring:
- MHTC Flow and Reflow wiring between control box and hydraulic unit to correct terminals ☐
- Wiring connections and connectors secured ☐

Controls:
- Control Location _____ Control to Terminal 4 ☐
- Air proving switch ☐ On/Off controls to Terminal 2 ☐

Power:
- Voltage, amp, fuse per Spec Label: ☐
- Disconnect switch located close to MH ☐

Inspected by:_____ Date of inspection: _____/_____/_____

Company:_____

MHTC/B Start Up Checklist

Unit Serial #: _____ Tag: _____

Model: MHTC Reflow ☐ MHTC Flow ☐ MHB ☐
Customer/Job: _____ Address: _____

Preliminary:

- Pre-start-up checklist completed? yes ☐ no ☐
  If no, perform Pre-Start-up Checklist before starting humidifier.

Start-Up Procedure:
The prerequisites for the MH activating staging valves to wet evaporative media are:

- Water supply valve opened yes ☐ no ☐
- Mains disconnect switched on yes ☐ no ☐
- Turn On/Off switch on yes ☐ no ☐
- On/Off Security loop (Terminal 1 and 2) closed. yes ☐ no ☐
- Demand greater than 30% yes ☐ no ☐

Controls:

- Installed Controls Match Configuration yes ☐ no ☐
- Control Setpoint: _____
- Demand (Modulating Humidistat) yes ☐ no ☐
  or
- Sensed RH < Setpoint (Transducer) yes ☐ no ☐

The Humidifier will undergo a self-test when the power is turned on activating the LED's and other internal components.

If the above listed prerequisites are fulfilled the 1) MHTC Reflow will fill the hydraulic unit reservoir, activate the pump and activate staging valves and begin normal operation. 2) MHTC Flow / MHB Flow will activate staging valves

Note: 1) If soft start is on the MHTC Reflow/Flow will cycle staging valves on 10 seconds / off 10 seconds for 5 minutes at startup.

2) If Inlet flush is on the MHTC Reflow will flush the tank for 60 seconds at startup.

Remarks:

_____

_____

_____

_____

Started by:_____ Date of Start Up: _____/_____/_____

Company:_____

Operation

MHTC LED Status Lights

The keypad and display panel includes 3 LED's which provide information about the humidifier's current status.

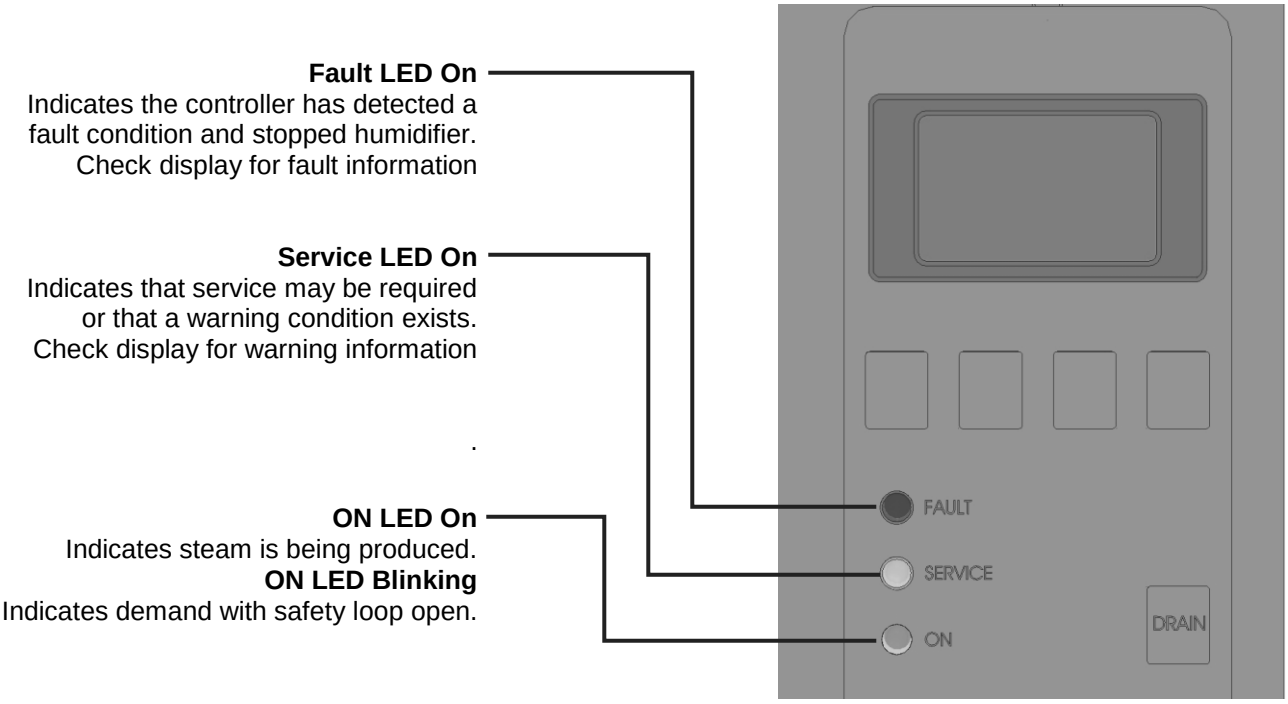


Figure 42: MHTC LED Status Lights

MHB Status Lights

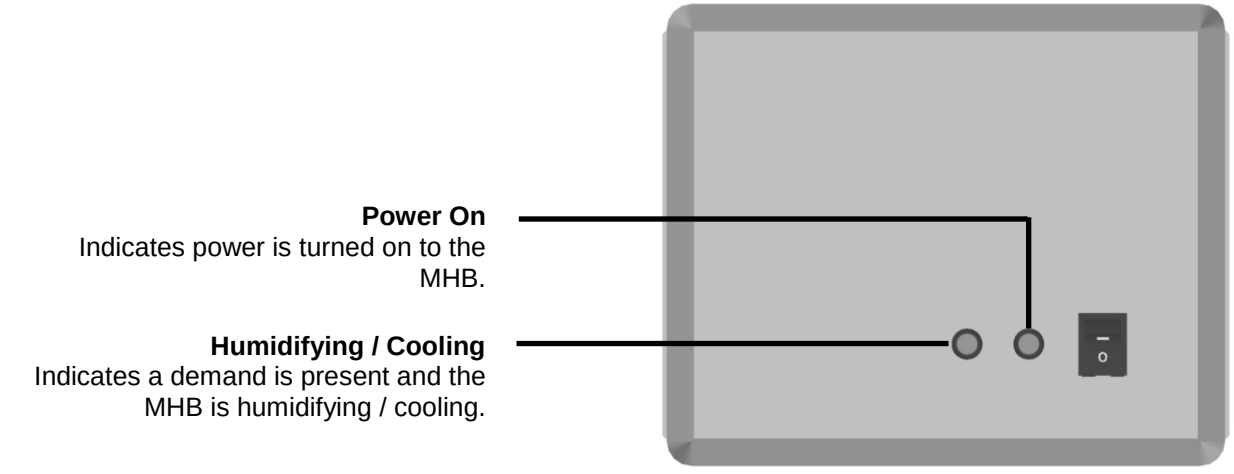


Figure 43: MHB Status Lights

MH Schematic

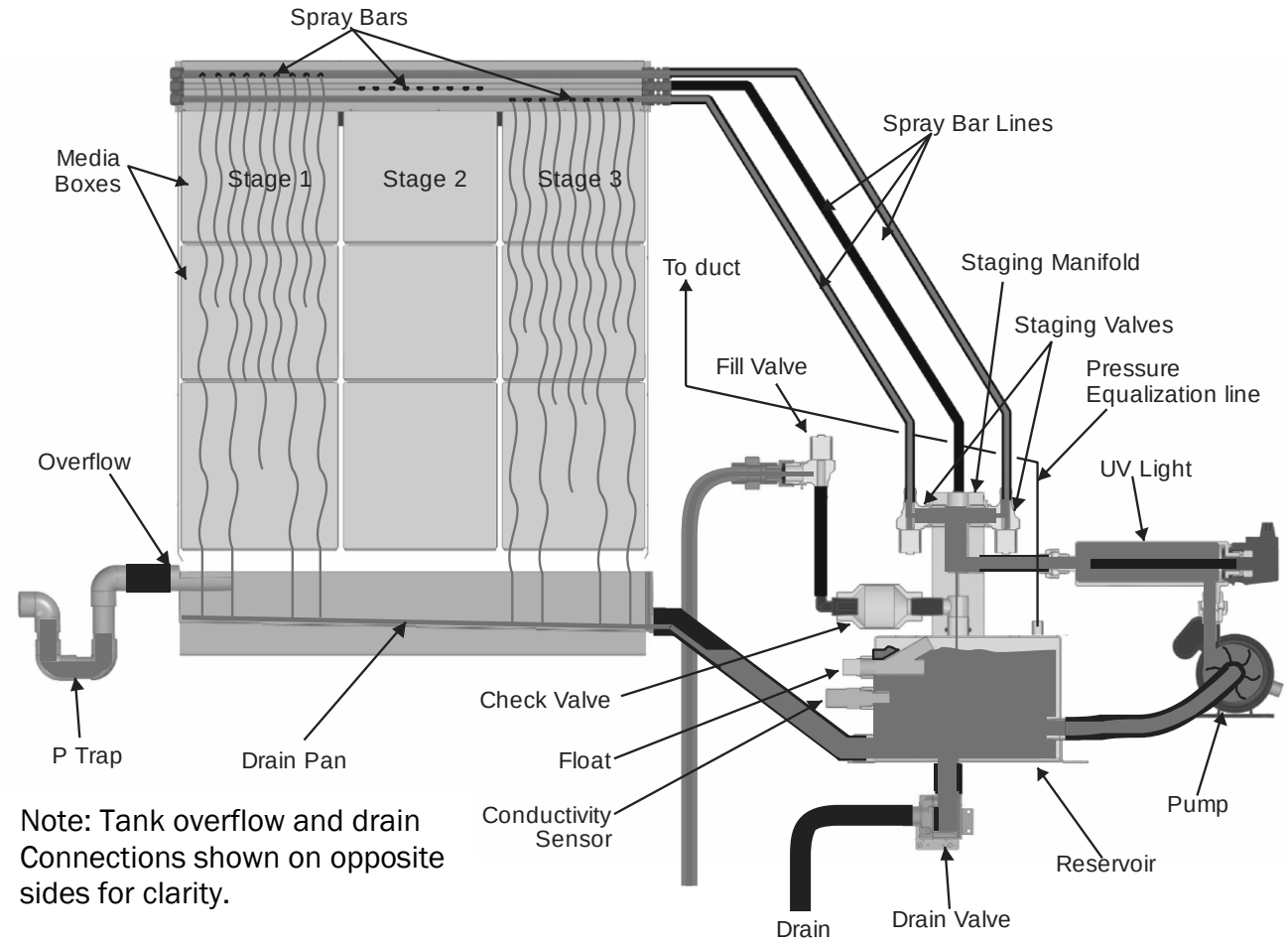


Figure 44: MH Reflow Schematic

How the MH Works

The MH is an evaporative humidifier/cooler that uses energy in the air to evaporate water from its evaporative media. The MH is designed for air humidification or air cooling. Cooling is achieved using the adiabatic process which decreases air temperature when water is evaporated. The duct unit with evaporative pads is designed to be installed in an air handler or a duct. The hydraulic units and control boxes should be installed outside the duct in an environmentally controlled space.

Humidification / Cooling

- When a demand is received, the MH will;

  MHTC Reflow - turn on the 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 the MH always supplies more water than can be evaporated to the media. 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 tank. 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 flush 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 and longer media life. 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 the duct unit's drain pan to the MHTC Reflow's reservoir a pressure equalization line must be installed between the reservoir and the duct downstream of the duct unit. The line ensures pressure in the reservoir and duct are equal and water flows properly from the drain pan to the reservoir.

Selecting an RH Setpoint

The optimum humidity setpoint depends on the reasons that a space is being humidified. The "ASHRAE Handbook – HVAC Applications" recommends specific design relative humidities for specific applications. See also Nortec publication "When You Need Humidity" (Form 124A) for more information on humidity settings.

Health and Comfort - The benefit of humidity is most pronounced for health and comfort in the 40-60% range. A humidity setting of 40-50 % is recommended for this purpose to prevent over humidifying.



Note:

The job site design may have specified a setpoint chosen specifically for the site. Refer to site documentation and where possible use setpoints specifically determined for the site.

Temperature Setback - In cold climates it is often necessary to reduce the humidity level in a space to prevent build up of condensation on the inside of exterior walls, windows, and trim. It is highly recommended that the temperature setback function of the Nortec digital controls be used under these conditions to prevent damage from condensation. The digital control with an outdoor temperature sensor installed will automatically setback the humidity setpoint to correspond with outdoor temperature.

Duct High Limit – The duct high limit is intended to prevent saturation and wetting in duct work at high load conditions. The evaporative principle of operation of the MH prevents the air from being overhumidified. As a result a duct high limit is generally not required for an MH unit. However if the duct work is very cold or in contact with exterior cold surfaces it may be necessary to install a high limit to prevent humidity levels from becoming too high.

MHTC Humidifier Configuration

Navigating the MHTC Software

The four input buttons below the digital display are used to navigate in the MHTC's software and to enter values. The function of the four buttons changes depending on what is being displayed on the screen. In all cases 4 icons representing the functions of the buttons are shown at the bottom of the screen.

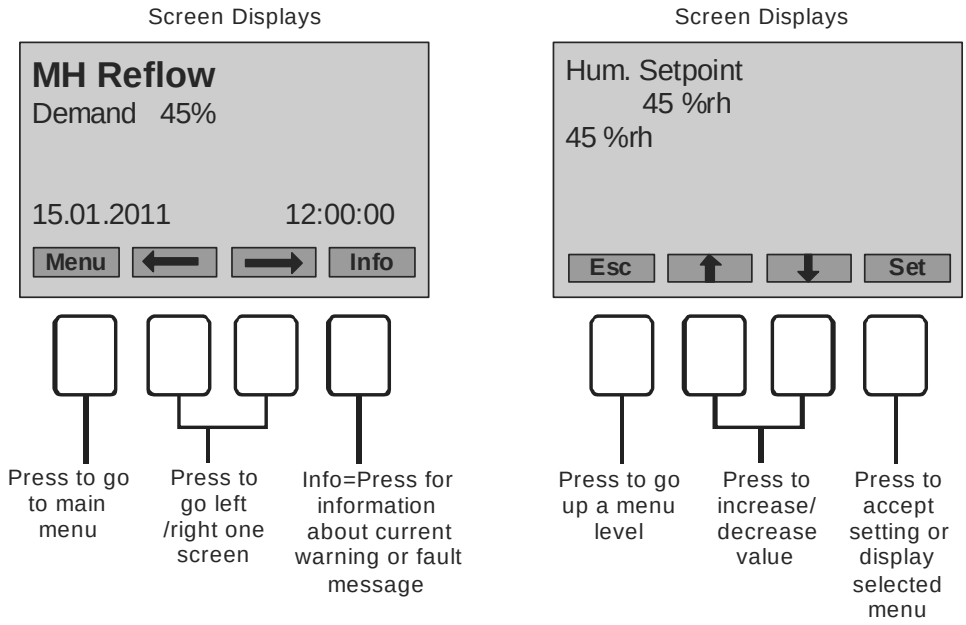
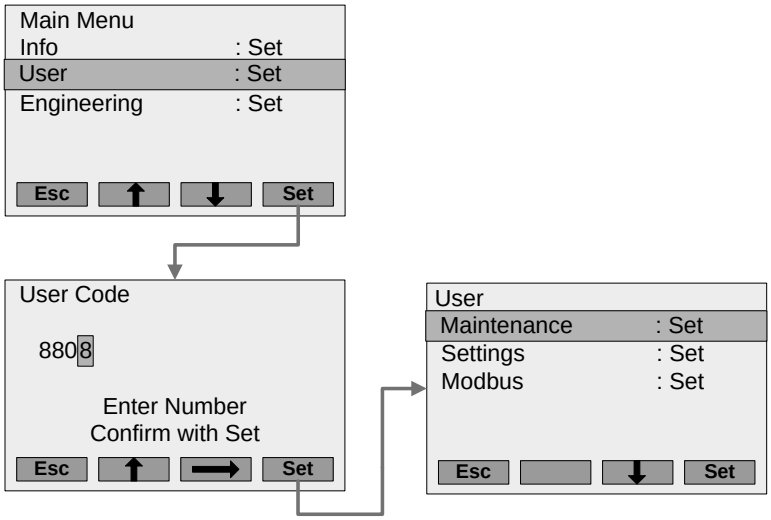


Figure 45: Navigating the MHTC Software

Main/User Menus (MHTC Password)

The **Main Menu** of the MHTC can be accessed by pressing the menu button on any status screen. The **Main Menu** contains three selections. Highlighting **Info** and pressing **SET** displays a scrollable screen which displays the status of all MHTC components. Selecting **User** and pressing **Set** displays the User menu which is used for configuring the MHTC. **Engineering** is reserved for factory configuration.



Main Menu
Press the **Menu** button from any status screen. Use the up down arrow keys to select **User** and press **Set.** Enter the code **8808** using the up arrow to change the value of each digit and the right arrow to move to the next digit. Press the **Set** button.

User Menu
From here you can access all user configurable settings. Select any sub-menu by using the **up/down** arrow buttons and pressing **Set** when the desired one is highlighted.

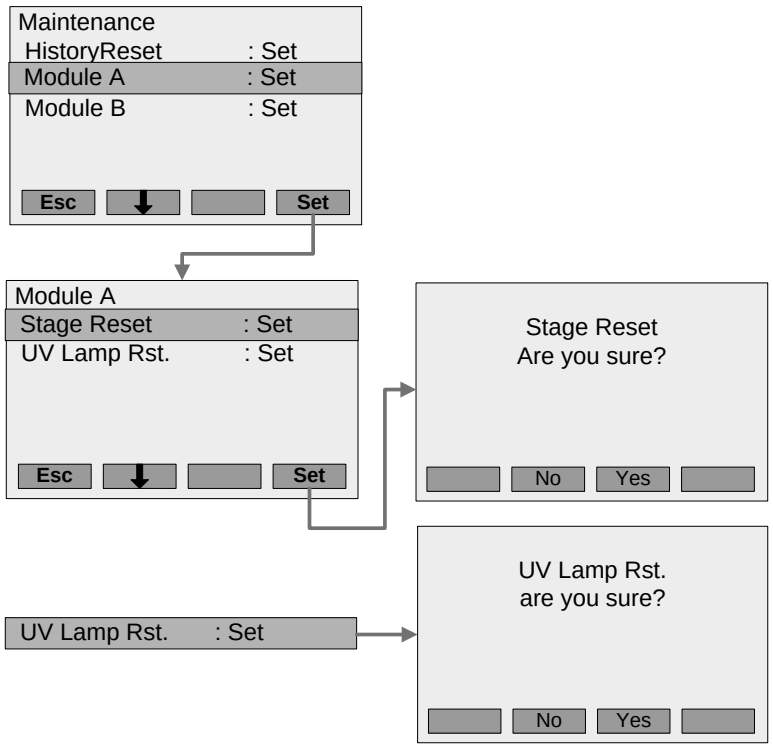
Note: Do not make changes unless you are familiar with the software.

Maintenance Menu

Caution: Servicing

- Poorly maintained humidifiers / coolers can endanger health of building occupants. If the MH is not properly maintained microbials may grow in it. If carried by air passing through the humidifier the germs can cause illness.
- The MH must be serviced in the intervals described in the maintenance section of this manual. Humidification boxes and mist eliminator media must be replaced after their service life has elapsed.

The selections in the **Maintenance Menu** allow you to reset service reminders for replacing media boxes and the UV lamp. Press **Set** while highlighting **Maintenance** in the **User Menu**. Then select **Module A** and press **Set** to display choices for resetting reminders for media box and UV lamp replacement.

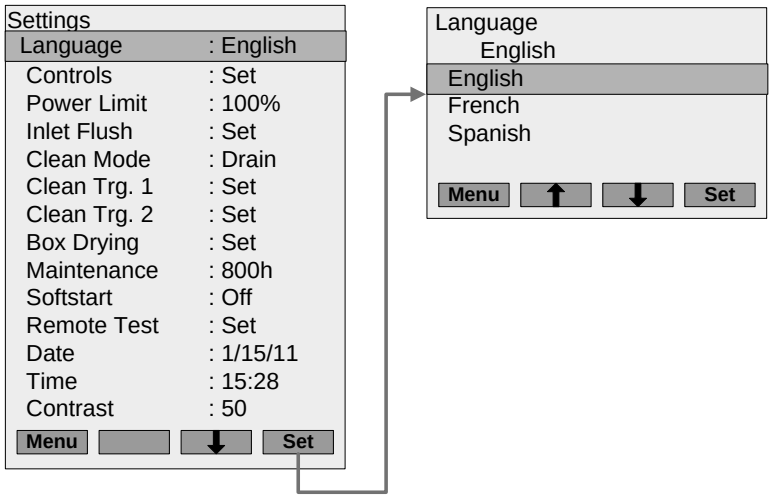


Maintenance Menu
After completing maintenance on the MHTC the maintenance reminders must be reset or an incorrect service reminder can be generated. The **Maintenance Menu** provides the means for resetting the timers

Stage Reset
Stage Reset resets the timer for replacing the media boxes. Press **Yes** to reset the timer.

UV Lamp Reset
When the UV lamp is replaced select **UV Lamp Rst.** In the maintenance menu and press **Yes** to reset the timer for replacing it.

Settings Menu

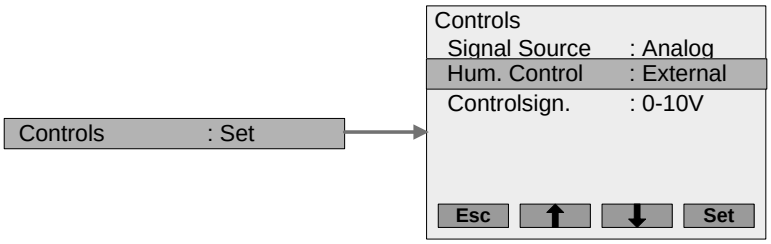


The selections in the **Settings** menu allows you to configure most user configurable features available with the MHTC. Press **Set** while highlighting **Settings** in the **User Menu.**

Language
Sets the language that will be used in the MHTC's display. Highlight the desired setting and press **Set** to select it.

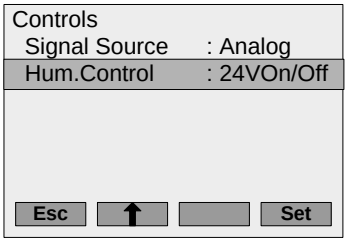
Controls

The **Controls** submenu configures the type of control that will be used to operate the MHTC. The MHTC can be configured for External control, 24V On/Off control, Internal Proportional control, and Internal Proportional and Integral control. Each of the four control methods require different parameters for configuration. The selections displayed in the **Controls** submenu depend on what is selected for **Hum. Control**.



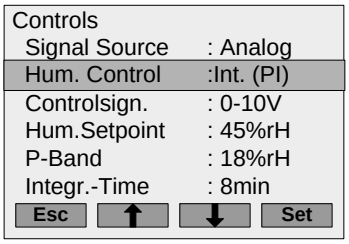
Hum. Control = External

When External control is selected the MHTC will stage to match demand based on an external control signal. Set Signal Source to Analog or Modbus. Set Controlsign to match the output of the controller being used.



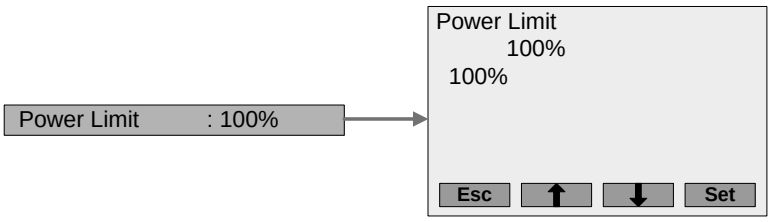
Hum. Control = 24VOn/Off

24Von/Off control is not supported. To operate the MHTC as On/Off set Hum. Control to External and Controlsign to 5VDC. Install a jumper from terminal 6 to terminal 4 of the control terminal strip. Install On/Off controls in series between terminal 1 and 2.



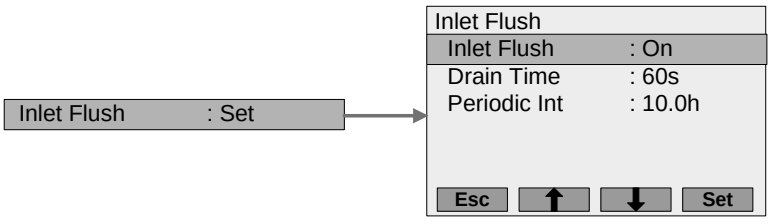
Hum. Control = Int. (P) or (PI)

When Internal control is selected the MHTC will calculate the required output based on RH signal supplied to it. Set Signal Source to Analog or Modbus. Set Controlsign to match the output of the RH transmitter being used. Configure Setpoint to the desired humidity. P-Band and Integr-Time should not normally be adjusted.



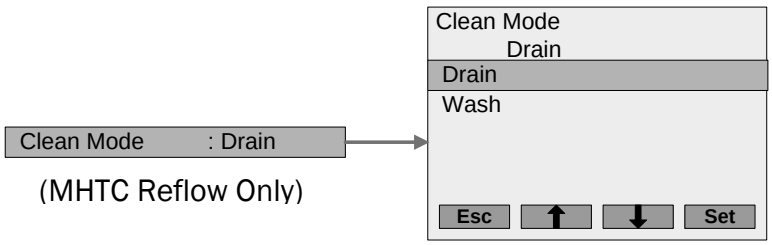
Power Limit

Manually reduces the maximum output of the MH. Can be used in cases where capacity is to high and the unit short cycles On/Off. Use **Up/Down** arrows to set the value then press **Set.**



Inlet Flush

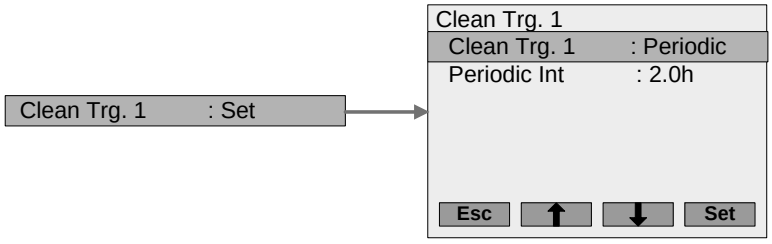
Sets the MHTC to flush supply lines when there is no demand to prevent water from becoming stagnant. Drain time = length of time the lines will be flushed. Periodic Int = time between flushes.



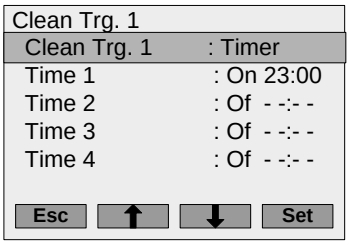
Cleaning Mode (MHTC Reflow Only)
Sets whether the MHTC Reflow will rinse media and flush the tank or simply flush the tank during cleaning cycles. Drain = only flush tank, Wash = rinse media and flush tank.

Cleaning Triggers
Cleaning is used to remove minerals left behind by evaporated water. Cleaning triggers are used by the MHTC to determine when cleaning cycles will take place. For the MHTC Reflow the cleaning cycle performed depends on the setting of the **Clean Mode** parameter. For the MHTC flow the cleaning always consists of activating the staging valves and washing the media.

Cleaning Trg. 1
Can be turned off for the MHTC Flow, the option to turn the trigger Off does not appear for the MHTC Reflow. To set the type of trigger to use highlight **Clean Trg. 1** and press **Set.**

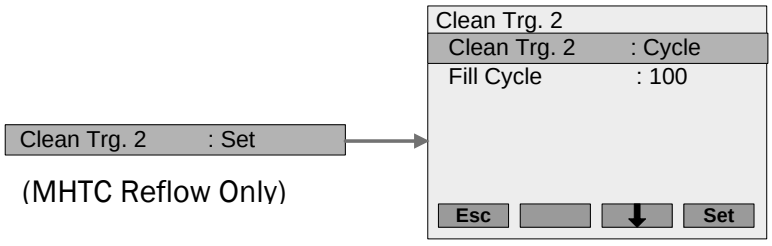


Clean Trg. 1 = Periodic
The cleaning cycle is triggered after a fixed number of operating hours. Periodic Int = hours between cleaning cycles.

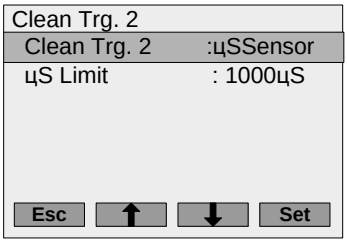


Clean Trg. 1 = Timer
The cleaning cycle is triggered at up to four specific times of day. Set each time of day by highlighting it and pressing **Set.** Turn the timer On and adjust the time in the screen that is displayed.

Cleaning Trg. 2
Is only displayed for the MHTC Reflow. The trigger can be turned off in which case only **Clean Trg. 1** will be used to initiate MHTC Reflow cleaning cycles.

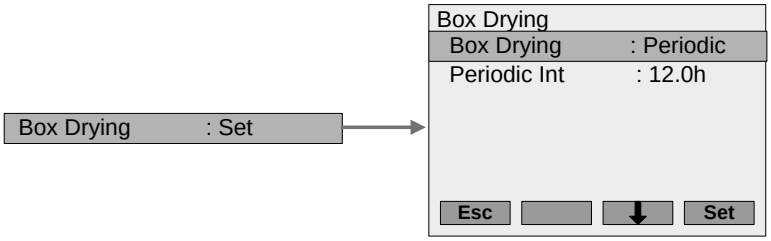


Clean Trg. 2 = Cycle
The cleaning cycle is triggered after a fixed number of fill cycles. To set the number of fill cycles between cleaning highlight **Fill Cycle** and press **Set.** On the screen displayed use **Up/Down** arrows to change the value. Press **Set** to confirm the setting.

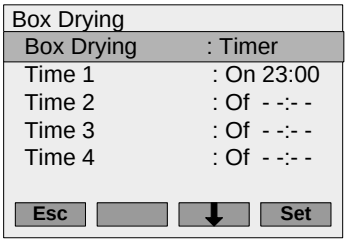


Clean Trg. 2 = µSSensor
This setting should be used together with the optional conductivity sensor installed. The cleaning cycles will be triggered when the sensor indicates conductivity is > µS Limit. To set **µS Limit** highlight it and press **Set**. On the screen displayed use **Up/Down** arrows to change the value. Press **Set** to confirm the setting.

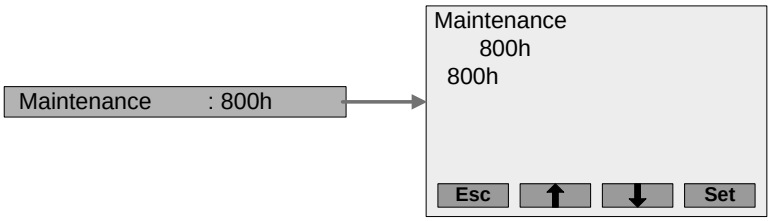
Box Drying
Box drying is used to assist in the prevention of bacteria growing in the evaporating media. Box drying can be set to occur after a fixed number of operating hours, at specific times of day, or can be turned off.



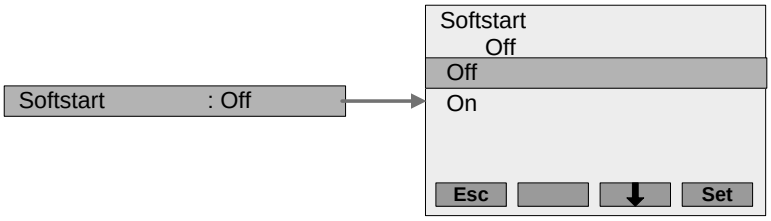
Box Drying = Periodic
Box drying will occur after a fixed number of operating hours. To change the number of hours highlight **Periodic Int.** and press **Set.** On the screen displayed use **Up/Down** arrows to change the value. Press **Set** to confirm setting.



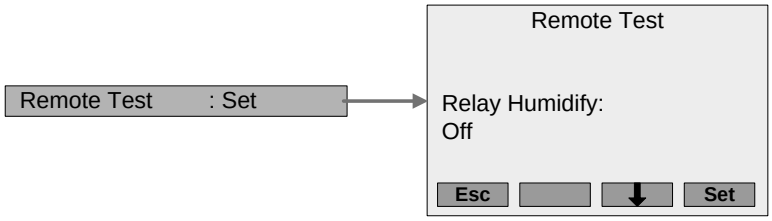
Box Drying = Timer
Box drying will occur at up to four specific times of day. Set each time of day by highlighting it and pressing **Set.** Turn the timer On and adjust the time in the screen that is displayed.



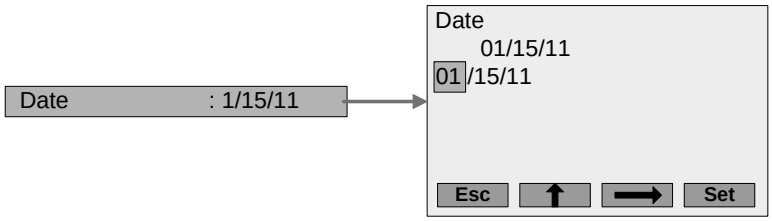
Maintenance
Sets the operating hours after which maintenance must be performed. When the interval expires a warning will be displayed and the yellow LED will be lit. If maintenance is performed within 168 hours of that time the MH will fault and stop operating.



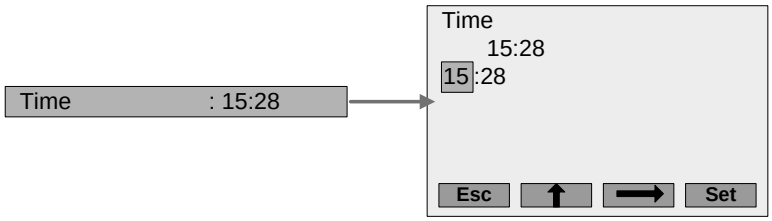
Softstart
Dry media does not absorb water readily. Softstart reduces the amount of water applied to dry boxes by cycling staging valves On 10 seconds / Off 10 seconds for a 5 minute period during startup after a long shut down period. This can prevent excess water from being carried in the air stream.



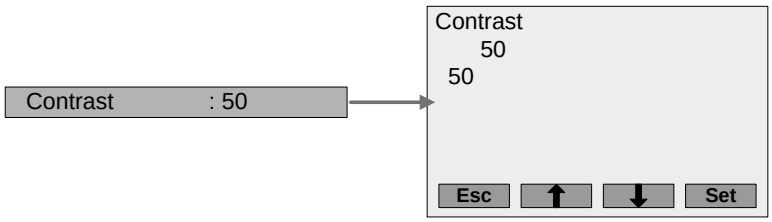
Remote Test
Allows the testing of remote relay operation. Use the **Up/Down** arrow keys to select a relay then press **Set** to toggle it On/Off.



Date
Sets the date of the MHTC's internal clock. Use **Up** arrow to change the value. Move to the next item using the **left** arrow. Press **Set** when done.



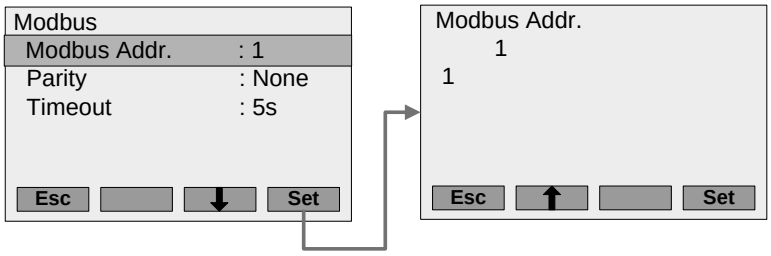
Time
Sets the time of the MHTC's internal clock. Use **Up** arrow to change the value. Move to the next item using the **left** arrow. Press **Set** when done.



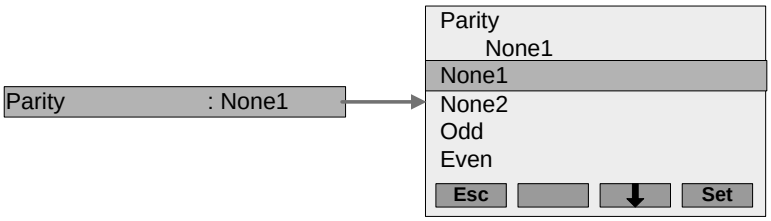
Contrast
Adjusts the contrast of the LCD display. Use **Up/Down** arrow keys to change the value. Press **Set** when done.

Modbus Menu

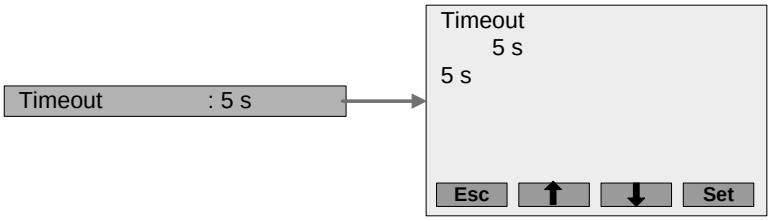
From the **User Menu** highlight **Modbus** and press **Set**. The Modbus menu allows you to configure the MHTC controller to communicate on your Modbus network by setting the Modbus address, parity, and communication timeout.



Modbus Address
Sets the Modbus address that the MHTC controller will use for communication on a Modbus network. Press **up/down** arrow keys to change value and press **Set** to accept.



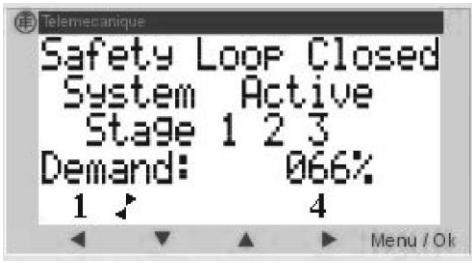
Parity
Sets the parity bit for Modbus communication to None, Odd, or Even. Highlight the required setting and press **Set** to select.



Timeout
Sets the length of time the controller will wait for Modbus data before a communication timeout is generated.

MHB Configuration

The MHB is factory configured to operate under most conditions and does not have any user configurations available. However the control module inside the control box has an LCD display which displays the current status of the MHB. The illustrations below explain the meaning of the MHB display screens.



Normal Operation
Displays the status of the safety loop, Active when the system is operating, number of stages that are on, an the current system demand.



Soft Start
Dry media cannot absorb water as effectively as wet media. In order to prevent wasting water the system will pulse staging valves if the media has been dry for a period of time. Once the media have been given some time to become wet the MHB will stop pulsing and continue normal operation.



Drying Cycle
In order to help prevent microbials from growing in the media the MHB controller will periodically shut off staging valve for a period of time to allow them to dry out. After a period of time it will resume normal operation.



Media Wash
To help flush away minerals that have been left in the media by evaporated water the MHB will periodically activate the staging valve(s) even when there is no demand. After a period of time it will resume normal operation.



Low Pressure Alarm
The pressure switch on the MHB will detect when the inlet water pressure is low and stop operation until water pressure increases sufficiently for proper operation. The display will indicate that the MHB is not operating due to low water pressure.



Maintenance Shutdown

Every 800 hours of operation the MHB will shut down for required maintenance. Maintenance indicated in Maintenance Schedule on page 62. Once maintenance has been performed hold button 1 and 4 for three seconds to reset the maintenance timer.

Maintenance and Servicing

Required Maintenance

Warning

If the Nortec MH Series is insufficiently maintained microbials which can cause illness, may grow in the media boxes, the mist eliminator, and the tank and may affect the air passing through the MH duct unit. Maintenance must be performed as specified.

Caution: Servicing

- Poorly maintained humidifiers / coolers can endanger health of building occupants. If the MH is not properly maintained microbials may grow in it. If carried by air passing through the humidifier the germs can cause illness.
- The MH must be serviced in the intervals described in the maintenance section of this manual. Humidification boxes and mist eliminator media must be replaced after their service life has elapsed.

Caution:

- All maintenance work must be carried out by qualified and trained personnel.
- Power to the MHTC/MHB should always be turned off using the dedicated external disconnect before removing the cover of the hydraulic unit or opening the control box.
- The instructions and details for maintenance work must be followed as described. Only use original NORTEC spare parts to replace faulty parts.

MHB Service Reminder

The MHB controller includes a service reminder which will shut down the MHB after 800 hours of operation. At that time the LCD display inside the control box will display the message shown in Figure 46: MHB Service Reminder. When the service reminder occurs the media must be inspected and replaced if it is heavily soiled and all the maintenance indicated in Maintenance Schedule on page 62 must be performed. Nortec is not responsible for any damages resulting from, or attributed to not performing required maintenance. (see Manufacturer's Warranty).

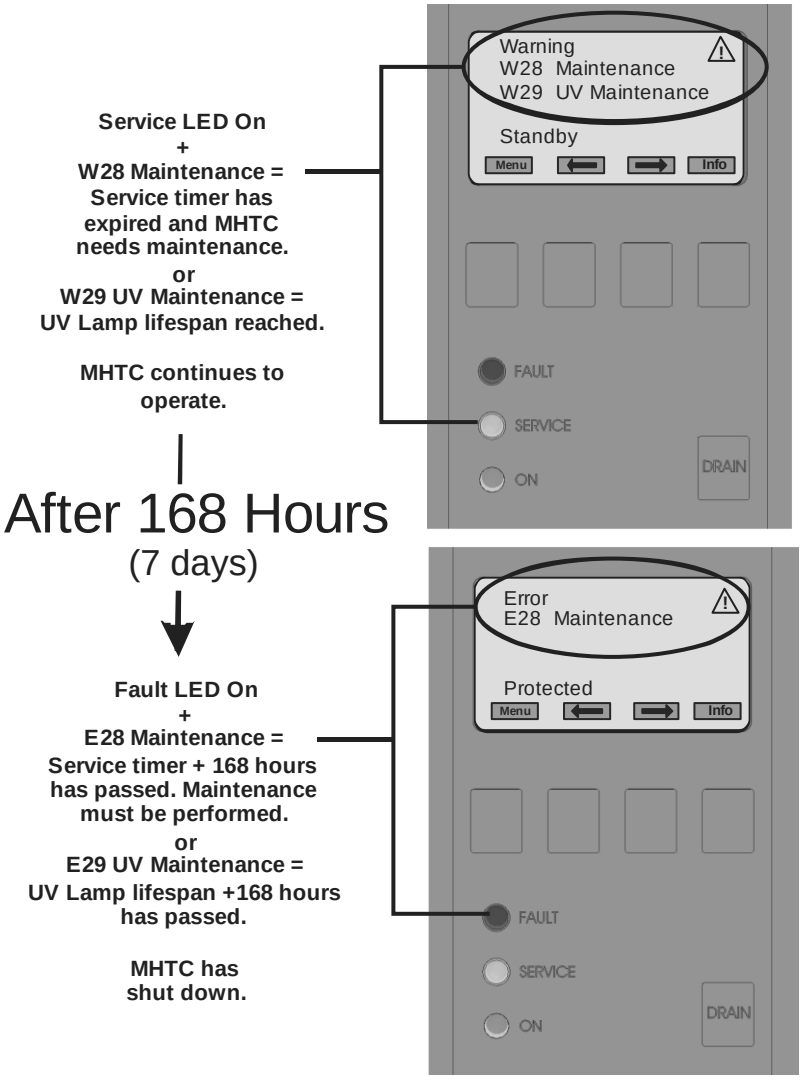
After the maintenance has been performed the service reminder must be reset by simultaneously pressing / holding button 1 and 4 for three seconds.



Figure 46: MHB Service Reminder

MHTC Service Warning/Fault

The MHTC controller includes a timer that monitors operating hours and generates a warning when service is required or the UV lamp needs to be replaced. Optimal maintenance time is dependent on water supply conditions and usage. The default factory service reminder is equivalent to 800 hours of operation at 100% output. Failure to perform maintenance when the service warning is displayed will cause the unit to lock out. Nortec is not responsible for any damages resulting from, or attributed to not performing required maintenance. (see Manufacturer's Warranty).



Warning
When the MHTC software determines that the service timer or UV lamp life has elapsed it first displays a warning and turns on the yellow service LED. The MHTC will continue to operate for another 168 hours after the warning is displayed.

Fault
After 168 hours the MHTC will display a fault and shut down.

If maintenance is not possible the MHTC can be temporarily put back into service by turning the MHTC off and on. The MHTC will run for another 168 hours.

This reset can be repeated 4 times after which the MHTC will not run until the Stage Reset function is entered in the software's Maintenance Menu.

Figure 47: Service Warning / Fault

NOTE:

- If the "Stage Reset" service reminder is not reset the MHTC may fault out on the W28 Maintenance Fault despite the fact that the maintenance has been performed.
- After performing the first maintenance on the MHTC it is possible to increase or decrease the service period to match water and air conditions. If the media and drain pan are relatively clean and free of dirt and scale increase the service period. If there is a lot of scale or the media looks dirty then from dirt and dust then reduce the service period and consider increasing cleaning cycles (See MHTC Configuration)

Maintenance Schedule

Caution: Servicing

- Poorly maintained humidifiers / coolers can endanger health of building occupants. If the MH is not properly maintained microbials may grow in it. If carried by air passing through the humidifier the germs can cause illness.
- The MH must be serviced in the intervals described in the maintenance section of this manual. Humidification boxes and mist eliminator media must be replaced after their service life has elapsed.

Regular maintenance is required to keep the Nortec MHTC/MHB operating at its peak capacity and efficiency. Follow the maintenance schedule shown in

Table 4: MHTC/MHB Maintenance Schedule to ensure long life and peak performance.

Remember to reset the **Stage Reset** and **UV Lamp Rst.** maintenance reminders on the MHTC and the **Maintenance Shutdown Reminder** on the MHB after performing service or replacing the UV lamp (see Maintenance Menu on page 51 or Maintenance Shutdown on page 58).

Table 4: MHTC/MHB Maintenance Schedule

Item	30 Days After Start-up	When Service Light is Lit	End of Season	What to Do
Media boxes and mist eliminator		✓	✓	1. Remove mist eliminator and media boxes. 2. Clean media box frames with combined detergent / disinfectant. 3. If media is heavily soiled then replace media boxes. Note: if media boxes indicate strong dust deposit, check that the air system's filter meets MERV 11 of ASHRAE 52.2 standard).
Water tank		✓	✓	1. Check for soiling (dust, slime, mineral deposit, etc.) 2. Clean with a combined detergent and disinfectant. Note: the actual hygiene status indicates whether the maintenance interval time must be adjusted
Frame structure	✓	✓	✓	1. Check screw connections of the frame structure, tighten loose screw connections. 2. Clean frame structure with a combined detergent and disinfectant.
Duct section downstream of the humidifier	✓	✓	✓	1. Check for collection of residual water. If present: check air velocity through media boxes (without mist eliminator max. 750 fpm (3.8 m/s). 2. Mount mist eliminator if necessary. 3. Clean duct with a combined detergent and disinfectant.
Hydraulic unit	✓		✓	1. Check connections and components for sealing and correct fastening. 2. Seal/replace leaky /defective components, and fasten loose components.
Water installation	✓		✓	1. Check hoses for cracks and correct fastening. 2. Replace defective hoses. 3. Check water supply line for sealing and seal if necessary. 4. Dismantle water filter (if present) and clean it.
Spray bar cap		✓	✓	1. Tip up spray bar cap and check the holes in the water distribution pipes for mineral deposit. 2. If necessary, dismantle and remove mineral deposit. 3. Clean spray bar cap and water distribution pipes with a combined detergent and disinfectant.
Drain line with siphon			✓	1. Check and clear if necessary.
Uv water treatment		✓	✓	1. Dismantle UV lamp and carefully clean glass tube and uv lamp. 2. After max. 8000 operating hours replace lamp.
Electric installation			✓	1. Check all cables and components for correct fastening, correct function and defects. 2. Have defective components replaced or loose components fastened by a qualified specialist.

Replacing Media Boxes

The Media boxes must be checked each time service is performed on the MHTC/MHB and replaced when they are heavily soiled or filled with minerals. Actual replacement time varies depending on operating conditions such as water quality and cleanliness of duct air (effectiveness and adherence to exchange intervals of the upstream air filter). To replace media boxes;

1. Follow Maintenance Shutdown and Extended Shutdown procedure on page 68.
2. Remove the mist eliminator (if present) by lifting upwards and then pulling towards you. The mist eliminator support pins should slide out from slots in the side panels of the MH Duct Module (see **Figure 48: Mist Eliminator Removal**.
3. Starting with the top media boxes lift boxes until mounting clips of boxes are free of slots in support members and then pull boxes back and out. (See **Figure 49: Media Box Removal**).
4. To reinstall media boxes start with bottom row and insert mounting clips into corresponding slots in support members. Push boxes in then down until they stop.
5. Ensure flexible EPDM flaps of spray bar cap are seated correctly on top row of boxes.
6. Install Mist eliminator by sliding its support pins into slots in the duct unit's side panels.
7. Reset the maintenance reminder of the MHTC controller (See Stage Reset on page 51).

Mist Eliminator Removal

- If a mist eliminator (optional) is present then remove it by lifting slightly and pulling back to slide support pins out of slots in side panels.
- Move the mist eliminator out of the way to provide access to the media boxes.

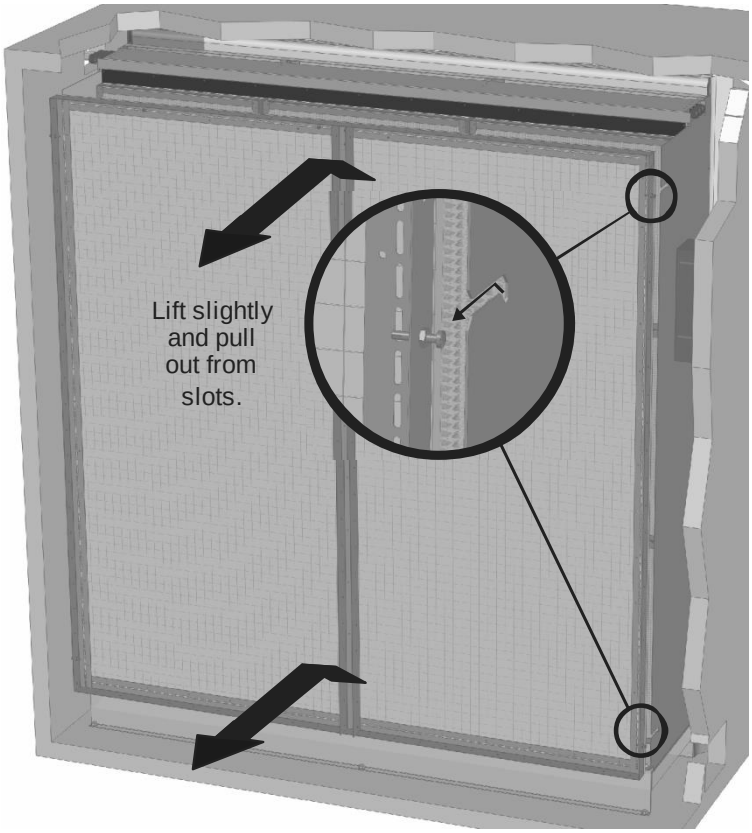


Figure 48: Mist Eliminator Removal

Media Box Removal

- Starting with the top row lift media boxes so that tabs engaged in support members are free.
- Then pull boxes back and out.
- To install reverse procedure starting installation with the bottom row.

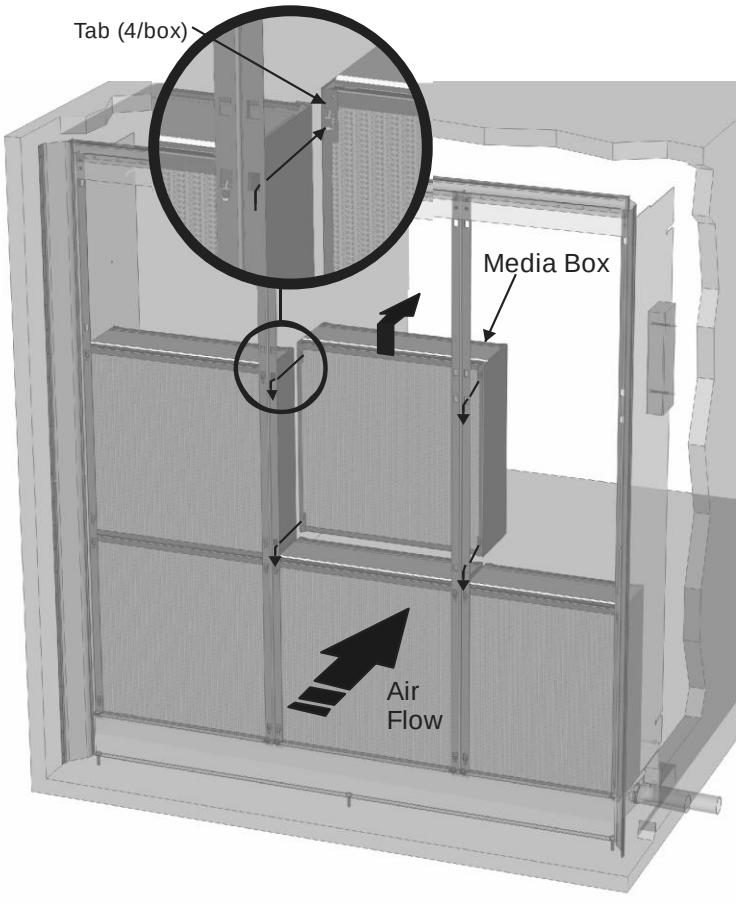


Figure 49: Media Box Removal

Replacing / Cleaning UV Lamp

The UV lamp effectiveness is rated for a maximum of 8000 hours of operation. After that time the lamp may still function but may not be as effective at killing germs and bacteria. The lamp must be replaced when the MHTC's UV Lamp warning is displayed. To replace the UV lamp.

1. Pull the retaining clip out to release the UV light plug.
2. Carefully lift the plug and pull the UV bulb out of the housing.
3. Unscrew the Gland Nut and remove Quartz Tube and O-Ring.
4. Clean outside of Quartz tube with CLR and a lint-free and soft cloth.
   - If the Quartz tube is heavily fouled, it should be replaced. The Quartz tube should be replaced every 2-3 maintenance cycles.
5. Reverse above procedure to reinstall the lamp.
6. Reset the UV lamp replacement timer (see UV Lamp Reset on page 51).

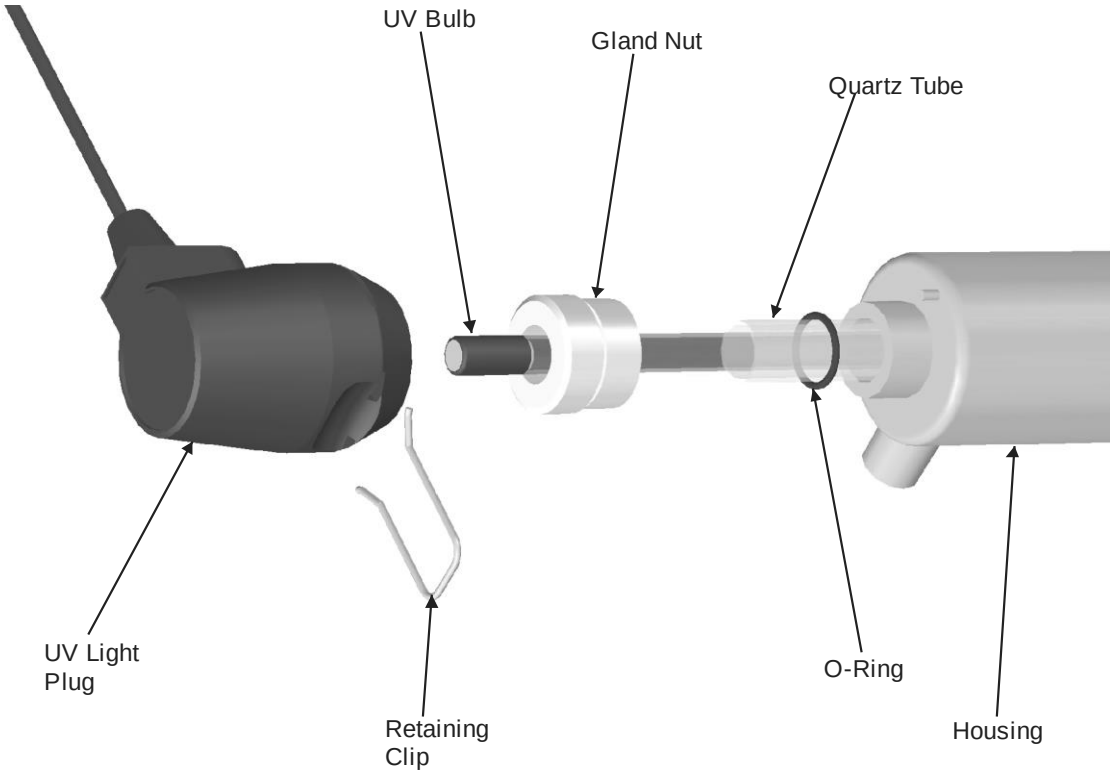


Figure 50: UV Lamp Replacement



Caution: When installing the UV lamp, make sure to hold the lamp until it is completely inserted. Under no circumstances let the lamp fall inside the holder, since this could damage the lamp.

Maintenance Shutdown and Extended Shutdown

The following procedure should be followed to shut down the MHTC/B for maintenance or should a period of extended shut-down be required.

1. Close the shut-off valve in the water supply line.
2. MHTC Reflow – Empty the hydraulic unit reservoir by starting the manual drain.
3. Wait for the reservoir to be empty.
4. Turn the power switch on the control box to “Off”.

Note:

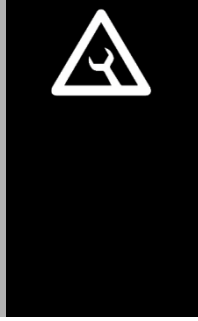
If an MHTC unit has to be switched off because of a malfunction, please note the code of the actual error before shutting the unit off.



5. Shut off the electrical power at the disconnect and secure the system against accidentally being reconnected to the mains.
6. If work has to be done on the MH then switch off the air handling system and secure the system against accidentally being switched on.
7. The unit can now be serviced (if maintenance is being performed), or “stored” in this state until the next season.
8. To restart the unit follow Start Up Procedure on page 38. If the unit has been left off for a long period of time then disconnect the supply water line before the unit and flush for at least 3 minutes. Then reconnect the line.

Note:

- As long as the MHTC/MHB is powered, it will automatically flush the supply lines to prevent water in the lines from becoming stagnant. This feature will reduce or prevent the possible accumulation of algae and bacteria growing in supply lines.
- Dust and dirt can accumulate in the media even when it is not operating. If the MH is to be left off for a long period of time it may be advantageous to remove media and store in a safe dry place. Dust and dirt can accumulate in the media even when it is not operating.



MHTC/MHB Maintenance Checklist

Model #: _____

Serial #: _____ Tag: _____

System Check (MHTC Only)

- W28 (Maintenance Warning) ☐ E28 (Maintenance Fault) ☐
- W29 (UV Maintenance Warning ☐ E29 (UV Maintenance Fault) ☐
- Other warnings or Faults shown in display / LED's? No ☐ Yes ☐ _____

(See Troubleshooting Chapter for actions to address warnings and faults if present)

Preparation

- Reservoir drained. (MHTC Reflow Only) ☐
- Disconnect open, On/Off switch to Off ☐
- Water shut off closed. ☐

Check/Replace Media Boxes

- Mist Eliminator Present? ☐ Mist Eliminator Removed ☐
- Media boxes still serviceable (not excessively dirty or fouled with scale) ☐

  Media boxes cleaned with detergent /disinfectant ☐

  Or
- Media boxes not serviceable (excessively dirty or fouled with scale) must be replaced ☐

  Media boxes replaced ☐
- Mist Eliminator reinstalled if present ☐

Drain Pan and Duct Frame

- Drain pan cleaned with detergent /disinfectant ☐
- All duct frame screws secure ☐
- Duct frame cleaned with detergent /disinfectant ☐
- Spray bar holes clear ☐ or Spray bar cap and holes cleaned ☐

UV Lamp (MHTC Reflow Only replace if W29 or E29 were present)

- UV lamp replaced (only if W29 or E29) ☐
- UV lamp tube cleaned ☐

General Inspection

- Electrical wiring not loose and in good condition, ☐
- Hoses in good condition / No kinks / No cracks in hose, ☐
- No Signs of water leaking around MH or in duct ☐

Completion

- Covers replaced, water shut off valve opened, On/Off switch to On, Disconnect Closed ☐
- MHTC only - "Reset Stages" in Software, (Password 8808, Maintenance Level) ☐
- MHTC only and only if UV lamp replaced "UV Lamp Rst." in Software ☐

Inspected by:_____ Date of inspection: _____/_____/_____

Company:_____

Troubleshooting

Organization of Troubleshooting Chapter

The troubleshooting chapter is broken down into 2 sections.

General Troubleshooting	Deals with troubleshooting incorrect operation, installation, and plumbing issues without any control software warnings or faults.
Humidifier Warnings and Faults	Deals with warning and error messages that are generated by the MHTC's control software.

CAUTION:

Be aware, when troubleshooting, that the MH is powered by high voltage. Familiarity with both good practices and wiring of the humidifier is recommended. Any troubleshooting that requires opening the cabinet should be done by qualified personnel.



NOTE:

Most faults are not caused by faulty equipment but rather by improper installation. A complete fault diagnosis always involves a thorough examination of the entire system. The fault often lies with the water supply system or control system.



Troubleshooting Requirements

- Ensure the installation meets the installation requirements outlined in the Installation Chapter of this manual.
- Familiarize yourself with the operation of the MH by reading the Operation Chapter of this manual.
- Wiring diagram specific for your MHTC is installed on the inside of the control box door. A generic copy of the MHTC and MHB wiring diagram is also included at the end of this chapter for reference purposes.
- When contacting your local representative or Nortec for troubleshooting assistance, please ensure the serial number has been obtained for reference purposes.

General Troubleshooting

The following section provides general guidelines for troubleshooting the MHTC/B humidifier and auxiliary components. For detailed troubleshooting information refer to the manuals that were provided with the auxiliary equipment, to Table 6: Troubleshooting Warnings and Faults, and to **Error! Reference source not found.** later in this chapter.

Table 5: General Troubleshooting

MH Unit

Problem	Cause	Solution
Residual water in the section of the duct behind (downstream) the NORTEC MH	1 Air velocity through the media boxes is too high. Reference Units without mist eliminator max. (750 fpm) 3.8 m/s. Units with a mist eliminator max. 1082 fpm (5.5 m/s).	1 Install mist eliminator or reduce air velocity in the duct.
	2 Water drain is leaking.	2 Check/seal water drain.
Humidity/cooling demand present however the NORTEC MH does not humidify.	1 Shut-off valve in the water supply line closed.	1 Open shut-off valve.
	2 Reflow models: circulation pump defective.	2 Replace circulation pump.
Maximum humidification/cooling Capacity is not reached.	1 System incorrectly dimensioned (insufficient capacity).	1 Contact your NORTEC supplier.
	2 Unit improperly configured.	2 Check unit configuration.
	3 Safety opens intermittently.	3 Defective sensors.
	4 Inlet temperature low.	4 Increase the temperature of the air passing through the MH.
	5 Insufficient water supply capacity	5 Check water supply, increase water pressure.
	6 Models with MH control unit: output limitation active.	6 Deactivate output limitation (see separate operating instructions for MH control unit).
Pump running (>5 min.) however no water out of staging valves.	1 Blockage in the bypass tube in the manifold block preventing the pump from purging air from the system.	1 Check for dirt or debris in the bypass tube in the manifold block. Use a small wire or pipe cleaner to clean the bypass channel in the manifold block (stage 2 valve will need to be removed).

Digital Humidistat

Symptom	Cause	Corrective Action(s)
Humidistat Reading incorrectly	1 Sensor out of calibration	1 Check reading against known reliable instrument. If out of calibration it can be field calibrated ±10%. Press ▼▲buttons together until calH appears on the display. Press ►to display the current calibration trim. Adjust using ▼▲ buttons. Press ⦿ button when done.
	2 Improper sensor location	2 Check that the humidistat is positioned in a location representative of room humidity.
	3 Exposed to draft or heat source	3 Check that heat/cold fluctuations, drafts, sunlight, doors, or vents are affecting the reading.
	4 No vapour barrier	4 Insure drafts cannot affect reading by ensuing vapour barrier is in place and working.

MHTC Warnings and Faults

The self-diagnostic system built into the MHTC is continually monitoring its operation.

Warnings

- When problem symptoms are detected, the MHTC will attempt to take self-corrective actions to try to correct the problem. The display will show a "W" followed by the warning code for information purposes and the MHTC will continue to operate.
- If the condition which generated the warning is eliminated the warning is cleared from the display.

Faults

- If the MHTC is not able to self-correct a problem symptom it will if necessary respond by shutting itself down.
- When this occurs the MHTC illuminates the red "Fault" LED, Displays an "F" followed by the fault code on the display, drains the reservoir, and activates the "Error" relay of the remote relay board.

Clearing a Fault

- Check the fault message that the MHTC is displaying and take any necessary actions to correct the cause(s) as outlined in Table 6, Troubleshooting Warnings and Faults.
- Power cycle the MHTC with the On/Off switch waiting 3 seconds between turning it off and on.

Table 6: Troubleshooting Warnings and Faults

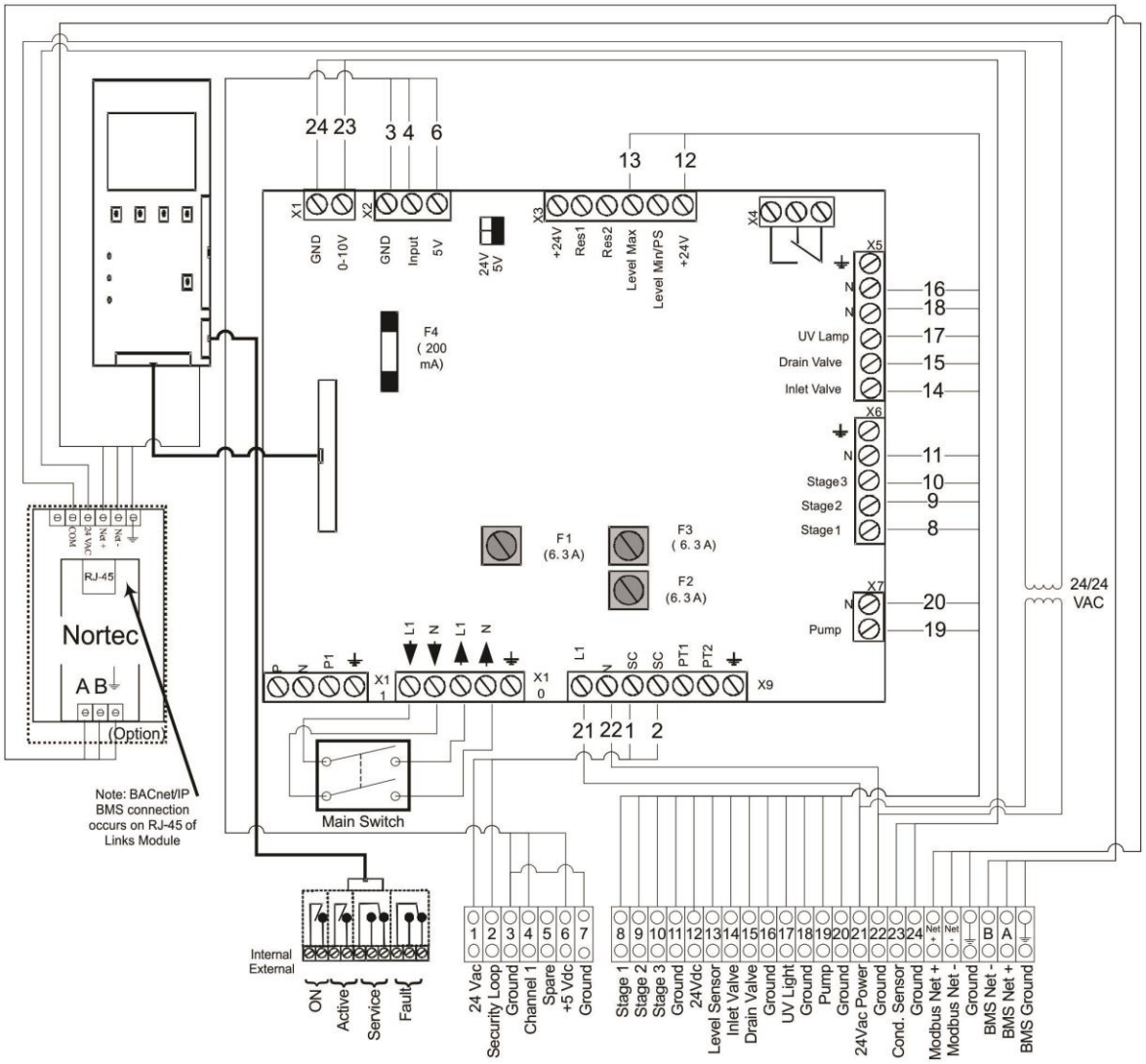
Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
W1	MH Card Missing	Red Flash	No MH Card	1 No MH Card installed on the control board	1 Install MH Card or start test run.
E1		Red			
E2	MH Card Empty	Red	No data on MH Card	1 No data stored on the MH Card	1 Install new MH Card
E3	MH Card Invalid	Red	Invalid MH Card	1 Invalid data stored on the MH Card	1 Install new MH Card.
E4	MH Card Incompat	Red	Incompatible MH Card	1 The MH card is not compatible with the hardware or the basic settings of the control board.	1a Install new MH Card 1b Modify basic settings.
E5	Module B Missing	Red	No response from Module B	1 Flat ribbon cable broken or disconnected	1a Plug in flat ribbon cable. 1b Replace ribbon cable.
				1 120V supply cable disconnected	1 Plug in 120V supply cable to module B

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
W20A	Safety Loop Open	Red and Green Flash	Safety Loop Open	1 Humidistat open	3 No call for humidity (normal operation)
				2 Air flow blocked	2 Check fan/filter of the air hancler.
				3 Air proving interlock open	3 If applicable check / turn on fan.
W21A	Level Sensor	Red Flash	Defective controller	1 Level sensor blocked	1 Check that level sensor can move freely.
E21A		Red		2 Level sensor broken	2 Check if level sensor is closed when float is raised. If not replace sensor.
W22A	Fill Timeout	Red Flash	Level sensor not closing when fill valve on	1 Water supply blocked / shut off	1 Check shut off valve, filter, pipes, etc.
				2 Water treatment system regenerating	2 Install relay to interrupt MH safety loop while system regenerates.
E22A		Red		3 Low water pressure	3a Check filter 3b Check for leaks in supply line. 3c Check supply water pressure
W23A	Drain Timeout	Red Flash	Float not opening when drain valve open	1 Drain valve blocked or defective.	1 Check / clean / replace drain valve.
				2 Siphon clogged	2 Clean siphon
				3 Relay defective	3 Replace control board.
E23A		Red		4 Level sensor stuck or shorted	4 Clean / replace level sensor.
				5 Pressure equalization line blocked / disconnected..	5 Install special siphon.
W25A	µS out of Range	Red Flash	Conductivity sensor reading out of range	1 Conductivity setting too low	1 Increase the conductivity setting in software.
				2 Supply water too conductive	2 Provide better quality supply water.
E25A		Red		3 Defective conductivity sensor	3 Replace conductivity sensor.
				4 Defective transmitter	4 Replace conductivity transmitter.

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
W28A	Maintenance	Red Flash and Yellow	Maintenance interval has elapsed	1 Maintenance is due	1 Perform maintenance according to Table 4 then reset “Stages Reset” in Maintenance menu.
E28A		Red and Yellow		2. Maintenance reminder not reset after performing maintenance	2 Reset the “Stages Reset” reminder in the Maintenance menu.
W29A	UV Maintenance	Red Flash and Yellow	Maximum life span of UV bulb reached	1 Life span of UV bulb reached	1 Replace UV bulb then reset the “UV Lamp Rst.” reminder in the Maintenance menu.
E29A		Red and Yellow		2. Reminder not reset after installing new UV bulb.	2 Reset the “UV Lamp Rst.” reminder in the Maintenance menu.
W32A	HumSensor broken	Red Flash	No signal from RH sensor	1 Sensor cable not connected or broken	1 Connect / replace sensor cable.
E32A		Red		2 Humidity sensor defective	2 Replace humidity sensor.
W33A	µS Sensor broken	Red Flash	No signal from conductivity sensor	1 Sensor cable not connected or broken	1 Connect / replace sensor cable.
				2 Conductivity transmitter defective or wrong version (conductivity constant)	2 Replace Conductivity transmitter.
E33A		Red		3 Conductivity transmitter not configured correctly	3 Contact your Nortec supplier.
				4 Conductivity sensor defective.	4 Replace conductivity sensor
W34A	Modbus disable	Red Flash	MH deactivated via Modbus	1 MH deactivated via modbus	1 May be normal operation. Contact network manager if humidity/cooling required.
E34A		Red		2 Modbus system failure.	2 Contact network manager. Check / activate Modbus network.
E35A	Modbus Timeout	Red	No Communication with Modbus network	1 Incorrect wiring	1 Check that wiring meets RS485 networking requirements.
				2 Wrong Modbus configuration	2 Check modbus address and parity.
				3 Modbus Network down	3 Activate Modbus network

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
W36A	Stage Hygene	--	Cleaning of media boxes in progress	1 Cleaning cycle in progress	1 None, normal operation.
W37A	Tank Draining	--	Draining of tank in progress	1 Tank drain in progress	1 None, normal operation.
W40A	No W-pressure	Red Flash	No supply water pressure (Reflow Only)	1 Water supply blocked / shut off	1 Check shut off valve, filter, pipes, etc.
				2 Water treatment system regenerating	2 Install relay to interrupt MH safety loop while system regenerates.
E40A		Red		3 Low water pressure	3a Check filter 3b Check for leaks in supply line. 3c Check supply water pressure

MHTC Reflow Control Box Wiring Diagram



nortec humidity.com

MHTC Series 2
Reflow Control Box
Diagram No. 2558976 rev C August 1, 2012

Figure 51: MHTC Series 2, Reflow Control Box Wiring Diagram

MHTC Reflow Hydraulic Unit Wiring Diagram

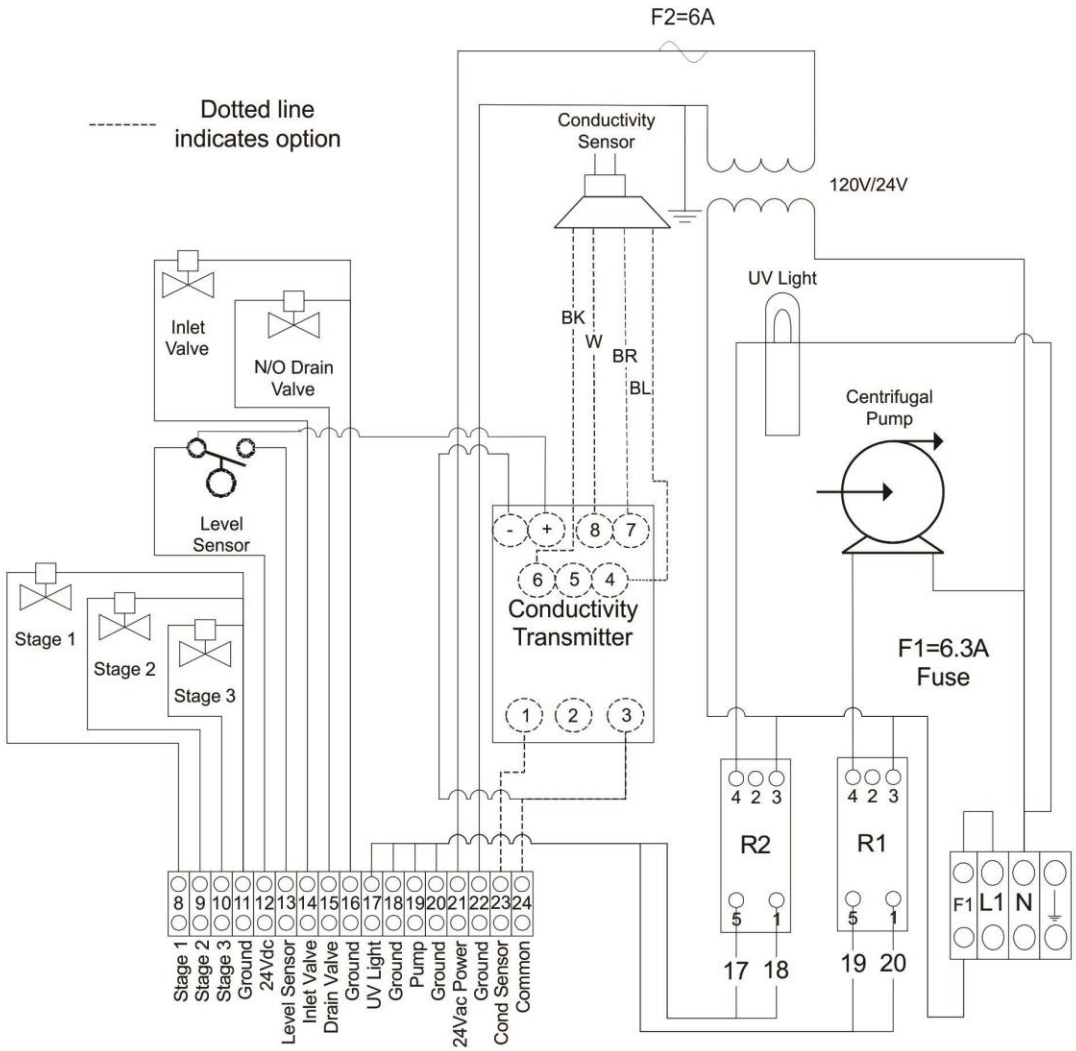
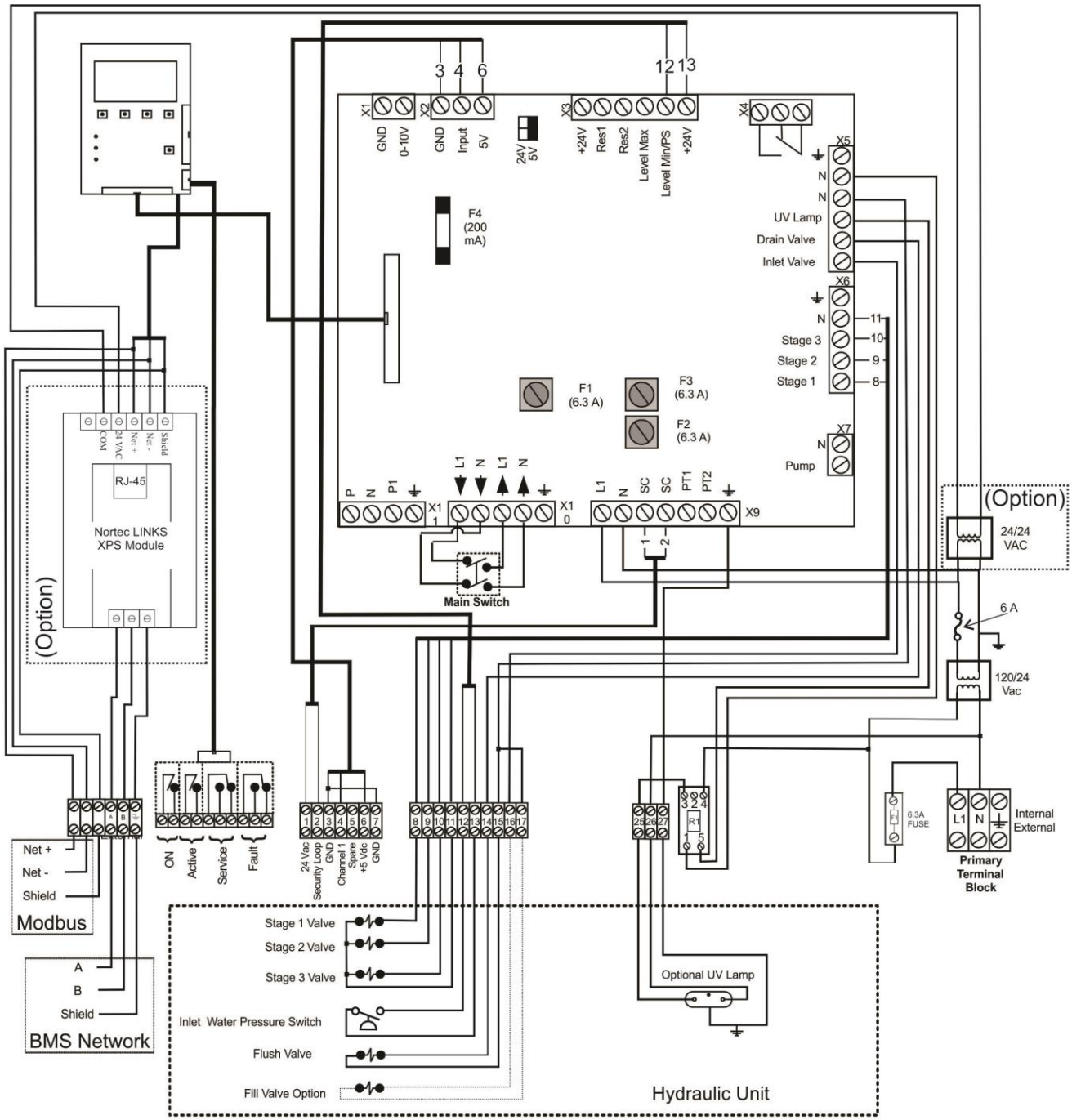


Figure 52: MHTC Series 2, Reflow Hydraulic Unit Wiring Diagram

MHTC Flow Control Box and Hydraulic Unit Wiring Diagram



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MHTC FLOW Control Box
Internal Wiring Diagram
Diagram No. 2543942 C Aug. 11/ 2011

Figure 53: MHTC Series 2, Flow Control Box and Hydraulic Unit Wiring Diagram

MHB 1 Stage Control Box and Hydraulics Wiring Diagram

MHB 1 Stage Control Box and Hydraulics Wiring Diagram

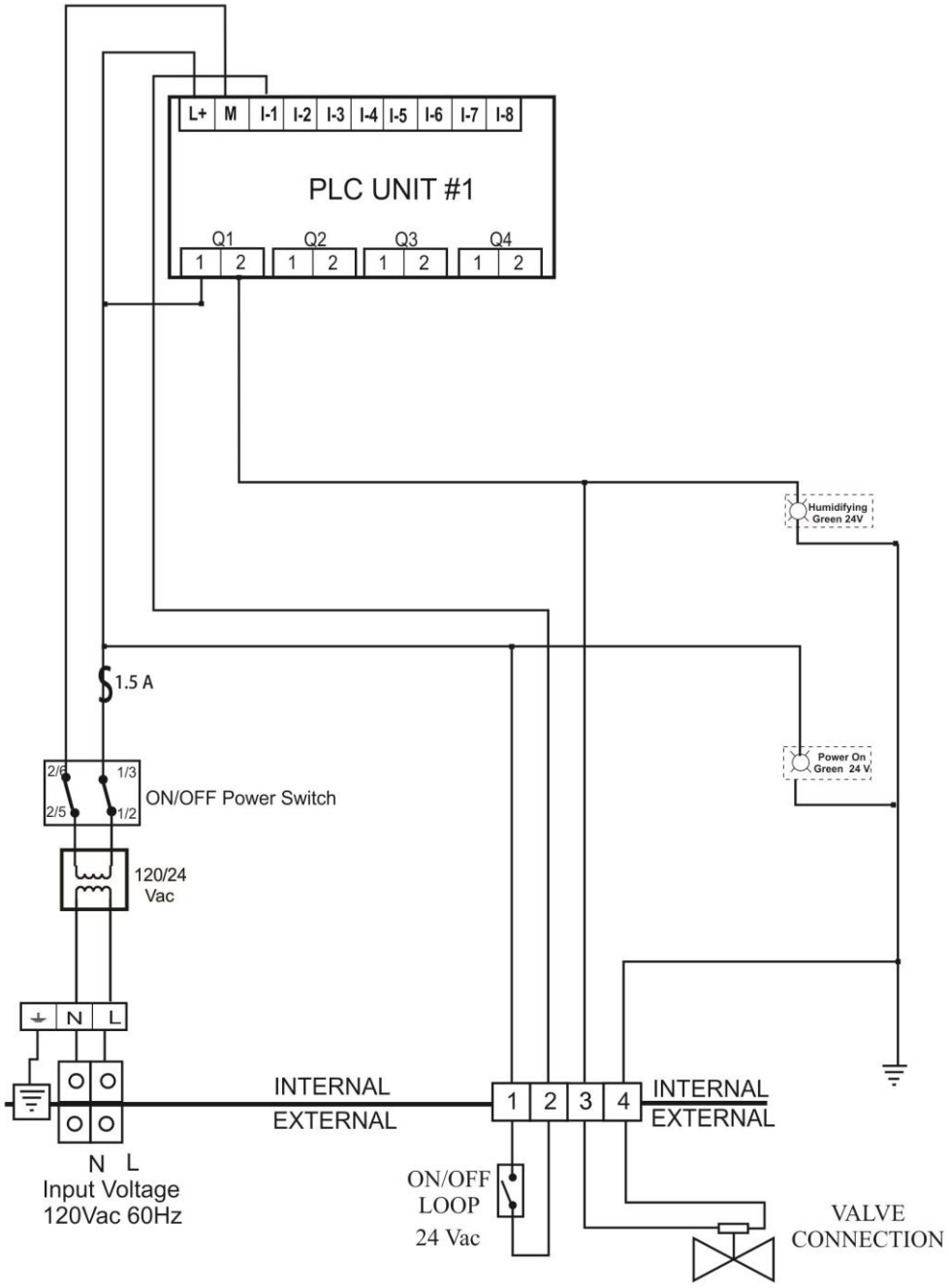


Figure 54: MHB Series 2, 1 Stage Control Box and Hydraulics Wiring Diagram

MHB Multi-Stage Control Box and Hydraulic Unit Wiring Diagram

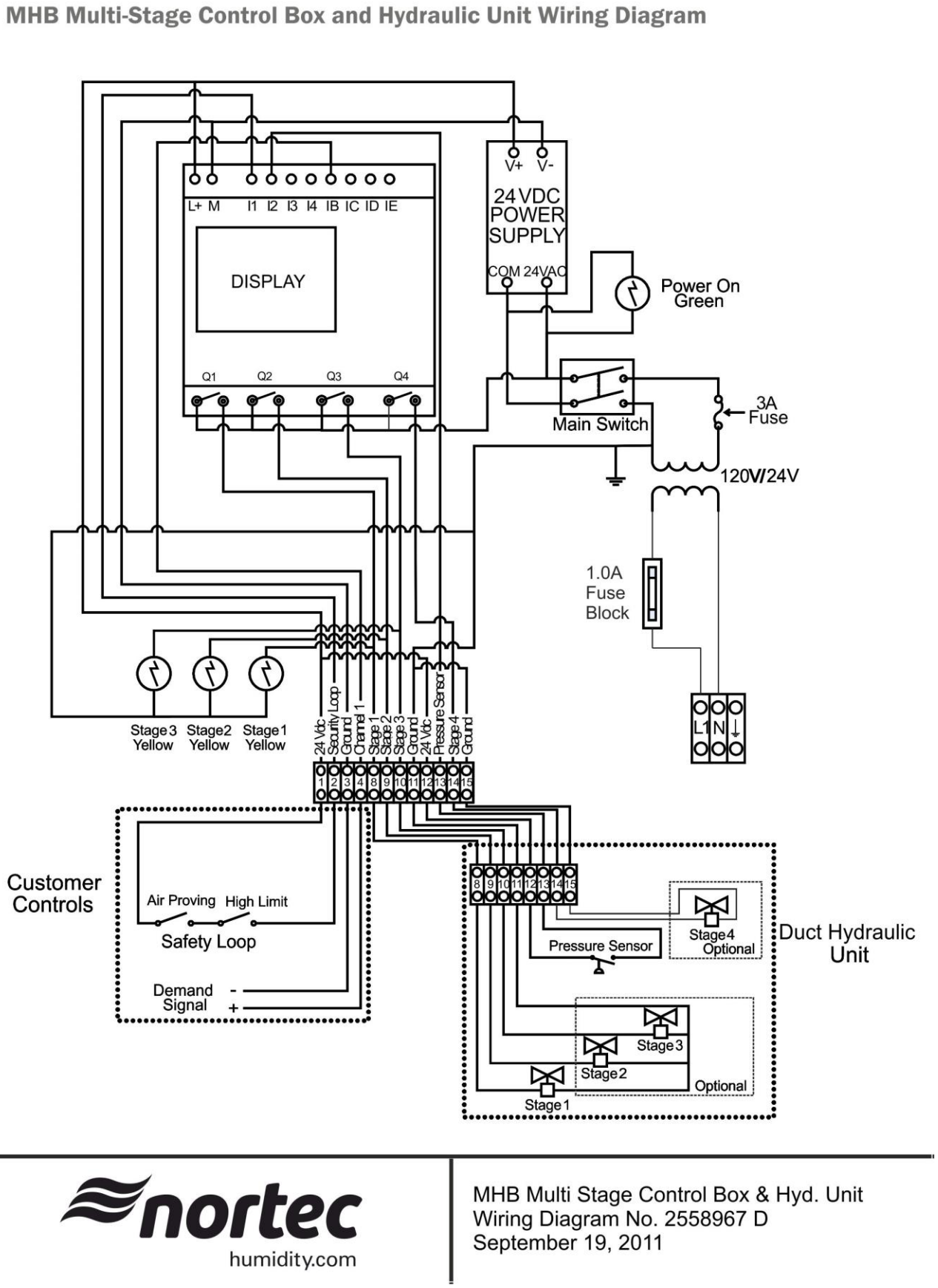


Figure 55: MHB Multi-Stage Control Box and Hydraulic Unit Wiring Diagram

Spare Parts

MHTC Control Box Parts

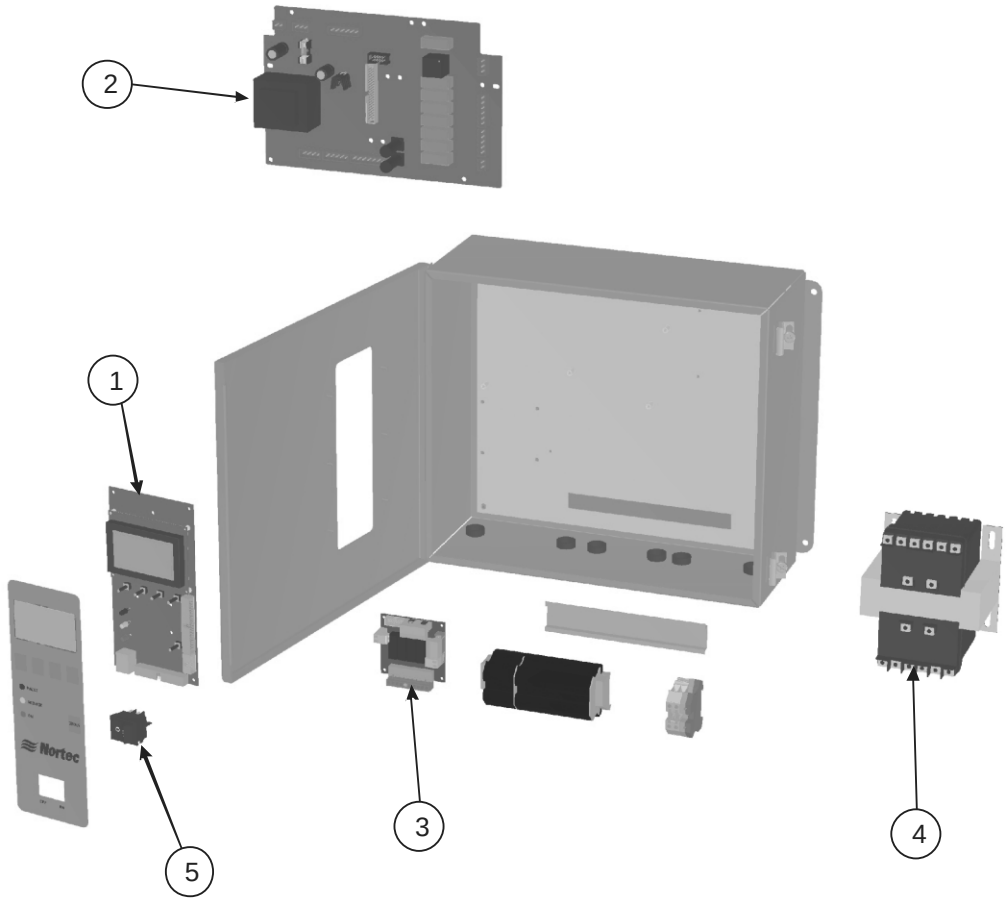


Figure 56: MHTC Control Box Parts

MHTC Reflow Hydraulic Unit Electrical Parts

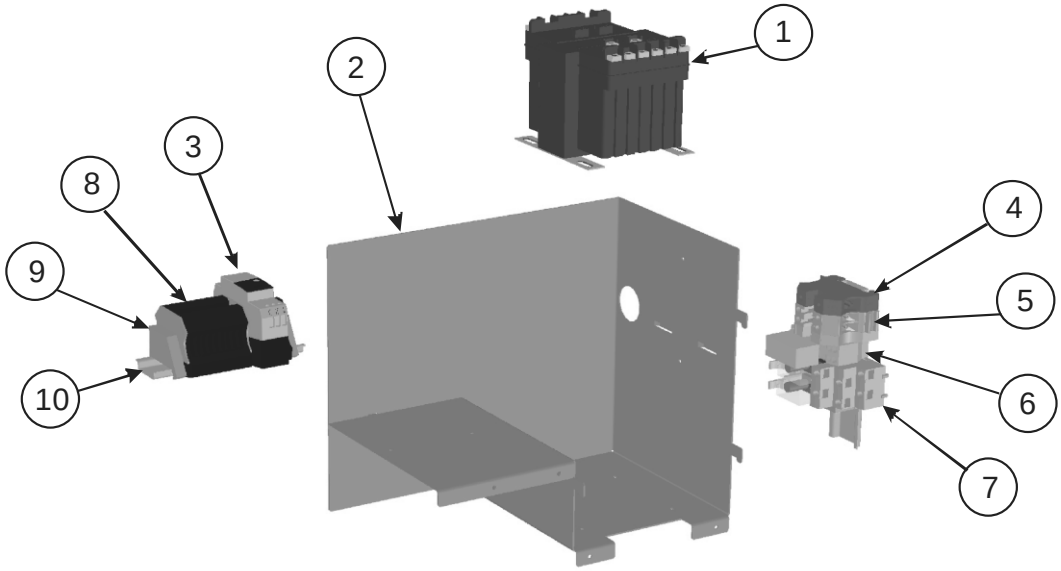


Figure 57: MHTC Reflow Hydraulic Unit Electrical Parts

Table 7: MHTC Control Box Parts

Item	Description	Part No.	Qty
1	PCB, Processor MH	2541251	1
2	PCB, Driver Board MH	2541226	1
3	PCB, Fault Remote Nortec	2521279	1
4	Transformer, 120/240-24 VAC 150VA	2532672	1
5	Switch Rocker DP/ST 10A-250V	2522489	1

Table 8: MHTC Reflow Hydraulic Unit Electrical Parts

Item	Description	Part No.	Qty
1	Transformer, 120/240-24 VAC 250VA	2532672	1
2	MH Electrical Mounting Bracket	2557321	1
3	Conductivity Transmitter	2544411	1
4	Terminal, Rail Mount Gree/Yellow	1501447	1
5	Terminal, Rail Mount, Beige	Contact Factory	2
6	Fused Disconnect Terminal Block w/fuse	Contact Factory	2
7	Relay Socket, Rail Mount Beige	1501452	2
8	Terminal, Rail Mount, Blue	1501448	10
9	End Bracket, Rail Mount Beige	1501450	2
10	Track, Rail	1501471	4 in.

MHTC Reflow Hydraulic Unit Plumbing Parts

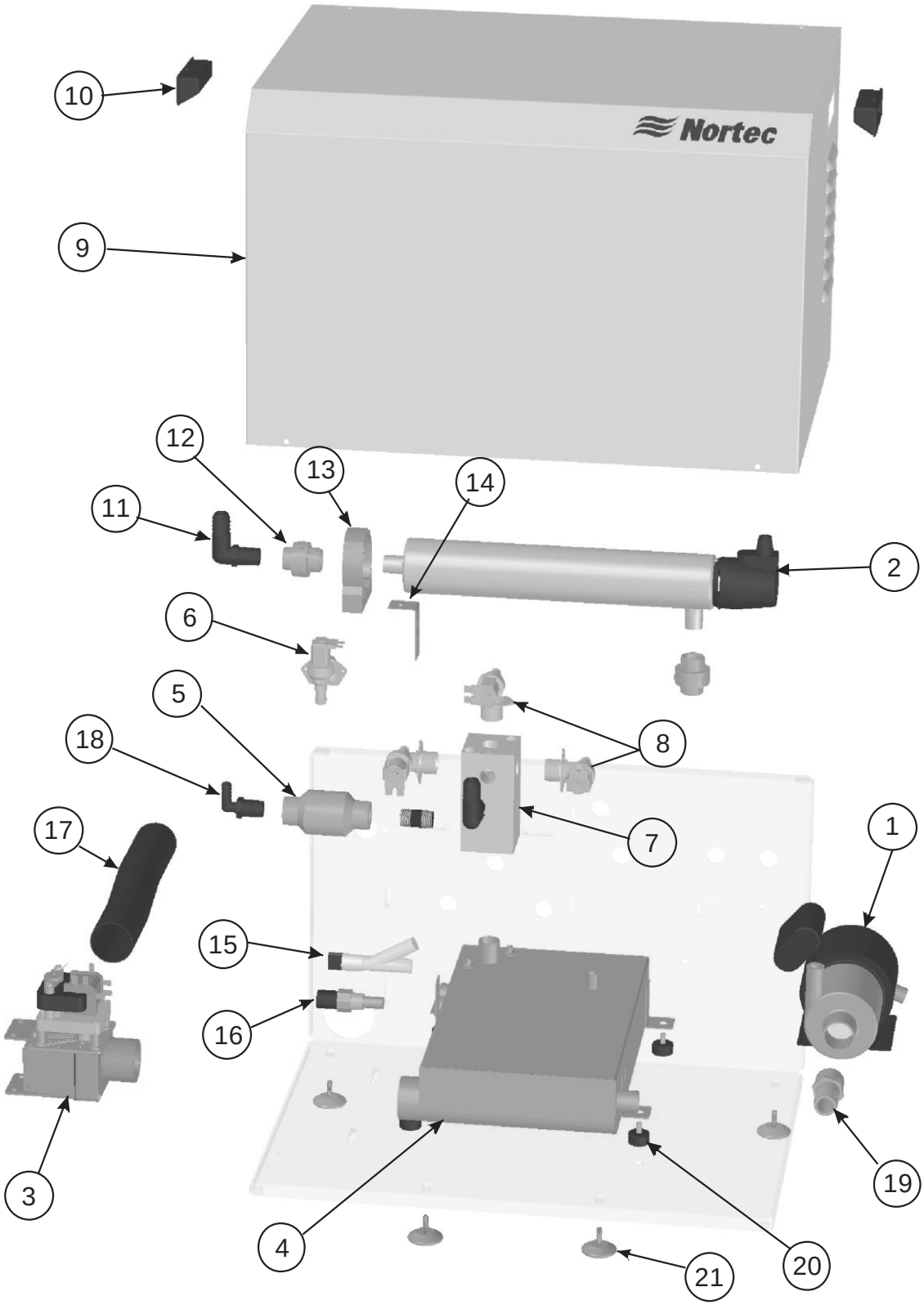


Figure 58: MHTC Reflow Hydraulic Unit Parts

Table 9: MHTC Reflow Hydraulic Unit Parts

Item	Description	Part No.	Qty
1	MH2 Inline Centrifugal Pump	2557297	1
2	UV Light Assembly	2544543	1
2a	UV Bulb	2544412	1
2b	Quartz Tube	2544413	1
3	MDP-2RA – N-O Drain Valve Assm	2557296	1
4	MH2 Reservoir Assm	2557285	1
5	Backflow Preventer	2557318	1
6	Fill Valve 17L/min	2557292	1
7	Staging Manifold	2557314	1
8	Staging Valve	Contact Factory	Varies
9	Cover MH2	2557475	1
10	Cabinet Handle	Contact Factory	2
11	0.5 in. NPT-0.75 in Insert Poly Elbow	2544516	1
12	Union 1/2 “ NPT, PVC	1544516	2
13	Clamp 2.5 in. Pipe	2557290	1
14	Bracket UV	2557310	1
15	MH2 Float	2557286	1
16	MH2 Conductivity Sensor, LF-EC	2557295	1
17	2 in. High Temp, DI Compatible Hose	2554038	12 in.
18	0.5in NPT-0,5in Hose Barb Poly Elbow	2557319	1
19	Hose Barb to 1in MNPT	2557287	1
20	Vibration Isolator	1509353	4
21	Levelling Foot	2557298	4

MHTC Flow Hydraulic Unit Plumbing Parts

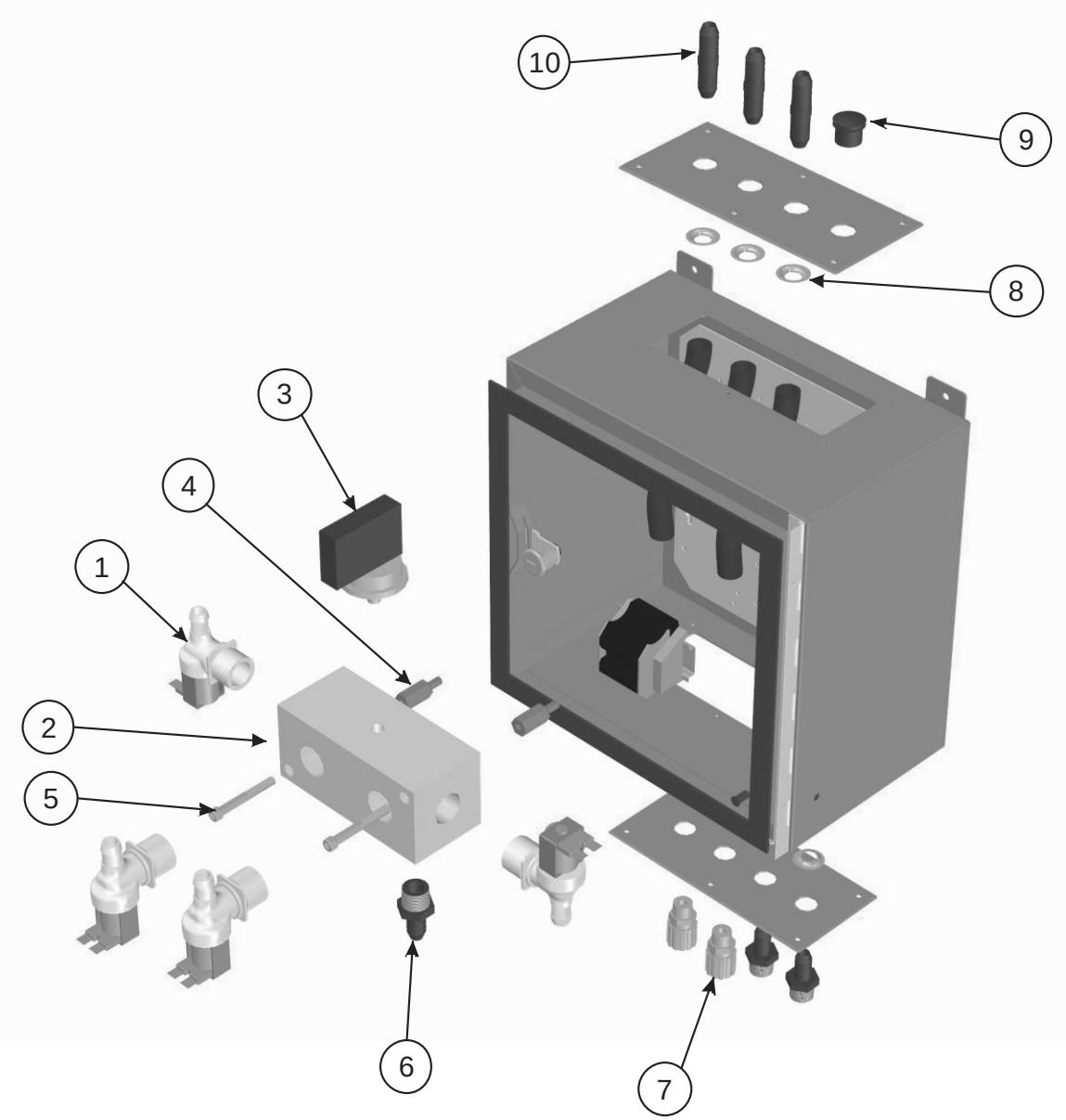


Figure 59: MHTC Flow Hydraulic Unit Parts

Table 10: MHTC Flow Hydraulic Unit Parts

Item	Description	Part No.	Qty
1	Staging/Flush Valves	See Factory	4
2	Flow Manifold Block, MH	2558965	1
3	Pressure Switch 10-100 psi	1504333	1
4	Stand-off, Zinc Plated, 0.25-20, 1in	2558964	2
5	Screw, Socket Head, 0.25in-20, 2in L	2558963	2
6	Adapter, Poly, 0.5 OD Barb - 0.5in MNPT	2558359	3
7	Cord Connectors 3/8 Hub Size	1506670	2
8	Push Nut, Zinc Plated Steel, 0.5in Shaft	2558962	5
9	Plug, Push In, Black Nylon, 0.75in hole	2558961	1
10	Coupler, Poly, Insert, 0.5 OD	2558358	3

Warranty

Nortec Humidity Inc. and/or Nortec Humidity 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.

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