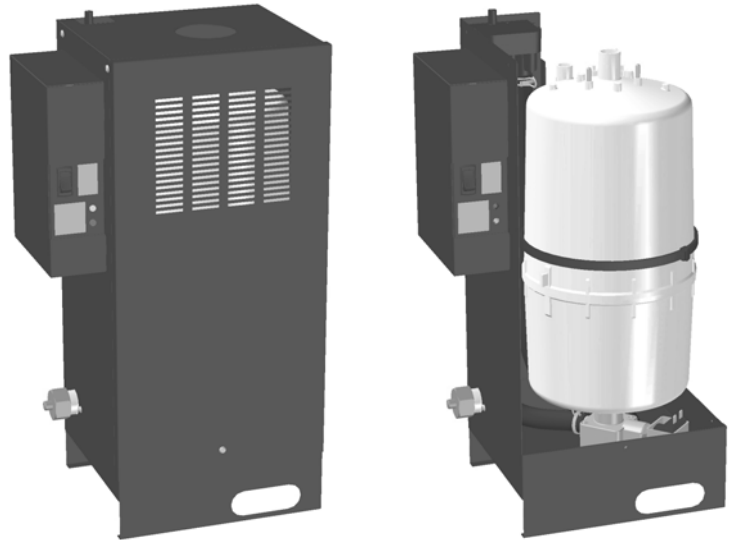




**Important:** Read and save these instructions. This guide to be left with equipment.



# **Nortec** **MES2**

## **Installation and Operation Manual**

Includes installation, operation  
maintenance and troubleshooting  
information for the Nortec MES2  
Electrode Steam humidifier

## ***Thank you for choosing Condair.***

INSTALLATION DATE (MM/DD/YYYY)

MODEL #

SERIAL #

CYLINDER #

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# Introduction



## **CAUTION: Servicing**

- Disconnect main power before performing any servicing.
- The plumbing and electrical compartments contain high voltage components and wiring. Access should be limited to authorized personnel only.
- During and following operation of the humidifier, the steam and components in contact with the steam such as the steam lines, steam distributors, cylinders, and condensate lines can become hot and can burn if touched.
- Condair does not accept any liability for improperly installed humidity equipment or the use of parts/components/equipment that are not authorized or approved by Condair.



## **CAUTION: Electrical**

- All electrical work should be in accordance with the local electrical code in location where the humidifier will finally be operated.



## **CAUTION: Plumbing**

- Drain water from humidifier can be very hot. Do not drain to public sink.
- All plumbing work should be in accordance with local plumbing code in location where the humidifier will finally be operated.



## **CAUTION: Installation**

- Do not mount on hot surfaces
- Do not mount in area where freezing can occur
- Do not mount on vibrating surface
- The Nortec MES2 produces steam at atmospheric pressure. No devices which could block steam output should be connected to the steam outlet.
- Steam lines must be installed so that no restriction can produce backpressure in the humidifier.
- Regardless of selecting on/off or modulating control method, Condair humidifiers must have a closed circuit across its on/off security loop control terminal to operate. Condair highly recommends the use of a duct high limit humidistat and air proving switch.

## 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. Condair assumes no responsibility for any material shortages beyond this period.
- 3 Inspect shipping boxes 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 Condair 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 that the dedicated fused disconnect provided for the humidifier is of sufficient size to handle the rated amps as indicated on the specification label.
- 3 Ensure sufficient clearances will be available as described in "Location" on page 13.
- 4 Ensure steam lines can be routed to distributor as described in Steam Lines and Condensate Returns on page 16.

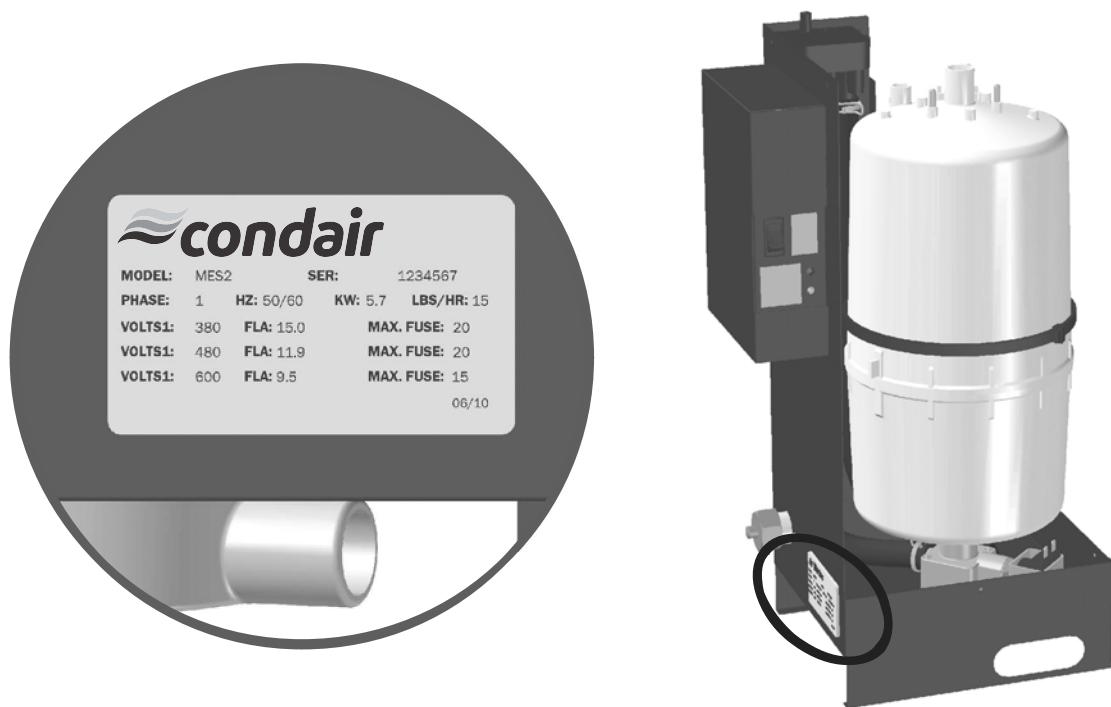
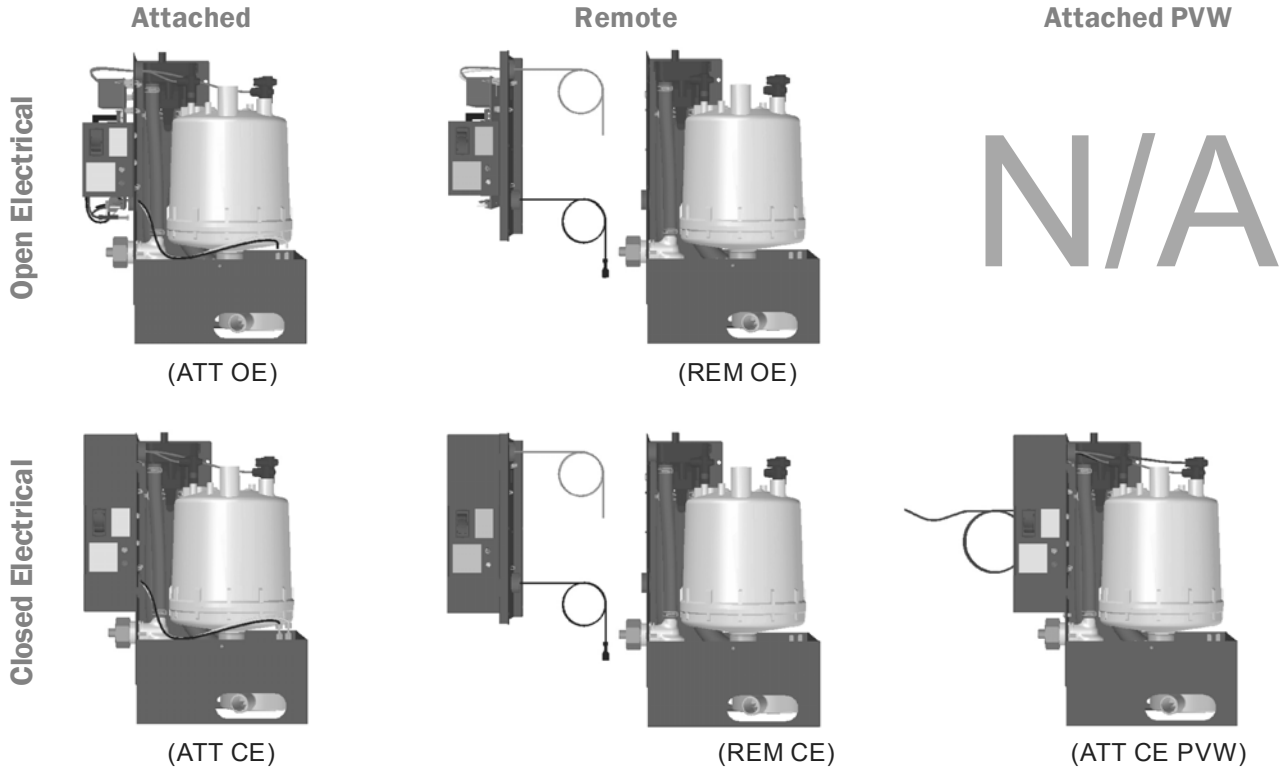


Figure 1: Specification Label Location

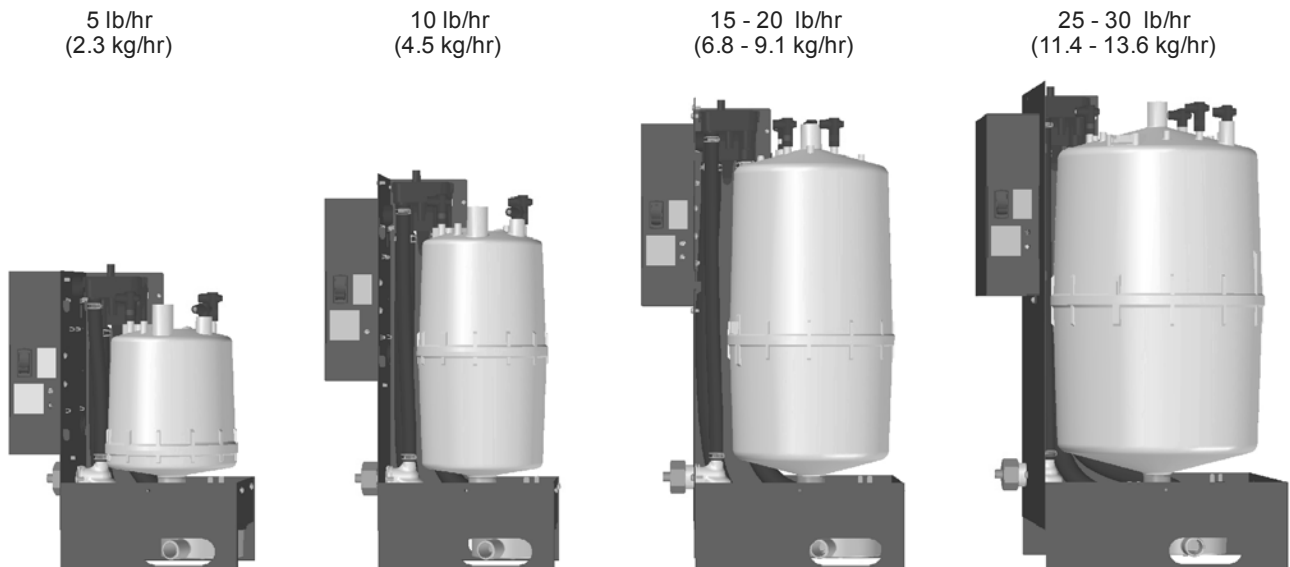
## Nortec MES2 Models

The Nortec MES2 is the most advanced OEM steam humidifier available and provides steady and reliable humidification using the same proven cylinder technology as Condair's commercial Condair's commercial electrode humidifiers. The Nortec MES2 is offered in 5 models corresponding to control configurations as shown in Figure 2. The remote configurations include 8 ft (2.4 m) of wiring for connecting the controls to the plumbing cabinet. The Primary Voltage Wiring (PVW) model provides 8 feet of primary wiring for connection to the contactor.



**Figure 2: Nortec MES2 Models**

The Nortec MES2 is available in 6 capacities ranging from 5 to 30 lb/hr (2.3 to 13.6 kg/hr) for operation on a range of voltages and phases as outlined in Table 1: Nortec MES2 Part Numbers and Electrical Data. The 6 capacities are packaged in 4 different cabinet sizes as shown in Figure 3.

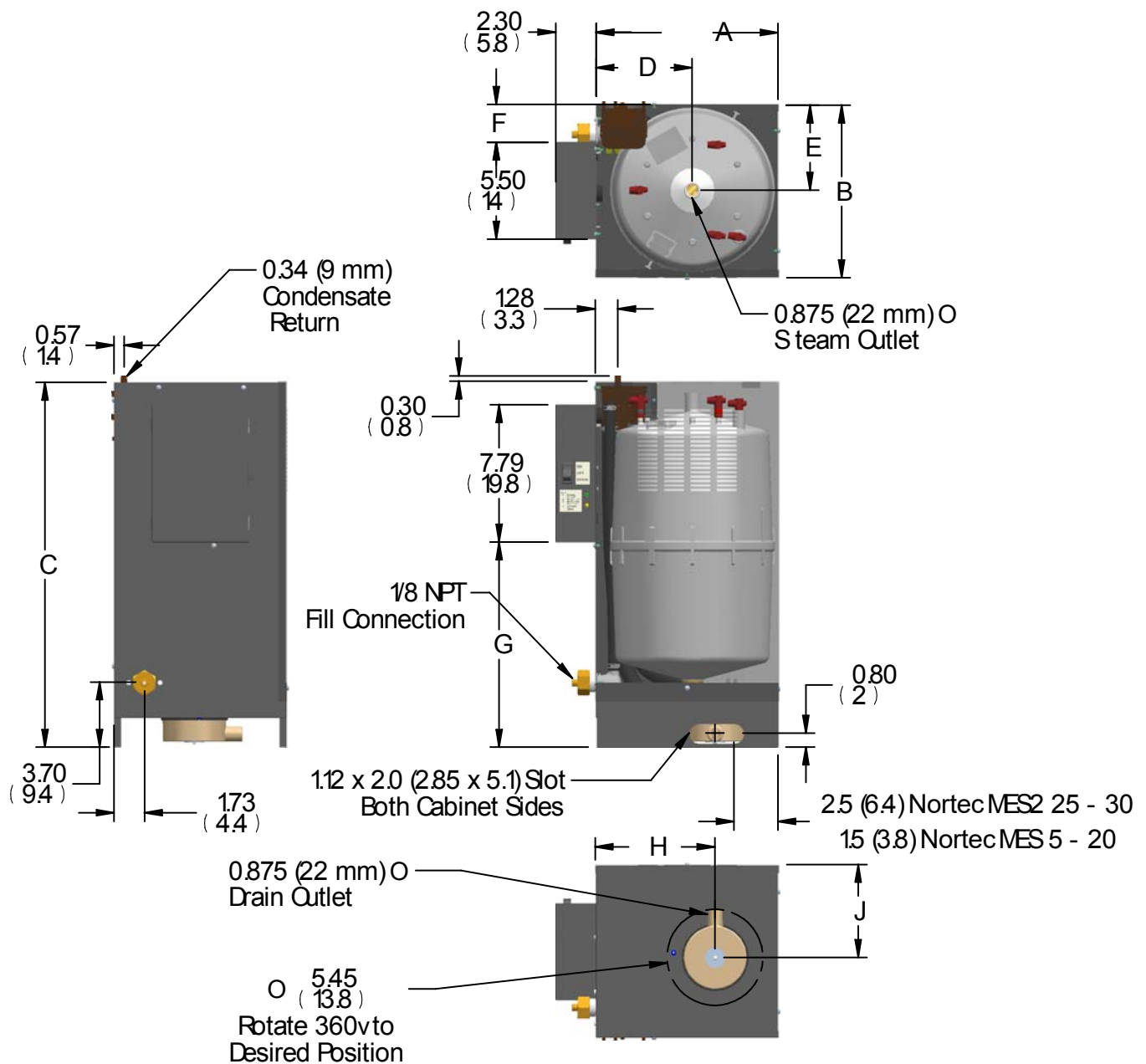


**Figure 3: Nortec MES2 Capacities and Cabinets**

**Table 1: Nortec MES2 Part Numbers and Electrical Data**

Capacity		Phase	Attached Open Elec.	Attached Closed Elec.	Remote Open Elec.	Remote Closed Elec.	Attached Closed Elec. PVW	Standard Cylinder	Volts	Amps	Max Ext Fuse	KW						
lb	(kg)		ATT OE	ATT CE	REM OE	REM CE	ATT CE PVW	No.	V	A	A	KW						
5	(2.3)	1	2550262	2550263	2550264	2550265	2550266	102	208	8.2	15	1.7						
									240	7.1	15							
									277	6.1	15							
			2550267	2550268	2550269	2550270	2550271	103	380	4.5	15							
									2550272	2550273	2550274		2550275	2550276	104	480	3.5	15
																600	2.8	15
10	(4.5)	1	2550277	2550278	2550279	2550280	2550281	202	208	16	25	3.4						
									240	14	20							
									277	12	20							
			2550282	2550283	2550284	2550285	2550286	203	380	8.9	15							
									2550287	2550288	2550289		2550290	2550291	204	480	7.1	15
																600	5.7	15
15	(6.8)	1	2550300	2550301	2550302	2550303	2550304	321	208	25	40	5.1						
									240	21	30							
									277	18	30							
			2550305	2550306	2550307	2550308	2550309	305	380	13	20							
									2550310	2550311	2550312		2550313	2550314	309	480	11	15
																600	8.5	15
		3	2550315	2550316	2550317	2550318	2550319	303	208	14	20							
									240	12	20							
			2550320	2550321	2550322	2550323	2550324	311	380	7.7	15							
									2550325	2550326	2550327	2550328	2550329	311	480	6.1	15	
20	(9.1)	1	2550340	2550341	2550342	2550343	2550344	321	208	33	50	6.8						
									240	28	45							
									277	25	35							
			2550345	2550346	2550347	2550348	2550349	305	380	18	30							
									2550350	2550351	2550352		2550353	2550354	309	480	14	25
																600	11	20
		3	2550355	2550356	2550357	2550358	2550359	303	208	19	30							
									240	16	25							
			2550360	2550361	2550362	2550363	2550364	311	380	10	15							
									2550365	2550366	2550367	2550368	2550369	311	480	8.2	15	
25	(11.4)	3	2553765	2553766	2553767	2553768	2553769	421	208	24	35	8.5						
									240	20	30							
									2553770	2553771	2553772		2553773	2553774	407	380	13	20
			2553775	2553776	2553777	2553778	2553779	411	480	10	15							
									600	8.2	15							
			30	(13.6)	3	2550370	2550371	2550372	2550373	2550374	421		208	28	40	10		
240	25	40																
2550375	2550376	2550377				2550378	2550379	407	380	16	25							
									2550380	2550381	2550382	2550383	2550384	411	480		12	20
600	9.8	15																

# Nortec MES2 Dimensions / Weights



Note: Unless otherwise specified dimensions are in inches (cm). Tolerance  $\pm 0.1$  in. (0.25 cm)

Capacity lb/hr (kg/hr)	A Width	B Depth	C Height	D* Steam Outlet	E* Steam Outlet	F Elec. Pos.	G Elec. Height	H Drain Center	J Drain Center	Net/Full Weight** lb (kg)
5 (2.3)	7.5 (19)	6.4 (16.3)	12.7 (35.3)	4.2 (10.7)	5.1 (13)	0.3 (0.8)	4.9 (12.5)	5.6 (14.2)	3.4 (8.6)	10.7/14.2 (5/6.6)
10 (4.5)	7.5 (19)	6.4 (16.3)	16.8 (42.7)	4.2 (10.7)	5.1 (13)	0.3 (0.8)	8.0 (20)	5.6 (14.2)	3.4 (8.6)	12.4/18.4 (5.8/8.5)
15-20 (6.8 - 9.1)	8.9 (22.6)	7.9 (20.1)	20.0 (50.8)	5.1 (13)	4.0 (10.2)	1.1 (2.8)	11.2 (28.5)	6.4 (16.3)	4.2 (10.7)	16.5/30.5 (7.8/14.2)
25-30 (11.4 - 13.6)	10.3 (26.2)	9.8 (24.9)	20.7 (52.6)	5.5 (14)	4.9 (12.5)	2.2 (5.6)	11.6 (29.5)	6.8 (17.3)	5.2 (13.2)	20.2/43.2 (9.5/20.0)

Note: \* Steam Outlet is not centered on MES2 5 & 10 lb/hr (2.3 & 4.5 kg/hr) models.

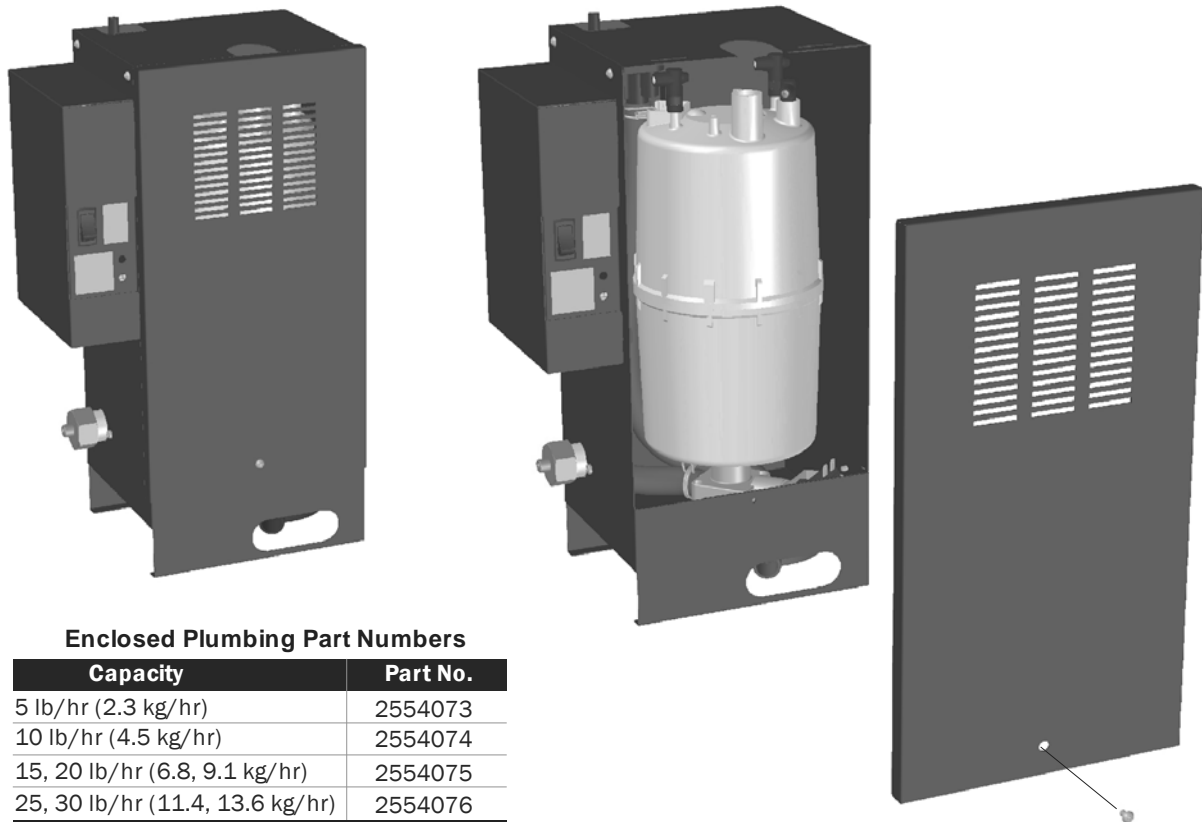
\*\* Weights given for Nortec MES2 with enclosed electronics and optional plumbing enclosure. Full Weight is weight with cylinder full of water. Full weight may exceed this value at end of cylinder life depending on the amount of scale and its composition.

Figure 4: Nortec MES2 Dimensions and Weights



## Options and Accessories

An enclosed plumbing option is available for each Nortec MES2 cabinet size. The option consists of a fixed cabinet with an easily removable door for servicing. Figure 5 shows the enclosed plumbing option installed on a 10 lb/hr Nortec MES2 ATT CE.



**Enclosed Plumbing Part Numbers**

Capacity	Part No.
5 lb/hr (2.3 kg/hr)	2554073
10 lb/hr (4.5 kg/hr)	2554074
15, 20 lb/hr (6.8, 9.1 kg/hr)	2554075
25, 30 lb/hr (11.4, 13.6 kg/hr)	2554076

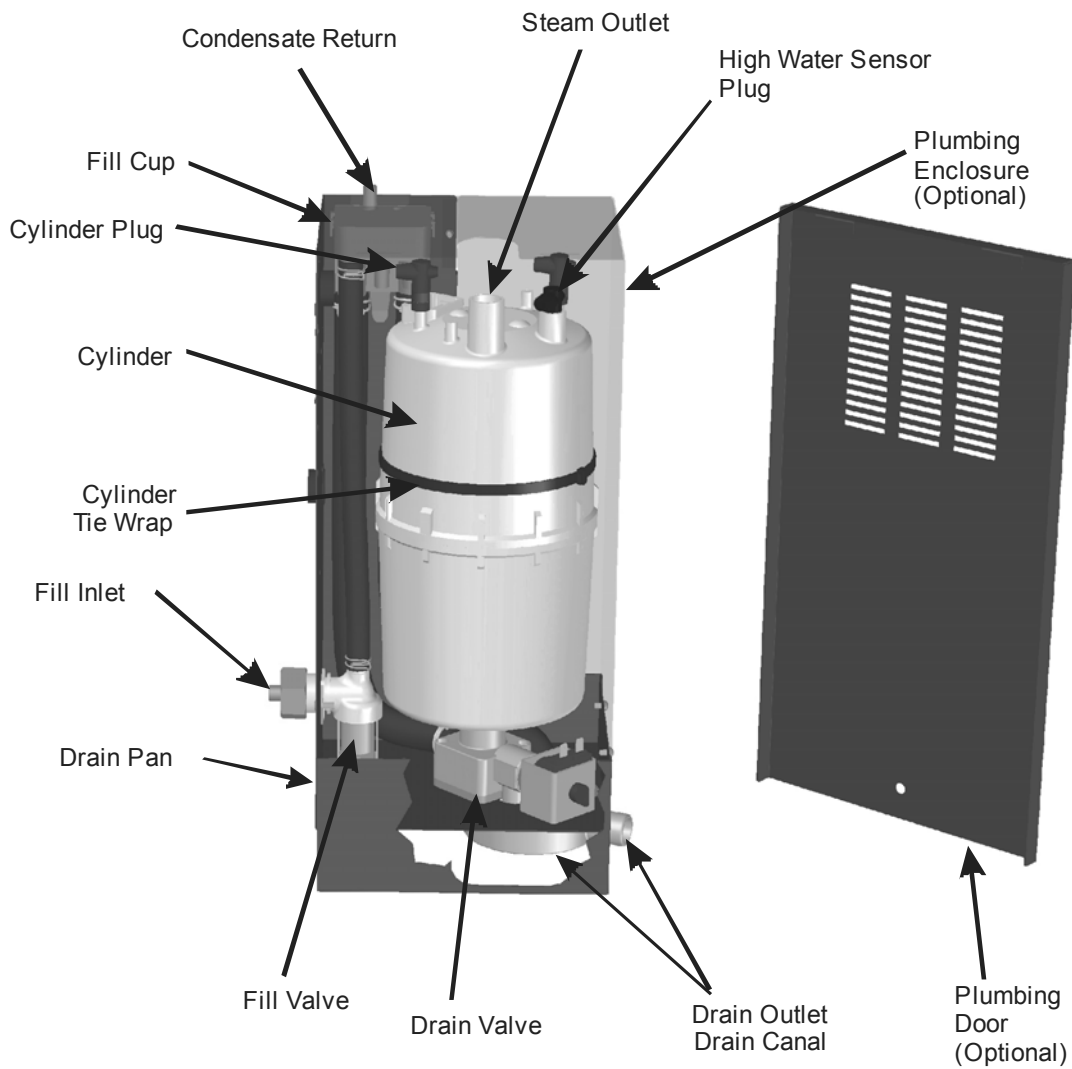
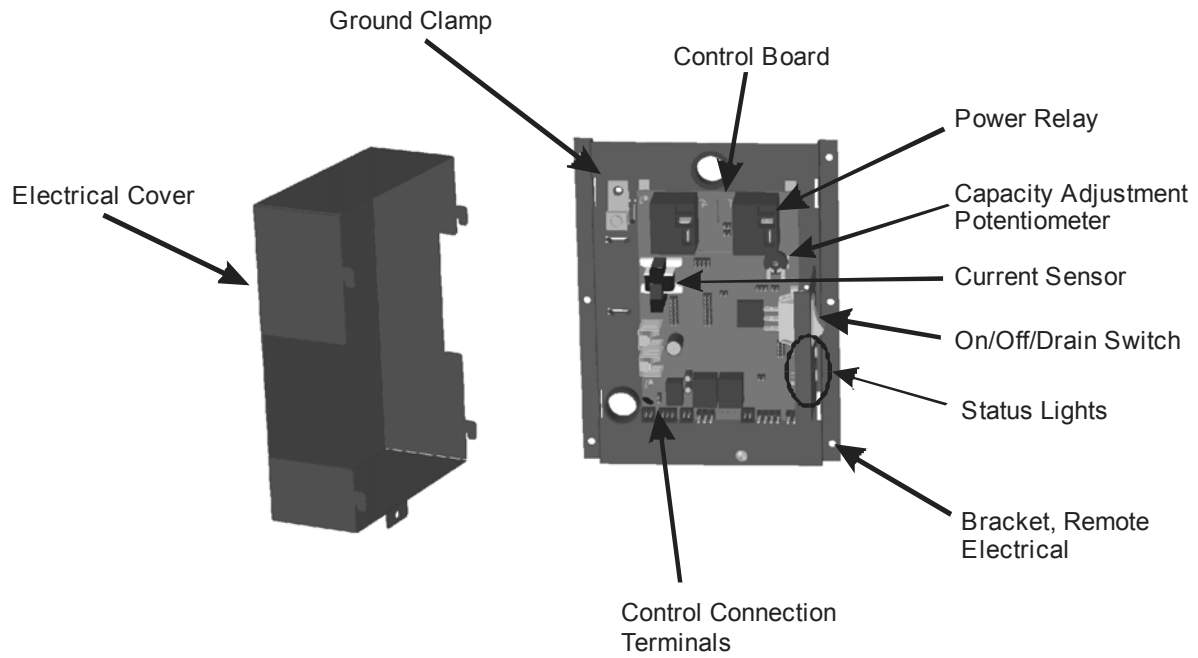
**Figure 5: Enclosed Plumbing Option**

Condair also provides a complete line of options and accessories for every humidification application. The following table lists some of the most common accessories available for use with the Nortec MES2 humidifier. Refer to the installation instructions that come with the accessories for their proper installation and operation.

**Table 2: Options and Accessories**

Option / Accessory	Used For
Modbus Interface	Controlling humidifier operation via Modbus (See Modbus Wiring on page 21 and Modbus Configuration on page 27).
Enclosed Plumbing	See above.
Steam Distributors	Adding steam into air ducts.
On/Off or Modulating Control Humidistats	Controlling the output of the humidifier based on sensed RH.
Air Proving Switch	Insuring humidification only occurs when air is moving in a duct.
Steam Hose	Connecting humidifier to steam distributor.
Condensate Hose	Collecting and draining condensate that collects in steam distributors and steam distribution lines.

# Humidifier Components

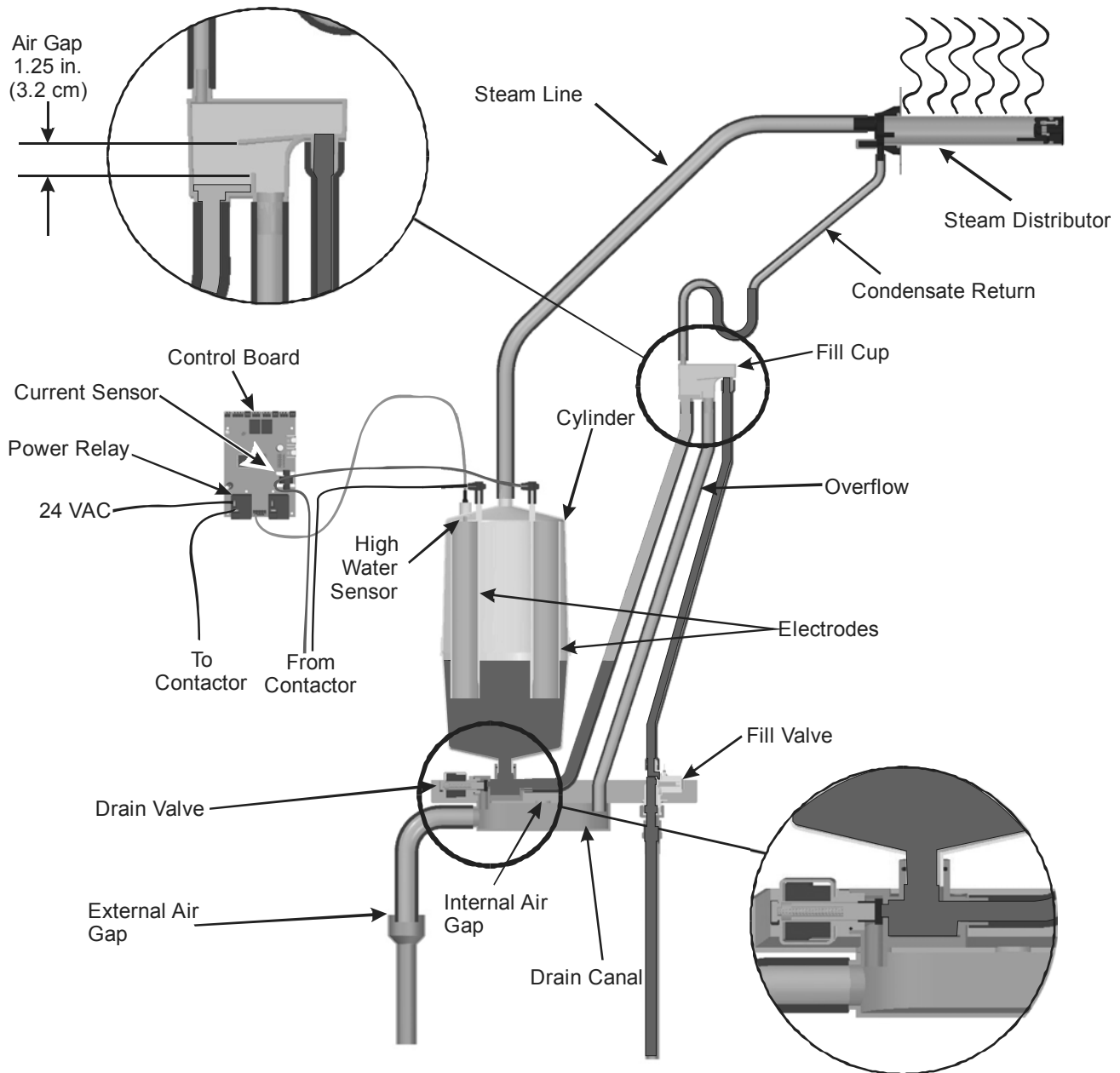


**Figure 6: Nortec MES2 Components**

**Table 3: Nortec MES2 Components**

<b>Component</b>	<b>Function of Component</b>
<b>Bracket, Remote Electrical</b>	Supports the control components for Nortec MES2 models which have remote electronics (REM).
<b>Capacity Adjustment Potentiometer</b>	Adjusts the maximum output of the humidifier from 100% down to 20%. See Figure 22: Capacity Potentiometer Adjustment on page 26.
<b>Condensate Return</b>	Provides a connection to return condensate to humidifier.
<b>Control Connection Terminals</b>	Terminals on the control board for connecting external controls to humidifier.
<b>Current Sensor</b>	Measures the amount of current flowing through the cylinder's electrodes.
<b>Cylinder</b>	Holds electrodes in water. Current between electrodes generates heat used to generate steam.
<b>Cylinder Plug</b>	Power connectors to electrodes in cylinder. Installer must connect wires from contactor to cylinder plugs. (PVW model has wires installed).
<b>Cylinder Tie Wrap</b>	Holds cylinder in place, reusable.
<b>Drain Outlet / Canal</b>	Combines cylinder drain water and fill cup overflow into a single drain outlet.
<b>Drain Pan</b>	Collects any water which may leak from water connections and routes it to drain.
<b>Drain Valve</b>	Drains water from humidifier.
<b>Control Board</b>	Controls all functions of the humidifier's operation and provides input and output connections to humidifier components.
<b>Electrical Cover</b>	Covers the control board and wiring on Nortec MES2 models with closed electrical (CE).
<b>Fill Cup</b>	Provides an air gap for backflow prevention.
<b>Fill Inlet</b>	1/8 NPT brass fitting for connecting supply water to the humidifier.
<b>Fill Valve</b>	Controls flow of water into humidifier.
<b>Ground Clamp</b>	Electrical ground connection for humidifier.
<b>High Water sensor Plug</b>	Used to detect max water level in cylinder.
<b>On/Off/Drain Switch</b>	Turns power on/off to humidifier controller and drains the cylinder for servicing. Note: Turn off humidifier disconnect to shut off primary power to the humidifier.
<b>Plumbing Enclosure/ Door</b>	The optional plumbing enclosure completely encloses the humidifiers water components.
<b>Power Relay</b>	Turns on/off power to the contactor (supplied by others) based on a signal from the humidifier's controller (mounted on control board).
<b>Status Lights</b>	Indicate if the humidifier is operating. If the humidifier is shut down on a fault the yellow LED flashes in sequence to indicate the fault that occurred.
<b>Steam Outlet</b>	Outlet for steam generated by the humidifier. Connect to the outlet with a steam hose and hose clamp.

## Humidifier Schematic



**Figure 7: Humidifier Schematic**

## How the Humidifier Works

The Nortec MES2 is an atmospheric steam generator that uses heat generated by electrical current flowing between submerged electrodes to generate steam. The Nortec MES2 is designed for air humidification via steam distributor.

### Steam Generation

- If the Nortec MES2 is configured for On/Off operation then as soon as the safety loop between terminal 1 and 2 is closed the humidifier assumes 100% demand, closes the power relay on the control board, and measures the current flowing through the power wire routed through the control board's current sensor. If it is configured for modulating operation it waits for a demand signal and for the safety loop between terminal 1 and 2 to be closed.

- If the demand is lower than the actual output the inlet valve is kept closed and output is reduced by letting the water level in the cylinder decrease by evaporation.
- If demand is higher than the actual output after a brief delay the fill valve is activated and water flows into the fill cup. Water from the fill cup flows into the bottom of the cylinder through a hose connected to the drain valve housing.

**Note:** The cylinder is gravity fed from the fill cup. If backpressure from the steam line is too high it will cause water to back up in the fill cup and flow down the overflow line to the drain.

- As soon as the water in the cylinder comes in contact with the energized electrodes current flows through the water. The resistance of the water to the electrical current generates heat and in turn steam. The more electrode that is covered by water the higher is the current and output. The unit continues to fill until the current matches demand or the high water sensor detects a high water level.
- The Nortec MES2 repeats the fill and boil down cycle repeatedly to match output to demand.
- Over time minerals in the water will adhere to the cylinder's electrodes. The humidifier will automatically fill to a higher water level to maintain full capacity during the life of the cylinder. Eventually because of scale formation it will no longer be possible for the humidifier to reach its full capacity. The Nortec MES2 software monitors this condition and when detected will stop operating and flash the yellow LED in a repeating sequence of 4 flashes.

## Drains

- As steam is produced minerals are left behind increasing the conductivity of the water. The Nortec MES2's patented auto adaptive cycle will monitor the water conductivity and perform drains to maintain the water at optimal conductivity for peak performance.
- The auto adaptive cycle provides the longest cylinder life in combination with keeping the tightest control and most efficient use of water during the entire cylinder life.

## Steam Distribution

The most common method for adding the steam into the air is to mount a steam distributor in a supply air duct as shown in Figure 7: Humidifier Schematic. In an air handler the best location for introducing the steam is after the heating coil where the air will be at its lowest humidity.

## Steam Line

The steam line between the cylinder steam outlet and the distributor may be Condair steam hose, copper pipe, or stainless steel pipe or tube. The Nortec MES2 is an atmospheric steam generator so it is very important no restrictions are present in the steam line and that the steam line is sized properly to carry the full output capacity of the humidifier. See Steam Lines and Condensate Returns on page 16 for information on selecting steam lines.

## Condensate Return

Whenever steam is generated, condensate is formed in the distribution system and steam distributor. Insulating steam lines is one important way to reduce the amount of condensate formed. Steam lines are sloped so that condensate does not collect in the lines and create a restriction to steam flow. The condensate must be collected and removed from the system so that it does not build up and leak into the duct or air handler. Condensate can be returned to the MES2 fill cup to reduce water waste or can be fed to drain.

# Installation

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- 12 Typical Nortec MES2 Installation**
- 13 Location**
- 14 Mounting**
- 15 Plumbing**
- 16 Steam Lines and Condensate Returns**
- 19 Primary Voltage Wiring**
- 20 Control Wiring**
- 21 Modbus Wiring**
- 22 Nortec MES2 Installation Checklist**



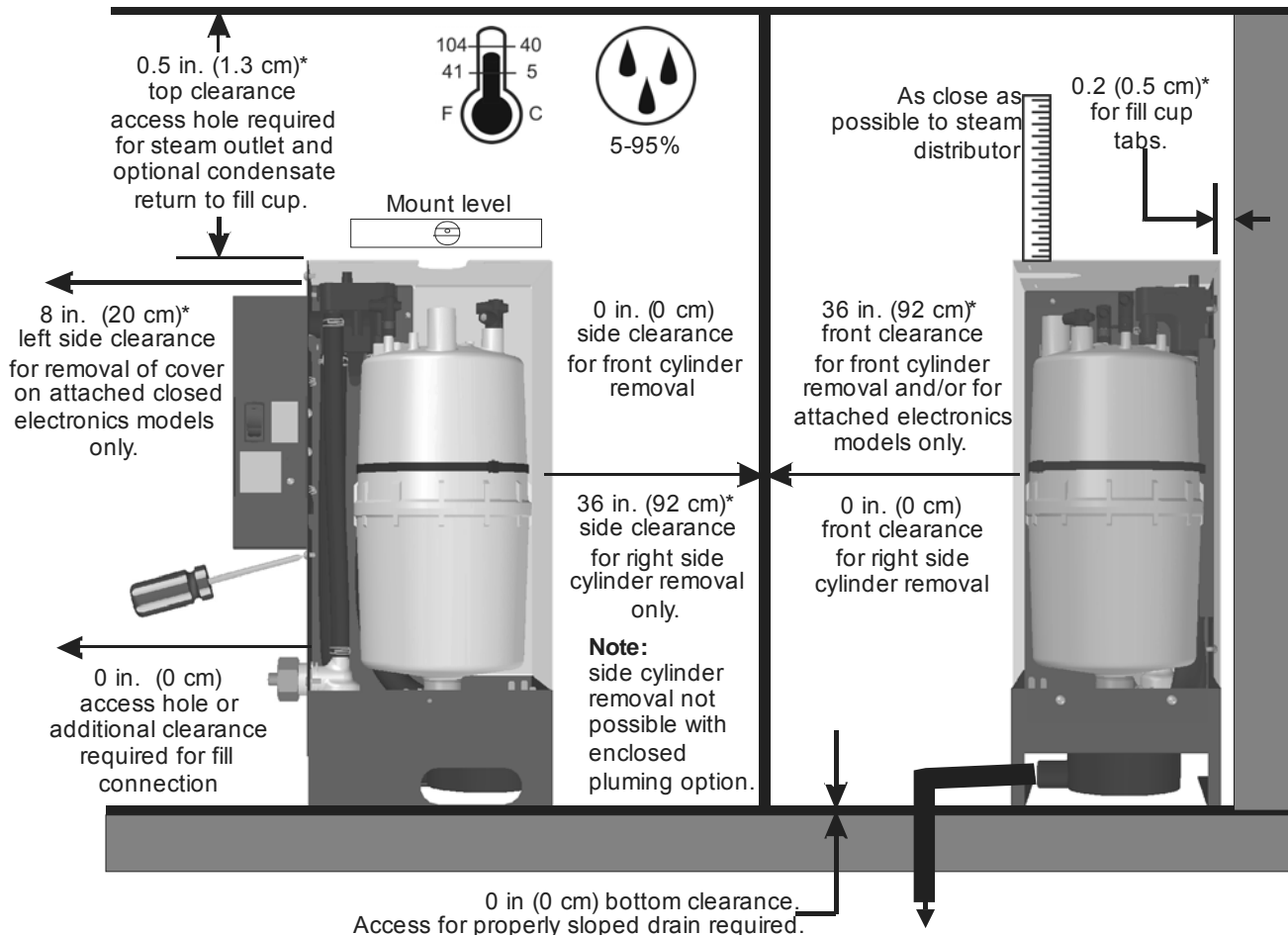
## Location

Mount to structural member or on surface capable of supporting the humidifier's operating weight (see Figure 4: Nortec MES2 Dimensions and Weights). The humidifier may be set on its base but clearance must be provided for the drain line to be sloped adequately. In general clearance is not required around the humidifier except for maintenance access and electrical and plumbing connections.

- The clearance dimensions shown are recommendations based on best practice. OEM must verify operation if they are not followed.
- Install only in areas with ambient temperature 41-104 °F (5-40 °C) relative humidity 5 - 95%.
- When possible install below the steam distributor. If mounted above the steam distributor take care to provide proper steam line routing and proper condensate traps.
- DO NOT locate the humidifier any further then absolutely necessary from the steam distributor location as net output will be reduced as a result of heat loss through the steam line.
- The main service access required is for changing the cylinder. This access can be from the front or right side. Right side service access is not possible with the optional plumbing enclosure.



**Note:** Conair recommends a vertical drop from the drain outlet and an air gap as close as possible to the drain outlet to insure proper draining of the humidifier.



\* Dimensions are recommendations based on best practice. OEM must verify operation if they are not followed.

**Figure 9: Mounting Location / Clearance**



## Mounting

- 1 The Nortec MES2 humidifier can be wall or floor mounted. No mounting holes are provided but can be made anywhere in the base and sides of the cabinet at installation time.
- 2 Use a minimum of 2 x #8 screws mounted securely into structural surfaces.
- 3 Make sure the unit is level.
- 4 If enclosed plumbing option is installed then mounting screws can also be installed into the plumbing enclosure.
- 5 It is the installer's responsibility to insure that the humidifier is securely and safely mounted in the air handler.

### Note:

- Installation methods shown are suggestions only actual mounting may differ and must be verified by OEM.
- When mounting to a vertical member by drilling holes in the cabinet, be careful not to make any holes in the bottom 1 in (2.5 cm) of the drain pan.

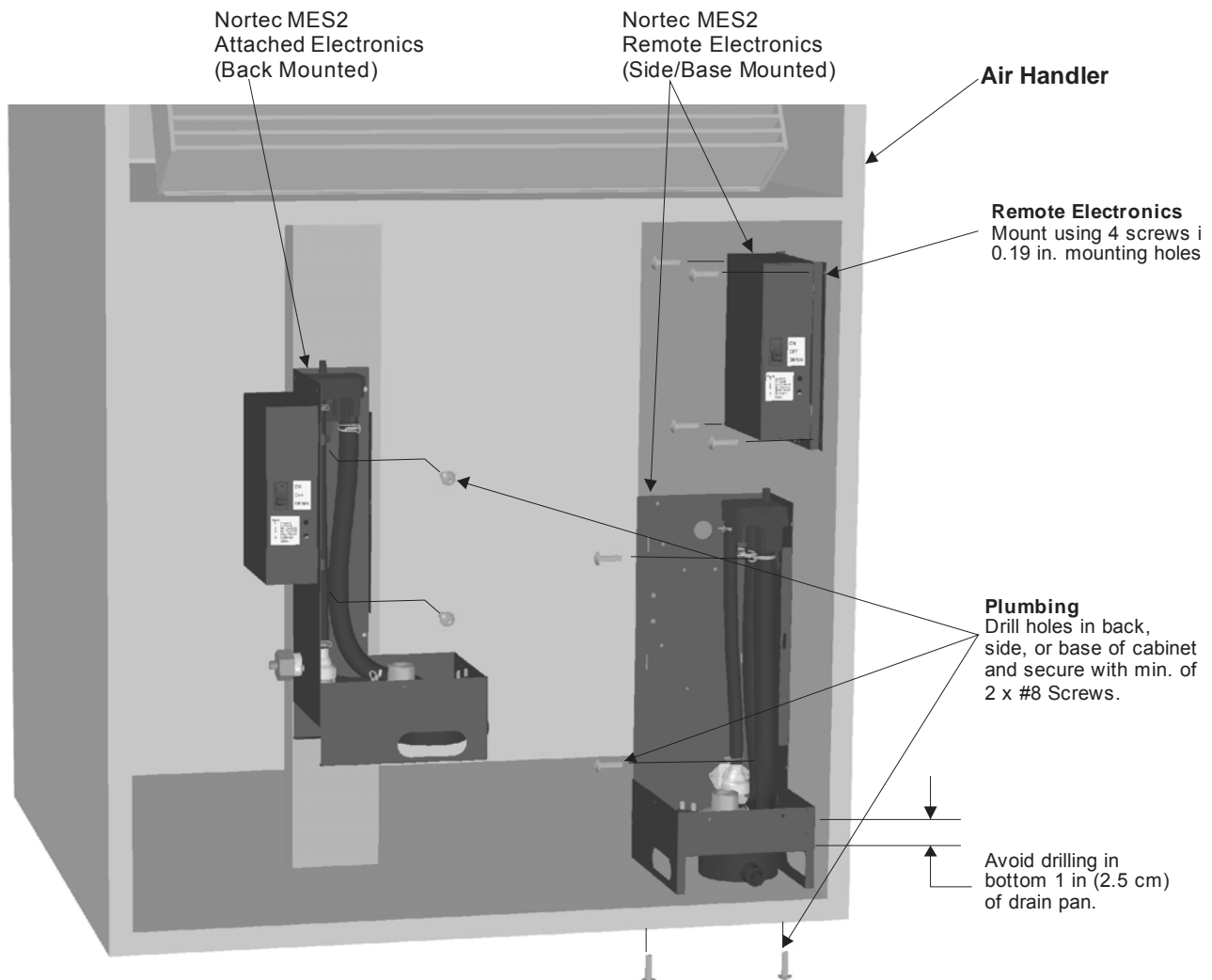
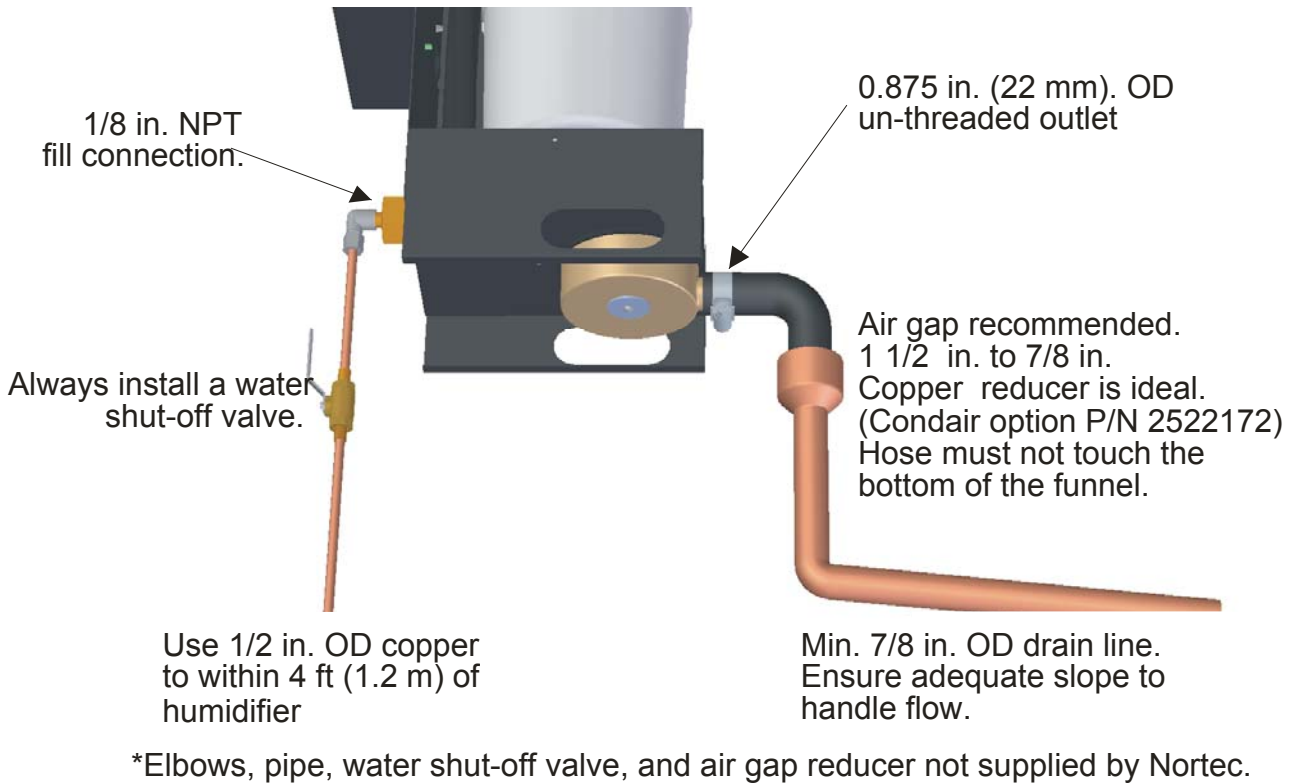


Figure 10: Nortec MES2 Mounting

## Plumbing



**Figure 11: Water Supply and Drain Connection**

- All water supply and drain line connections should be installed in accordance with local plumbing codes.
- Supply water is recommended at 30 to 80 PSIG and 150-1200 Microsiemens (Hardness 0-12 GPG). Consult factory for water conditions outside of this range. Install water shut off valve before humidifier to facilitate servicing.
- The drain line should not end in a sink used frequently by personnel, or where plumbing codes prohibit it. Route to a floor drain or equivalent for safety reasons.
- Ensure drain line is adequately sized to provide free and easy draining and that an air gap is installed as shown. A restricted drain can cause cylinder water to over concentrate and result in poor operation.
- If a drain is not located near the humidifier use a condensate pump rated for hot drain water such as Condair's P/N 1429527.



### **For humidifiers installed in some cities including the City of Los Angeles:**

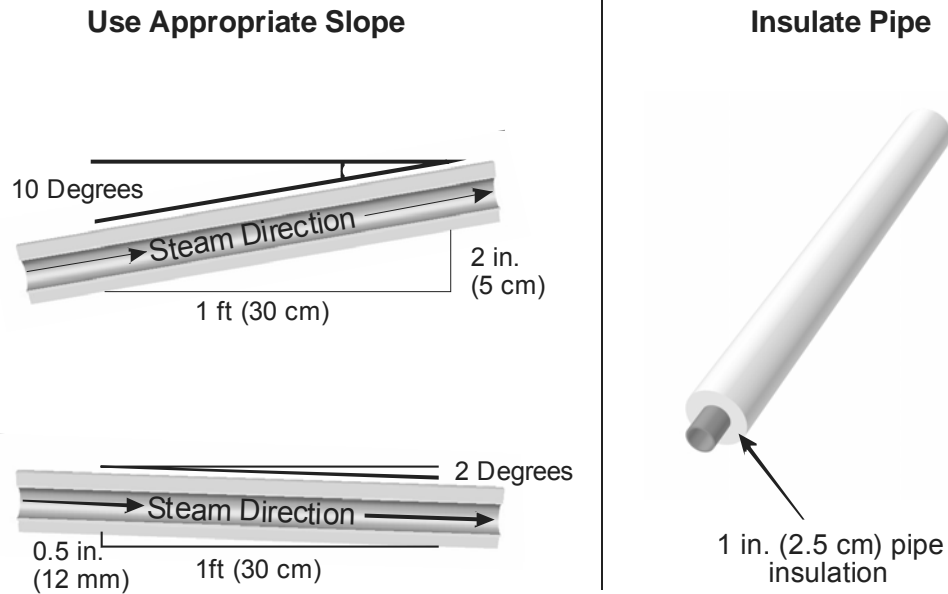
- A city-approved spring-loaded double ball CHECK VALVE must be installed by contractor on the potable water inlet to the humidifier. Recommended valve manufacturer: Watts Regulator, Size 3/8" inlet and outlet, Model #7.
- Each drain line from the humidifier must be routed, without dips or sags, to terminate above the flood level rim of a city approved indirect waste receptor.

# Steam Lines and Condensate Returns



## MAIN RULES FOR ATMOSPHERIC STEAM LINES

- Slope the steam lines
- Trap condensate (Use full size 'T' for Traps)
- Condensate traps must be a minimum of 3 in. (15 cm) in height or duct static pressure + 2 in. whichever is greater.
- Steam lines must not have any restrictions which could cause back pressure.
- 1.0 in. (2.5 cm) pipe insulation recommended.
- Follow recommended materials, size and length see tables.



**Figure 12: Main Steam Line Requirements**

**Table 4: Recommended Steam Line Material**

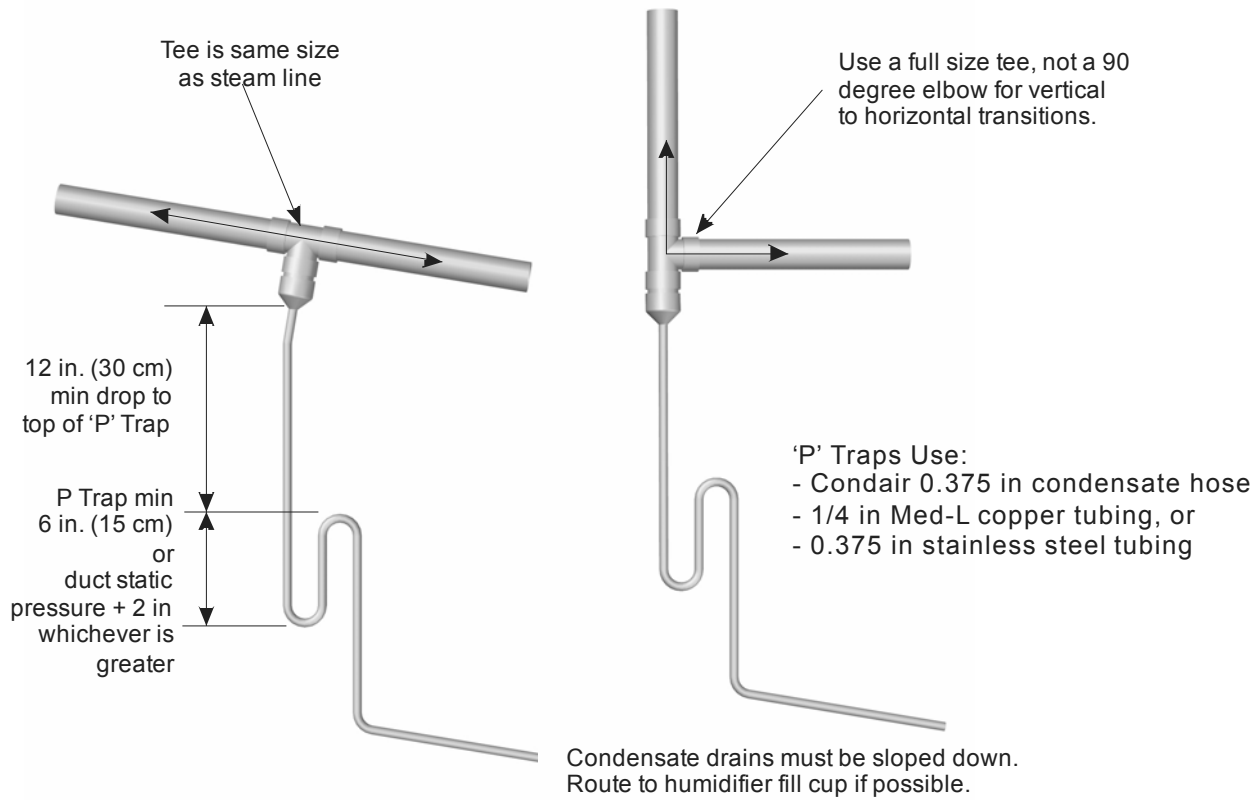
Steam Line Material	Steam Line Length		Steam Line Description
	ft	m	
Copper Tube	0-10	0-3	3/4 in MED-L Tubing (7/8 in. OD)
Stainless Steel Tube	0-10	0-3	7/8 in. Tubing (0.049 W)
Nortec Hose	< 10	< 3	Part Number 1328810 (7/8")

**Note:** Larger diameter lines should be used for steam runs longer than those listed. Contact Condair for recommendation and instructions on proper installation of reducers for larger diameter steam lines.

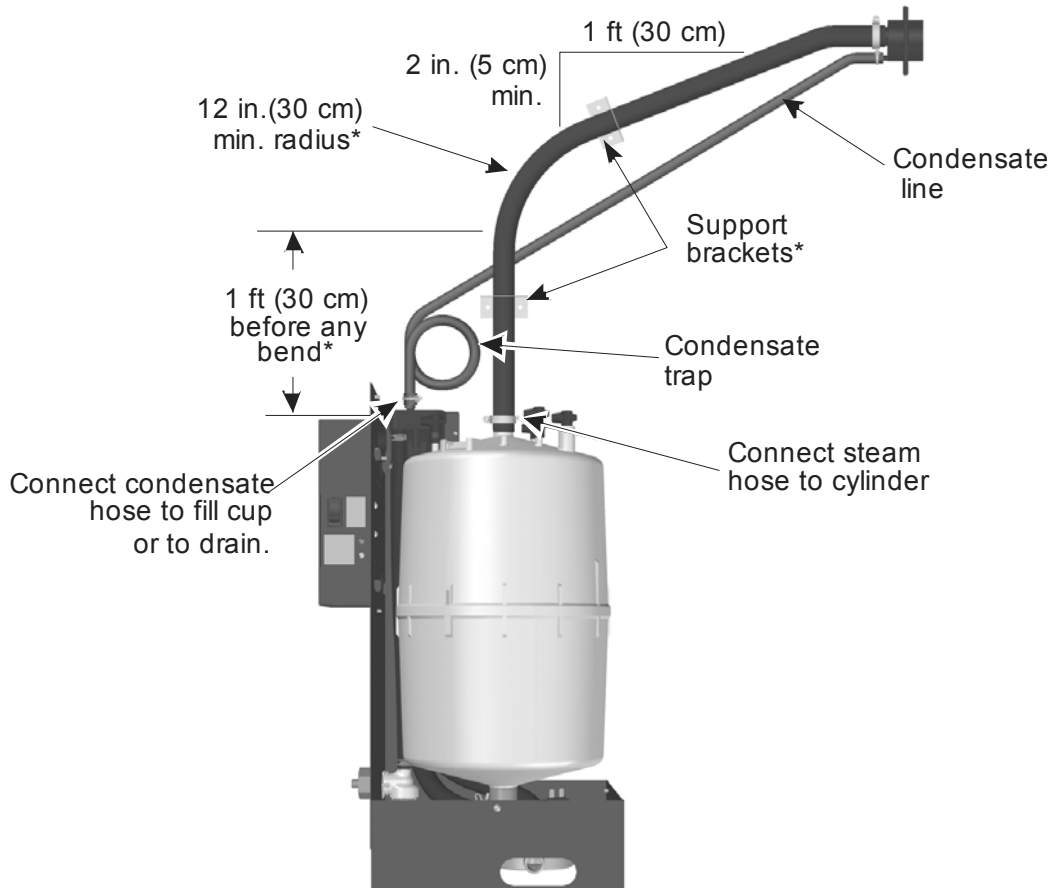
**Table 5: Maximum Recommended Length of Steam Line**

Steam Output (Lb/hr)	Distance (ft)	Possible Loss (lb/hr)	Steam Line Size (in)
5	8	1.0	3/4
10	15	1.5	3/4 <sup>1</sup>
15	20	2.0	3/4 <sup>1</sup>
20			
25	25	2.5	3/4 <sup>1</sup>
30			

**NOTE:** 1 Contact Condair for information on possible losses of other steam line diameters used for longer runs.  
2 The use of steam line other than copper, stainless steel tube or Condair supplied steam line will void the warranty and may adversely affect the operation of the humidifier

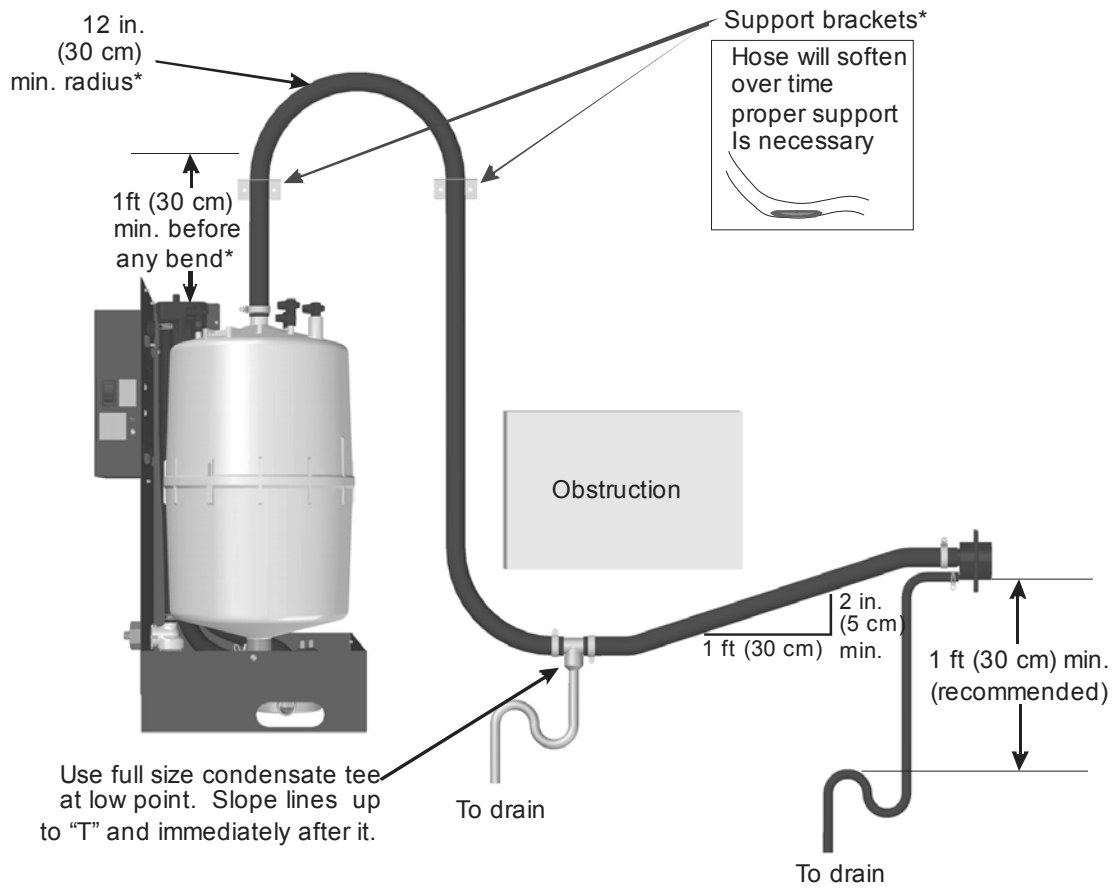


**Figure 13: Condensate Traps**



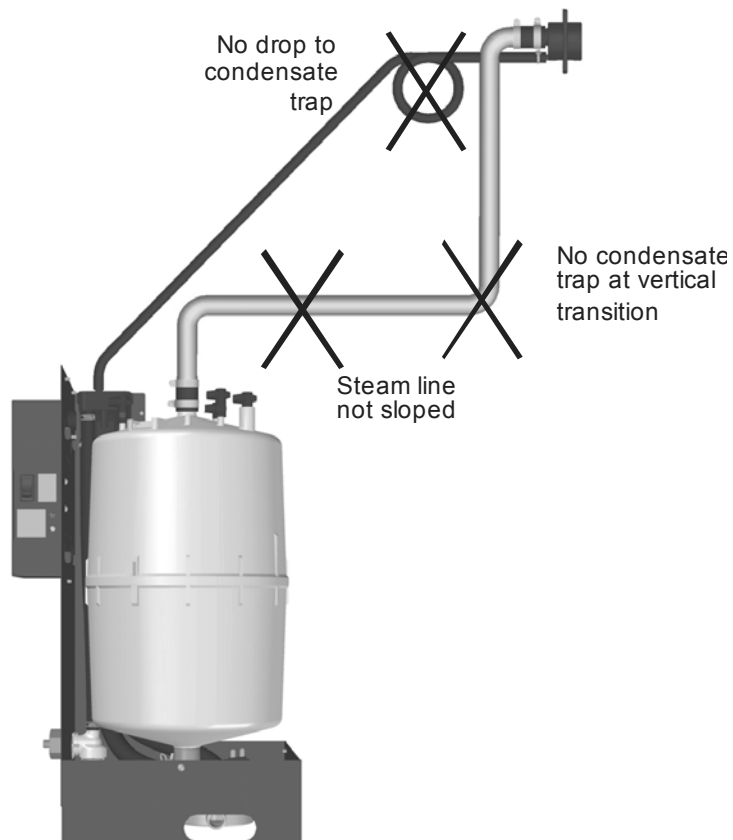
\* Dimensions and brackets are recommendations based on best practice. OEM must verify operation if they are not followed.

**Figure 14: Steam Distributor Above Humidifier (Hose)**



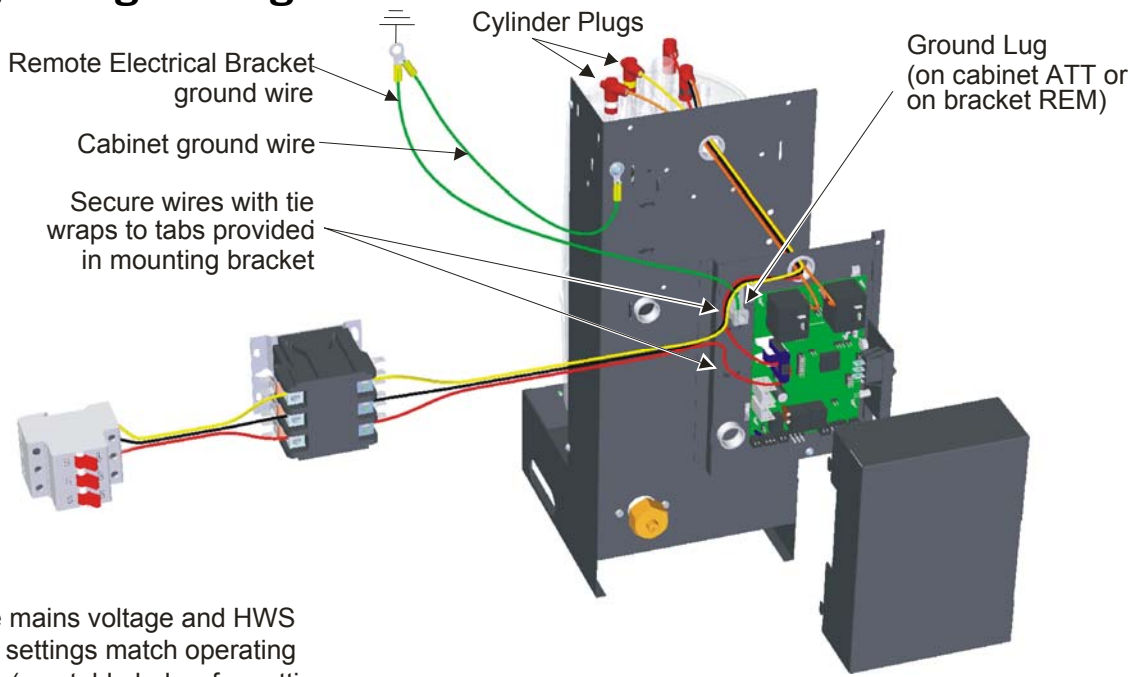
\* Dimensions and brackets are recommendations based on best practice. OEM must verify operation if they are not followed.

**Figure 15: Steam Distributor Below Humidifier With Obstruction (Hose)**



**Figure 16: Common Steam Line Errors**

# Primary Voltage Wiring

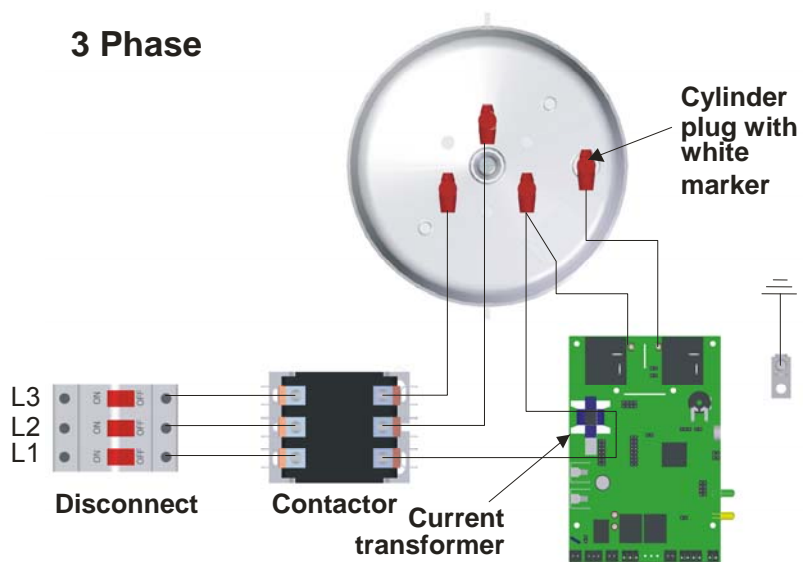


**Note:**

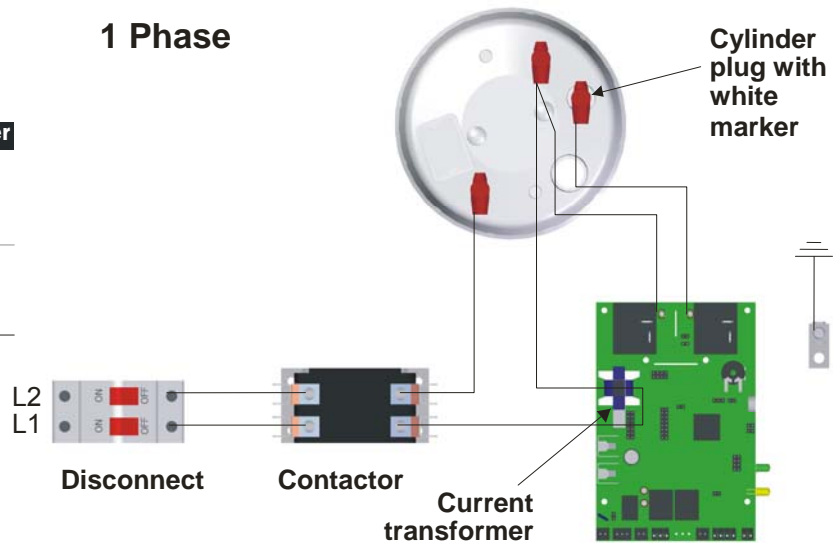
- 1 Ensure mains voltage and HWS jumper settings match operating voltage (see table below for setting, see Figure 21 for jumper location).
- 2 Dedicated fused disconnect must be installed. Fusing must not exceed max circuit protection as indicated on the specification label.
- 3 Ensure that adequate power is available to carry full humidifier amp draw as indicated on the specification label.
- 4 Insert wires into cylinder plugs and tighten with 2mm allen wrench to 11 in-lb.
- 5 Ensure both plumbing cabinet and remote electrical bracket (if present) are grounded. Use ground wires if required.
- 6 All wiring to be in accordance with national and local electrical codes.

Mains Voltage and HWS Select		
Mains Voltage	Jumper	HWS Jumper
600	J1	J8
480	J2	
380	J3	
277	J4	J9
240	J5	
208	J6	

## 3 Phase

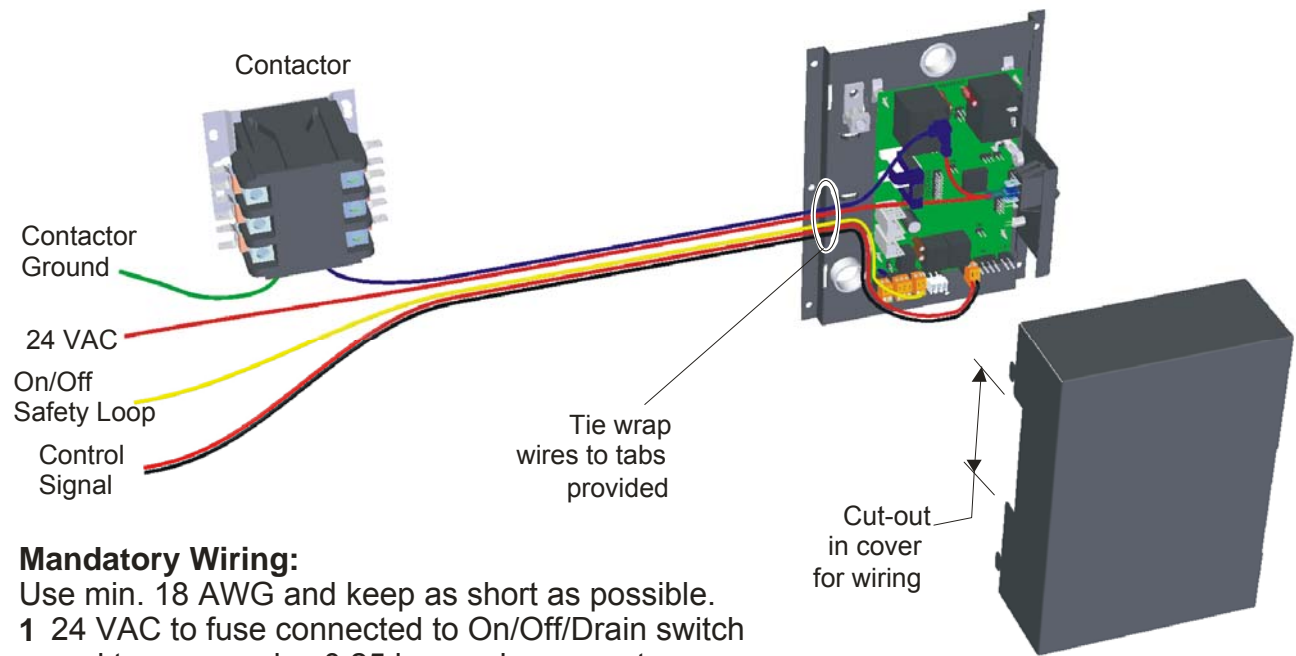


## 1 Phase



**Figure 17: Primary Power Connection**

# Control Wiring



## Mandatory Wiring:

Use min. 18 AWG and keep as short as possible.

- 1 24 VAC to fuse connected to On/Off/Drain switch and to power relay 0.25 in. spade connectors.
- 2 Ground wire from humidifier ground to air handler ground.
- 3 On/Off/Safety input (24 VAC) input to point 2 of P3.

## Optional Wiring:

- 4 Modulating control input (0-10 or 2-10 VDC) to P5 (J10 must be removed for modulation).
- 5 500 ohm resistor between 1-2 of P5 for mA modulating control input.
- 6 Remote Fault to P2.

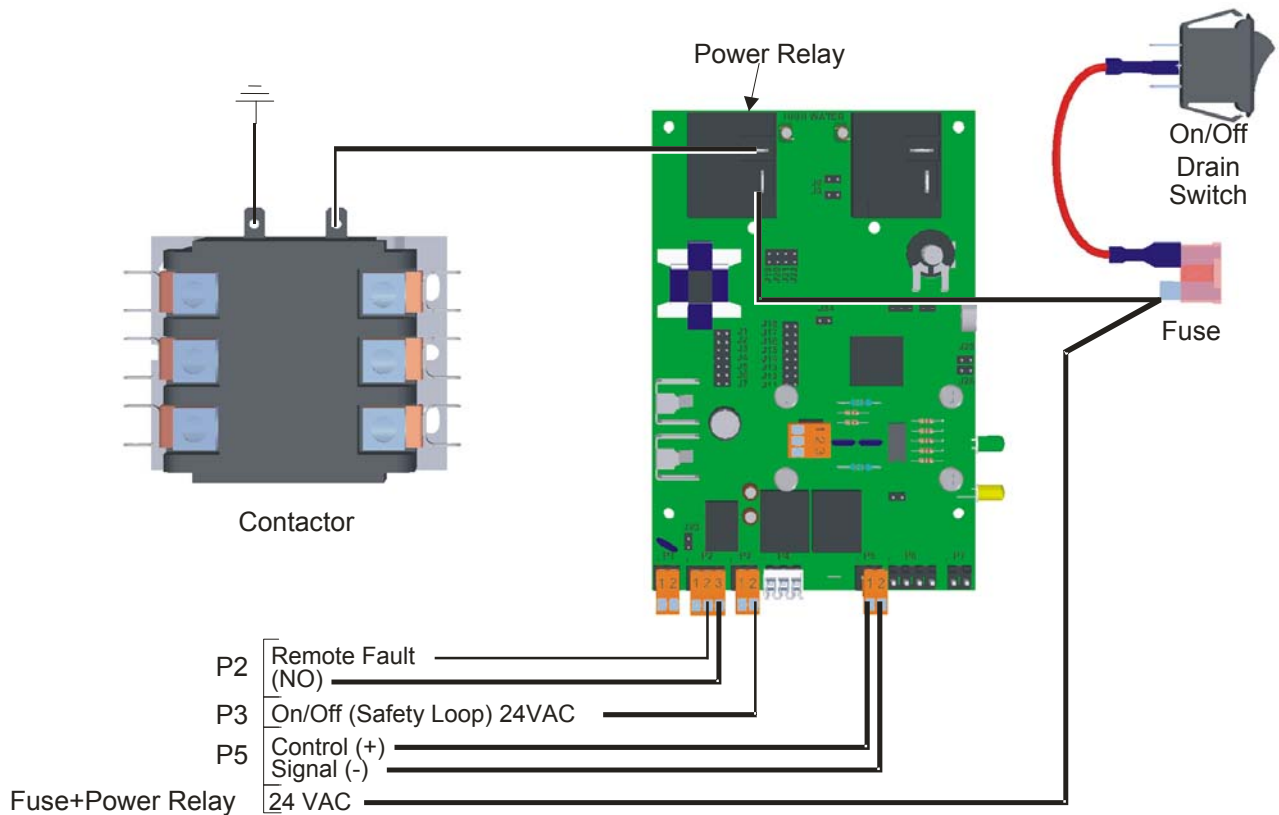


Figure 18: Control Wiring

The Nortec MES2 humidifier can be operated with either On/Off controls or On/Off Safety and one modulating input. See On/Off or Modulating Control (J10) on page 26 to configure the MES2 for modulation. For control wiring use minimum 18 AWG and keep as short as possible. For Modbus wiring use 18-24 AWG shielded, twisted pair 120 Ω impedance cable.

Remote fault indication is provided via a normally open relay which is closed when the controller is in a fault condition. The dry contact may be connected to maximum of 1 amp at 24 VAC or 24 VDC.



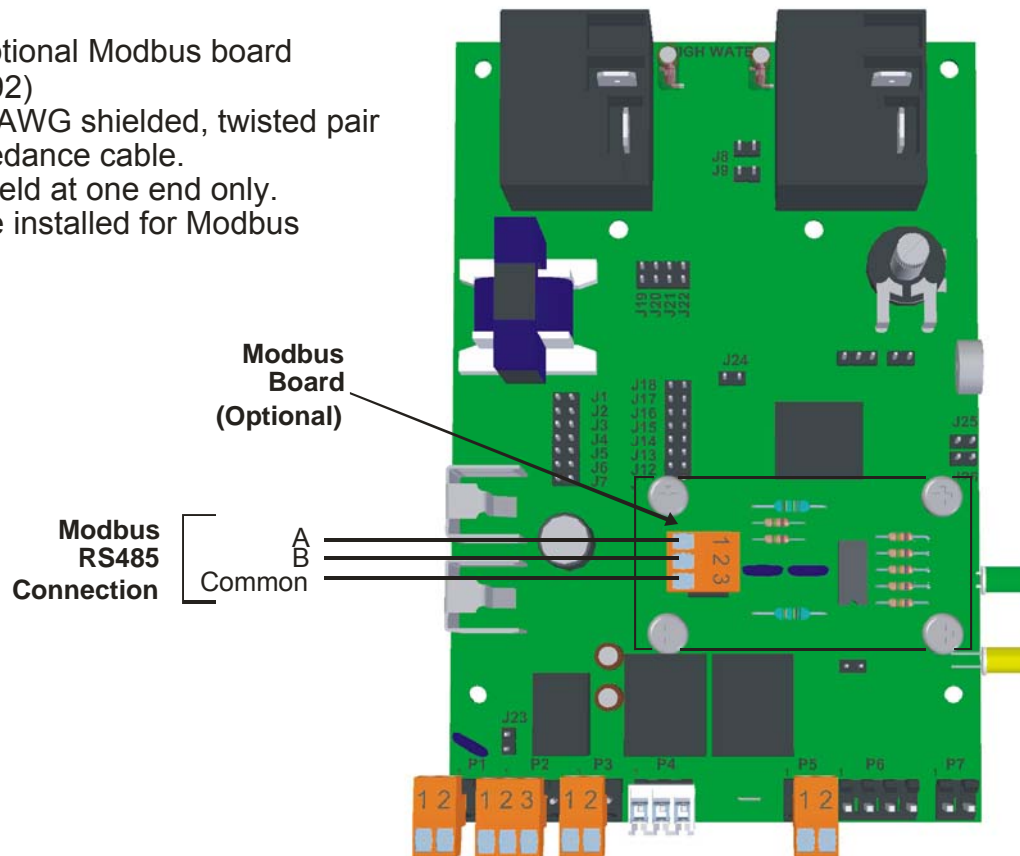
**Note:** Regardless of selecting on/off or modulating control method, Condaair humidifiers must have a closed circuit across its on/off security loop control terminal to operate. Condaair highly recommends the use of a high limit humidistat and an air proving switch in series for this function.

## Modbus Wiring

The optional Modbus interface board can be installed onto the Nortec MES2 control board to provide Modbus control of the Nortec MES2. In order for Modbus control to be active a jumper must be installed on J26 of the control board. See Modbus Configuration on page 27 for information on configuring Modbus communication.

**Note:**

- 1 Requires optional Modbus board (PN 1509592)
- 2 Use 18-24 AWG shielded, twisted pair 120 Ω impedance cable.
- 3 Connect shield at one end only.
- 4 J26 must be installed for Modbus control.



**Figure 19: Modbus Wiring**



# Nortec MES2 Installation Checklist

Unit Serial #: \_\_\_\_\_ No. of humidifiers: \_\_\_\_\_ Tag: \_\_\_\_\_

Unit type: \_\_\_\_\_ Voltage: \_\_\_\_\_V/\_\_\_\_\_ph

Cylinder type: \_\_\_\_\_ Customer/Job: \_\_\_\_\_ Address: \_\_\_\_\_

## WATER QUALITY:

Well water  City water

## POWER:

- Voltage, amp, fuse per Spec Label: yes  no
- Jumper 1-6 setting \_\_\_\_\_
- Jumper 8/9 setting \_\_\_\_\_
- Disconnect switch yes  no

## HUMIDIFIER MOUNTING: (Clearances around the unit Acceptable Obstruction)

- Humidifier level.  Cylinder removal clearance

## STEAM LINE(S):

- Material \_\_\_\_\_ Diameter / Size
- Slope up (min 2 in/ft).  Slope down (min 0.5 in/ft)
- Low point condensate traps  No hose kinks / Restrictions
- Type of Insulation if installed \_\_\_\_\_

## CONDENSATE LINE(S):

- P Trap min 6 in or duct press + 2 in  P Trap sufficient drop to ensure flow

## WATER LINE:

- 1/2 in to within 4ft of unit  Water pressure: 30-80 psig

## DRAIN LINE:

- Diameter / Size \_\_\_\_\_ Air gap within 3 ft of the unit

## CYLINDER:

- Seated in drain valve and secured yes  no

## WIRING:

- Wiring connections and connectors secured yes  no

## CONTROLS:

- On / Off / Security loop devices working correctly yes  no
- Jumper J10 set to  
Modulating (removed)   
Or  
On/Off (installed)
- Jumper J26 set to  
Terminal block input control (removed)   
Or  
Modbus control (installed)

Inspected by: \_\_\_\_\_ Date of inspection: \_\_\_\_/\_\_\_\_/\_\_\_\_

Company: \_\_\_\_\_

# Operation

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## **24 User Interface**

- 24 LED Status Lights
- 24 On/Off Drain Switch

## **25 Humidifier Configuration**

- 26 Capacity Adjustment
- 26 Mains Voltage Select (J1 to J6)
- 26 High Water Sensor Voltage (J8 and J9)
- 26 On/Off or Modulating Control (J10)
- 26 Modulation Offset (J13)
- 27 Ground Fault Interrupt (GFI) (J15)
- 27 Modbus Control (J26)

## **27 Modbus Configuration**

- 27 Modbus Addresses

## **30 Start Up Procedure**

# User Interface

## LED Status Lights

The Nortec MES2 user interface includes 2 LED's which provide information about the humidifier's current status.

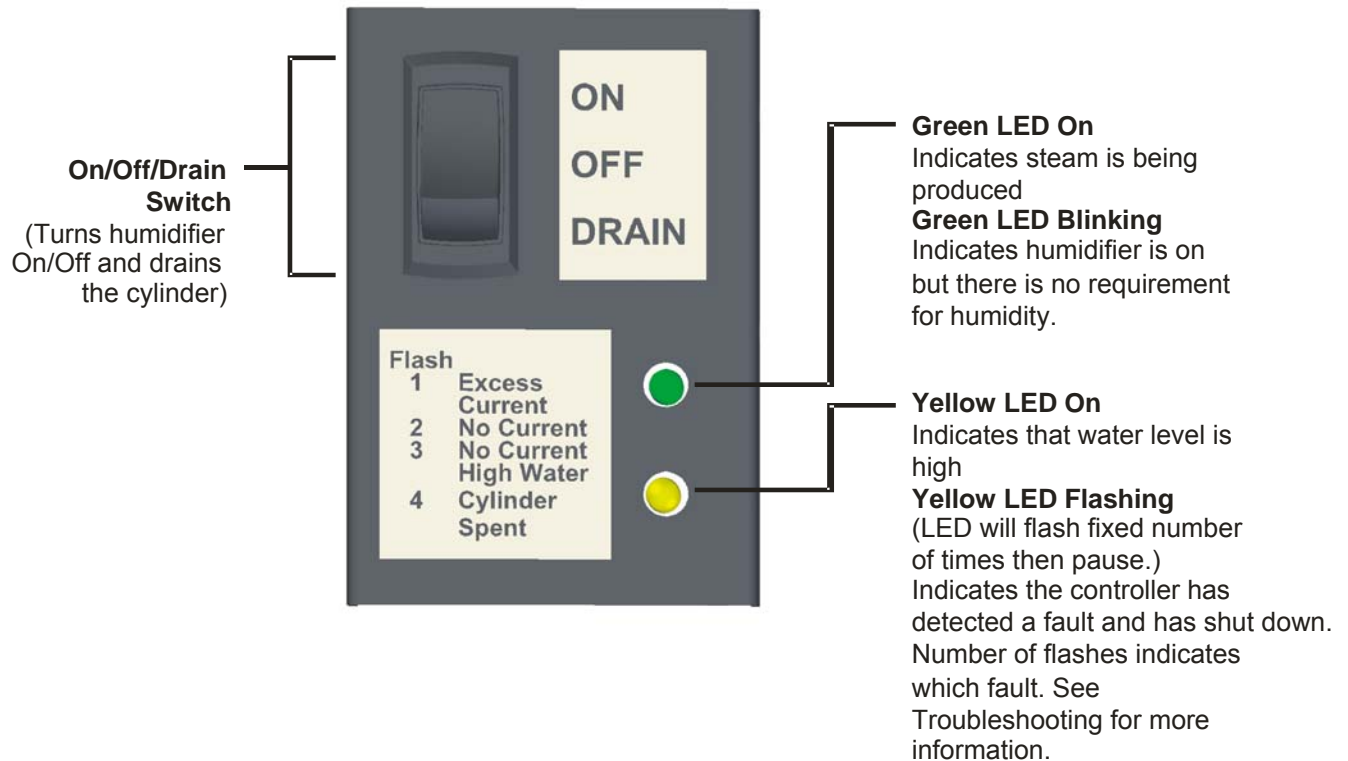


Figure 20: User Interface

### Yellow LED Steady On

When the yellow LED is steady on (not flashing) it indicates that the high water sensor has interrupted filling of the cylinder. The LED is on for information only and unless it persists for an extended period of time it does not require any action.



### On/Off Drain Switch

The On/Off Drain switch turns on power to the Nortec MES2 control board or to the MES2's drain valve. For normal operation the switch should be set to the On position.

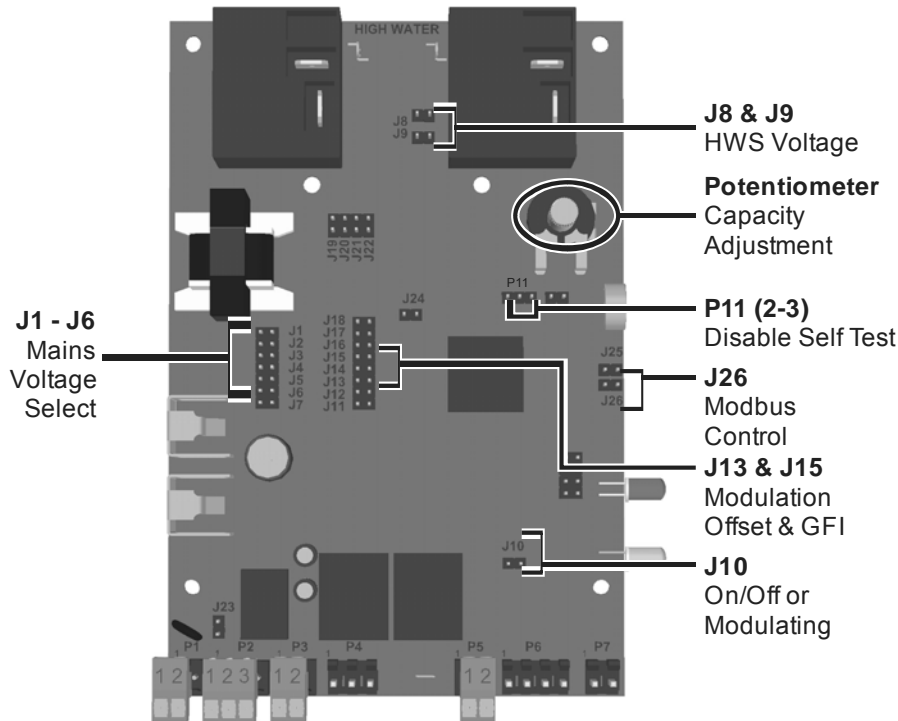
To manually drain the humidifier set the switch to the drain position until the cylinder is completely empty then turn the switch off. Do not leave the switch in the drain position for extended periods of time.

When servicing the humidifier the switch should be set to Off and the fused disconnect or breaker should be turned to Off.

## Humidifier Configuration

The Nortec MES2 is factory configured to operate under most conditions without the need for any changes to its configuration. If required several settings can be made using jumpers on the Nortec MES2's control board. The output of the Nortec MES2 can also be reduced by using a potentiometer on the Nortec MES2's control board. See Figure 21: Nortec MES2 Control Board Jumpers for location of jumpers and the capacity adjustment potentiometer.

**Note:** Condair recommends not making any configuration changes unless they are required and that any changes to the Nortec MES2's settings be performed by a qualified technician.



**Figure 21: Nortec MES2 Control Board**

**Jumpers Table 6: Nortec MES2 Control**

Jumper	Installed	Removed
J1	550-600 V	No Affect
J2	440-480 V	No Affect
J3	380-415 V	No Affect
J4	277V	No Affect
J5	220-240 V	No Affect
J6	200-208 V	No Affect
J8	HWS setting for 380-600 V	No Affect
J9	HWS setting for 200-277 V	No Affect
J10	On/Off Operation	Modulating Operation
J13	2-10 VDC or 4-20 mA* modulation	0-10 VDC or 0-20 mA* modulation
J15	GFI on, power relay off during drain	GFI off power relay on during drain
J26	Modbus control enabled	Modbus Control disabled
P11 (2-3)	Self test at start up disabled	Self test at start up enabled

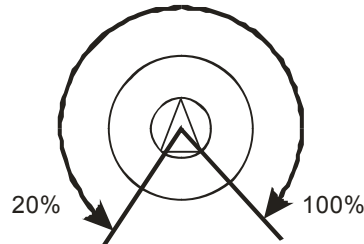
\* mA modulation control requires a 500 ohm resistor installed between pins 1-2 of P5 control signal input terminal (see Figure 18: Control Wiring).

**Caution:** Never adjust jumpers other than those listed in this section. Other jumpers are factory set and must not be changed.



## Capacity Adjustment

The Capacity adjustment potentiometer can adjust the capacity of the humidifier between 100% and 20% of its rated output. (Factory setting = 100% output)



**Figure 22: Capacity Potentiometer Adjustment**

## Mains Voltage Select (J1 to J6)

The jumper setting must be set to match the operating voltage of the humidifier. The Nortec MES2 is factory calibrated to provide maximum output over a range of operating voltages depending on the setting of J1 to J6. Changing the jumper location sets the fill off amps of the humidifier to correspond to that required at its operating voltage. One jumper only must be installed on J1 to J6. See Table 6 for correct jumper placement.

## High Water Sensor Voltage (J8 and J9)

The Nortec MES2 detects high water by measuring current flowing to its high water sensor pin (Cylinder plug with white marker). To insure accurate detection of current, the High Water Sensor (HWS) circuit must be configured using J8 and J9 to match the operating voltage. A jumper must be installed on either J8 or J9, not on both. See Table 6 for correct jumper placement.

## On/Off or Modulating Control (J10)

The Nortec MES2's output can be controlled by either an On/Off humidistat or a modulating humidistat. To set the Nortec MES2 to operate with a modulating humidistat remove Jumper J10. (Factory setting = jumper Installed, On/Off operation)

**J10 Removed**– Modulating operation, the controller monitors the demand signal on terminal point 4 of the control terminal strip and adjusts humidifier output to match it. For mA control install a 500 ohm resistor across pins 1 and 2 of P5 control signal input terminal.

**J10 Installed** - The Nortec MES2 is configured for On/Off operation. The controller will ignore any modulating signals even if they are connected.

## Modulation Offset (J13)

The Nortec MES2 controller can be configured to work with a modulating humidistat with 4-20 mA or 2-10 VDC output. Modulation offset can be configured with jumper 13. (Factory setting = Jumper Removed, 0-10 VDC or 0-20 mA control signal). See Table 6 for correct jumper placement.

## Ground Fault Interrupt (GFI) (J15)

Ground current leakage can occur when the humidifier performs drains. With jumper J15 the Nortec MES2 can be configured to turn off the power to the electrodes whenever a drain takes place. See Table 6 for correct jumper placement.

## Modbus Control (J26)

The Nortec MES2 can be controlled via its Modbus interface. When configured for Modbus control the Nortec MES2 ignores On/Off and modulation control inputs on its control terminal strip and operates strictly based on data received via Modbus. The Modbus interface can also be used to make some configuration changes and to read the status of the Nortec MES2. See Table 7.

**J26 Removed** – The Modbus interface is turned off and the humidifier operates based on control inputs at its terminal strip.

**J26 Installed** – The Modbus interface is turned on. The humidifier will operate strictly based on control inputs received via Modbus and can be configured and queried using the Modbus interface.

## Disable Self Test (P11, 2-3)

On start up the Nortec MES2 performs a self test that activates all outputs briefly including the remote fault output. To disable the self test the jumper installed on P11 pins 2-3 can be installed.

## Modbus Configuration

Contact Factory – 1-866-667-8321.

## Modbus Addresses

The following table lists the MES2 parameters that are available via Modbus. 4XXXX parameters can be read and written by the Modbus master. 3XXXX parameters are read only.

**Table 7: Modbus Addresses**

Function	Description	Address	Details
Output Control	OFF Disables the humidifier and places the humidifier in standby mode ON Enables the humidifier (humidifier will operate based on the SET OUTPUT input)	40002	255: inhibit actions of humidifier 0: allow normal operation
Set Output	Sets the desired steam output from 0-100% This value shall be zero after a microprocessor reset	40004	Remotely set humidity reading over network. Value of 0 to 100 (per cent). If no network signal for N minutes, reverts to 0.

**Table 7: Modbus Addresses (Continued)**

Function	Description	Address	Details
Force Drain	When written to (FF), will interrupt the humidification process and activate the humidifier drain valve. After 20 minutes the controller will reset this value (00). After a microprocessor reset, the default setting shall be (00)	40005	255 will start the process, 0 will be accepted, to clear if the request has not been cleared itself
Reset Run Hour Counter	Resets the humidifier controller's run hour counter to zero hours	40006	255 will start the run hours counter process. 0 will be accepted to clear the run hours counter.
Set Modbus address	Change the humidifier controller's MODBUS address. Range is 1-247. This setting shall be non-volatile with a default setting of 1.	40201	The value changes will only take effect following a hardware reset of the control board.
Set Modbus Baud rate	Changes the humidifier's baud rate. Range is 4800, 9600, and 19200 B/sec. This setting shall be non-volatile with a default value of 9600 B/sec.	40202	The value changes will only take effect following a hardware reset of the control board
Set Modbus parity	Change the humidifier controller's MODBUS parity. Range is None, Even, Odd This setting shall be non-volatile with a default setting of Even.	40203	The value changes will only take effect following a hardware reset of the control board
Units	Required by the control board for capacity calculations	40204	0=LBS, 1=KG
Unit type	Required by the control board for current and capacity calculations	40205	Depending on the setting in UNITS (Modbus: 40204) Hex value representing maximum unit capacity (100% fill off amps)
Unit voltage	Required by the control board for current and capacity calculations	40206	Hex Value Unit Type 0      110-120 1      208 2      220-240 3      230 4      277 5      347 6      380 7      400 8      415 9      440-480 A      550-600
Unit phase	Required by the control board for current and capacity calculations	40207	Bit Allocation Single phase = 1 Three phase = 2 Three phase (6 electrode) = 4
Electrode current	The value of the electrode current in Amps	30104	Hex value representing the humidifies current in amps Resolution: 0.10 amps Example: 015F (hex) = 35.1 Amps

Function	Description	Address	Details
Steam output	The current steam output in Kg/Hr. or LBS/hr See UNITS (Modbus 40031)	30105	Hex value representing the humidifies steam output in kg/hr Resolution: 0.10 kg or LBS Example: 013B (hex) = 31.5 kg/hr or LBS/hr
Run hour counter	The number of hours the humidifier has been in operation since the last time the run hour counter was reset	30106	Hex value representing the number of humidifier operational hours since the last reset. Resolution: 5 minutes Maximum count: 5460 Hours. Example: 07D0 = 2000 hours
Humidifier state	Describes the current state of the humidifier and it's I/O's Contactor ON/OFF Fill Valve ON/OFF Drain Valve ON/OFF	30107	Bit Allocation Note More than one bit can be active at any time. Contactor on = 1 Fill valve on = 2 Drain valve on = 4
Alarms	The humidifier shall describe any faults Too long to fill Excess Current End of cylinder life No current	30108	Bit Allocation Note More than one bit can be active at any time. Too long to fill = 1 Excess current = 2 End of cylinder life = 4 No Current = 8
Maximum production	The rated maximum steam production for the humidifier	30111	Value written into Unit type (40205) is also stored here
Firmware version	The firmware version of the humidifier controller	30113	Packed BCD version3.52 would be 0x0352



## Start Up Procedure

- 1 Examine the humidifier and 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 If enclosed plumbing option is installed ensure that the front cover is in place and secured with its retaining screw.
- 3 Open the supply water shut off valve.
- 4 Turn on the mains power using the installed disconnect.
- 5 Turn the On/Off switch to the “On” position.

The humidifier will perform a self-diagnostic sequence during which the LED's and internal components will be momentarily activated.

If an error is detected during the self-diagnostic sequence the humidifier will not start. The yellow status LED will flash in sequence to indicate the detected fault. See Table 7: Troubleshooting Nortec MES2 Faults on page 43 for information on diagnosing and correcting faults.

After the system test the humidifier is in normal operation mode.

- 6 Check and adjust the control setpoint on the control and high limit humidistat.
- 7 When the external humidistat generates a demand for humidity and the security loop is closed the green humidifying LED on the front of the humidifier will light up, the power relay on the control board will engage, the fill valve will activate (after a delay) and the cylinder will slowly fill with water.

**Note:** While the cylinder is filling with water there should be no water flowing down the drain. If water is flowing down the drain it can indicate excessive backpressure or a leaking drain valve. See chapter on troubleshooting starting on page 39.

- 8 It can take some time for the water to be heated up by the submerged electrodes and for steam to be produced. Once the fill valve shuts off after reaching the appropriate water level, the water in the cylinder will start to heat up until steam is generated.

**Note:** If operated on low conductivity water it may take several hours for the Nortec MES2 to reach full output capacity. This is normal. During this time the humidifier will not perform any drains and the conductivity of the water in the cylinder will increase.



# Maintenance and Servicing

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## **32 Required Maintenance**

- 32 Cylinder Spent Fault
- 32 Replacement Cylinder
- 33 Removing the Cylinder
- 34 Drain Valve Cleaning
- 35 Installing the New Cylinder

## **36 Extended Shutdown**

- 36 Starting After Extended Shutdown

## **37 Nortec MES2 Maintenance Checklist**

## Required Maintenance

The Nortec MES2 humidifier has been designed to require very little maintenance. Regular maintenance consists of checking the humidifier to insure it is in good condition, replacing the cylinder when the software advises that the cylinder is spent and cleaning out the drain valve whenever the cylinder is replaced.

### Cylinder Spent Fault

When the cylinder is spent the Nortec MES2 will stop operating and the yellow LED will flash in a repeating pattern of 4 flashes. At this time the cylinder must be replaced. See Table 7: Troubleshooting Nortec MES2 Faults on page 43 for more information on other flash sequences.

The steam cylinder is disposable and must be replaced at end of cylinder life. Cylinder life is dependent on water supply conditions and humidifier usage.

**Caution:** Failure to replace the cylinder at the end of cylinder life will result in improper operation and may result in damage to the humidifier. Condaire is not responsible for any damages resulting from, or attributed to, the failure to replace a spent cylinder (see Manufacturer's Warranty).

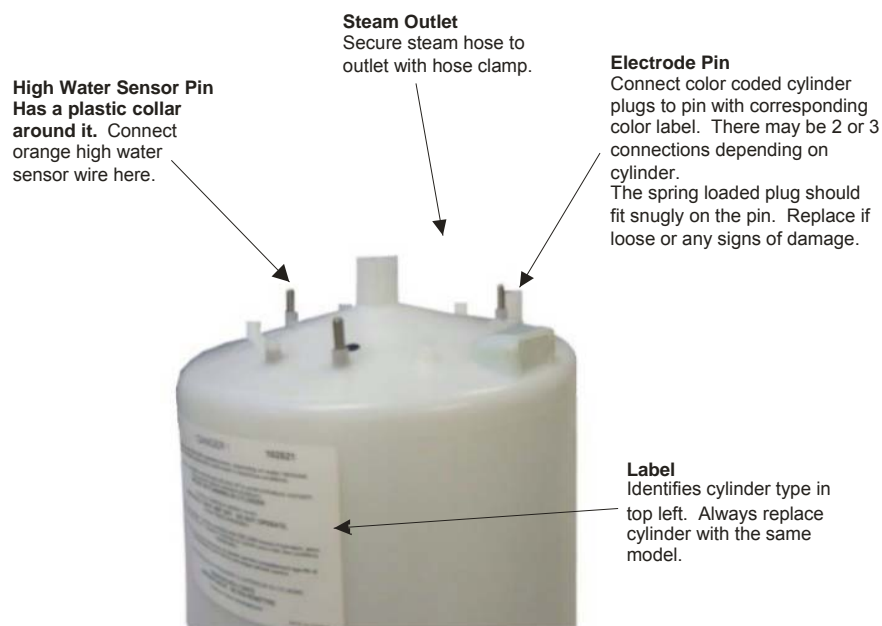


**Note:** Condaire recommends keeping a replacement cylinder in stock throughout the humidification season. This will prevent possible downtime when the humidifier reports cylinder end of life.



## Replacement Cylinder

The label on the existing cylinder identifies the cylinder type in its top left corner. When ordering a cylinder always quote the three or five digit model number on the label, the humidifier's serial number, and the humidifier's voltage. Serial number and voltage are located on the specification label on the left side of the humidifier.



**Figure 23: Nortec MES2 Cylinder**

## Removing the Cylinder



### Warning

- Check to see if yellow service LED is flashing (see Figure 20: User Interface on page 24) then disconnect main power at the external disconnect before any servicing.
- The inside of the humidifier's cabinet contains high voltage components and wiring. Access should be limited to authorized personnel.

- 1 Drain the existing cylinder by switching the On/Off/Drain switch to the Drain position. Let the humidifier drain until no more water is flowing out to drain (usually not more than 10 minutes).
- 2 Turn the humidifier On/Off/Drain switch to off.
- 3 Close supply water shut off valve.
- 4 Turn off power to the humidifier with the external disconnect.
- 5 If enclosed plumbing option is installed remove the screw securing the front cover.
- 6 Remove the cylinder plugs from the cylinder pins by pulling vertically.
- 7 Using a flat screwdriver loosen the hose clamp where the hose is connected to the cylinder.
- 8 Using a small flat screwdriver press the tab on the cable tie holding the cylinder in place and pull the cable tie open.
- 9 Tip the top of the cylinder forward to pivot it out of the steam hose. When free of steam hose lift the cylinder out.

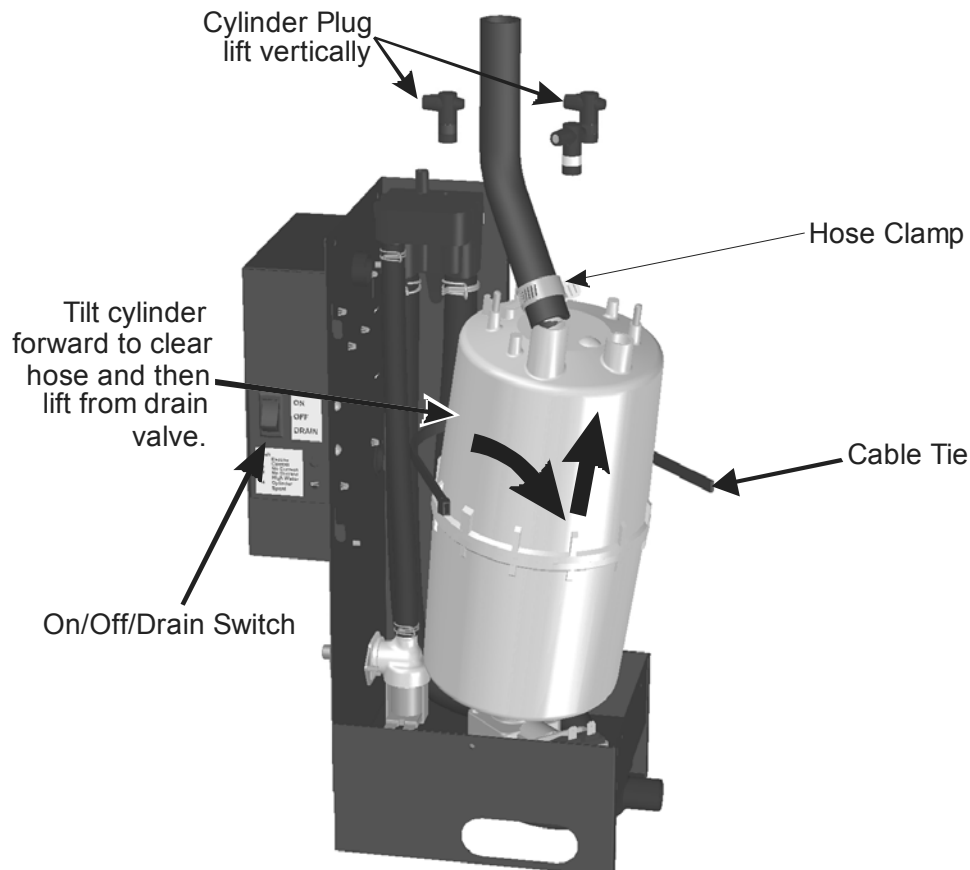


Figure 24: Cylinder Removal

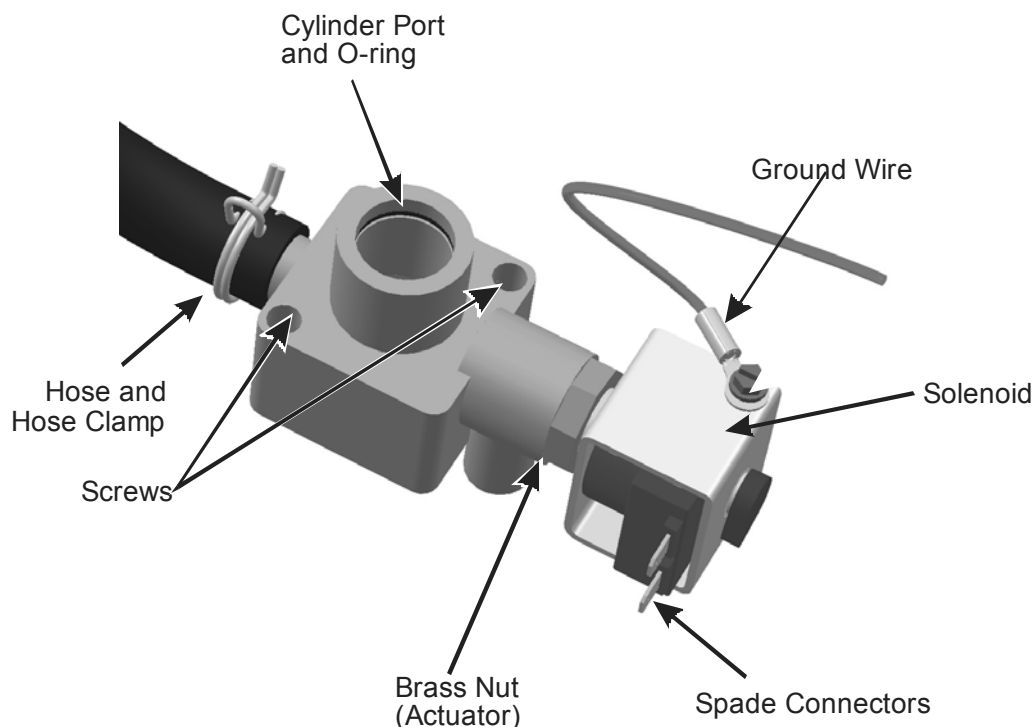
## Drain Valve Cleaning

Always clean the drain valve before installing a new cylinder. Scale from the spent cylinder may have fallen into the drain valve and could prevent its proper operation. To properly clean the drain valve it must be removed and disassembled.

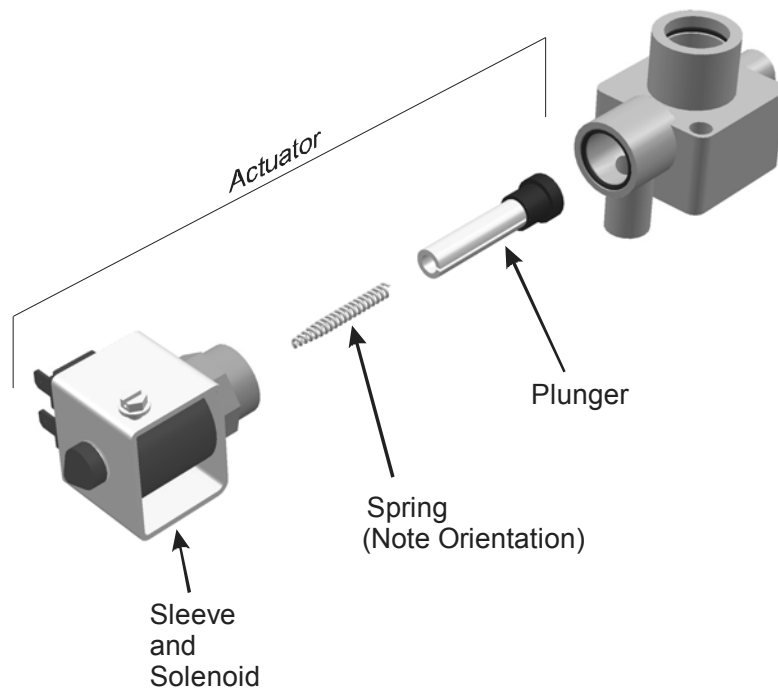
**Note:** Be sure to reattach the green ground wire to reduce the risk of electrical shock.



- 1 Disconnect spade terminals from the drain valve.
- 2 Remove the screw holding the green ground wire and the two screws holding the valve to the drain pan.
- 3 Squeeze the tabs of the spring clamp holding the hose to the drain valve and slide it up the hose. Pull hose from drain valve. Lift the drain valve from the drain pan.
- 4 Unsnap red coil cap on solenoid and remove the solenoid from the valve.
- 5 Loosen brass nut holding actuator to plastic housing with a wrench and disassemble actuator.
- 6 Clean actuator components and valve housing (inlet port, outlet port, and cylinder port). Put new o-ring that was supplied with new cylinder into valve.
- 7 Reassemble actuator making sure tapered end of spring is oriented as shown Figure 26. Tighten brass nut 1/4 turn past hand tight.
- 8 Clean out end of hose and reattach to valve. Slide hose clamp back in place and place valve into drain pan.
- 9 Secure valve with 2 screws and attach green ground wire to solenoid.



**Figure 25: Drain Valve**



**Figure 26: Drain Valve Actuator Assembly**

## Installing the New Cylinder



**CAUTION:** Make sure the new cylinder is the same model as the one that was removed. Model number is on top left corner of cylinder label.

- 1** Insert cylinder into drain valve. Tilt cylinder forward and fit end of steam hose to steam outlet. Tip cylinder back into place.
- 2** Secure cylinder with the reusable cable tie. Tighten hose clamp being careful not to over tighten and crush the plastic cylinder steam outlet.
- 3** Attach color-coded cylinder plugs to the corresponding color-coded cylinder pin. Push down completely. Connect high water sensor plug. Spring-loaded plugs should fit snugly onto the cylinder pin. Replace if they are loose or damaged.
- 4** If enclosed plumbing option is installed replace the humidifier cover and secure with screw.
- 5** Turn on power to humidifier with the external disconnect.
- 6** Open supply water shut off valve.
- 7** Turn the humidifier On/Off /Drain switch to On.

## Extended Shutdown

Should it be required to disconnect power to the humidifier for a period of extended shut-down, always drain the cylinder first. Otherwise, the electrodes are subject to harmful corrosion which drastically shortens the cylinder life.

- 1 Switch the On/Off/Drain Switch to the Drain position.
- 2 Wait until the humidifier is completely drained (usually takes less than 10 minutes).
- 3 Turn the On/Off /Drain switch to the off position.
- 4 Shut off power to the humidifier with the external disconnect.
- 5 Close the supply water shut-off valve.

### *Caution:*

- Do not leave the switch in the DRAIN position indefinitely as the drain coil could burn out.
- When disconnecting power to the humidifier for an extended period of time drain the cylinder first to prevent harmful corrosion.



**Note:** As long as the Nortec MES2 is powered, it will automatically drain the cylinder when there has not been a call for humidity for an extended period of time. This feature will reduce or prevent the possibility of corrosion of the electrodes and the accumulation of algae and bacteria growing in the cylinder. The cylinder will remain empty until there is a call for humidity at which time the fill valve will open and refill the cylinder. The unit will go through its normal process for optimum operation.



## Starting After Extended Shutdown

- 1 Check to see the humidifier has not been damaged and the installation has not been altered.
- 2 Open the supply water shut-off valve.
- 3 Turn on the power to the humidifier with the external disconnect.
- 4 Turn the On/Off/ Drain switch to the On position.
- 5 Follow the start up procedure in the section titled Start Up Procedure on page 30.

# Nortec MES2 Maintenance Checklist

Model #: \_\_\_\_\_

Serial #: \_\_\_\_\_

Tag: \_\_\_\_\_

Cylinder #: \_\_\_\_\_

## CHECK CYLINDER

- Cylinder spent), yellow LED flashing 4 times in sequence.   
(If Yellow LED is On and cylinder is not new then cylinder will have to be replaced soon.)

## REPLACE CYLINDER

- Cylinder drained.
- Disconnect open, On/Off/Drain switch off, water shut off valve closed, cover removed.
- Cylinder removed
- Drain valve removed / cleaned / new O-Ring installed
- Drain valve cleaned / installed / ground wire attached.
- New Cylinder Installed  New cylinder model # \_\_\_\_\_  
(Should be same as removed cylinder)
- Cylinder plug colors match cylinder dots.
- Cylinder plugs snug and in good condition.
- High Water Sensor plug snug and in good condition.
- Steam hose attached.
- Cover replaced, water shut off valve open, On/Off /Drain switch On, Disconnect Closed

## SYSTEM CHECK

- Yellow Led flashing? No  Yes  Flash Sequence? \_\_\_\_\_  
(See Troubleshooting Chapter for actions if yellow LED is flashing)
- Primary power disconnect turned off
- Cylinder plugs snug and in good condition.
- Electrical wiring not loose and in good condition,
- Steam hoses and steam lines in good condition / No kinks in hose,
- No Signs of water leaking around humidifier, steam line, condensate returns,
- Cover replaced, water shut off valve open, On/Off /Drain switch On, Disconnect Closed

Inspected by: \_\_\_\_\_ Date of inspection: \_\_\_\_/\_\_\_\_/\_\_\_\_

Company: \_\_\_\_\_





# Troubleshooting

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## **40 Organization of Troubleshooting Chapter**

## **40 Troubleshooting Requirements**

## **41 General Troubleshooting**

41 Humidifier

42 Steam Distributors

42 Modbus

## **42 Nortec MES2 Faults**

43 LED Flash Sequence

43 Clearing a Fault

## **45 Nortec MES2 Wiring Diagram**

## Organization of Troubleshooting Chapter

The troubleshooting chapter is broken down into 2 sections.

<b>General Troubleshooting</b>	Deals with troubleshooting incorrect humidifier operation, steam line and plumbing issues without any control software faults.
<b>Humidifier Warnings and Faults</b>	Deals with faults that are generated by the humidifier's control software.

**CAUTION:** Be aware, when troubleshooting, that the humidifier is powered by high voltage and familiarity with both good practices and wiring of the humidifier is recommended. Any troubleshooting should be done by qualified personnel.



### NOTE:

- Check if yellow service LED is flashing before turning off the humidifier to determine if a fault has occurred. See Figure 20 on page 24 and Table 7 on page 43.
- Most humidifier 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. Often, the steam hose connection has not been properly executed, or the fault lies with the humidity 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 humidifier by reading the Operation Chapter on page 24 and the section describing How the Humidifier Works on page 9 in this manual.
- A generic copy of the Nortec MES2 wiring diagram is included at the end of this chapter for reference purposes.
- When contacting your local representative or Condair 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 Nortec MES2 humidifier and auxiliary components. For detailed troubleshooting information refer to the manuals that were provided with auxiliary equipment and to Table 7: Troubleshooting Nortec MES2 Faults on page 43.

### Humidifier

Symptom	Cause	Corrective Action(s)
Nothing happens when On/Off switch is turned on.	1 Fuse blown	1 Check inline fuse between On/Off/Drain switch and control board.
	2 Incorrect Voltage	2 Check voltage supplied to On/Off/Drain switch is 24 VAC.
	3 Mains power turned off	3 Turn on mains power.
Humidifier will not humidify or not reaching RH setpoint	1 Safety loop open. No 24 VAC at 2.	1a Check if there is 24 VAC at point 2 of Terminal P3 on the control board. 1b Check if air handler is outputting 24 VAC run signal. 1c Check wiring and operation of On/Off devices connected in series between output calling for humidity and point 2 of terminal P3.
	2 No demand signal (If J10 removed for modulation)	2 Check voltage between P5 and ground. 25% of full-scale signal must be present for humidifier to start.
	3 Not configured correctly for On/Off or modulating control	3 Check that J10 on control board is removed for modulating control and installed for On/Off control.
	4 Capacity has been manually limited	4 Check Manual Capacity adjustment potentiometer. Clockwise increases capacity.
	5 Low conductivity water	5 Check if yellow LED is on. If operated on low conductivity water it may take several hours for the Nortec MES2 to reach full output capacity. This is normal. During this time the humidifier will not perform any drains and the conductivity of the water in the cylinder will increase.
	6 Humidifier undersized	
Humidifier has faulted and yellow LED is flashing	1 Software has detected an abnormal condition	1 Refer to Table 7: Troubleshooting Nortec MES2 Faults.

## Steam Distributors

Symptom	Cause	Corrective Action(s)
Distributor spitting out water	1 Distributor not level	1 Use support at end of distributor to ensure it is level.
	2 "P" Trap too close to distributor	2 "P" Trap must be a minimum of 12 in (30 cm) below the distributor to ensure flow. Relocate if required.
	3 Condensate line not sloped sufficiently	3 Sufficient slope to insure flow is required. Reinstall if required.
	4 Trap blocked	4 Check that water flows through trap. Clear out if blocked.
	5 Steam line not insulated	5 If steam line is long condensate build up could overload distributor condensate port. Insulate line to improve efficiency and install additional condensate traps as required.
	6 Incorrect steam line installation	6 Check that steam line has been installed with condensate traps and slope per installation instructions on page 16.
	7 Humidifier foaming and foam carried up steam line.	7a Check if foaming caused by short cycling. 7b Check if foaming caused by blocked or restricted drain. 7c Check if steam line is causing back pressure and preventing proper filling.
Condensation in Air Handler	1 Installation clearances not observed	1 Refer to distributor installation manual for required clearances. Relocate distributor if required.
	2 Design conditions changed	2 Check supply air temperature and humidity to determine if conditions have changed.
	3 High limit not functioning	3 Check setting and operation of high limit. Replace if defective.

## Modbus

Symptom	Cause	Corrective Action(s)
No Modbus Communication	1 Incorrect Wiring	1a Use 18/24 AWG Shielded Twisted Pair, 120 Ω cable. 1b. Connect shield to one end only. 1c. Check polarity of data wires.
	2 Incorrect Communication Parameters	2 Defaults are 9600 B/sec, Modbus Address 1, Even Parity
	3 Noise interference	3a Route data cable away from noise generating devices. 3b Install an RS485 repeater.

## Nortec MES2 Faults

The self-diagnostic system built into the Nortec MES2 is continually monitoring the operation of the humidifier. When an abnormal condition occurs that cannot be self corrected by the software the Nortec MES2 will turn off power to the cylinder, drain the cylinder, and annunciate the fault using the yellow status LED.

### LED Flash Sequence

To differentiate between different fault conditions the yellow LED is flashed in different sequences. Table 7 lists Nortec MES2 faults, their meaning, possible causes, and corrective actions.

### Clearing a Fault

- Check the flash sequence against the list of fault messages and take any necessary actions to correct the cause(s) as outlined in Table 7: Troubleshooting Nortec MES2 Faults.
- Power cycle the humidifier with the On/Off switch. Wait 3 seconds between off and on.

**Table 7: Troubleshooting Nortec MES2 Faults**

Yellow LED	System Detected	Cause	Corrective Action(s)
1 flash	<b>Excess Current</b> Current has exceeded 130% of max	1 Drain blocked water over concentrated	1 Clean the drain line and drain valve.
		2 Drain solenoid not energized, water over concentrated	2 Check and correct wiring to drain valve.
		3 Filling too fast, fill valve damaged	3 Check fill rate and replace the fill valve if needed.
		4 Water supply too conductive	4a Contact Condair representative for recommendation on alternate cylinder 4b Change the water supply
		5 Humidifier short cycling	5a Check if high limit or other On/Off control is cycling On/Off in less than 5 minutes. Check location and setting of high limit. 5b Reduce the output by turning down the capacity potentiometer. 5c If modulating control check if controller Pband too tight. 5d Check for temperature swings.
		6 Wrong cylinder installed	6 Install correct cylinder model
		7 Cylinder Spent but not detected by software	7 Replace the cylinder (see maintenance chapter)
		8 Condensate from other source	8 Remove condensate returns other than from steam line.
		9 Back pressure	9 Eliminate back pressure

**Table 7: Troubleshooting Nortec MES2 Faults (Continued)**

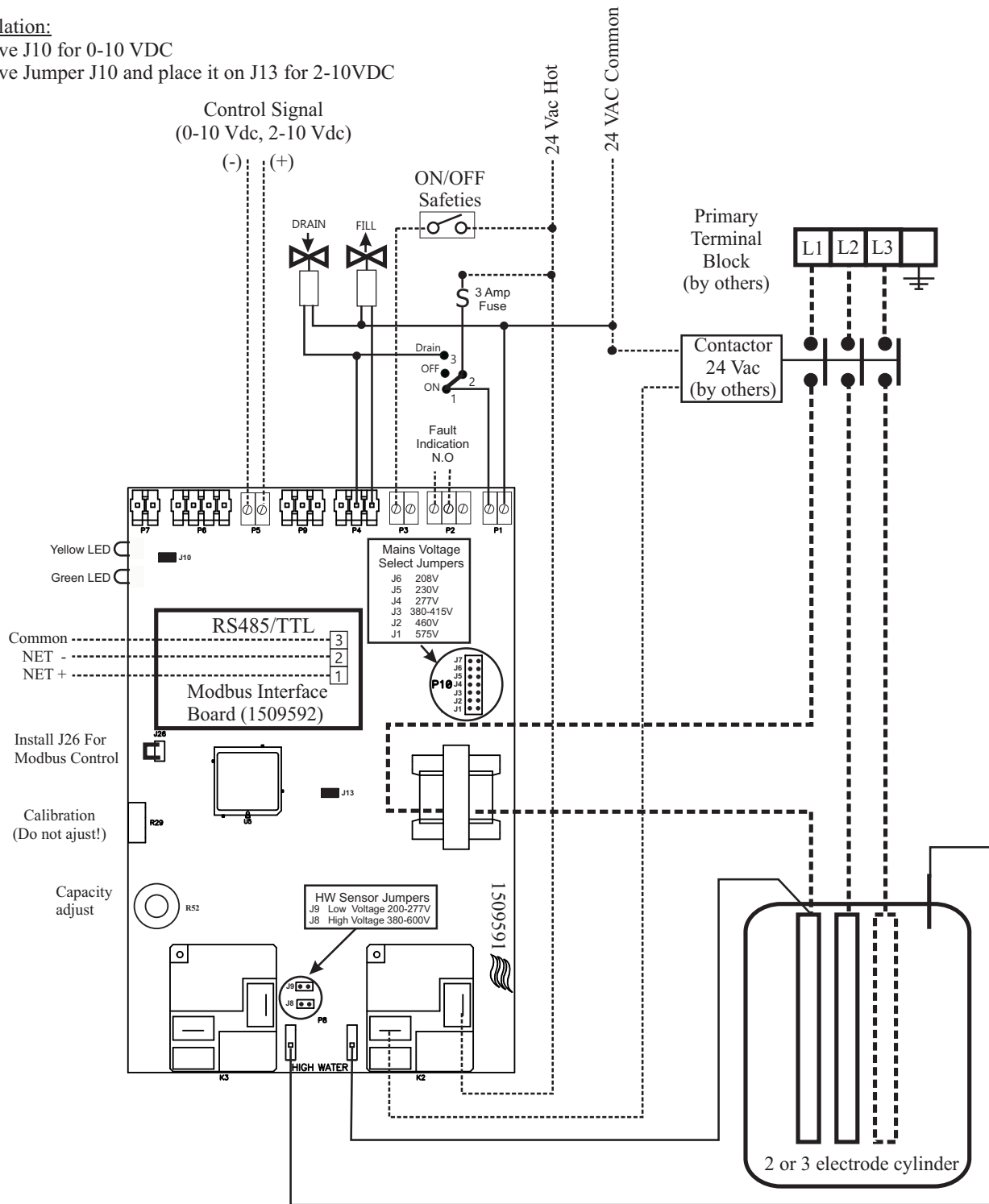
Yellow LED	System Detected	Cause	Corrective Action(s)
2 flashes	<b>No Current</b> Fill valve activated for long time but high water level not reached. Fill should be faster than 1" per minute.	1 Drain valve leaking or stuck open	1 Clean drain valve or replace (see maintenance chapter)
		2 Water shut off valve closed	2 Open shut off valve
		3 Fill Valve strainer blocked	3 Clean out strainer on fill valve
		4 High system back pressure	4a Check for kinked hose 4b Check for proper condensate removal (see installation chapter)
3 flashes	<b>No Current, High Water</b> Water level at top of cylinder with no current	5 High water sensor not connected	5 Check that cylinder plug with white marker is connected to short electrode with a plastic collar around it and to control board.
		6 Low water conductivity	6a Check conductivity of water. If less than 150 microsiemens contact factory for recommendation. 6b Add 1/4 teaspoon of salt to fill cup and restart unit.
		1 Primary wire not looped through current transformer.	1 Open disconnect, rewire primary wire through current transformer.
4 flashes	<b>Cylinder Spent</b> Electrodes covered with scale.	2 1 phase of 3 phase supply blown	2 Check that all phases are energized.
		3 High water sensor plug is on an electrode pin.	3 Install high water sensor plug on cylinder pin with collar around it.
		4 Cylinder plugs installed incorrectly	4 Check that cylinder plugs colors match markers next to electrodes on cylinder and that white marked cylinder plug is connected to pin with collar around it.
		1 Cylinder electrodes are calcified.	1 Replace cylinder with same model number (see maintenance chapter)
4 flashes	<b>Cylinder Spent</b> Electrodes covered with scale.	2 Software incorrectly detected cylinder is spent	2a If fault has occurred shortly after start up then check for low water conductivity. (See 2 flashes cause 6) 2b Check if water in cylinder is foaming. If yes see 1 flash - Excess current causes.

# Nortec MES2 Wiring Diagram

**Modulation:**

Remove J10 for 0-10 VDC

Remove Jumper J10 and place it on J13 for 2-10VDC



NOTE: Dotted lines denote wiring by others with the exception of Primary Voltage Wiring ( PVW ) units which will come with all primary wiring to the cylinder and 10' of wiring to run the electrical back to the contactor



Nortec MES2 with Optional Modbus board  
**WIRING DIAGRAM**  
 DIAGRAM NUMBER 2553788 Rev. D  
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Figure 27: Nortec MES2 Wiring Diagram













