



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



Nortec **SE-Series**

Installation and Operation Manual

Includes installation, operation,
maintenance, and troubleshooting
information for your indoor
Nortec SETC B+ and Nortec SEP
steam exchange humidifier



Thank you for choosing Condair.

INSTALLATION DATE (MM/DD/YYYY)

MODEL #

SERIAL #

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Introduction



CAUTION: Servicing

- Disconnect main power before any servicing.
- Shut off pressurized steam supply and ensure steam pressure is safely relieved before any servicing of pressurized steam components.
- The electrical compartment contains 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 tank, blower pack, steam lines, steam distributors, and condensate lines can become hot and can burn if touched.
- Condaire 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 Condaire.



CAUTION: Electrical

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



CAUTION: Plumbing / Steam Lines

- Plumbing to be performed by a licensed plumber.
- Pressurized steam line installation to be performed by a qualified installer.
- Drain water from humidifier can be very hot. Do not drain to public sink.
- All plumbing and pressurized steam supply line work should be done according to local plumbing code.



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 SETC/P produces steam at atmospheric pressure no devices which could block steam output should be connected to the steam outlet.
- Steam output lines must be installed so that no restriction can produce backpressure in the humidifier.
- Regardless of selecting On/Off or modulating control method, Condaire humidifiers must have a closed circuit across its On/Off security loop control terminal to operate. Condaire highly recommends the use of a high limit humidistat and an air proving switch in series for this function.
- Unit damage caused by water quality outside of the specified ranges is not covered under warranty.

Receiving and Unpacking

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

Note: A steam valve, actuator, and wye strainer are shipped along with the SETC/P humidifier but in separate small boxes.



- 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 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 If steam supply is from a Medium or High Pressure boiler ensure supply steam line includes a relief valve to prevent supply pressure from exceeding 15 psig.
- 3 Ensure means for returning boiler steam condensate to boiler at atmospheric pressure are available.
- 4 Ensure sufficient clearances will be available as described in Location on page 11.
- 5 Ensure steam lines can be routed to distributor SAM-e manifold or blower pack as described in Steam Lines and Condensate Returns on page 17.
- 6 Report any discrepancy immediately to the site engineer.

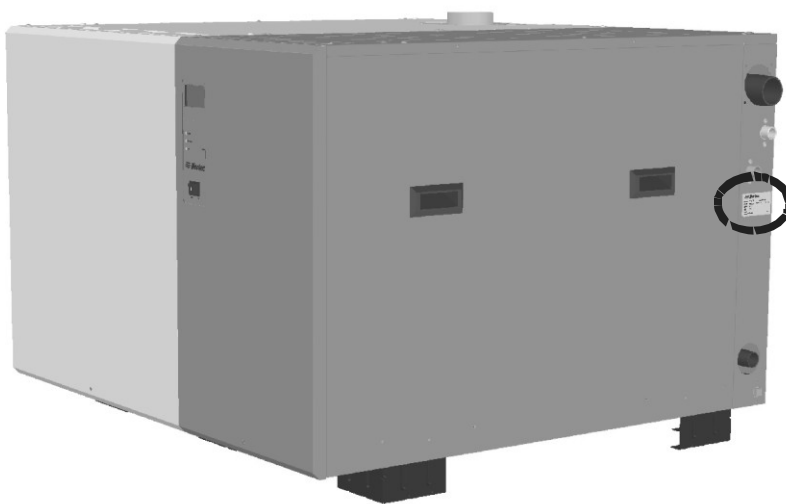


Figure 1: Specification Label Location

Humidifier Components

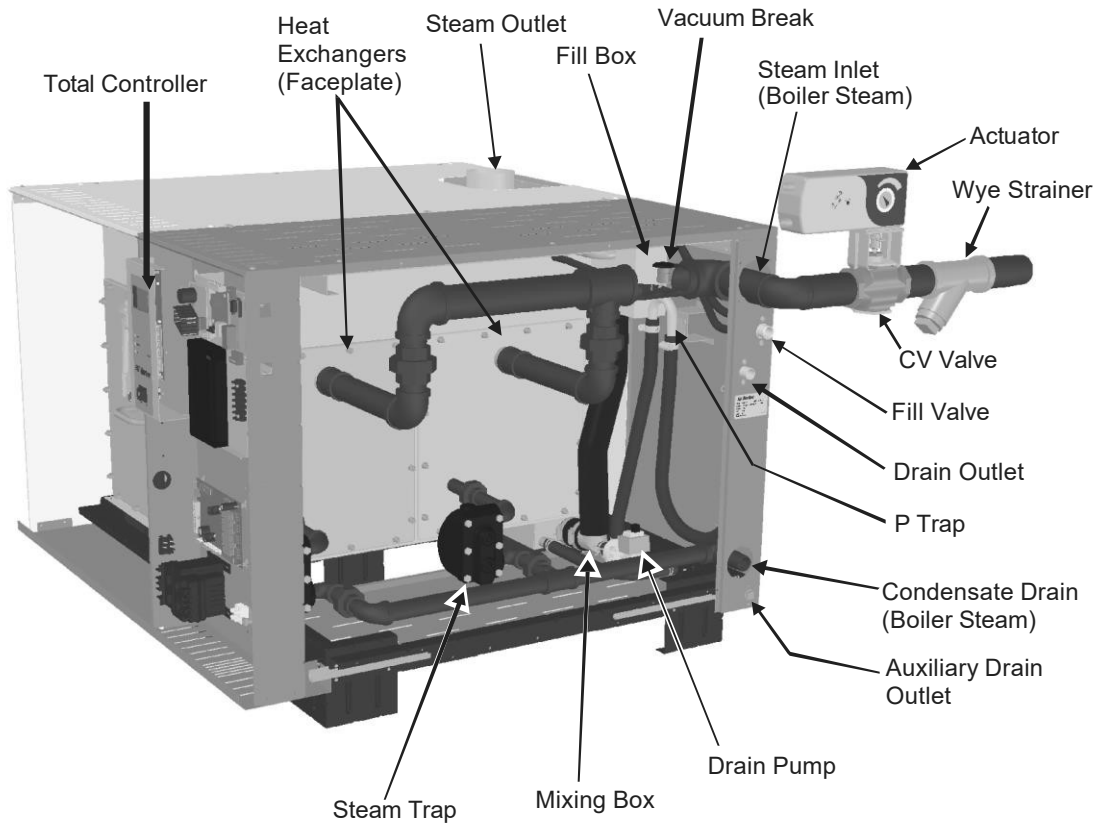
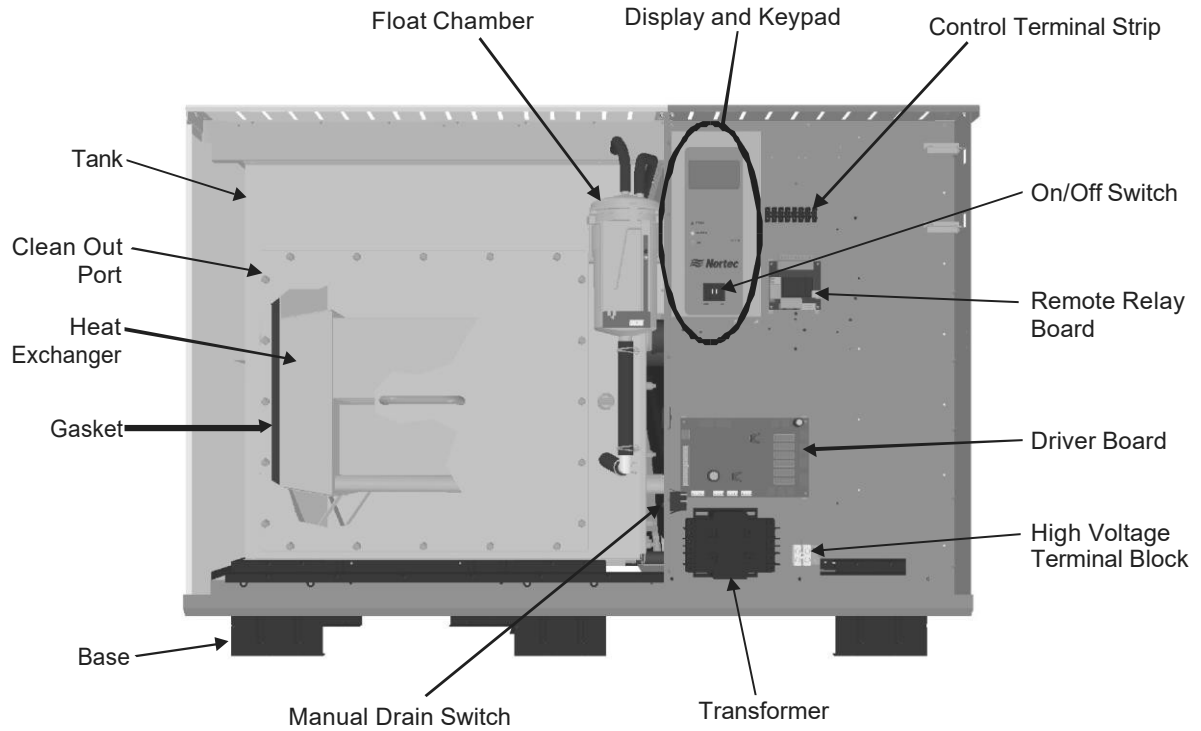


Figure 2: Nortec SETC Humidifier Components

Description of Components

Table 1: Humidifier Components

Component	Function of Component
Actuator	Opens and closes the CV valve in proportion to demand for steam.
Auxiliary Drain Outlet	Drains water from tank in case of pump failure.
Base	Provides an integrated floor support for the humidifier.
Clean Out Port	Provides access to clean scale from the tank and heat exchanger.
Condensate Drain	Drains condensate formed from boiler steam in the heat exchanger(s)
Control Terminal Strip	Terminal strip for connecting external controls and blower pack to humidifier.
CV Valve	Controls the amount of steam allowed into the heat exchanger which in turn controls the output of the humidifier.
Display and Keypad	User interface for configuring the humidifier.
Drain Outlet	Drain port used for draining water from the humidifier tank.
Drain Pump	Drains water from humidifier.
Driver Board	Provides input and output connections to humidifier components.
Fill Box	Provides an air gap for backflow prevention.
Fill Valve	Controls flow of water into humidifier.
Float Chamber	Measures water level in the humidifier tank.
Gasket	Seals heat exchanger face plate and clean out port cover to tank.
Heat Exchanger(s)	Exchanges energy from boiler steam to the tank water to produce steam for humidification. The faceplate mounts the heat exchanger to the tank.
High Voltage Terminal Block	Primary power connection from remote disconnect to humidifier.
Manual Drain Switch	Manually activates pump to drain water from the tank.
Mixing Box	Blends hot tank water with cool fill water to provide drain water cooling.
On/Off Switch	Turns power On/Off to humidifier controller. Note: Turn off humidifier disconnect to shut off primary power to the humidifier.
P Trap	Prevents steam from flowing out the drain outlet.
Remote Relay Board	Provides a terminal strip to dry contacts which open/close to indicate the humidifier is on, humidifying, needs service, or is in a fault condition.
Steam Inlet	Connection for boiler steam, it is connected to the heat exchangers.
Steam Outlet	Connect to steam line with steam hose.
Steam Trap	Drains condensate from the heat exchanger without letting boiler steam escape to drain.
Tank	Holds the water used to generate clean steam for humidification.
Total Controller	Controls all functions of the humidifier's operation and provides user interface for configuration of the humidifier.
Transformer	Steps primary voltage down to 24 VAC for the controller and internal components such as the fill valve and drain valve.
Vacuum Break	Prevents a siphon from occurring when the drain pump is stopped.
Wye Strainer	Protects CV valve and other system components from dirt and rust in the piping system.

Nortec SETC/P Models

The Nortec SETC with its Total Controller and state-of-the-art features and options is the most advanced steam exchange humidifier available. The base model Nortec SEP provides steady and reliable humidification using the same proven heat exchanger technology as the Nortec SETC. The Nortec SETC/P is available in capacities ranging from 50 lb/hr (23 kg/hr) to 1050 lb/hr (475 kg/hr). Nortec SETC/P humidifiers are packaged in five different cabinets depending on their capacity. Figure 3: Nortec SETC/P Models shows the configuration and relative size of the five different cabinets. Table 3 provides specifications for the Nortec SETC/P product line.

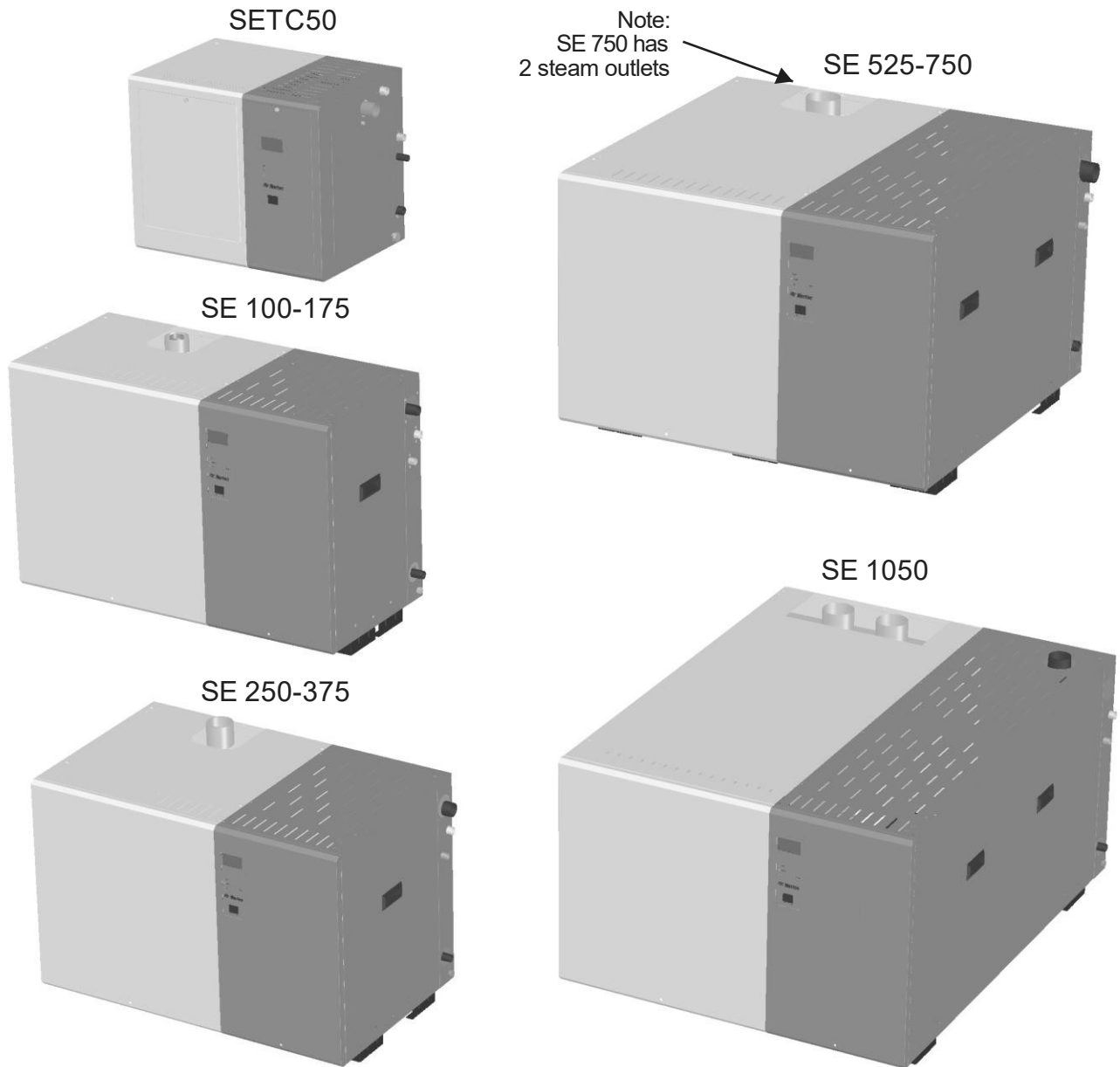


Figure 3: Nortec SETC/P Models

The Nortec SE 50, 100, 175, 250, and 375 all have a single heat exchanger. The Nortec SE 525 and 750 have two heat exchangers. The Nortec SE 1050 has three heat exchangers. All models have a single pressurized steam inlet and condensate drain with internal manifold connecting separate heat exchangers if they are present.

Outdoor Model (Nortec SETC Only)

The outdoor model of the Nortec SETC provides a weatherproof enclosure that allows the Nortec SETC to be installed on rooftops in moderately cool climates. Refer to the Nortec SETC installation manual that is provided with the outdoor model to insure proper installation.

Options and Accessories

Condair 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 Nortec SETC/P humidifier. 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
Freeze Protection Package (Nortec SETC Only)	Emptying the tank in case of fault or power failure to prevent freezing. (Factory installed)
Floor Stand	Supporting the humidifier 27 inches above the floor (height can be reduced by cutting legs of floor stand). (field assembled)
Ceiling Mounting Kit (Nortec SE50 Only)	Providing a drain pan and support brackets for mounting an Nortec SE50 unit from the ceiling.
Steam Distributors	Adding steam into air ducts
Remote Blower Pack	Adding steam into a space remote from the humidifier.
SAM-e Steam Distribution Manifold	Adding steam into air ducts where short absorption is required.
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.
Condair LINKS 2 (Nortec SETC Only)	Connecting the humidifier to a building management interface. hardware allows control of the humidifier via BACnet, Lonworks, Johnson N2, or Modbus.
Condair OnLine (Nortec SETC Only)	User and factory monitoring and configuration of the humidifier via the internet.

Table 3: Nortec SETC/P Specifications

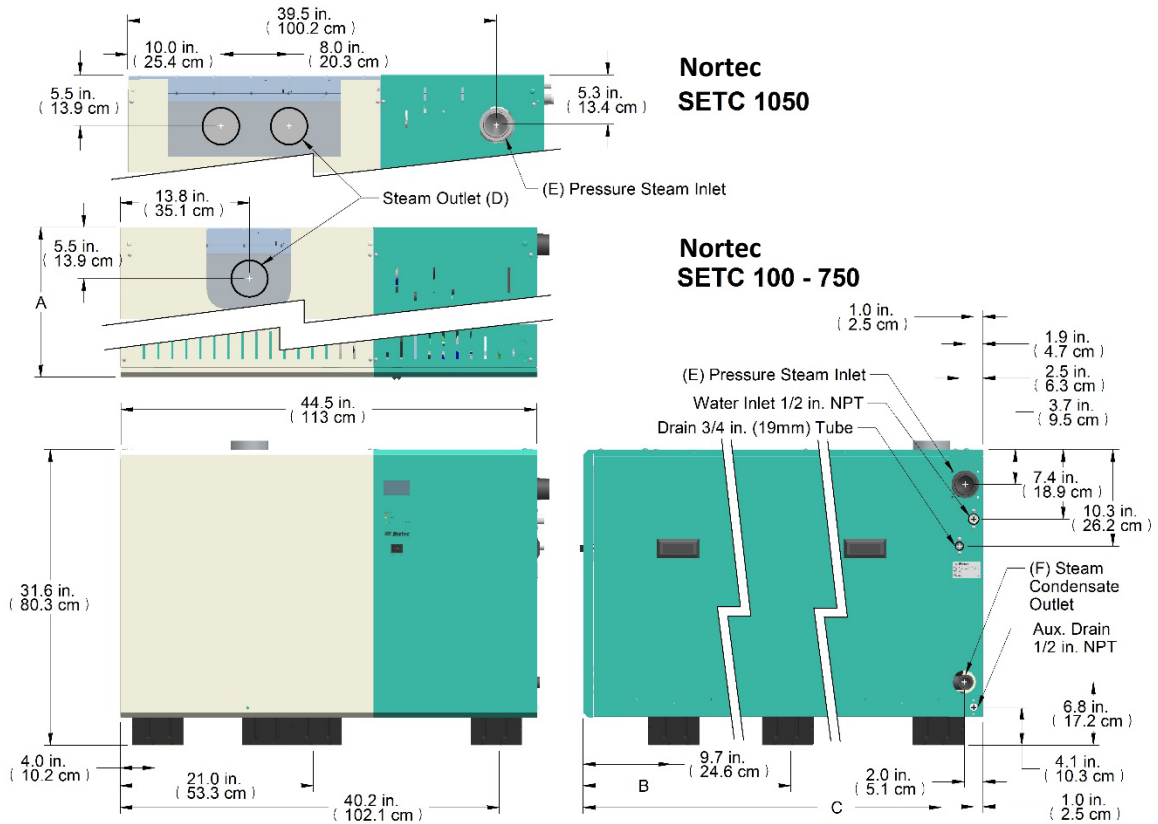
Nortec Model	SETC Part No	SEP Part No.	CV Valve	CV Valve, Steam Inlet, Wye Port (NPT)	Condensate Port (NPT)	Net/Full Weight lb (kg)	Required fill line flow gal (l) /min	Required Drain capacity gal (l) /min	Electrical
50	2552765	2520383	2.8	1/2	3/4	125/180 (57/82)	2.6 (10)	5.2 (20)	Voltage 110-120 Phase 1 Amps 1.25 A Power 0.15 KW Max Disconnect 15 A
100	2550073	2525132	5.5	3/4	3/4	267/423			
175	2550074	2525133	10	1	3/4	(121/192)			
250	2550075	2525134	12	1	3/4	355/599			
375	2550076	2525135	20	1 1/4	3/4	(161/272)			
525	2550077	2553312	28	1 1/2	1	529/992			
750	2550078	2553313	40	2	1	(240/450)	4.5 (17)	8 (29)	
1050	2550080	2525139	77	2, 2 1/2, 2 1/2	1 1/4	703/1384 (318/628)			

Table 4: Nortec SETC/P Capacities and Water Consumption

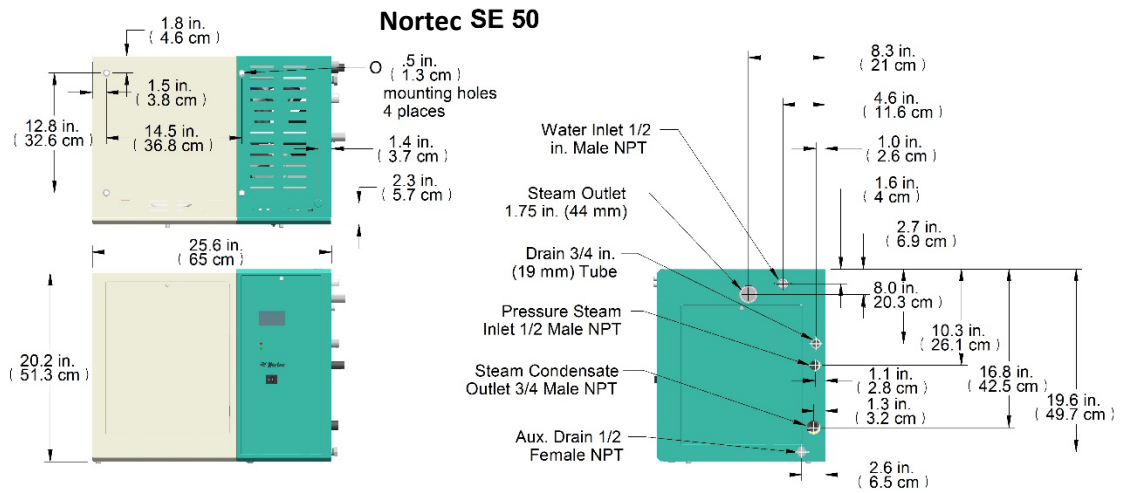
Nortec Model	*Supply Steam Pressure (psig)	*Max Output lb/hr (kg/hr)	Approximate Boiler Steam Consumption lb/hr (kg/hr)	**Water Consumption gal (l) /hr	**Drain Volume gal (l) /hr
50	5	13 (6)	15 (7)	2.3 (9)	0.8 (3)
	10	32 (14)	36 (16)	5.7 (21)	1.9 (7)
	15	50 (23)	58 (26)	9.0 (34)	3.0 (11)
100	5	26 (12)	30 (14)	4.7 (18)	1.6 (6)
	10	63 (29)	72 (33)	11.3 (43)	3.8 (14)
	15	100 (45)	115 (52)	18.0 (68)	6.0 (23)
175	5	46 (21)	52 (24)	8.2 (31)	2.7 (10)
	10	110 (50)	127 (58)	19.8 (75)	6.6 (25)
	15	175 (80)	201 (91)	31.5 (119)	10.5 (40)
250	5	65 (30)	75 (34)	11.7 (44)	3.9 (15)
	10	158 (72)	181 (82)	28.3 (107)	9.4 (36)
	15	250 (114)	288 (131)	44.9 (170)	15.0 (57)
375	5	98 (44)	112 (51)	17.5 (66)	5.8 (22)
	10	236 (107)	272 (123)	42.5 (161)	14.2 (54)
	15	375 (170)	431 (196)	67.4 (255)	22.5 (85)
525	5	137 (62)	157 (71)	24.5 (93)	8.2 (31)
	10	331 (150)	380 (173)	59.5 (225)	19.8 (75)
	15	525 (239)	604 (274)	94.4 (357)	31.5 (119)
750	5	195 (89)	224 (102)	35.1 (133)	11.7 (44)
	10	473 (215)	543 (247)	84.9 (321)	28.3 (107)
	15	750 (341)	863 (392)	134.8 (510)	44.9 (170)
1050	5	273 (124)	314 (143)	49.1 (186)	16.4 (62)
	10	662 (301)	761 (346)	118.9 (450)	39.6 (150)
	15	1050 (477)	1208 (549)	188.7 (714)	62.9 (238)

* Supply steam pressure must be present at the CV valve to achieve rated output

** At maximum output , 25% blow down, and with drain water cooling activated



Model	A in. (cm)	B in. (cm)	C in. (cm)	D in. (mm)	E NPT	F NPT
100	20.8 (53)	N/A	16.1 (40.8)	1 3/4 (44)	3/4	3/4
175				3 (76)	1	3/4
250	27.2 (69)	N/A	22.4 (56.8)	3 (76)	1	3/4
375				4 (102)	1 1/4	3/4
525	42.7 (108.6)	21.9 (55.5)	38.0 (96.4)	4 (102)	1 1/2	1
750				4 (102)	2	1
1050	58.3 (148.2)	29.7 (75.3)	53.6 (136.1)	2 X 4 (102)	2 1/2	1 1/4



Installation

- 10 Typical Humidifier Installation**
- 11 Location**
- 12 Mounting on Optional Stand**
- 13 Ceiling Mounting (Nortec SE50 Only)**
- 14 Plumbing**
- 15 Boiler Steam and Boiler Condensate Return**
- 17 Steam Lines and Condensate Returns**
- 22 Electrical**
- 23 External Controls**
 - 23 Control Wiring
 - 23 Control Location
 - 24 On/Off Control Wiring
 - 25 Modulating Control Wiring
 - 27 Transducer Control Wiring
- 28 Optional Outdoor Temperature Reset**
- 29 CV Valve Actuator Wiring**
- 30 Remote Relay Board Wiring**
- 31 Staged Modulation Wiring (Nortec SETC Only)**
- 32 Options and Accessories**
 - 32 Remote Blower Pack

Typical Humidifier Installation

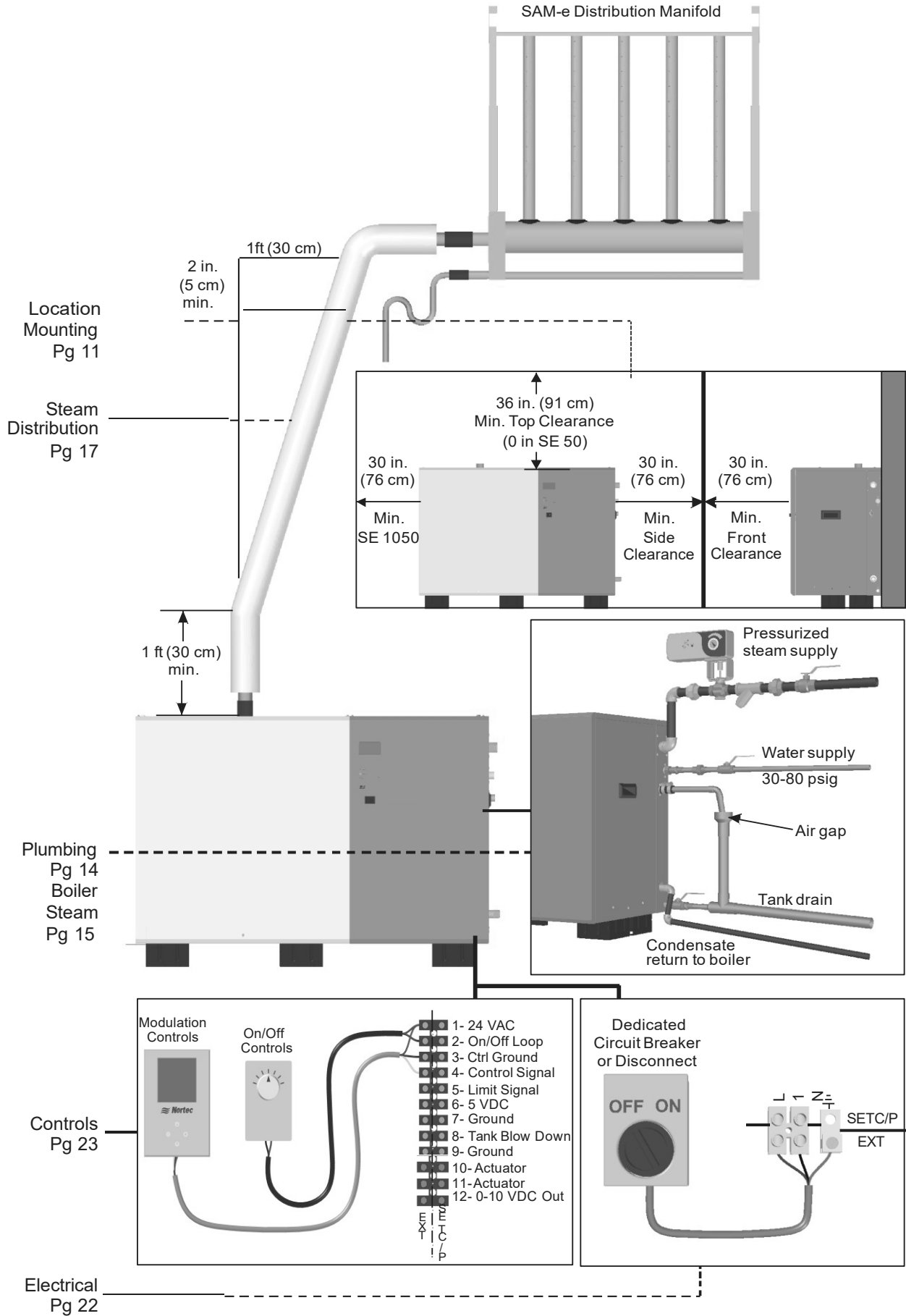


Figure 5: Typical Humidifier Installation

Location

The Nortec SE series humidifiers are designed to be either floor mounted or stand mounted (stand optional). Nortec SE 50 models can also be ceiling mounted with the optional ceiling installation kit, part number 2520345.

- Install only in areas with ambient temperature 41-104 °F (5 – 40 °C) relative humidity 5 - 95% (non condensing).
- Ensure mounting surface is strong enough to support the full weight of the humidifier and accessories (see Table 3: Nortec SETC/P Specifications).
- Install in location where electrical power, boiler steam, and drain can be connected to the humidifier.
- 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.
- Condensate drain is located close to the bottom of the humidifier. Locate the unit so that condensate line slopes down to boiler or use pump (by others) to lift to boiler. Use stand if necessary.
- Avoid mounting humidifier on combustible surfaces including (but not limited to) carpet, tile, or certain insulating materials.
- 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. Condair does not accept responsibility for installation code violations.



Note: Condensate drain line must be sloped downward to boiler condensate return. Use pump (by others) or stand (optional) if necessary.

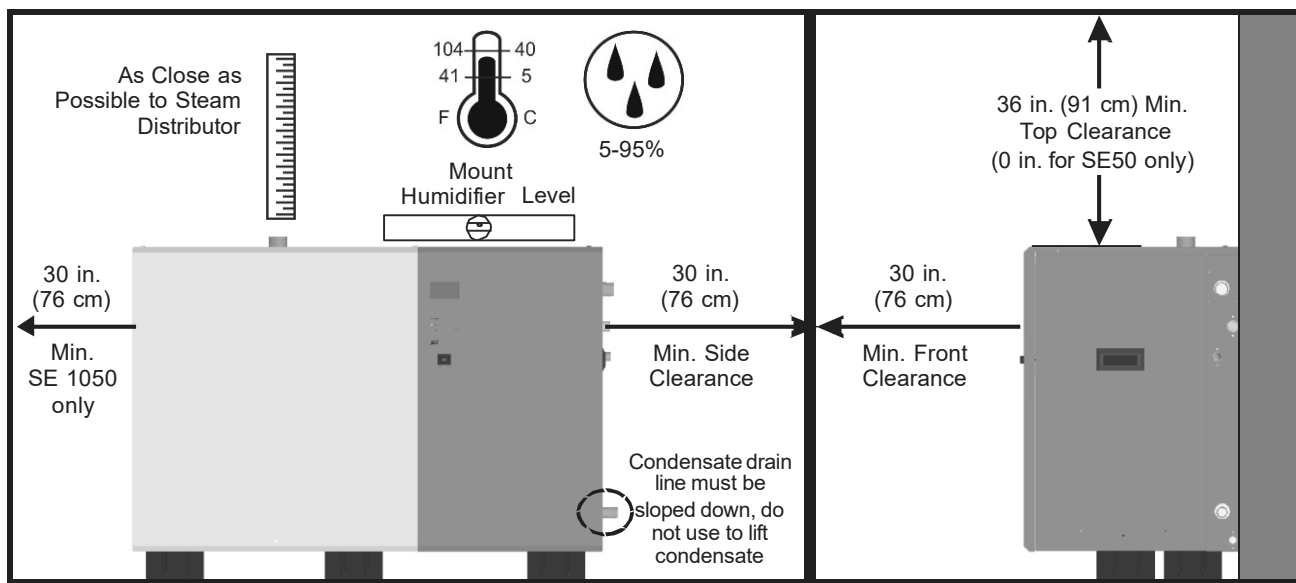


Figure 6: Installation Location / Clearance

Mounting on Optional Stand

The optional Nortec SE floor stand positions the Nortec SE humidifier at a convenient working height and provides additional clearances for sloping drains. The stand must be assembled at site.

- Assemble the stand according to the instructions that are provided with it.
- Ensure the stand and humidifier are installed on a level surface
- Permanently secure the stand to the floor via the holes in the leg support plates following any local codes or regulations.

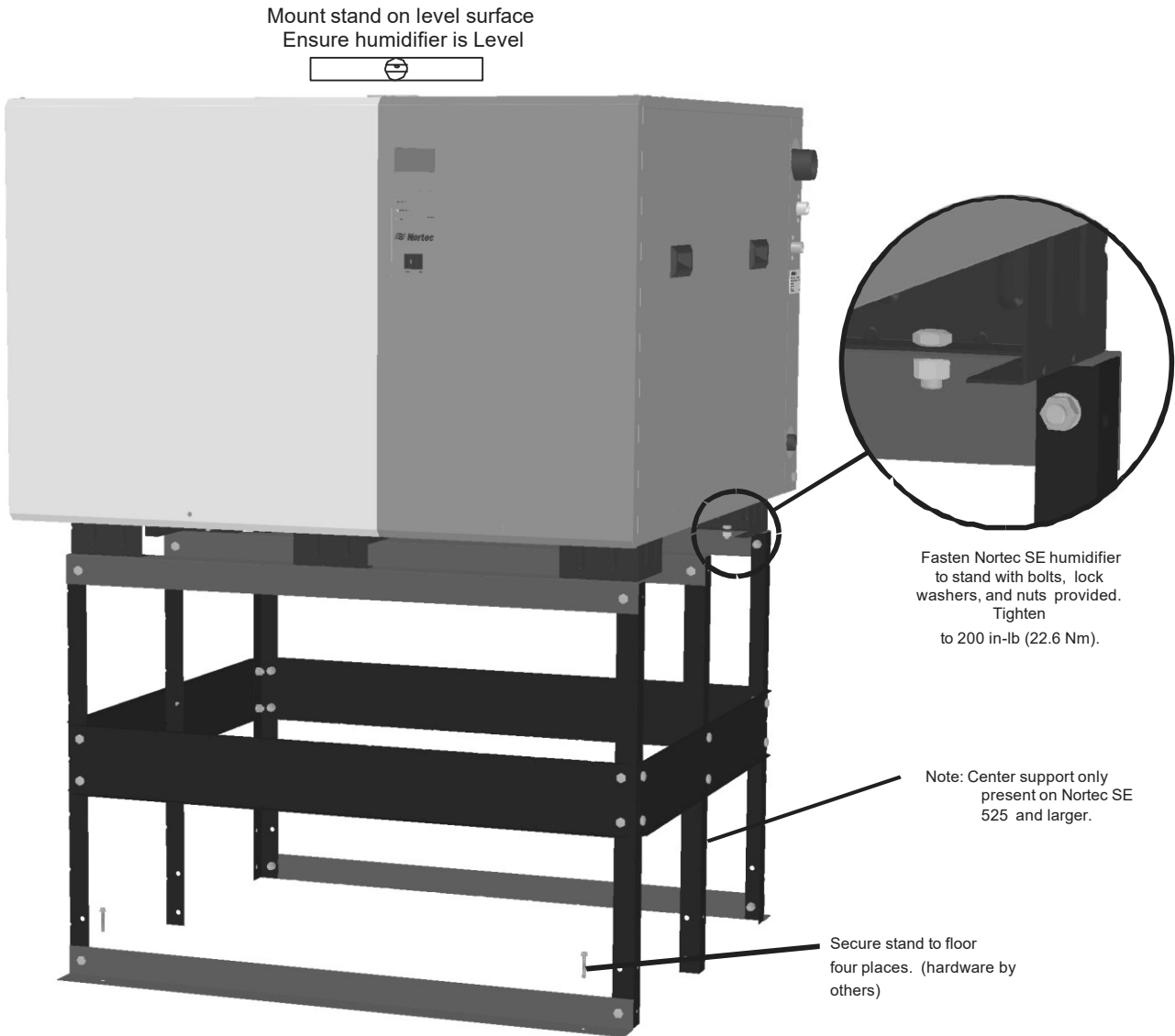


Figure 7: Mounting on Optional Stand

Note: The humidifier must be secured to the stand (hardware provided) and the stand must be secured to the floor (hardware by others).



Ceiling Mounting (Nortec SE50 Only)



Note: The Nortec SE50 requires regular maintenance including removal of scale from the heat exchanger and tank. Make sure it is installed in a location where the maintenance can be performed.

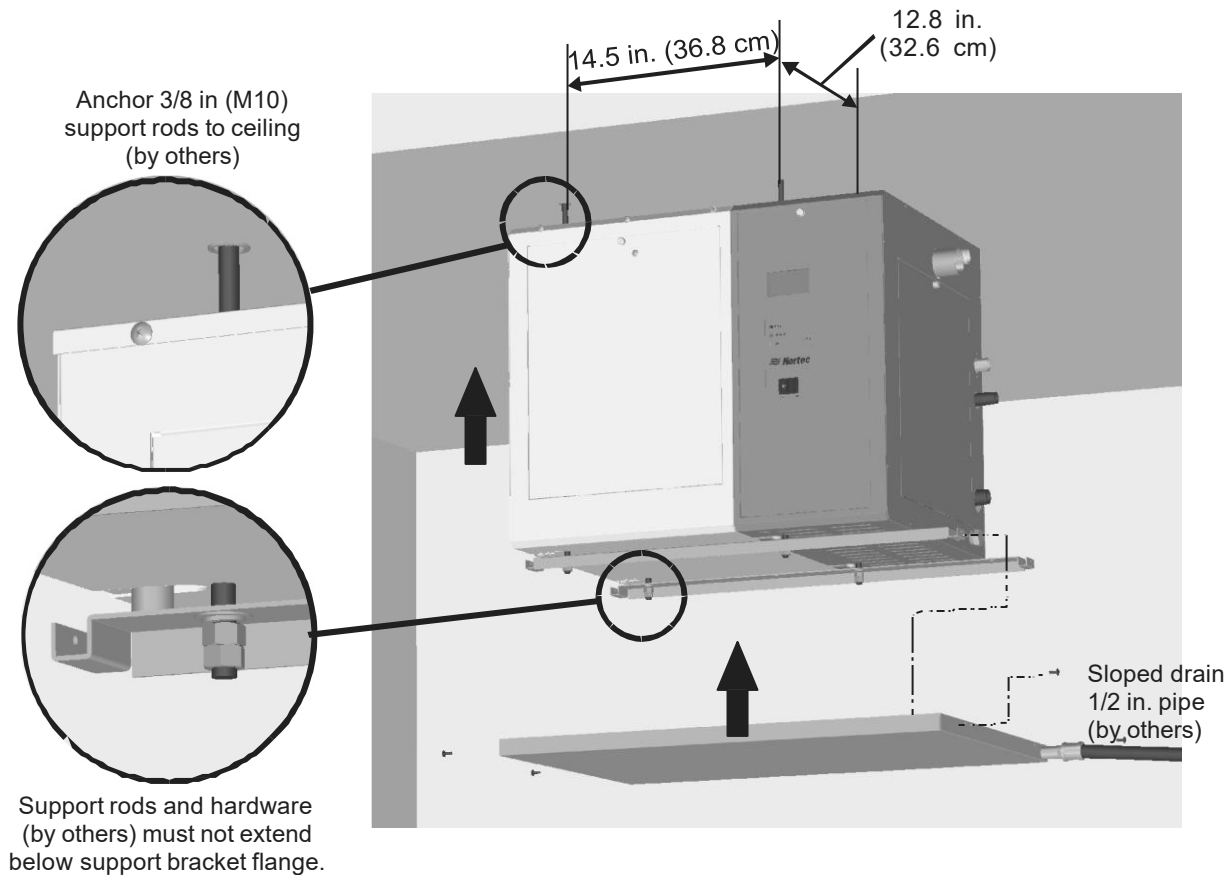
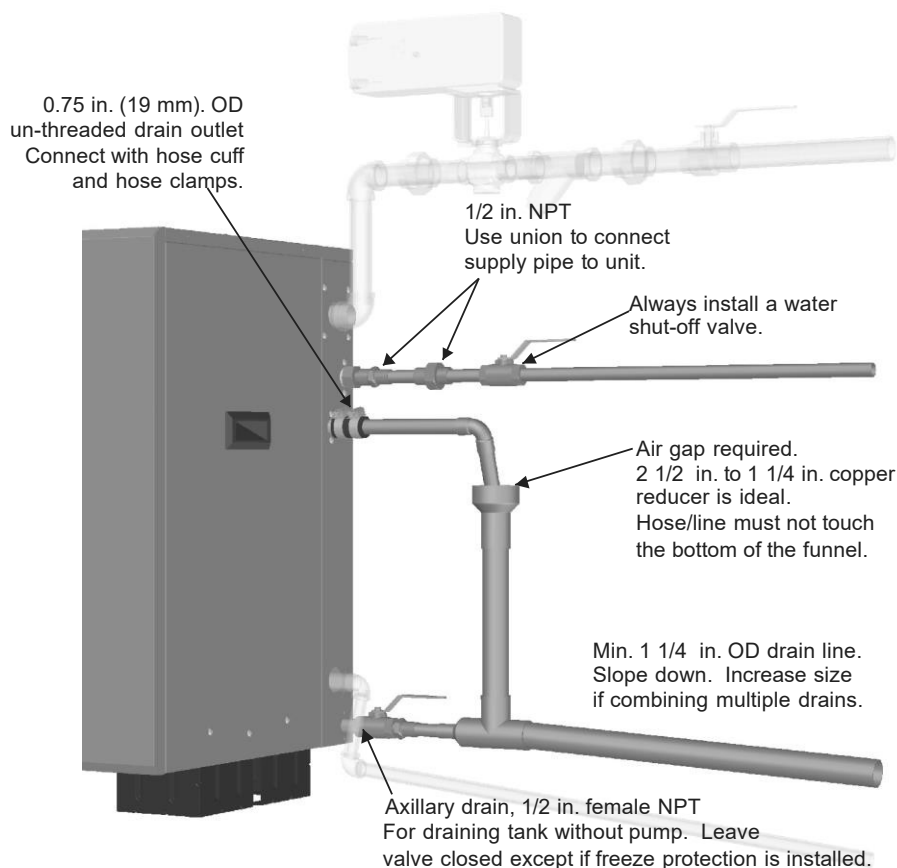


Figure 8: Ceiling Mounting the Nortec SE50

Condair offers an optional ceiling mounting kit (part number 2520345) which allows the Nortec SE50 to be ceiling mounted with zero clearance to the ceiling. Follow the following guidelines for installation.

- Follow the instructions provided with the ceiling mounting kit.
- Install in a location where regular maintenance can be performed. Provide clearance as shown in Figure 6: Installation Location / Clearance.
- The Nortec SE50 weighs 180 lb (82 kg) when filled with water and without any accessories or piping. It is the installer's responsibility to calculate the total weight which must be supported, to ensure the ceiling structure is adequate, and to install support rods and to connect drain pan per local codes and regulations.
- The humidifier cannot be used as a structural member. All piping connected to the unit must be supported independently.
- A drain line emptying into an open drain must be connected to the ceiling kit drain pan. Condair recommends a 1/2 in. pipe with sufficient slope to ensure any water collected in the pan will drain from it.

Plumbing



*Pipe, unions, and water shut-off valve not supplied by Condaair.

Figure 9: Water Supply and Drain Connection

Note:

- Drain Water is very hot, do not use plastic pipe for drain or condensate lines, do not drain to public sink. Route to floor drain or equivalent.
- Supply cold potable water, deionized water or reverse osmosis water at 30 - 80 PSIG.
Hardness 5-7 grain or 90 - 120 mg/l (as Ca⁺² as CaCO₃)
Total Dissolved Solvents (TDS) 0.5-3 mg/l or **Conductivity** 1 to 70 mho/cm
Chlorides 0-25 ppm **PH** 7.2-8.5 **Alkalinity** 30-130 mg/l (as CaCO₃)



- All water supply and drain line connections must be installed in accordance with local plumbing codes.
- See Table 3 and Table 4 on page 7 for supply water flow requirements.
- Install water shut off valve and union before humidifier to facilitate servicing.
- Insure drain line is adequately sized to provide free and easy draining and that an air gap is installed as shown. See Table 3 and Table 4 on page 7 for flow requirements.
- Auxiliary drain connection with manual shut off valve is recommended for all units. Valve to be left closed on units without freeze protection option installed. Valve to be left open on units with freeze protection option installed except during servicing.
- High hardness or silica content supply water may require increased maintenance.
- Unit damage caused by water quality outside of the specified ranges is not covered under warranty.

Boiler Steam and Boiler Condensate Return



Note:

- Pressurized steam line installation to be performed by a qualified installer.
- Damage to Nortec SE heat exchanger will occur if it is exposed to pressure above 20 psi.. A safety relief valve must be installed to prevent the Nortec SE from being exposed to pressure in excess of 15 psi when the Nortec SE is connected to a medium or high pressure boiler via a pressure reducing valve.
- The steam supply line must be designed to provide design pressure at the CV valve when there is 100 % demand (CV valve completely open). Pressure losses in the steam supply line will reduce Nortec SE output.
- Condensate must be drained to a non-pressurized boiler condensate return line.

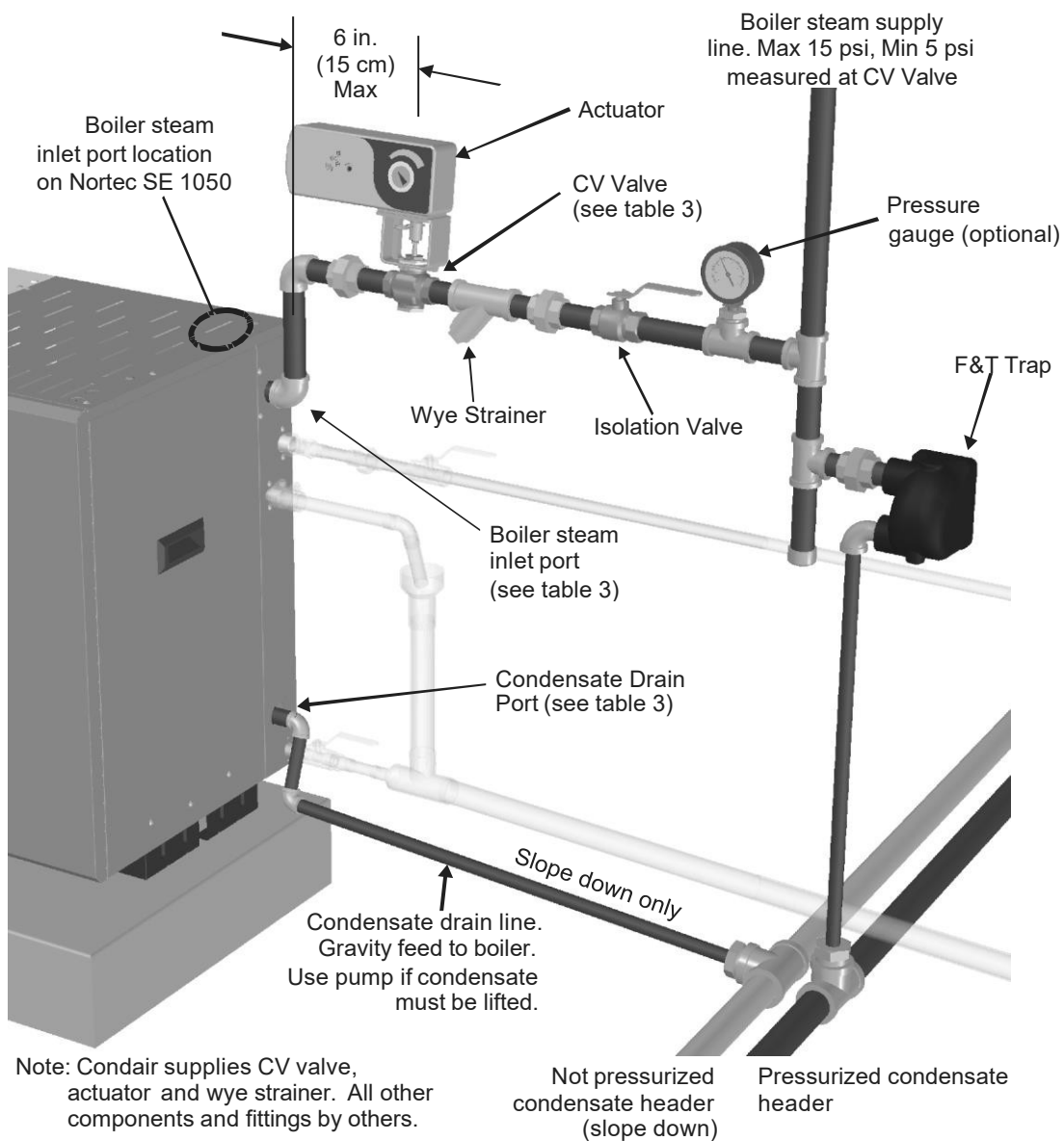


Figure 10: Nortec SE Boiler Steam and Condensate Connection

Condair supplies a CV valve, actuator and wye strainer with each Nortec SE humidifier. The port sizes of the CV valve, boiler steam inlet port, and condensate drain port are given in Table 3: Nortec SETC/P Specifications on page 7. Follow the following guidelines for installation.

- All steam line connections must be installed in accordance with local codes.
- Install the CV valve actuator following the procedure in Figure 11: CV Valve Actuator Installation after the CV valve is installed on the steam line. Wire the actuator as described in CV Valve Actuator Wiring on page 29.
- Boiler steam supply line design is the responsibility of the installer. The boiler steam supply line must be designed so that that design pressure is present at the CV valve when the CV valve is completely open (100% demand). The diameter of the supply line up to the wye strainer may have to be oversized to insure proper steam pressure.
- The Nortec SE will operate on supply steam pressures between 5 and 15 psi measured at the CV valve. Lower steam supply pressures will result in lower output. See Table 4: Nortec SETC/P Capacities and Water Consumption on page 7 for capacities at different supply pressures.
- If condensate cannot be gravity fed to the boiler then a pump must be used to lift the condensate. See Spirax Sarco (www.spiraxsarco.com) and others for pumps and additional information on condensate management.

Caution: Condensate leaves the steam traps inside the Nortec SE under slight pressure. Steam flash could occur in the condensate drain line.



- The boiler steam and condensate connections are independent. Boiler steam condensate should be returned to the boiler and should not be mixed with water from the tank drain.
- The steam supply pressure can be entered into the Nortec SETC control software to provide display of unit output. See Pressure Based on page 56.

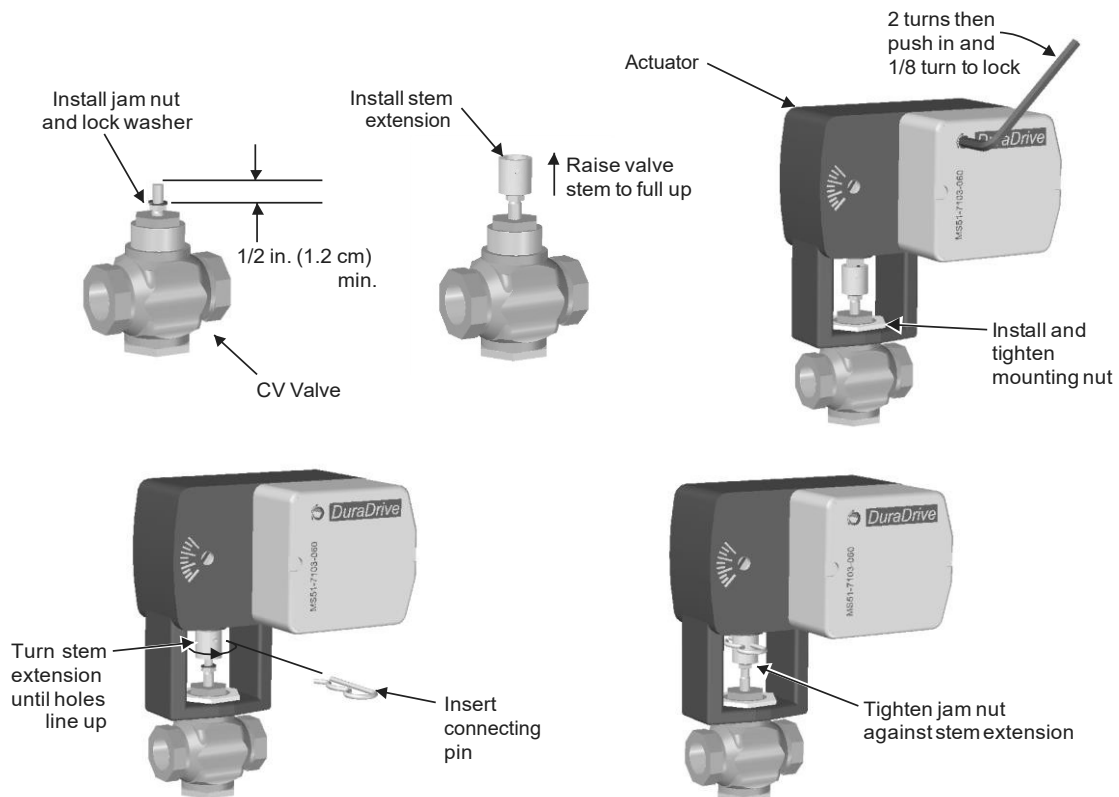


Figure 11: Schneider - CV Valve Actuator Installation

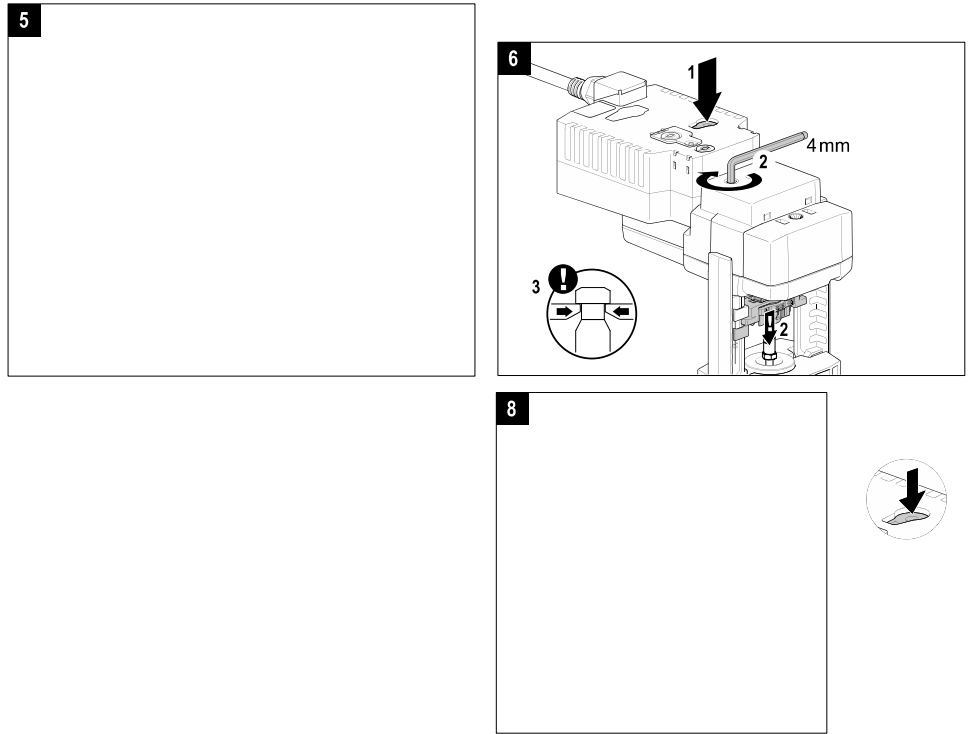
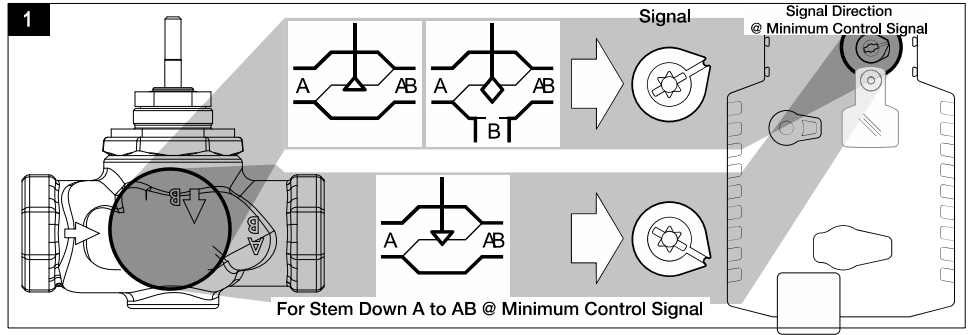


Figure 12: Belimo Valve Actuator Installation

Steam Lines and Condensate Returns



MAIN RULES FOR ATMOSPHERIC STEAM LINES

- Slope the steam lines.
- Trap condensate (Use full size 'T' for Traps).
- Steam lines must not have any restrictions which could cause back pressure.
- Insulate with 1.0 in. (2.5 cm) pipe insulation.
- Follow recommended materials, size and length see tables.

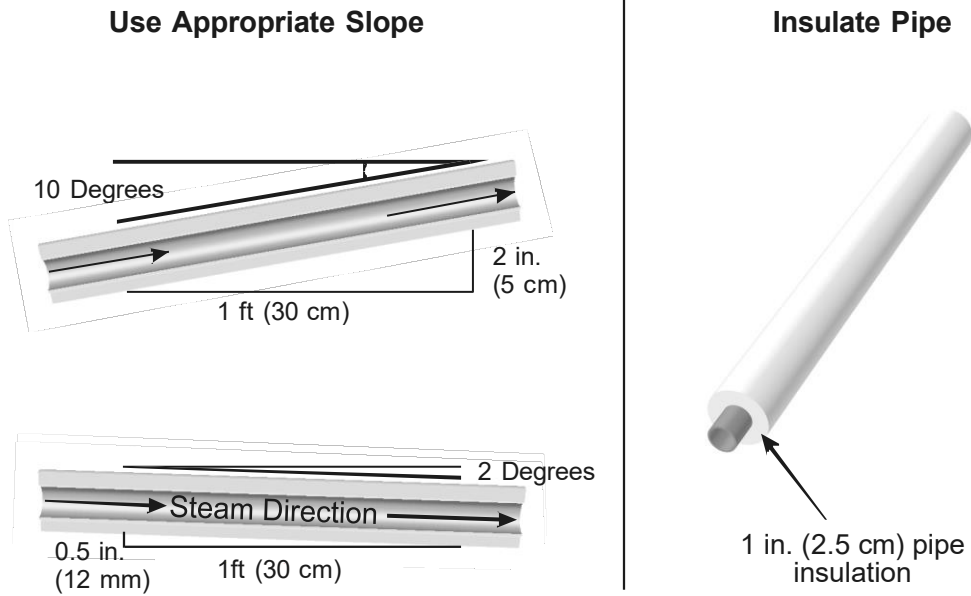


Figure 13: Main Steam Line Requirements

Table 5: Recommended Steam Line Material

Steam Line Material	Lb/hr (kg/hr)	Steam Line Length		Steam Line Description
		ft	m	
Copper Tube	0-100 (0-45)	0-90	0-27	1 1/2 in. MED-L Tubing (1.625 in. OD)
	101-250 (46-113)	0-180	0-54	3 in. MED-L Tubing (3.125 in. OD)
	251-650 (114-295)	0-260	0-79	**4 in. MED-L Tubing (4.125 in. OD)
*Stainless Steel Tube	0-100 (0-45)	0-90	0-27	1.75 inch Tube x 0.065 inch thick wall
	101-250 (46-113)	0-180	0-54	3 inch Tube x 0.065 inch thick wall
	251-650 (114-295)	0-260	0-79	**4 inch Tube x 0.065 inch thick wall
Condair Hose	31-100 (14-45)**	<15	<4.5	***Part Number 1328820 (1 3/4")

Note: * Use only stainless steel tube for reverse osmosis and deionized water applications.

** Use 2 x 4 in. steam lines for steam capacities higher than 750 lb/hr (307 kg/hr)

*** Use one steam hose per 100 lb/hr (45 kg/hr) of output.



Steam Hose Odour: Condair hose may generate a slight odour during initial use. This odour is temporary and will disappear after a short period of time.

Table 6: Maximum Recommended Length of Steam Line

Unit Size	Steam Output		Steam Outlet and Line Size		Maximum Length		Possible Loss		Possible Loss at Max. Length	
	lb/hr	(kg/hr)	copper (SST)		ft	(m)	lb/hr/ft	(kg/hr/m)	lb/hr	(kg/hr)
50	50	(23)	1 1/2	(1 3/4)	37	(11)	0.11	(0.16)	4	(2)
100	100	(45)	1 1/2	(1 3/4)	90	(27)	0.11	(0.16)	10	(4.5)
175	175	(80)	3	(3)	90	(27)	0.16	(0.24)	14	(6.5)
250	250	(114)	3	(3)	180	(55)	0.16	(0.24)	28	(13)
375	375	(170)	4	(4)	180	(55)	0.22	(0.33)	39	(18)
525	525	(239)	4	(4)	220	(67)	0.22	(0.33)	48	(22)
750	750	(341)	2X 4	(4)	260	(79)	0.44	(0.66)	114	(52)
1050	1050	(477)	2X 4	(4)	260	(79)	0.44	(0.66)	114	(52)

NOTE: See Table 7 for equivalent length of common fittings.

Table 7: Equivalent Length of Some Common Fittings

Tube Diameter in.	90 Degree Elbow ft (m)	45 Degree Elbow ft (m)	Side Outlet Tee ft (m)	Gate Valve ft (m)	Control Valve ft (m)
1 1/2 or 1 3/4	3.5 (1)	1.75 (0.5)	7 (2.1)	0.8 (2.4)	34 (10)
3	5 (1.5)	2.5 (0.75)	11 (3.3)	1.1 (3.1)	54 (16)
4	8 (2.4)	4 (1.2)	15 (4.5)	1.6 (0.5)	80 (24)

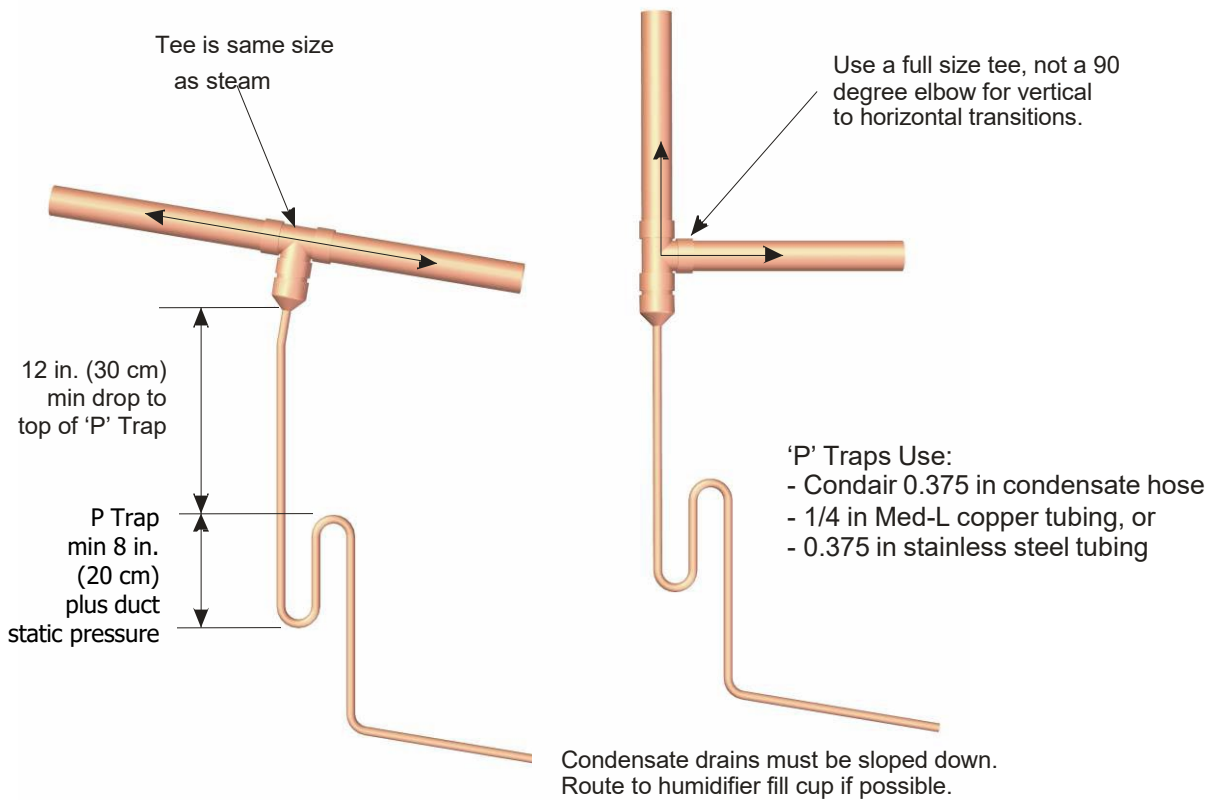


Figure 14: Condensate routing

Note: Condensate should not be routed to a sink used frequently by personnel. Route to a floor drain or equivalent. Condensate normally cools in traps but is still hot. A SAM-e or larger steam line generates more condensate and water may not cool in the trap. A drain water cooler option may be installed if required by code.



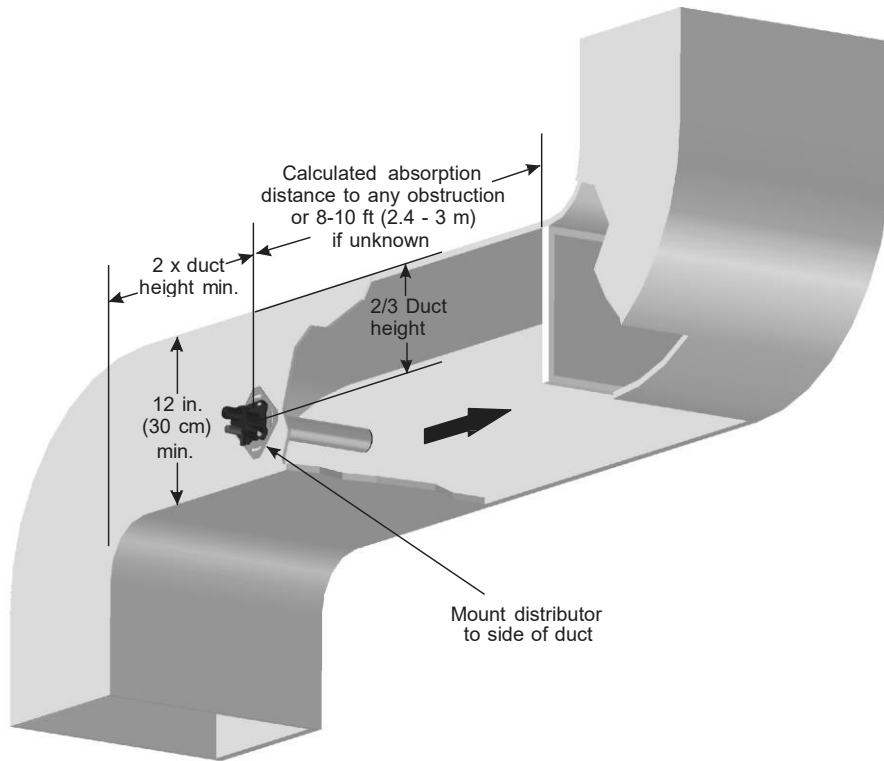


Figure 15: Distributor Location in Duct



Note:

Refer to distributor or SAM-e installation manuals for detailed installation instructions.

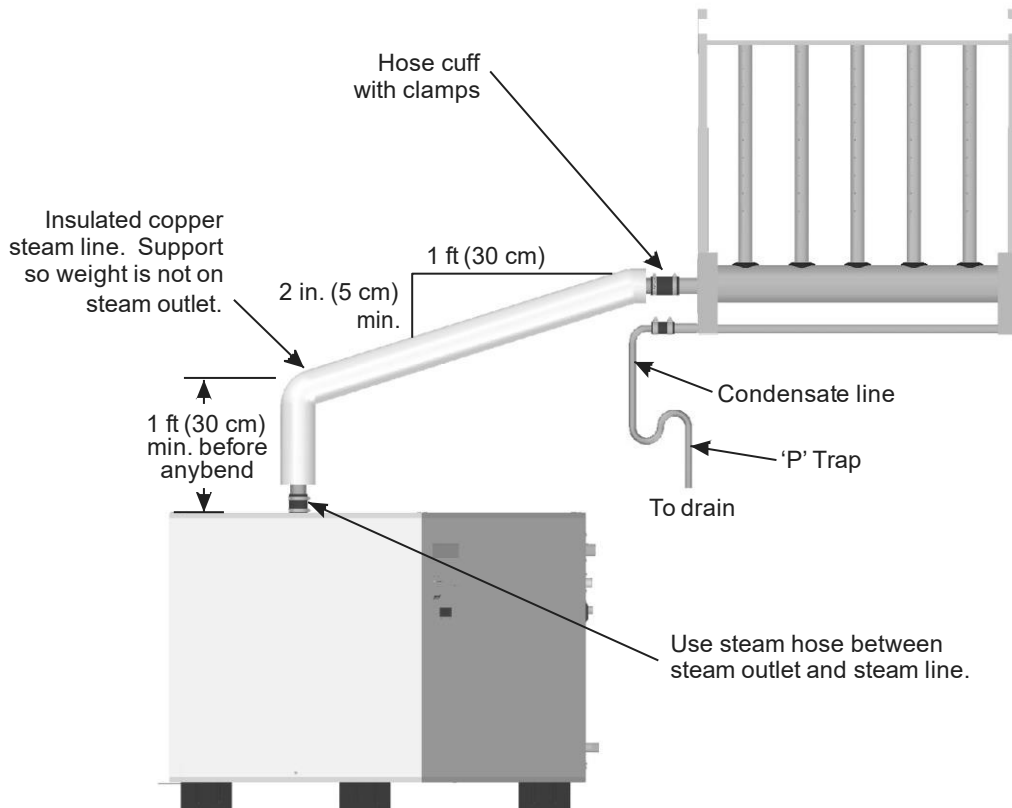


Figure 16: SAM-e/Steam Distributor Above Humidifier (Copper Steam Line Shown)

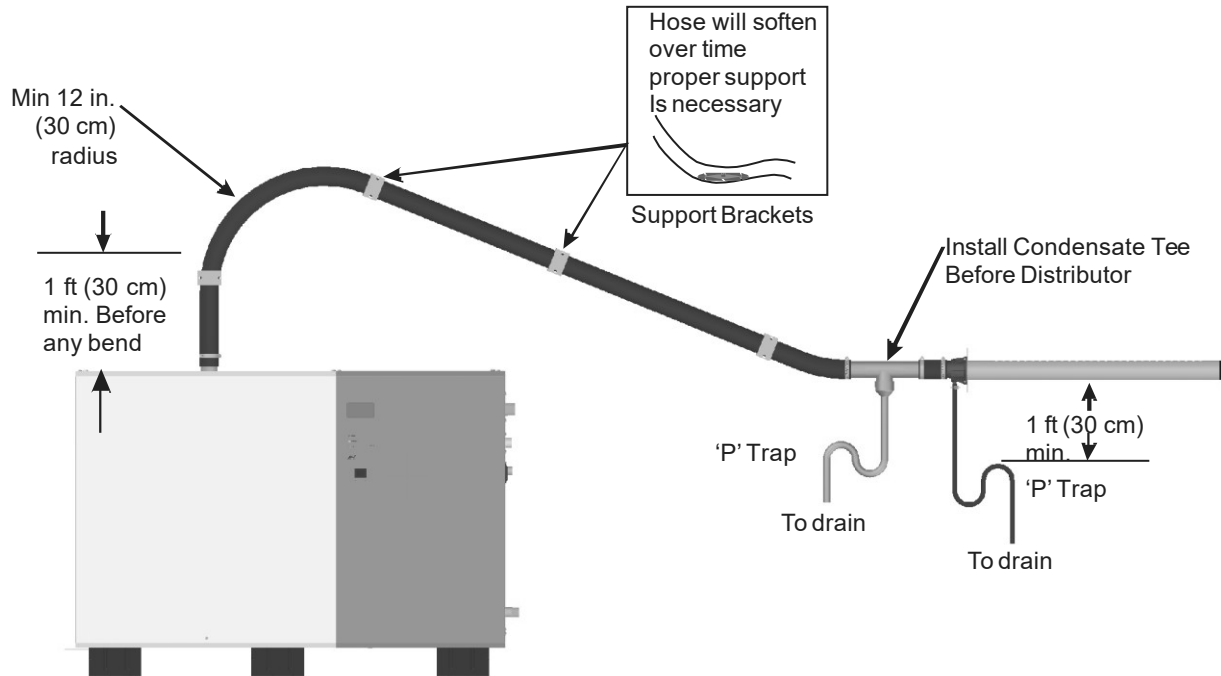


Figure 17: Steam Distributor/SAM-e Below Humidifier (Hose Shown)

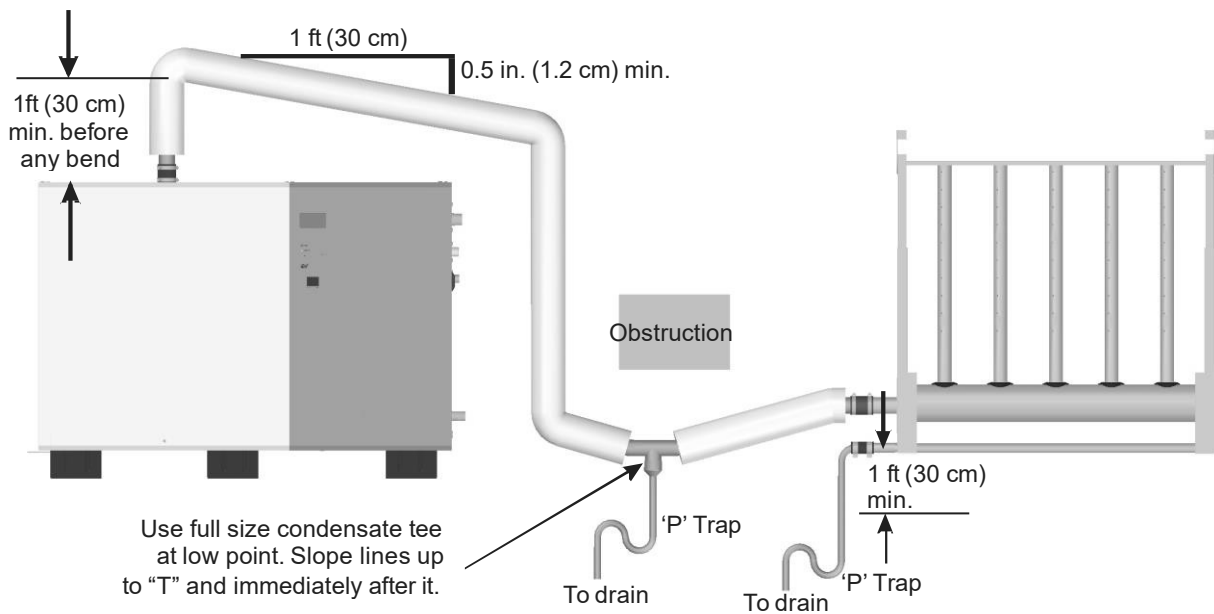


Figure 18: Steam Under Obstruction (Copper Steam Line Shown)

Method for Longer Runs With Limited Vertical Space

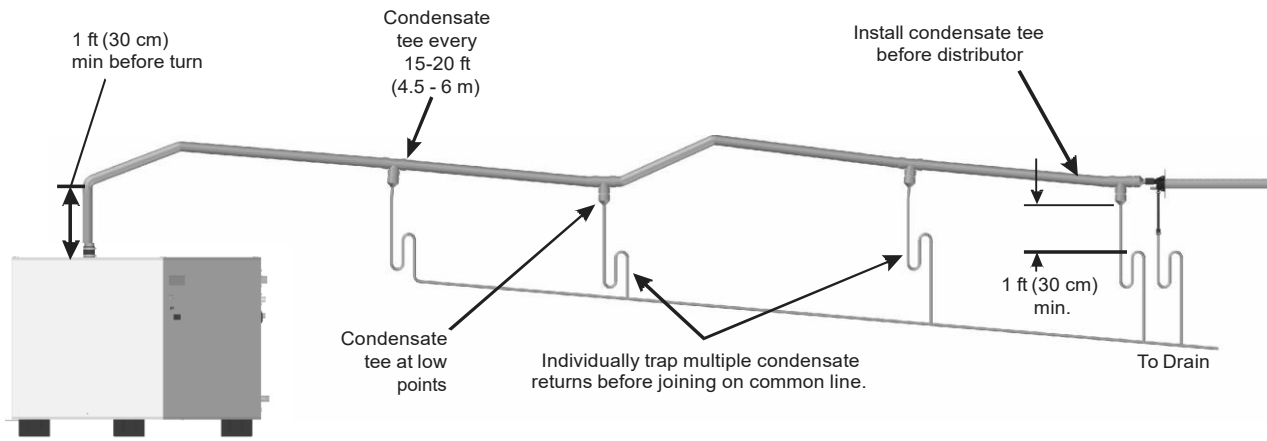
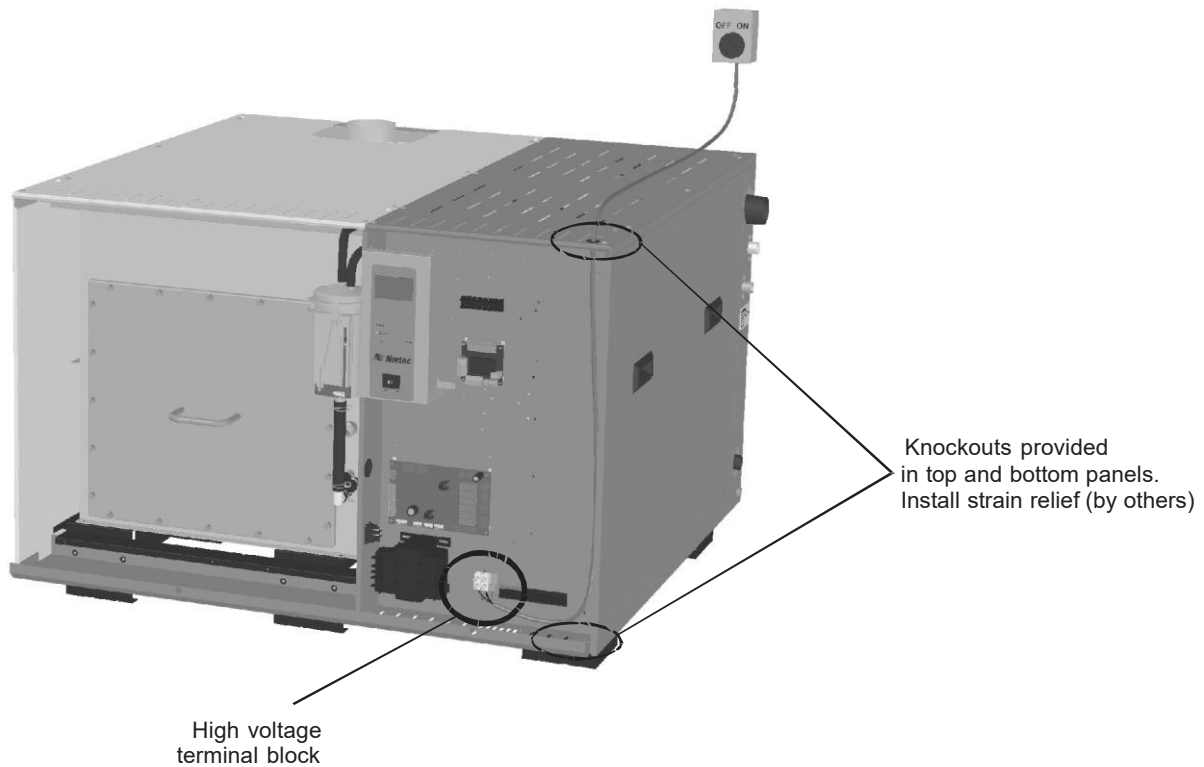


Figure 19: Long Steam Run

Electrical

Caution:

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



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 humidifier amp draw as indicated on the specification label.
- 3 All wiring to be in accordance with national and local electrical codes.

Nortec SETC / P Primary Power

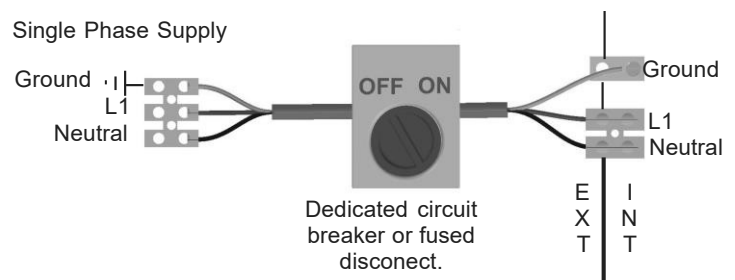


Figure 20: Primary Power Connection

External Controls

Control Wiring

Controls are available from Condair as accessories. If controls were not ordered with humidifier 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 Nortec SETC humidifier can be operated with two modulating inputs. The Nortec SEP has one modulating input which can be used for a duct high limit or humidity control. Both the Nortec SETC and Nortec SEP can be operated as On/Off. See Control Setting on page 53 for Nortec SETC configuration and On/Off or Modulating Control (J10) on page 61 for Nortec SEP configuration.



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

Control Location

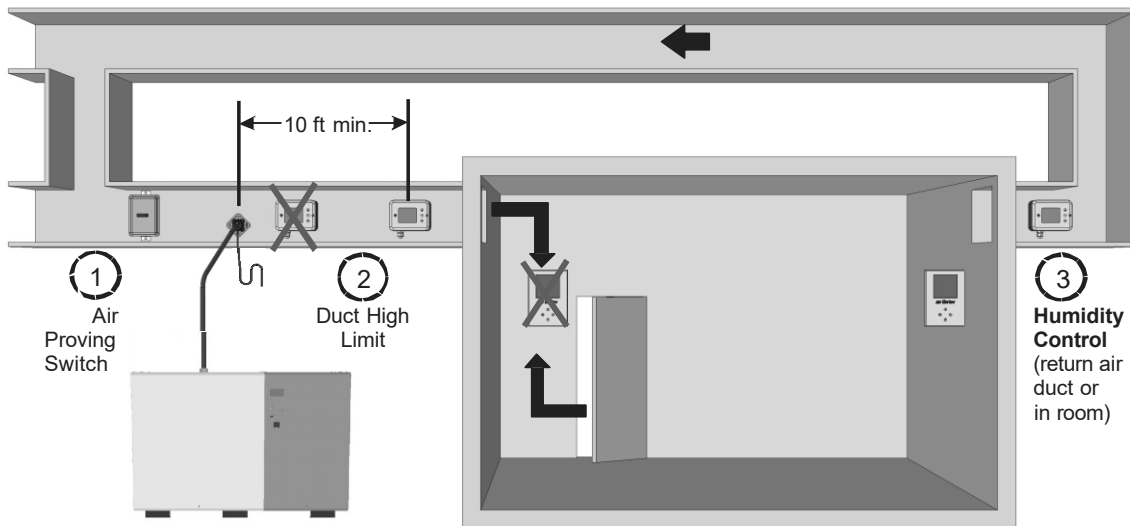


Figure 21: Control Location

- 1** Air Proving Switch
 - Locate so that it can sense air flow or lack of it.
- 2** Duct High Limit
 - Nortec SETC can be modulating, On/Off, or a humidity sensor. Nortec SEP can be modulating or On/Off.
 - Locate at least 10 feet from steam distributor or far enough that under normal conditions steam is fully absorbed.
- 3** Humidity Control
 - Nortec SETC can be Modulating, On/Off, or a Humidity Sensor. Nortec SEP can be modulating or On/Off.
 - Can be located either in return air duct (preferred) or in room being humidified.
 - Mount in area representative of room humidity (draft, doorways, sunlight, or overhang such as a shelf can affect reading). Avoid placing near discharge diffuser of humidified air.



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

On/Off Control Wiring

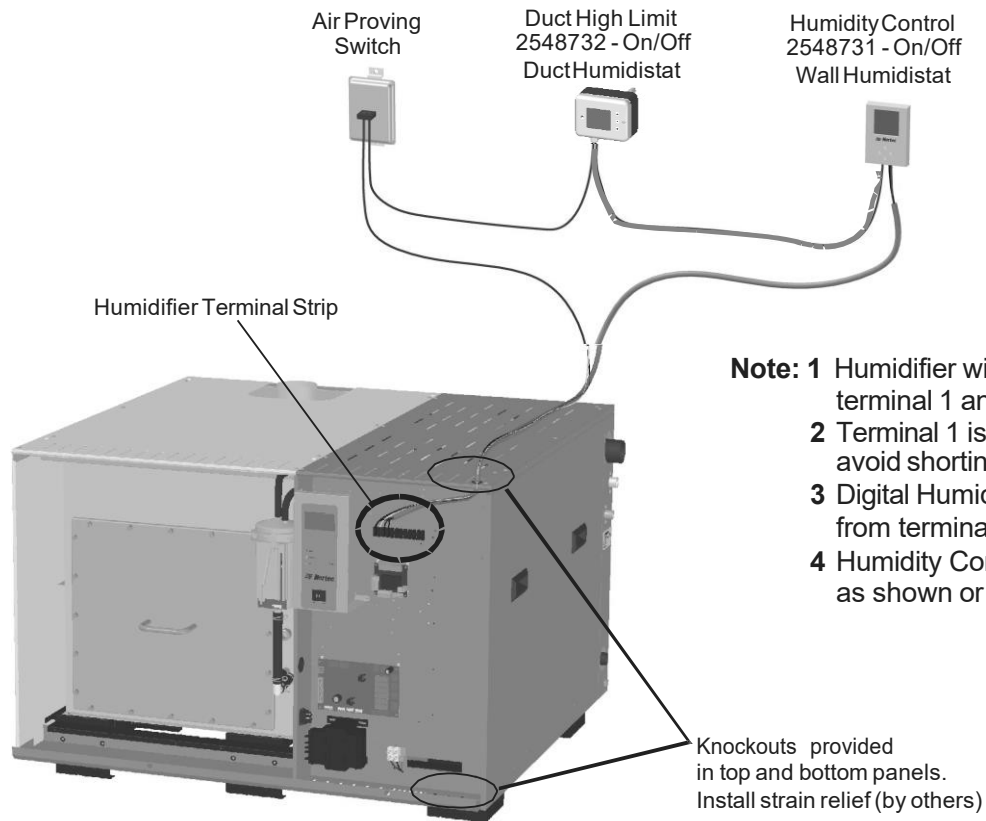


Figure 22: On/Off Controls

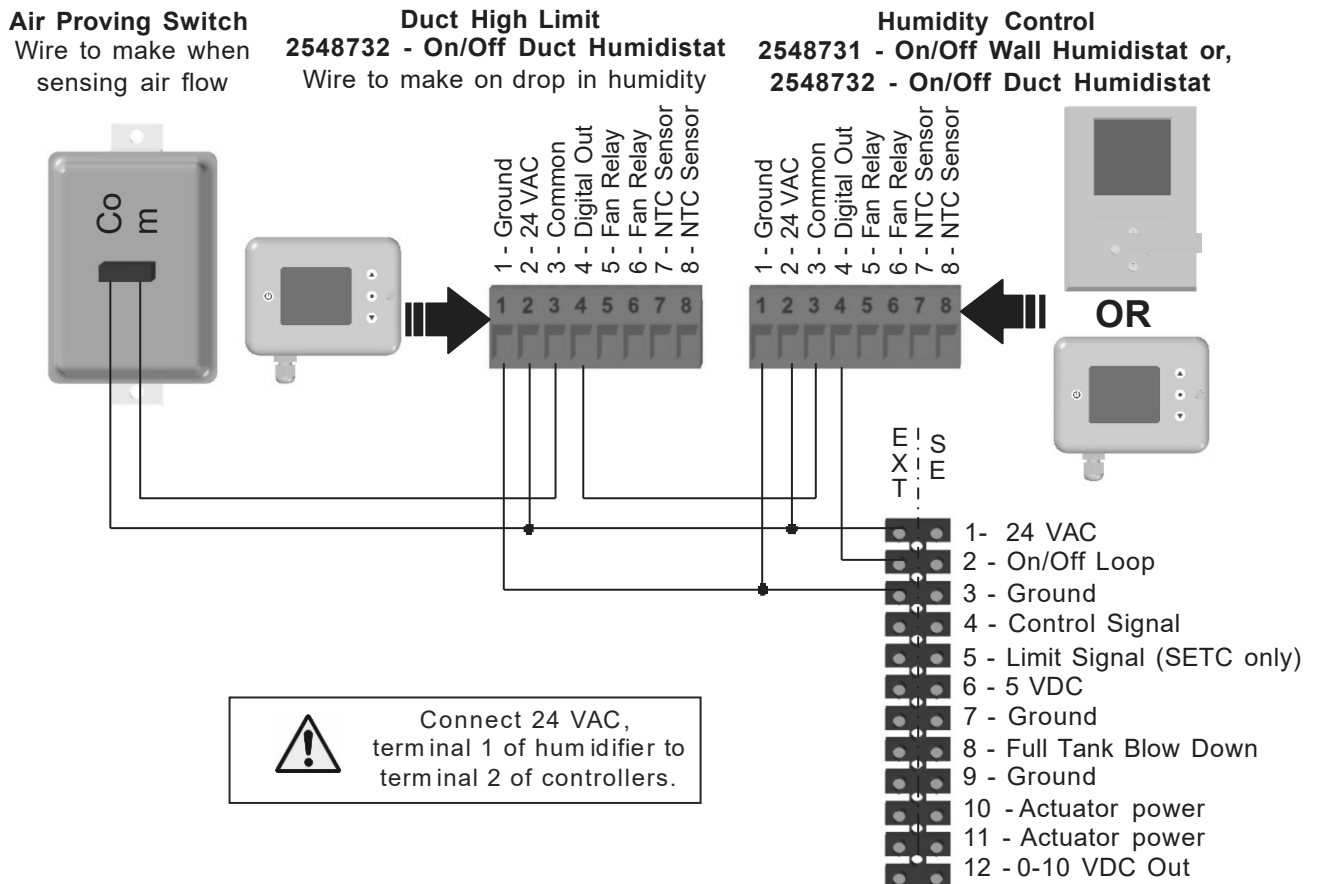


Figure 23: Digital On/Off

Modulating Control Wiring

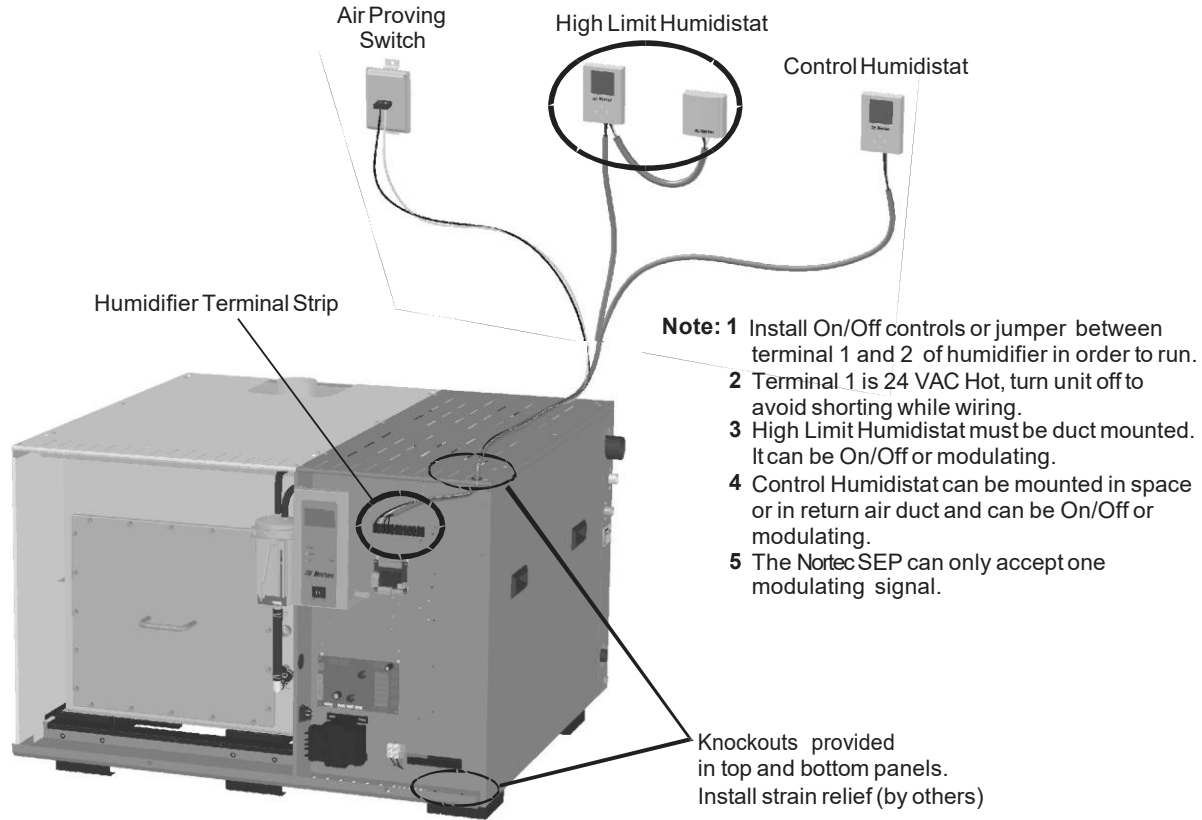


Figure 24: Modulating Controls

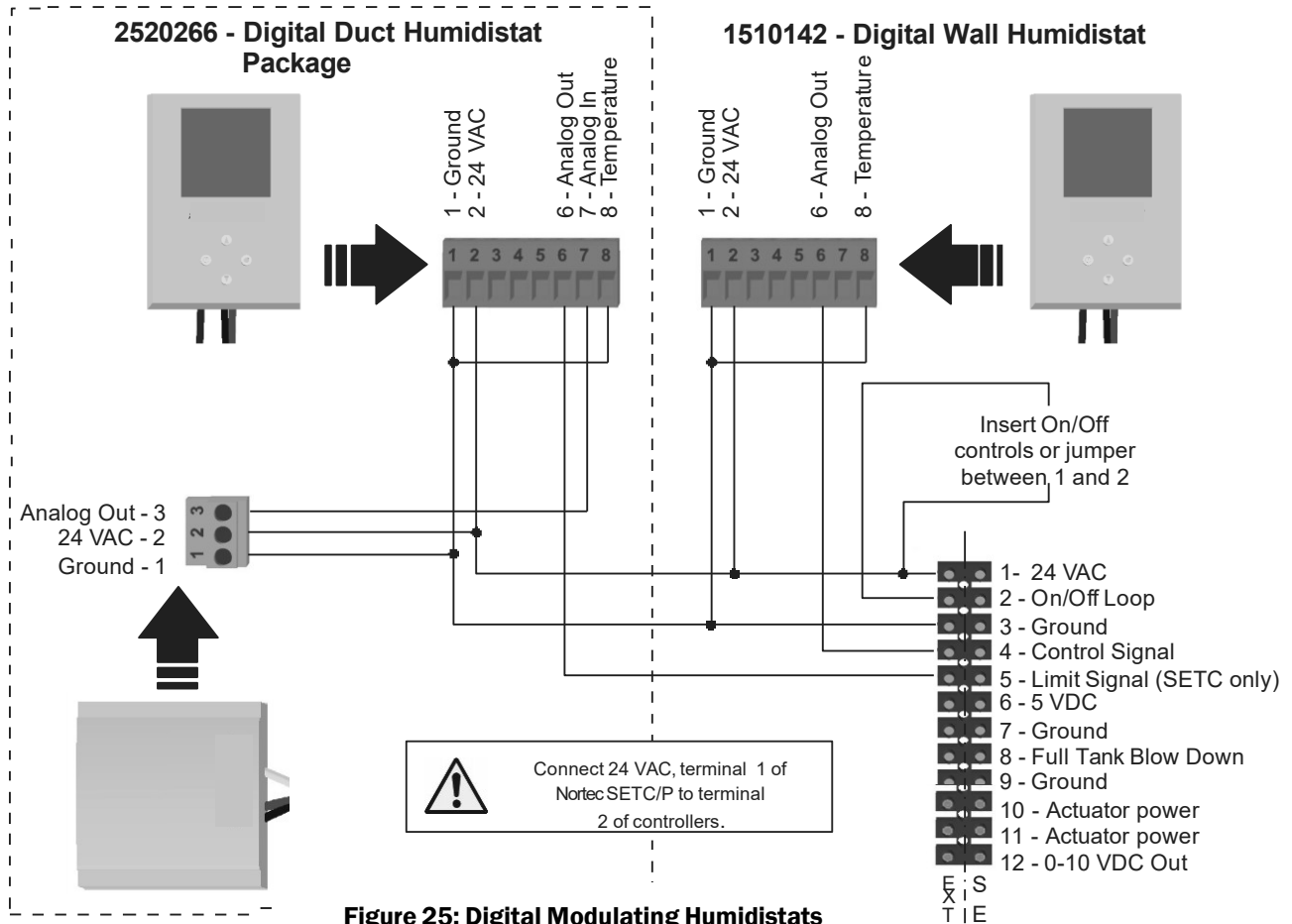


Figure 25: Digital Modulating Humidistats

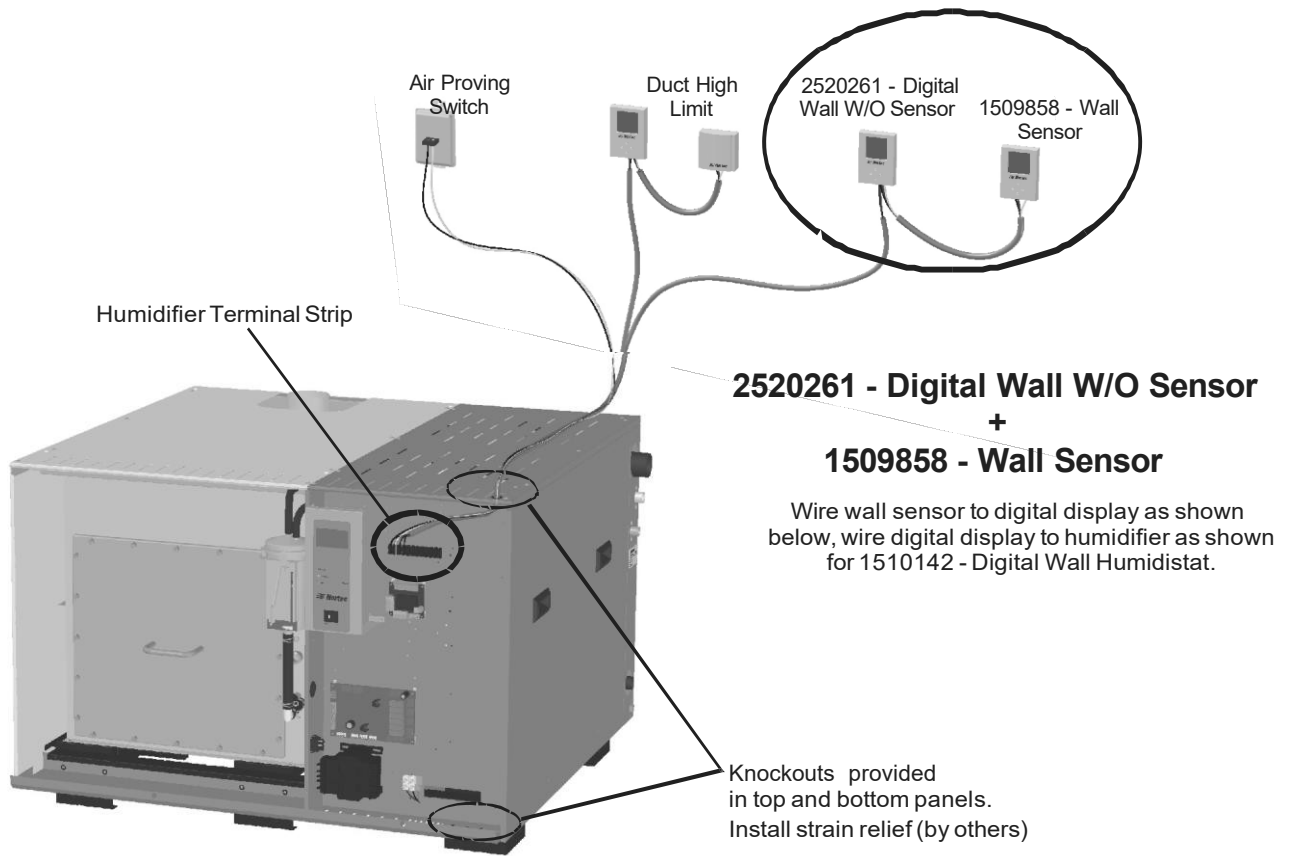


Figure 26: Digital Wall Humidistat – Remote Wall Sensor

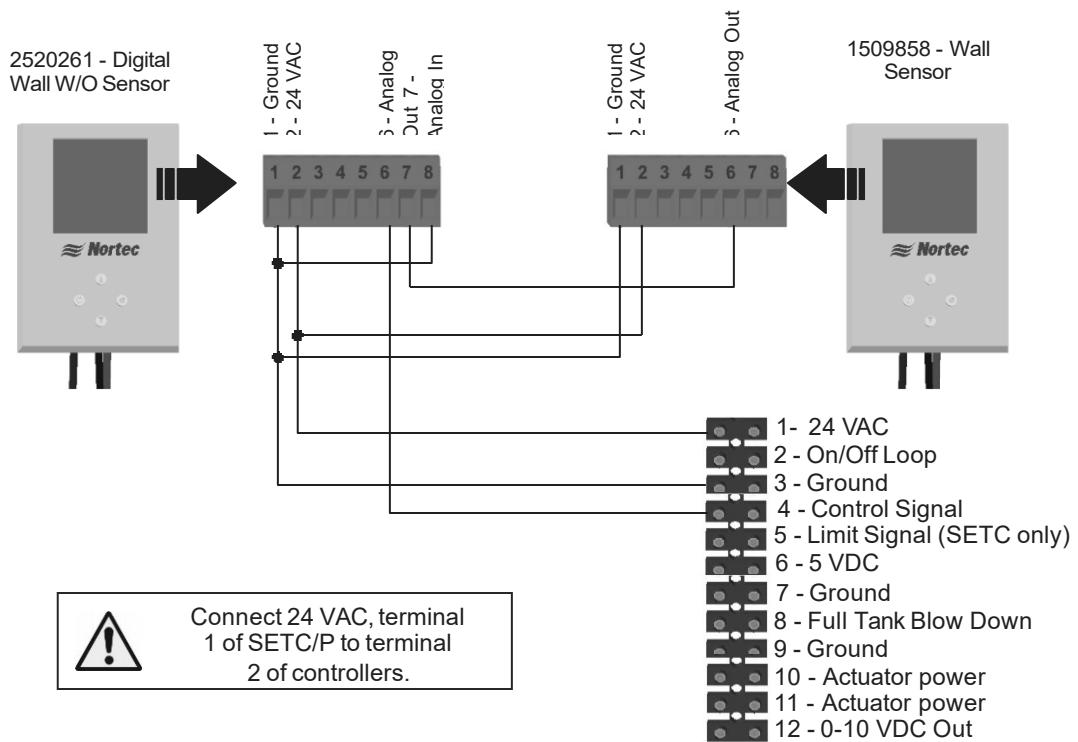


Figure 27: Remote Wall Sensor Wiring

Transducer Control Wiring (Nortec SETC Only)

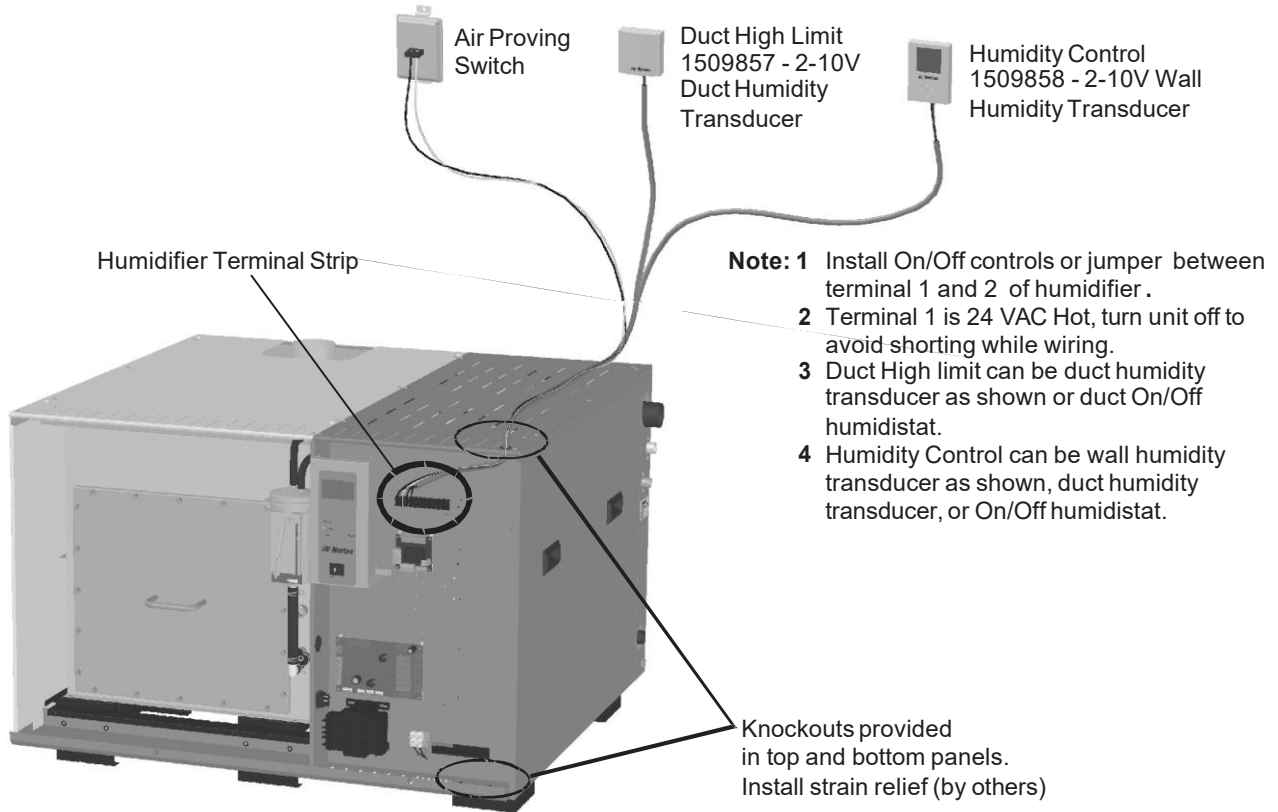


Figure 28: Transducers

1509857 - 2-10V Duct Humidity Transducer

1509858 - 2-10V Wall Humidity Transducer

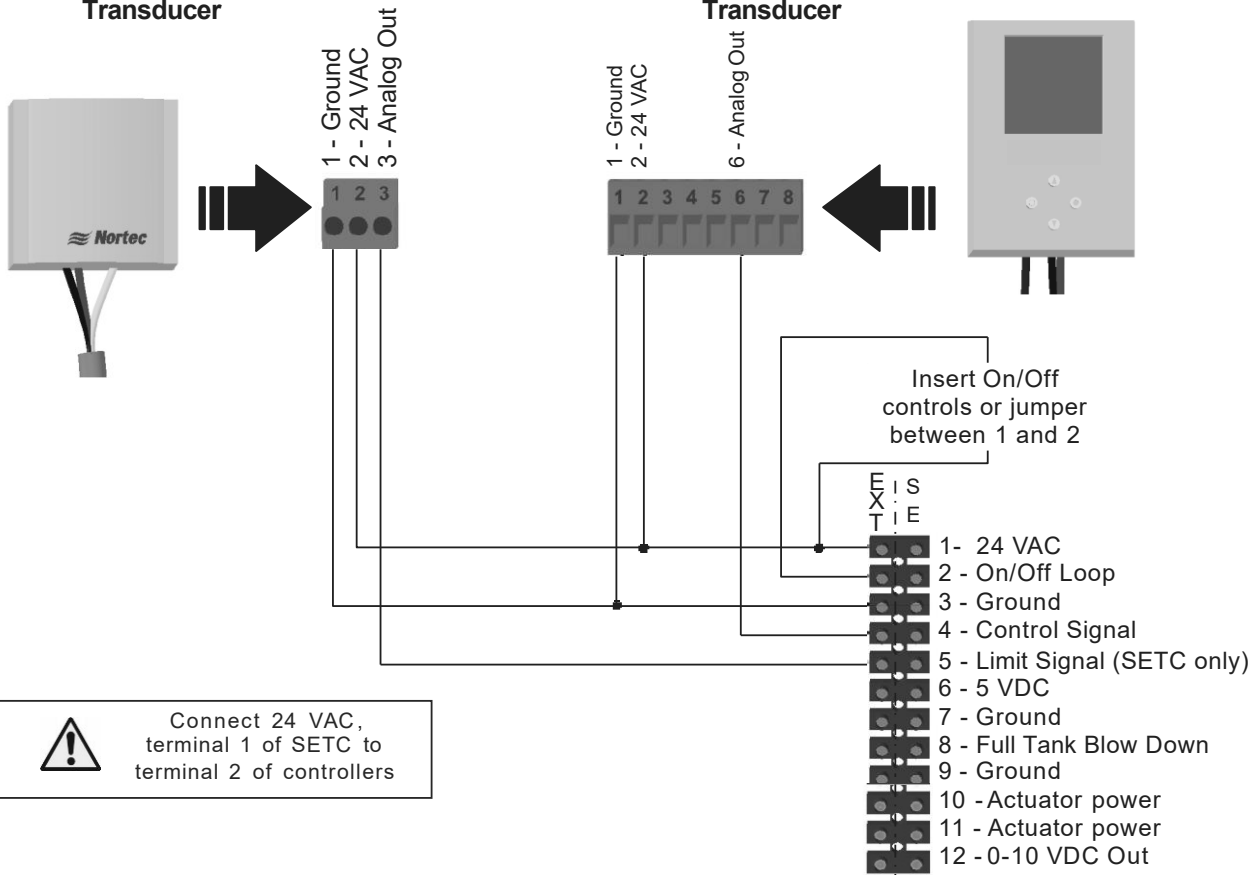


Figure 29: Digital

Optional Outdoor Temperature Reset

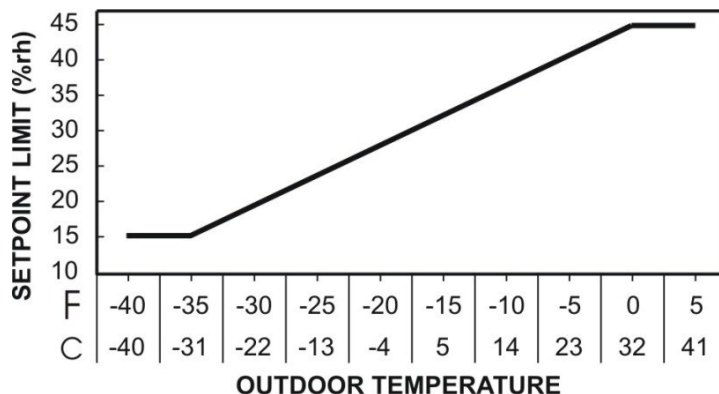


Figure 30: Outdoor Temperature Reset

- 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.

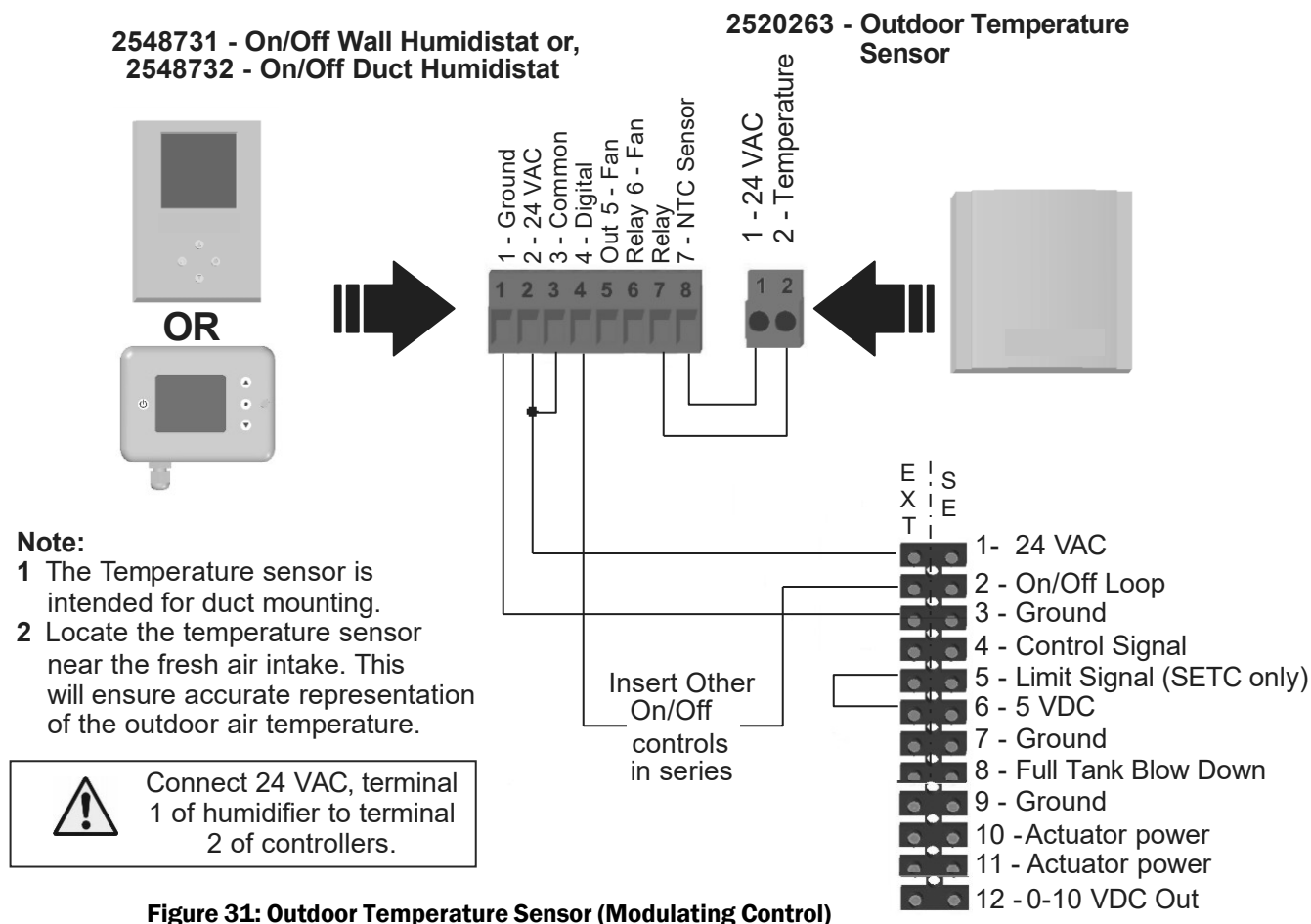


Figure 31: Outdoor Temperature Sensor (Modulating Control)

2520263 - Outdoor Temperature Sensor

**1510142 - Digital Wall Humidistat or,
2520266 - Digital Duct Humidistat Package**

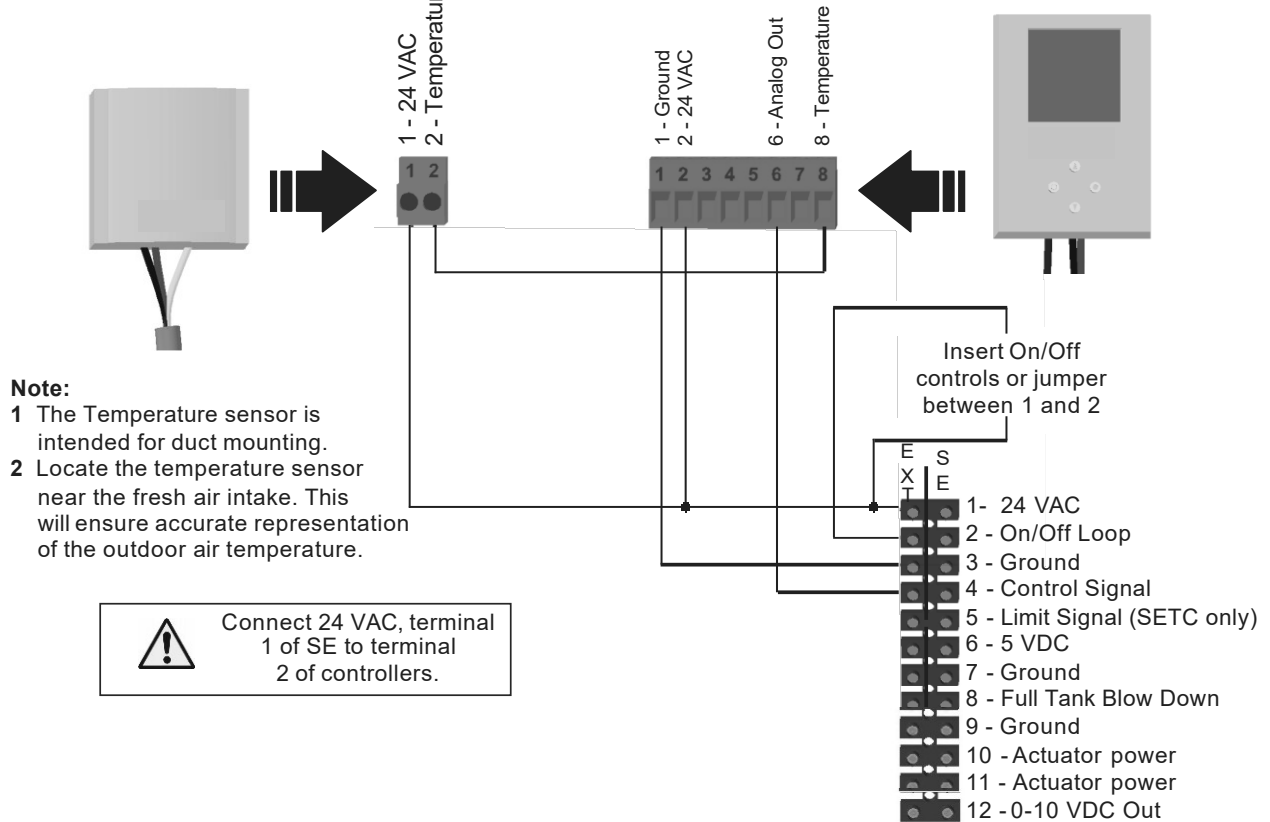


Figure 32: Outdoor Temperature Setback (On/Off Control)

CV Valve Actuator Wiring

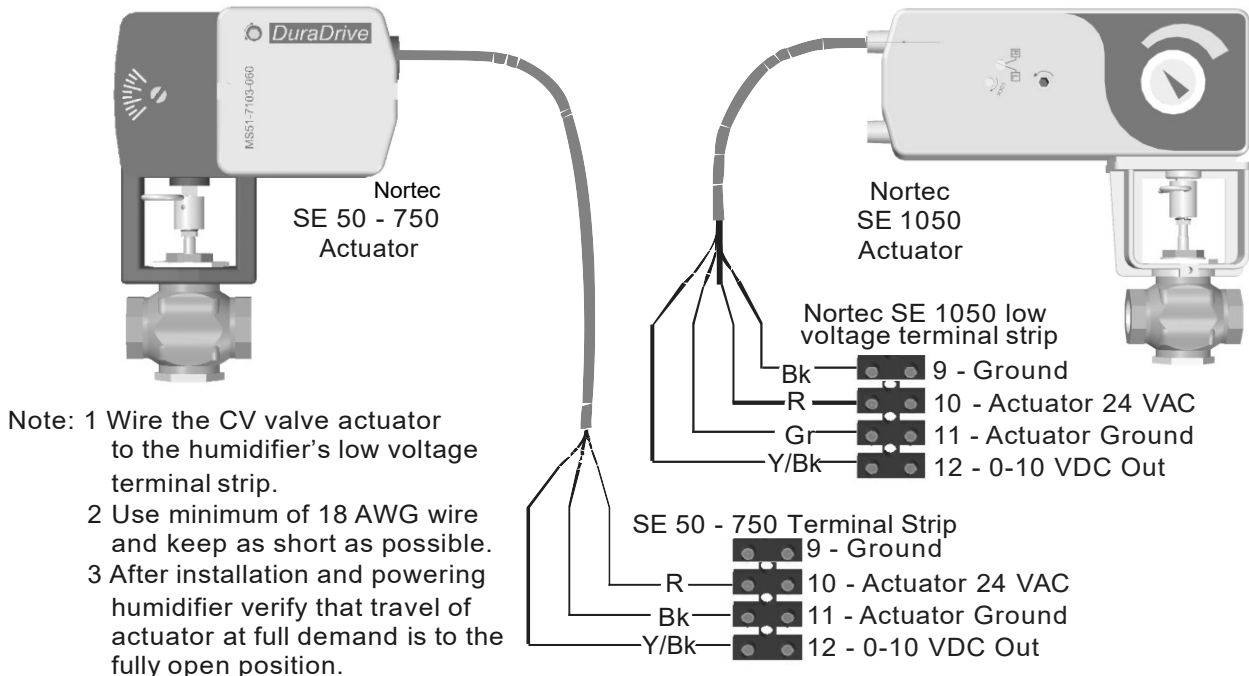


Figure 33: Schneider - CV Valve Actuator Wiring

Belimo Actuator Wiring

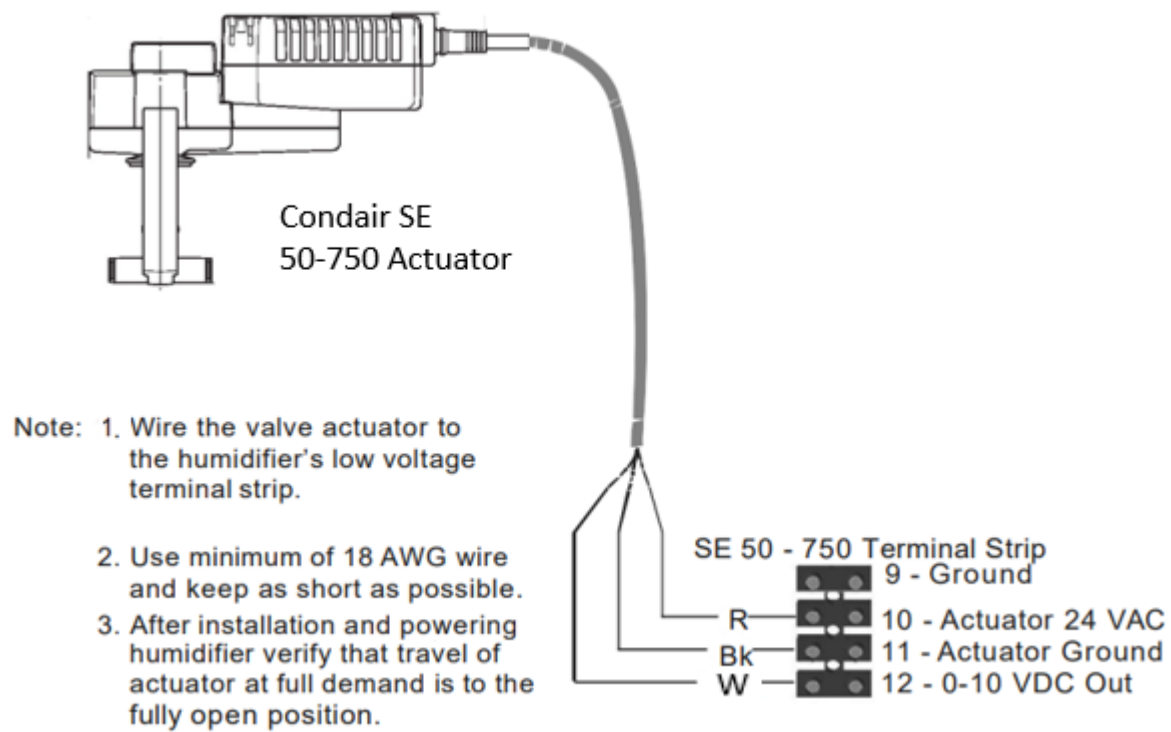


Figure 34: Belimo Actuator Wiring

Remote Relay Board Wiring

The Nortec SETC (not SEP) remote relay board provides the output signal for the CV Valve Actuator and includes 4 relays that can provide remote status indication. The remote relay board is located as shown in Figure 35: 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 sends a signal to the CV valve actuator to open the CV valve and steam is being produced.
- 3 **Service** – The relay can be wired to open (NC) or close (NO) when a warning is displayed on the humidifier 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 humidifier controls.

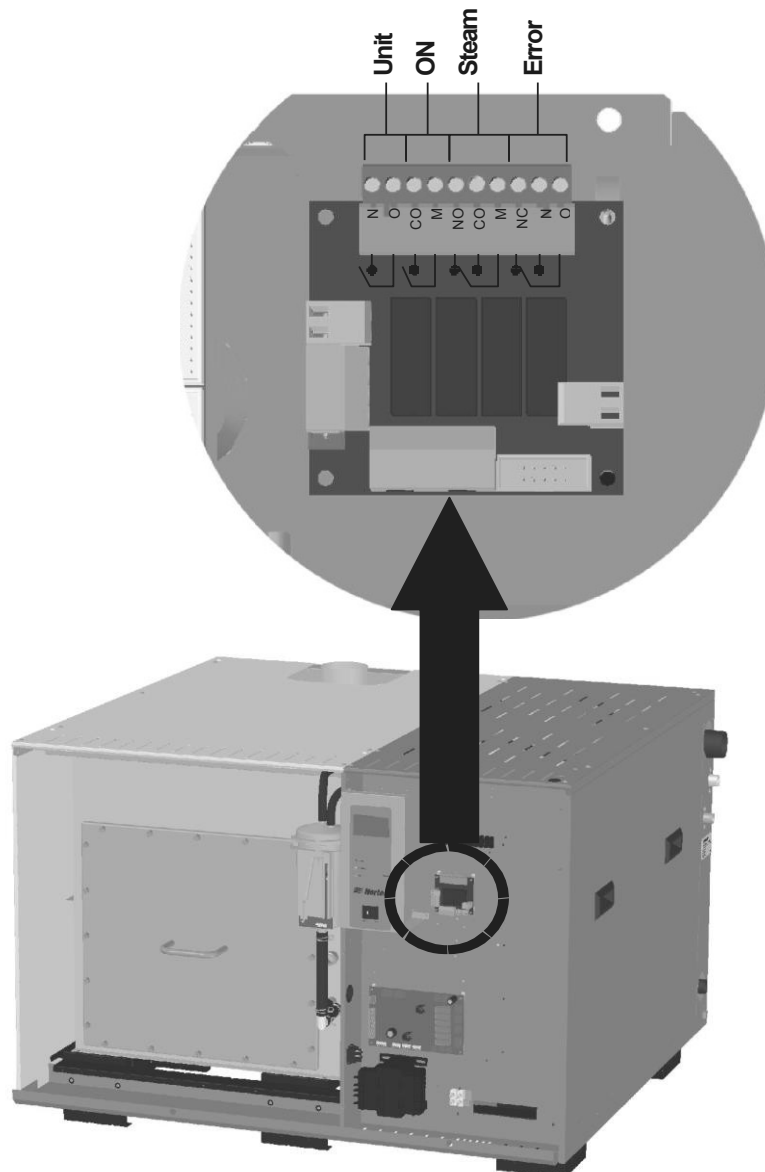
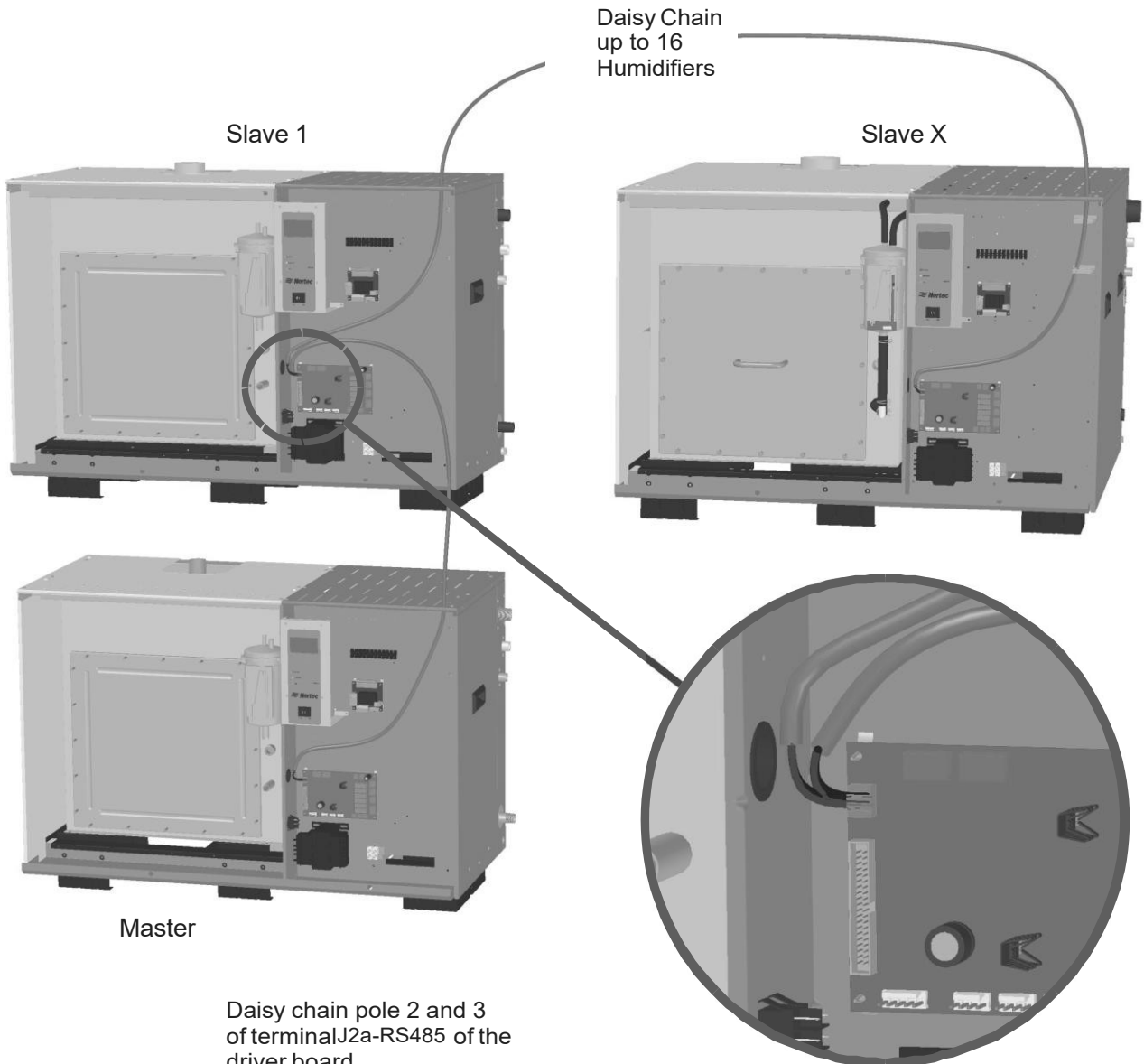


Figure 35: Remote Relay Board Wiring

Staged Modulation Wiring (Nortec SETC Only)

- Connect up to 10 units (equivalent of 10,500 lb/hr (4,770 kg/hr)) using 18-24 AWG multi-strand, twisted pair, shielded cable.
- Connect humidistats/transducers and On/Off safety loop to master unit only.
- See Multi Mode on page 54 and Multi Unit Op. Range on page 56 for software configuration.



Daisy chain pole 2 and 3 of terminal J2a-RS485 of the driver board.

Note:
Do not reverse polarity.
Do not connect to pole 1 or 4.

Figure 36: Staged Modulation Wiring

Options and Accessories

Note:

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



Remote Blower Pack

Remote blower packs are available for the Nortec SETC/P for applications where steam for humidification must be introduced directly into the space being humidified. For instructions on installing the remote blower pack refer to the installation instructions supplied with it. The steam line and condensate return instructions provided in this manual are also applicable to remote mounted blower packs.

The blower packs include a safety relay which should be used to prevent the humidifier from operating if the blower packs do not have power. Wire humidifier security loop in series through all blower packs and other On/Off controls.

Drain Water Cooling (External)

Pneumatic and electric drain water coolers are available from Condair for installation outside the humidifier or on condensate drains from steam traps, distributors, and SAM-e headers. If condensate cannot be routed back to the humidifier tank via the humidifier's fill cup then an external drain water cooler may be required to meet regulations restricting the temperature of hot water that can be fed to drain. The external drain water cooler is only available for field installation.

Start Up

- 34 Installation Check**
- 35 Nortec SETC User Interface**
 - 35 Manual Drain Switch
- 36 Start Up Procedure**
- 37 Status Screens**
- 39 Condair Digital Controls**
- 40 Staged Modulation (Nortec SETC Only)**
- 40 LINKS 2**
- 40 Condair ONLINE**
- 41 Nortec SETC/P Pre-Start Up Checklist**
- 42 Nortec SETC/P Start Up Checklist**

Installation Check

Before turning on power to the Nortec SE, inspect the installation to insure that it was carried out correctly. Refer to Figure 37: Installation Check, to the Nortec SETC/P Pre-Start Up Checklist on page 41, and to the chapter on Installation that starts on page 9.

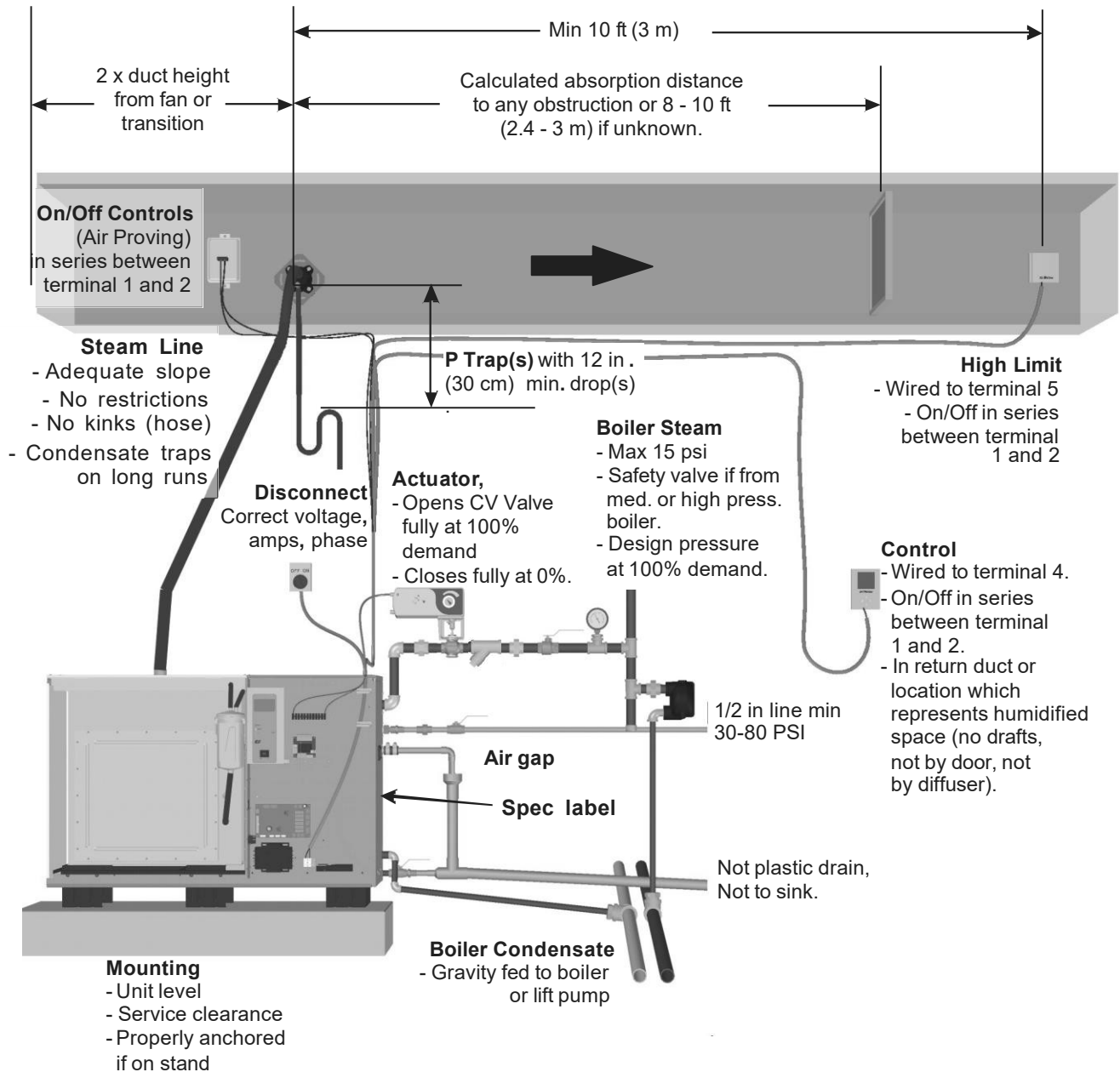


Figure 37: Installation Check

SETC User Interface

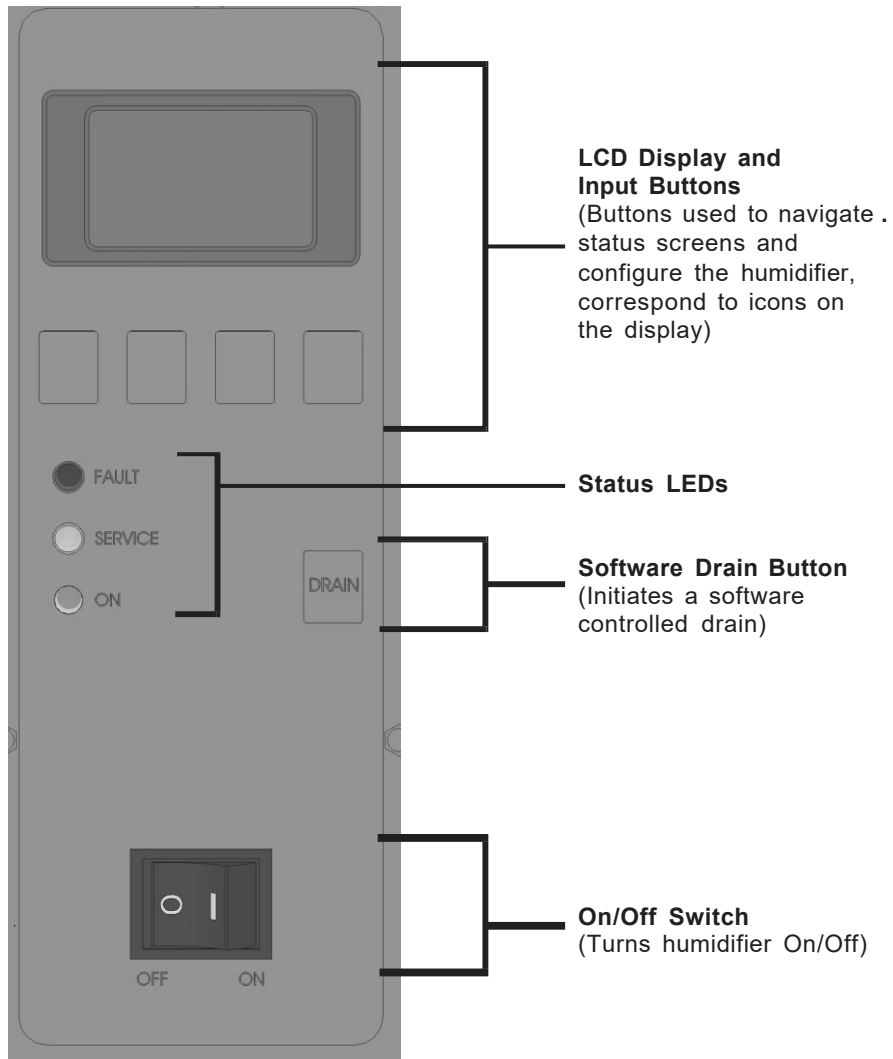


Figure 38: Nortec SETC User Interface

Manual Drain Switch

The Nortec SETC/P has a manual drain switch that can drain the tank even if software is not functioning. To drain the tank put the switch into the drain position. For normal operation the switch should be in the off position.

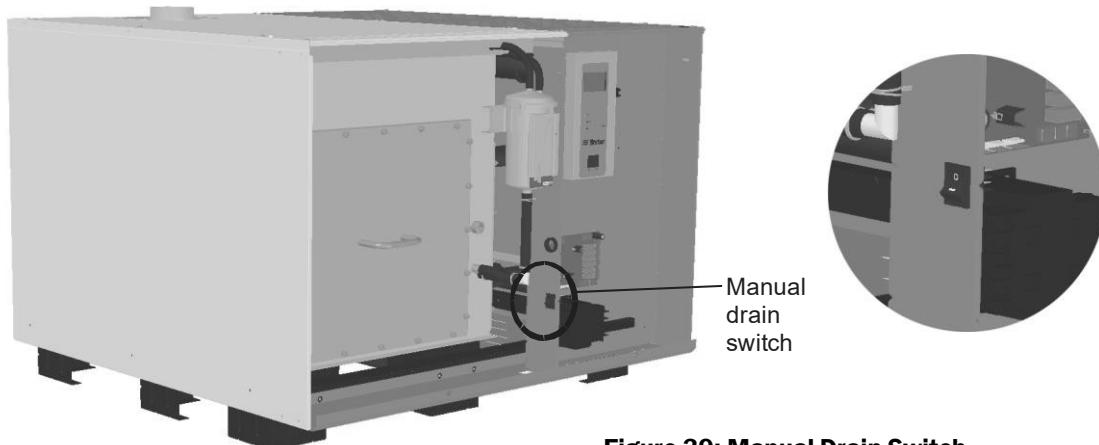


Figure 39: Manual Drain Switch

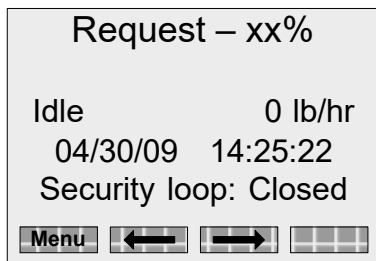
Start Up Procedure

- 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 Open the supply water shut off valve. If the auxiliary drain valve is installed ensure it is closed.
- 3 Slowly open boiler steam isolation valve to allow boiler steam into the steam supply line up to the CV valve.
- 4 Turn on the main power using the installed disconnect then turn the On/Off switch on the front of the humidifier to On.



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. The Nortec SE will then begin filling with water. The fill time is between 10 and 30 minutes depending on the size of the unit.

- 5 Once the water level is close to the top of the tank the LED lights on the SE's float chamber will light up and indicate the water level. On start up the Nortec SE will perform a float and drain pump test by first filling until just the green LED is lit and then draining until just the red LED is lit. After the float and drain test the humidifier is in normal operation mode.

Note:

- Pressing the ESC key on the keypad will interrupt the float and drain test and the humidifier will go straight to normal operating mode.
- If an error is detected during the self-diagnostic sequence a Fault will be displayed. See troubleshooting section for information on diagnosing and correcting faults.
- Nortec SEP does not have an LCD display. The information on the Nortec SETC's LCD depends on the Nortec SETC's configuration and actual operating conditions. It may vary from display shown.

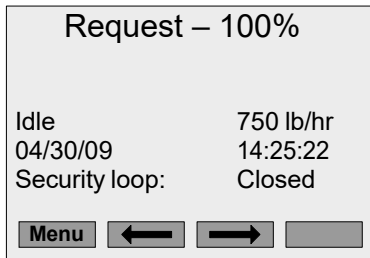


- 6 If On/Off or a control humidistats have been installed check and adjust the control setpoint on the control and high limit humidistat (see Nortec Digital Controls on page 39). If transducer controls have been installed then adjust the humidity setpoint using the keypad and display (see Transducer Control on page 39)
- 7 When either the external humidistat or internal controller generate a demand for humidity higher than 15%, the security loop is closed, and the float chamber indicates the tank is full the SE will transmit a signal to the CV valve to open. Steam will flow into the SE's heat exchanger(s) and the SE will heat the water in its tank.

Note: on initial startup with cold water in the Nortec SE's tank it may take 5 to 15 minutes (depending on unit size) for the Nortec SE to reach a full boil and produce its rated steam.

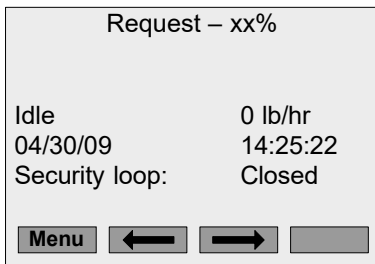


- 8 The green humidifying LED on the front of the humidifier will light up and the display will indicate “Humidifying” and the amount of steam being produced (Nortec SETC only).



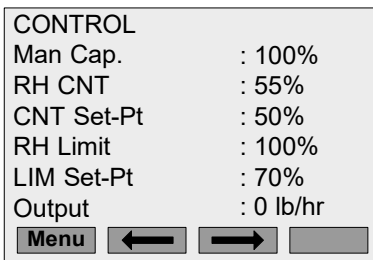
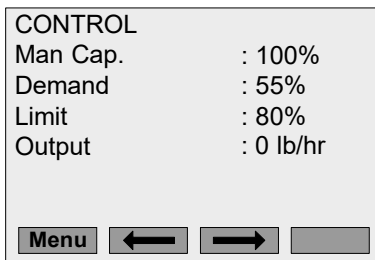
Status Screens

In addition to the main status screen the Nortec SETC 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, status, output, date and time, and security loop status. If status is not idle or humidifying the left arrow key becomes a “?”. If the button corresponding to the arrow key is pressed the display will give additional information on the status of the humidifier.



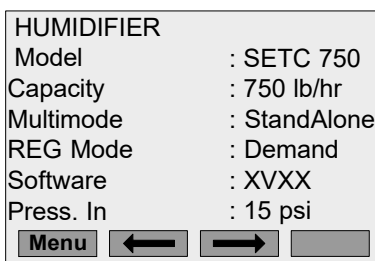
Control Information Screen

Output is the lb/hr steam output of the unit. Man Cap is the user configured capacity limitation. Depending on the control configuration the screen also reports the current inputs of channel 1 and 2. If the unit is configured for internal control it also provides the current humidity and setpoints.



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 control information screen do not match those connected to the humidifier.



Humidifier Information Screen

Model is the humidifier model type. Capacity is maximum output if the unit is supplied 15 psi steam. Multimode indicates if the humidifier is operating as part of a group controlled by a single control signal. REG Mode is the configured control method. Software is the installed software version. Press. In is the boiler steam supply pressure.

Analog Output	
Output Signal	: X.X VDC
Capacity	: xxx lb/hr
Total O/P	: xxx lb/hr
Tank Monitor	: On/Off
Quick Warm	: On/Off
Press. Base	: On/Off
Menu ◀ ▶	

Analog Output Information

Output Signal is the signal currently being output to the actuator.
 Capacity is maximum output based on actual boiler steam press.
 Total O/P is the current output of the humidifier.
 Tank Monitor indicates if tank monitoring is On/Off.
 Quick Warm indicates if Quick Warm is On/Off.
 Press Base indicates if output is based on actual steam pressure.

TANK STATUS	
Fill Valve	: ON/OFF
Drain Pump	: ON/OFF
Float Level	5
Run Time	: xxx hr
Serv. Time	: xxx hr
Serv Due	: xxx hr
Menu ◀ ▶	

Tank Status

Fill Valve indicates if the fill valve is open or closed.
 Drain pump indicates if the drain is on or off.
 Float level indicates the current float level.
 Run Time is total weighted operating hours since last service.
 Serv Time is the service interval set for the humidifier
 Serv Due is the time remaining before service is required.

SENSOR INPUTS	
Sec. Loop	: Closed
Tank Temp.	: Closed
Menu ◀ ▶	

Sensor Inputs

Sec. Loop indicates if the security loop is open or closed.
 Tank Temp indicates if the tank is cold (open) or hot (closed)..

FEATURES LIST	
Idle Mode	: Idle Drain
FTBD	: On/Off
Time Prop.	: On/Off
BD Rate	: 25%
Drain Cool	: On/Off/Smart
Float Check	: On/Off
Menu ◀ ▶	

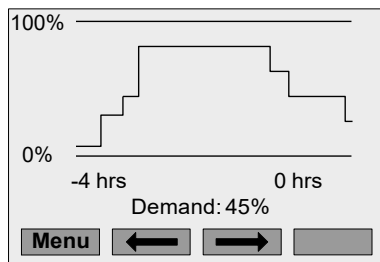
Features List

Idle Mode indicates what the humidifier is configured to do when there is no demand.
 FTBD indicates if full tank blow down is enabled.
 BD Rate indicates water drained for scale control as % of output
 Drain Cool indicates configuration of drain water cooling feature
 Float Check indicates if the humidifier will perform float checks.

FEATURES LIST	
Idle Mode	: Idle Drain
FTBD	: On/Off
Time Prop.	: On/Off
BD Rate	: 25%
Drain Cool	: On/Off/Smart
Float Check	: On/Off
Menu ◀ ▶	

Operational Hours

Total indicates the number of hours the humidifier has been producing steam.
 Weighted indicates the total amount of steam the humidifier has produced expressed as number of hours running at 100% output.



Trend Graph

This graph provides a history of the humidifiers output for the past 4 hours. It displays a percentage of full output which corresponds to the demand signal. The current demand signal is displayed at the bottom of the screen.

Digital Controls

Condair provides optional On/Off, Modulating Control, or Transducer digital controls. Figure 40 and Figure 41 show the function and meaning of the Digital Control's display and buttons. All controls are available either wall mounted or with a remote sensor for duct mounting.

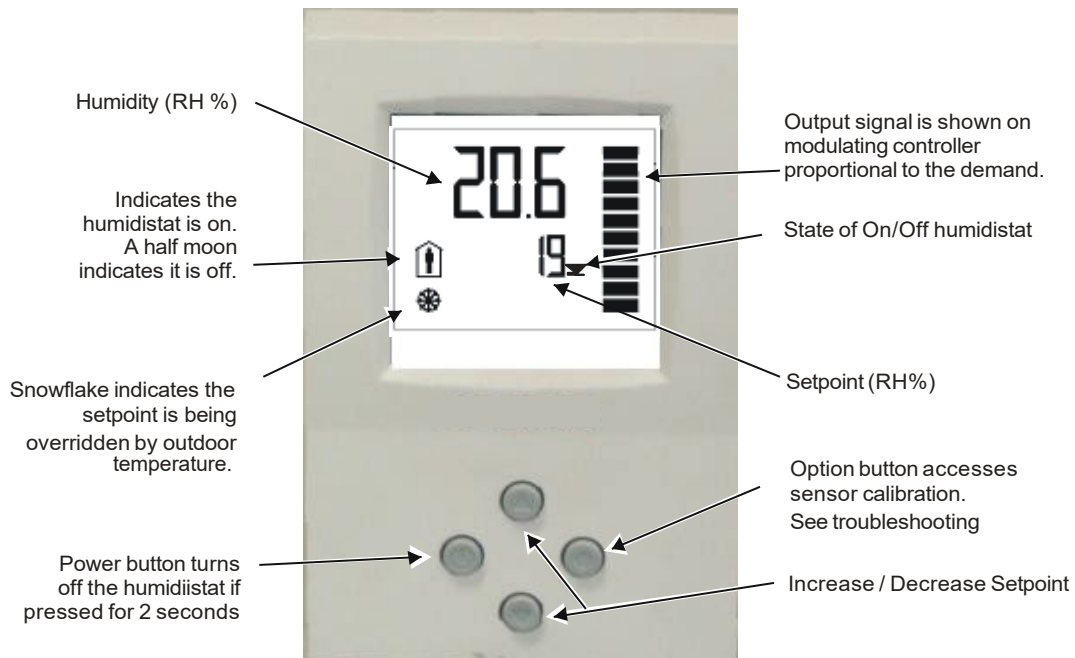


Figure 40: Modulating and On/Off Digital Control Operation

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 Nortec SETC's display and keypad.

Note: It is possible to field calibrate Condair Digital controls if the displayed humidity is found to be different than a known trusted source. See Digital Humidistat on page 75 of chapter on Troubleshooting.

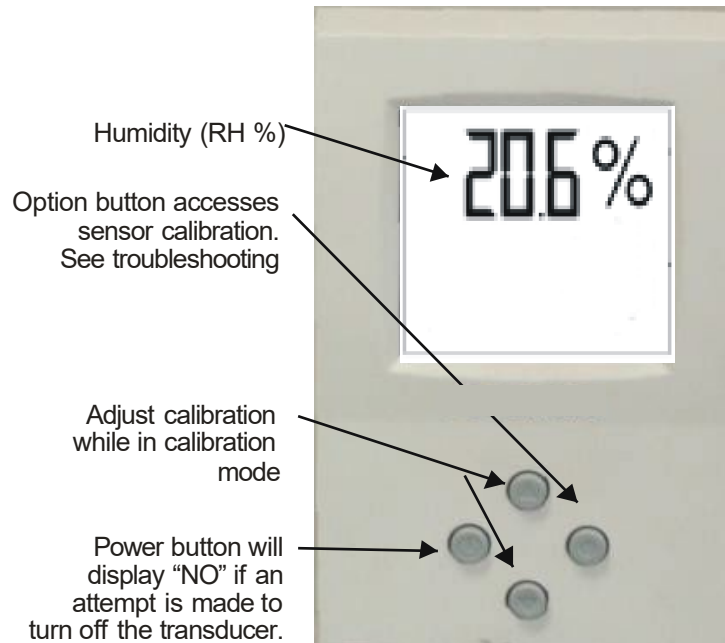


Figure 41: Transducer Control Operation

Staged Modulation (Nortec SETC Only)

Start up of each humidifier configured and installed for Staged Modulation is the same as starting up standalone humidifiers with the exception that for the humidifier to fill and produce steam the demand to the master unit must be greater than the **Multi Unit Op. Range** setting of the unit being started. (Example for a slave unit configured to operate between 20 and 30% the demand to the master must be greater than 22%)

Each unit connected in a staged modulation system will display its demand as a percentage of the range for which it is configured. Example, a slave unit configured to operate between 20 and 30% demand will display a demand of 50% when demand to the master is 25%.

Note: See Multi Mode on page 54 and Multi Unit Op. Range on page 56 for software configuration. See Staged Modulation Wiring on page 31 for control wiring of humidifiers in a Staged Modulation system.

LINKS 2 (Nortec SETC Only)

LINKS 2 is an option that can be integrated with the Nortec SETC. It allows a Building Management System to monitor and / or control the humidifier. For complete information about LINKS 2 and its operation and configuration, go to www.condair.com and look up the LINKS 2 manual.

Condair ONLINE (Nortec SETC Only)

Condair ONLINE is an option that can be integrated with the Nortec SETC. It allows a user to monitor their unit from any computer with an internet connection by logging in to www.condaironline.com. It can also be configured to send service reminders and fault warnings when they occur.

Nortec SETC/P Pre-Start Up Checklist

Unit Serial #: _____ Tag: _____

Unit type: _____ Voltage: _____ V/ _____ ph Steam output: _____ lb/hr

Customer/Job: _____ Address: _____

Water Quality:

- Potable (0-12 grains/gal, 0-14 ppm Silica, 0-25 ppm Chlorides) RO DI

Humidifier Mounting: (Clearances around the unit Acceptable Obstruction)

- Level Front/Side Clearance Anchored (if on stand)

Steam Line(s):

- Slope up (min 2 in/ft). Slope down (min 0.500 in/ft)
- Diameter / Size _____ Material _____
- Low point condensate traps No Hose Kinks / Restrictions
- Insulated Type of Insulation _____

Condensate Line(s):

- P Trap min 8 in. (20 cm) plus duct static pressure P Trap min 12 in drop

Water Line:

- Can provide required flow Water pressure: 30-80 psig

Drain Line:

- Air gap within 3 ft of the unit Diameter / Size _____
- Auxiliary drain connected with shut off valve

Boiler Steam

- Boiler Pressure _____ psi Pressure to humidifier _____ psi
- 15 psi relief valve if med/high press boiler
- Actuator closes and opens CV valve fully Design pressure at CV valve
- Condensate return Gravity feed or pump

Wiring:

- Wiring connections and connectors secured yes no

Controls:

- Control Location _____ Control to Terminal 4
- High Limit Location _____ High Limit to terminal 5

Power:

- Voltage, amp, fuse per Spec Label: yes no
- Disconnect switch located close to humidifier yes no

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

Company: _____

Nortec SETC/P Start Up Checklist

Unit Serial #: _____ Tag: _____
 Unit type: _____ Voltage: _____ V/ _____ ph Steam output: _____ lb/hr
 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 humidifier activating the CV valve actuator to make steam are as follows:

- Water supply valve opened yes no
- Boiler steam isolation valve open 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 15% yes no

Controls:

- Installed Controls Match Configuration yes no
- Control Setpoint: _____ High Limit 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 followed by a float test.

If the above listed prerequisites are fulfilled the humidifier will fill the tank, open the CV valve and begin normal operation.

Note: 1) It can take 10 to 30 minutes for the tank to fill depending on humidifier size.
 2) Once filled it can take 5 to 15 minutes (depending on humidifier size) for a cold tank to come to a full boil.

Remarks:

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

Company: _____

Operation

44 Nortec SETC LED Status Lights

44 Nortec SEP LED Status Lights

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45 Steam Generation

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59 Diagnostic Menu

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Nortec SETC LED Status Lights

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

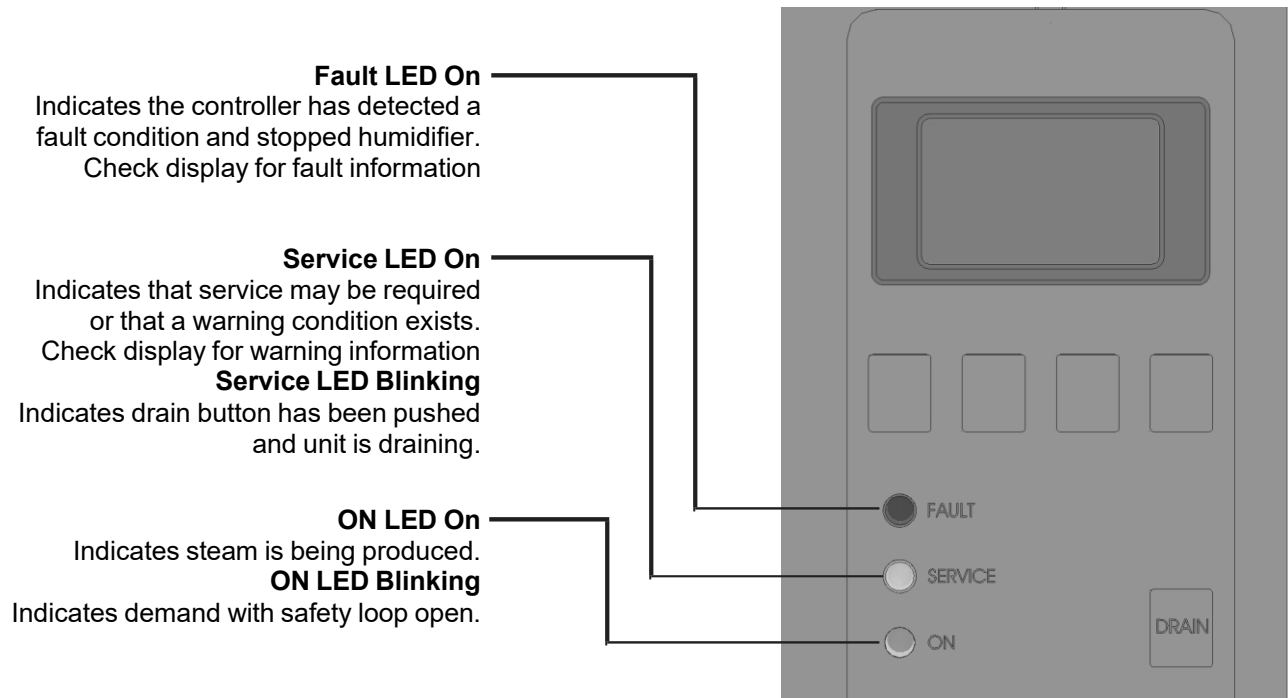


Figure 42: Nortec SETC LED Status Lights

Nortec SEP LED Status Lights

DEMAND LED On
Indicates steam is being produced.

DEMAND LED Blinking
Indicates humidifier is in standby waiting for a demand.

SERVICE LED Flashing
Indicates the controller has detected a fault. The flash sequence of the LED indicates which fault has been detected.

FAULT LED On
Indicates the controller has detected a fault condition and stopped humidifier.
Read Service LED's flash sequence to determine fault detected.

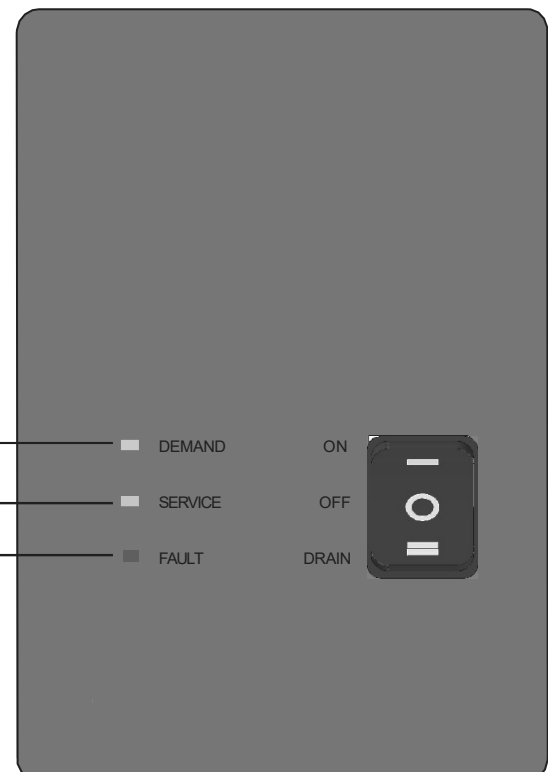


Figure 43: SEP LED Status Lights

Humidifier Schematic

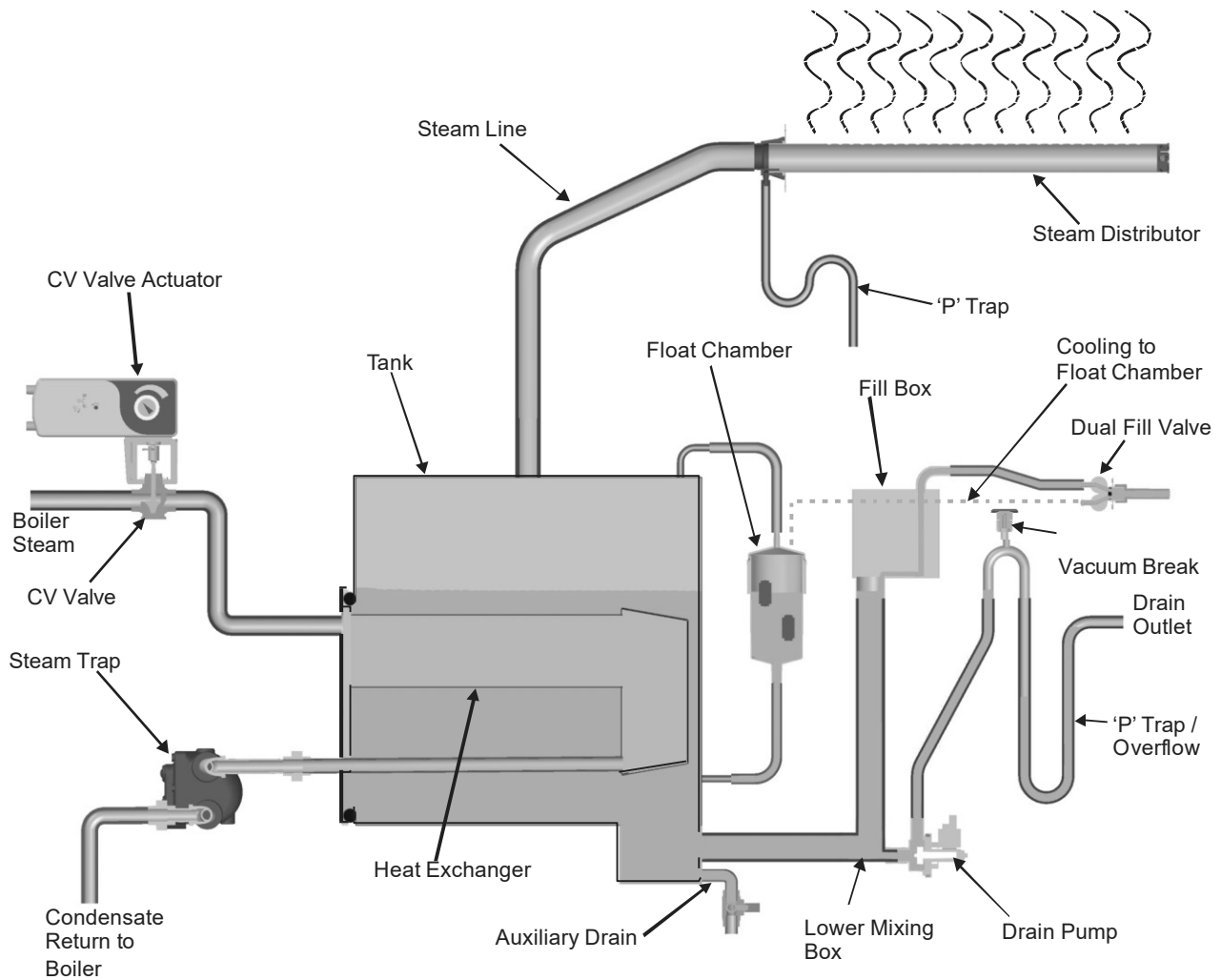


Figure 44: Humidifier Schematic

How the Humidifier Works

The Nortec SETC/P is an atmospheric steam generator that uses energy from pressurized steam flowing through a heat exchanger submerged in water to generate steam. The Nortec SETC/P is designed for air humidification via steam distributor, blower pack, or steam manifold (Nortec SAM-e).

Steam Generation

- After initial start-up and tank filling the humidifier will sit in standby mode, awaiting a call for humidity.
- When a call is received, the humidifier will send a signal to the electric actuator. The actuator will open as required and the flow of boiler steam will begin.
- Energy from the boiler steam is transferred to the fresh water tank through a heat exchanger inside of the unit. This causes the water to boil. Full boil from a cold tank can take up to 15 minutes. On Nortec SETC models, the Keepwarm feature can be activated to reduce boil time, see Idle Mode on page 52.

- Once the humidifier has reached full boil, the humidifier will modulate the actuator, controlling the flow of steam into the unit. This will allow the unit to reduce its output level as the humidity levels in the space being humidified are reached.
- During the boiling process minerals are left behind from the water. The unit will occasionally activate the drain pump to flush out some of the minerals in the water and reduce the concentration in the tank. The fill valve will also be activated periodically to replace water that is boiled off during normal operation.
- When the demand to the unit ceases, the unit will close the steam valve and steam production will stop. The unit will enter standby mode and await a call for humidity. If Keepwarm is activated (Nortec SETC only), the CV valve will be opened periodically to heat the tank.

Drains

- As steam is produced minerals are left behind in the Nortec SE's tank. The Nortec SE performs periodic drains to reduce the amount of minerals that will precipitate as scale.
- In general more frequent drains result in less maintenance. The amount of water drained to control mineral concentration in the tank can be configured in the Nortec SETC's software.
- To cool drain water the Nortec SE activates the fill valve whenever the drain pump is activated. Cool fill water flows down from the fill box and blends with hot tank water in the lower mixing box before being drawn into the drain pump. The drain cooling feature can be deactivated via software (see Drain Cool on page 51).

Steam Distribution

Steam generated by the humidifier may be introduced into the air in several different ways. The most common method for adding the steam into the air is to mount a steam distributor tube in a supply air duct as shown in Figure 44: Humidifier Schematic. For larger ducts or larger loads it is also common to use a steam manifold with a single steam line connection and multiple tubes for distributing the steam, see Figure 45: Nortec SAM-e Manifold. For introducing steam directly into a room, remote mounted blower packs are used see Figure 46: Remote Blower Pack.

Steam Line

The steam line between the tank steam outlet and the distributor may be Condair steam hose, copper pipe, or stainless steel pipe or tube. The Nortec SETC/P 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. It is also important to minimize the length of steam lines. See Steam Lines and Condensate Returns on page 17 for information on selecting steam lines and maximum recommended lengths.

Whenever steam is distributed condensate is formed in the distribution system and steam distributor, manifold, or blower pack. Insulating steam lines is one important way to reduce the amount of condensate formed. Steam lines must be sloped so that condensate does not collect in the lines and create a restriction to steam flow.

Condensate Return

The condensate must be collected and removed from the system so that it does not build up and leak into the duct (or room if blower pack is used). Condensate must be collected and fed to drain.

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 Condaire 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 Condaire 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. Condaire recommends a setting of 85% for the duct high limit. It may be necessary to reduce this setting if the duct work is very cold or in contact with exterior cold surfaces.

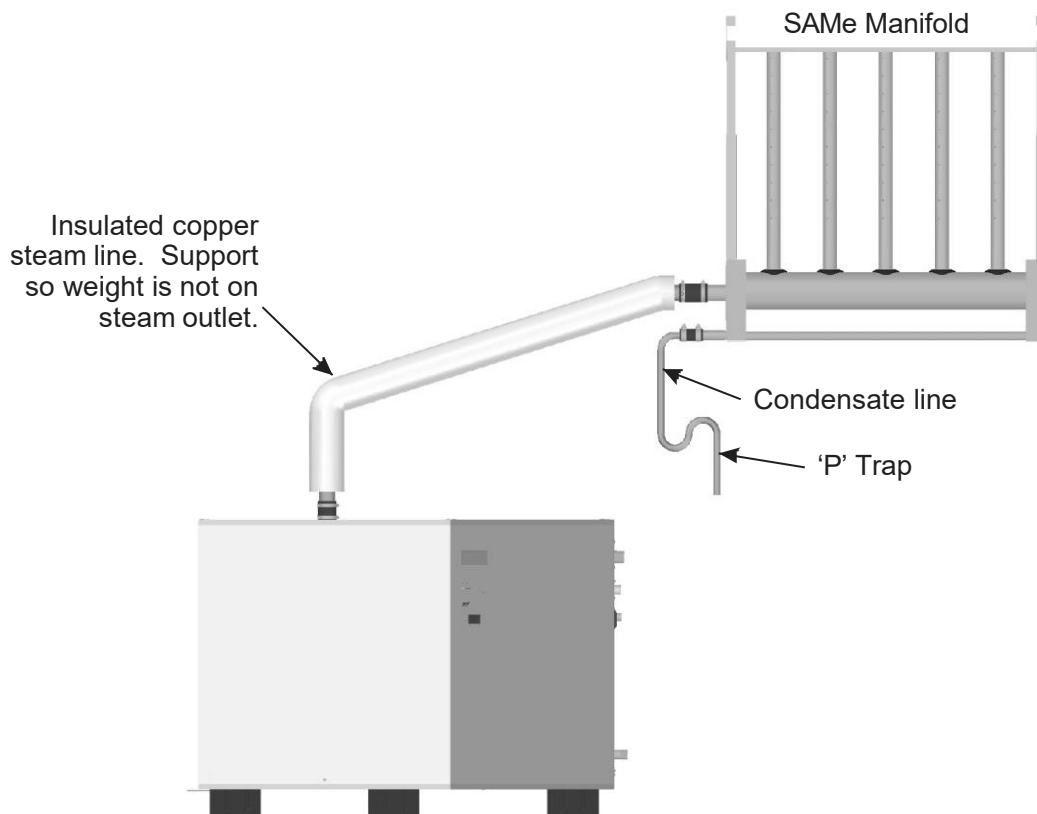


Figure 45: Nortec SAM-e Manifold

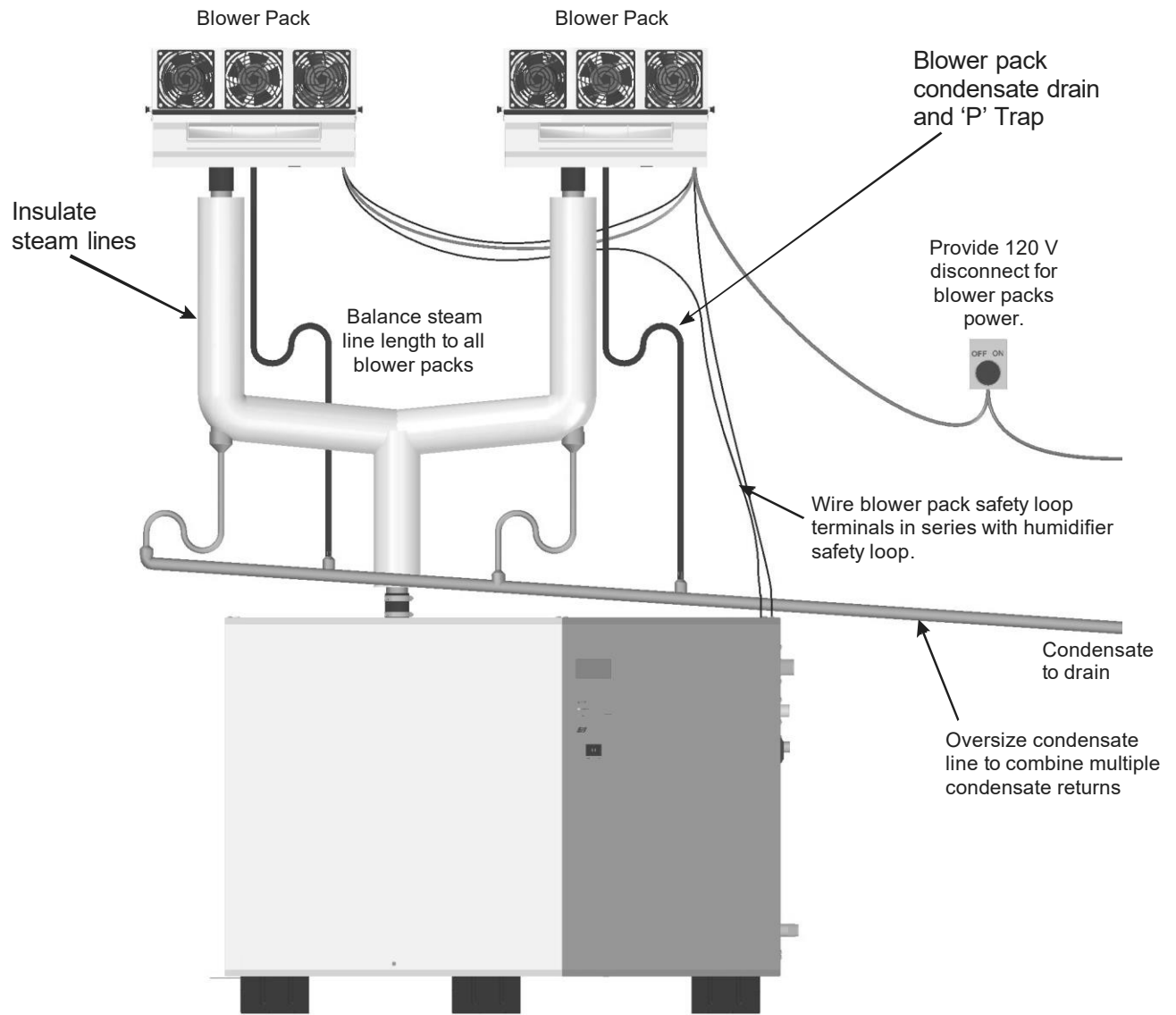


Figure 46: Remote Blower Pack

Nortec SETC Humidifier Configuration

Navigating the Nortec SETC Software

The four input buttons below the digital display are used to navigate in the Nortec SETC'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.

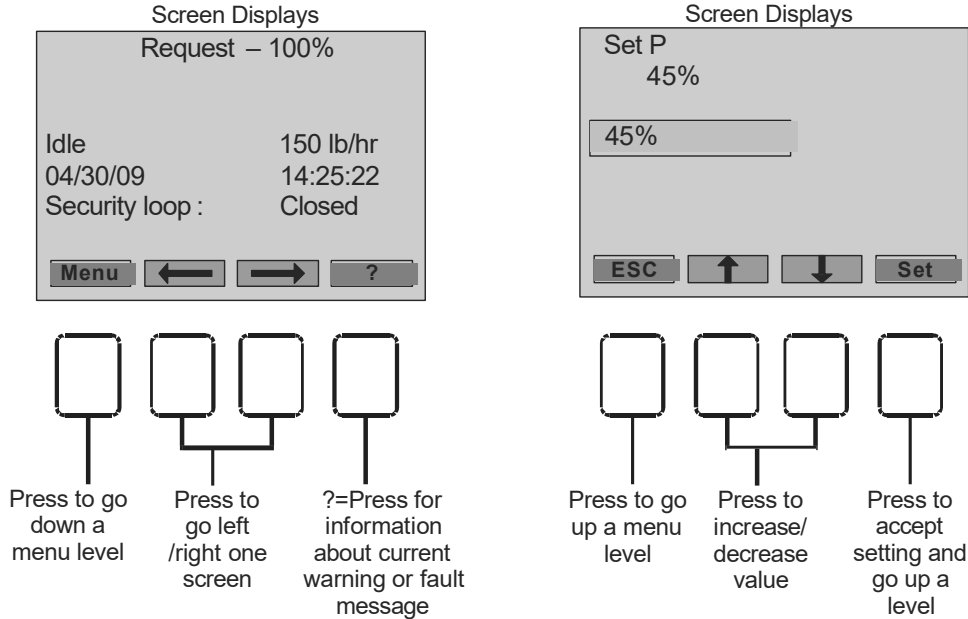
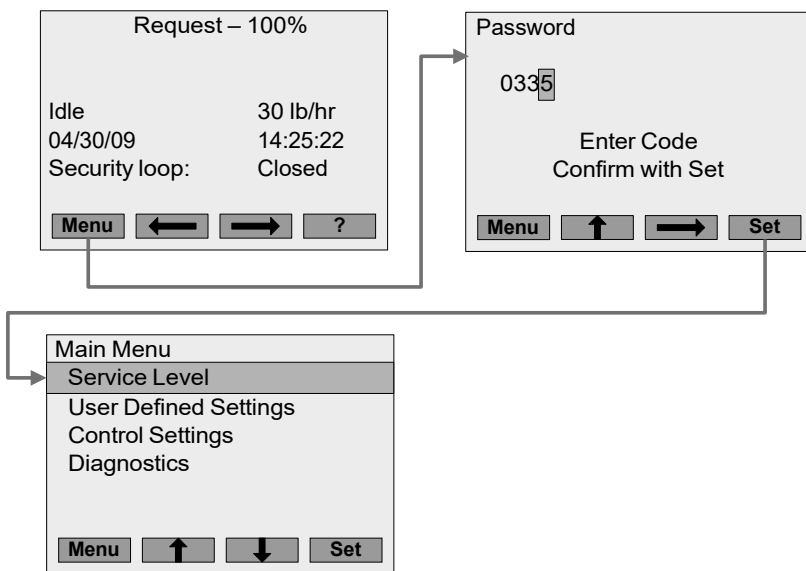


Figure 47: Navigating the Nortec SETC Software

Main Menu (Nortec SETC Password)

The menu levels of the Nortec SETC are password protected to prevent configuration changes by unauthorized persons. In order to access the menu level press the button corresponding to the Menu icon and when prompted enter the password 0335.



Enter Password

Press the **Menu** button from any status screen. Enter the user level code **0335** 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.

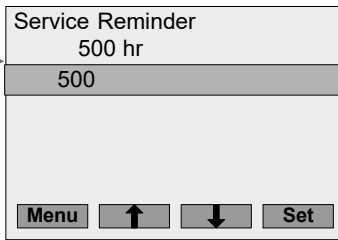
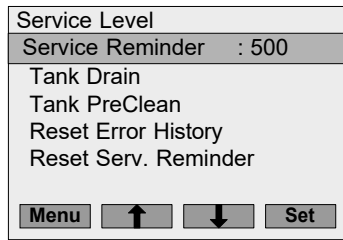
Main Menu

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.

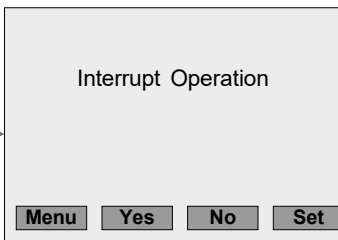
Service Level

The selections in the **Service Level** allow you to reset service reminders and the fault history. Press **Set** while highlighting **Service Level** in the **Main Menu**.



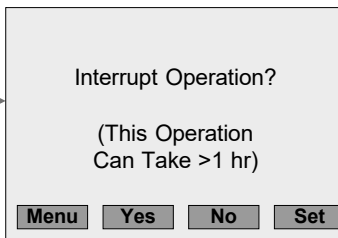
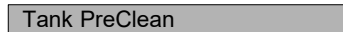
Service Reminder

Sets the maintenance time interval for the humidifier based on run time at 100% output. The controller will display a warning when the time expires. (Default = 500 hr)



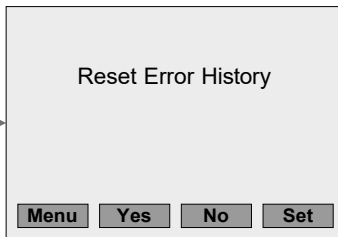
Tank Drain

If the yes button is pressed the controller activates the drain pump and empties the tank.



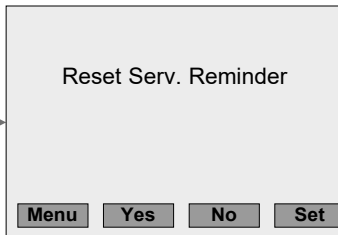
Tank Pre Clean

Preparation for regular maintenance to remove loose scale that may be present in the tank.



Reset Error History

Deletes the list of errors stored in the error history. The **Error History** is located in the **Diagnostics Menu**. Resetting the error history is not normally required, but can be done after repairs to remove faults that are no longer needed.



Reset Service Reminder

Resets the service reminder after the humidifier has been serviced.

User Defined Settings

The selections in **User Defined Settings** allow you to configure most user configurable features available with the Nortec SETC. Press **Set** while highlighting **User Defined Settings** in the **Main Menu**.

User Defined Settings	
Drain Cool	: On
BD Rate	: 25%
FTBD	: Off
FTBD Time	: Off
FTBD Hours	: 100
Idle Mode	: Idle Drain
Idle Time	: 72 hr
Fill Corr	: 100%
Drain Corr	: 100%
Float Ck	: 23:30
Date	: 06/27/09
Time	: 13:22
Unit	: lb/hr
Language	: English
Contrast	: 10
Leak Ck	: Off

Drain Cool	
On	
Off	
On	
Smart	

Drain Cool

Selects whether drain water cooling will be performed by adding fill water to drain water. **Off** = fill valve not activated during drain. **On** = fill valve activated whenever drain pump is on, **Smart** = fill valve only activated with drain pump when tank is hot. (Default = Smart)

BD Rate : 25%

Blowdown Rate	
25%	

Blowdown Rate

Sets the amount of water as a percentage of steam produced that will be drained to control mineral concentration in the tank (Default = 25%)

FTBD : Off

Full Tank Blowdown	
Off	
On	

Full Tank Blowdown

Sets whether the tank will be periodically flushed to help flush minerals and scale. Blowdown frequency is controlled by the **FTBD Hours** parameter below. (Default = On)

FTBD Time : Off

FTBD Time	
Hour	23

FTBD Time

Sets the time of day when a full tank blow down will occur to avoid interrupting humidifier operation during critical times. (Default = 23:30)

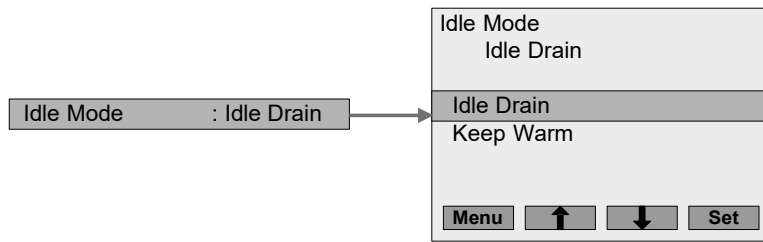
FTBD Hours : 100f

FTBD Hours	
100	

FTBD Hours

Sets the number of hours between full tank blow downs. Hours are accumulated on a weighted basis (1 hour at 50% demand = 0.5 hrs). (Default = 100 hr)

(User Defined Settings Continued)



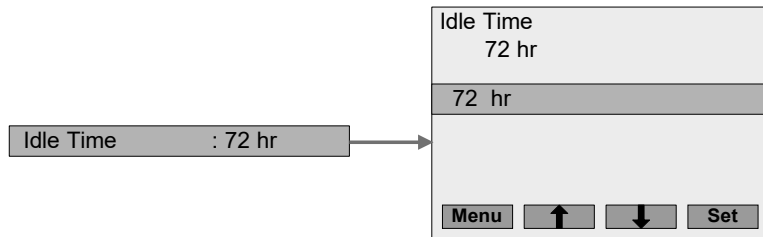
Idle Mode

Sets what the humidifier will do during periods with no demand.

Idle Only = Do nothing.

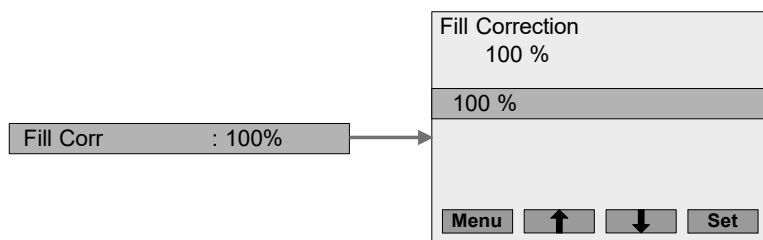
Idle Drain = Drain the tank if there is no demand (wait time set with idle Time parameter).

Keep Warm = periodically open CV valve to keep tank warm. for a demand and drain the tank if no demand (Default = Idle Drain)



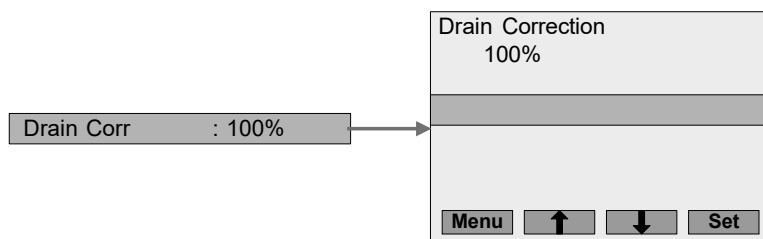
Idle Time

Sets the time without demand before the **Idle Drain** function will drain the tank (if activated). (Default = 72 hr)



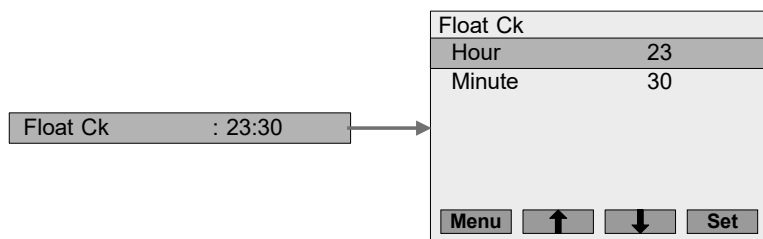
Fill Correction

Increases or decreases the length of fill valve pulses to compensate for abnormal site conditions. (Default = 100%)



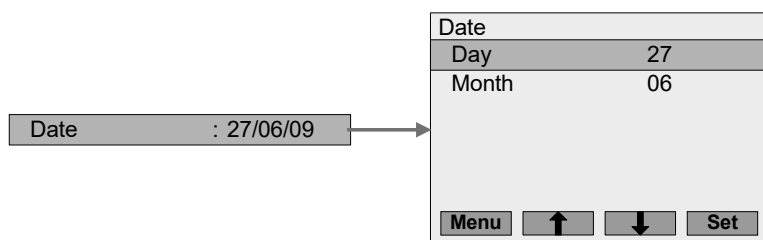
Drain Correction

Increases or decreases the length of fill valve pulses to compensate for abnormal site conditions. (Default = 100%)



Float Check

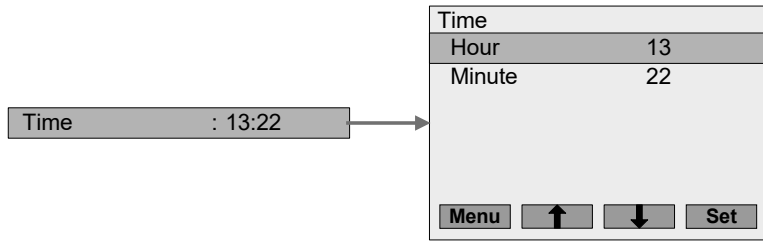
Sets the time of day when a float check to verify drains and float operation will take place. Can also disable the float check. (Default = 23:30 and On)



Date

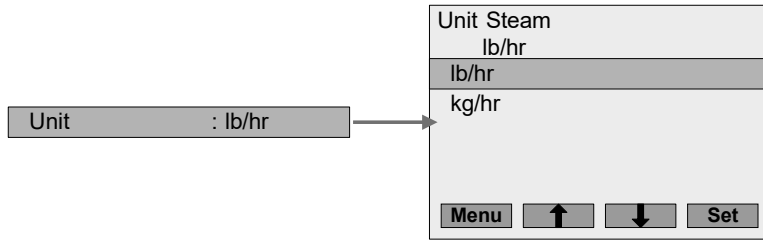
Sets the date. Selecting Day, Month, or year takes the user to a submenu that allows the value to be increased or decreased by pressing up/down arrows. Set accepts the setting.

(User Defined Settings Continued)



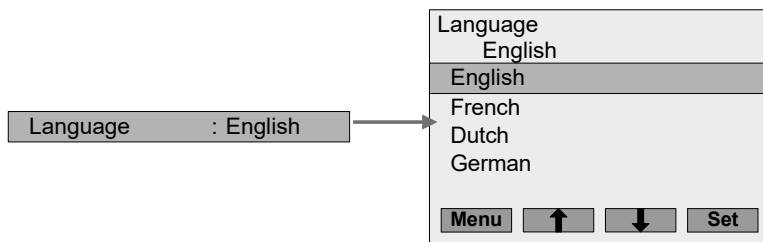
Time

Sets the time of day. Selecting Hour or Minute takes the user to a submenu that allows the value to be increased or decreased by pressing u/down arrows. Set accepts the setting.



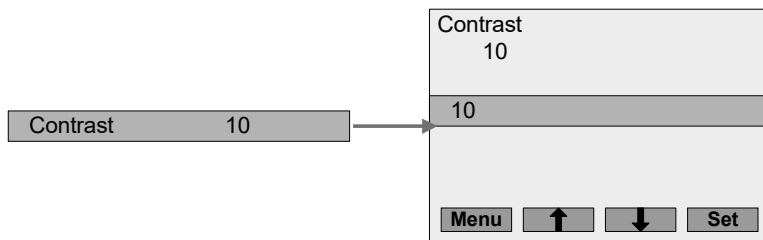
Unit

Sets the units of measure to use for display of steam output to either lb/hr or kg/hr. (Default = lb/hr)



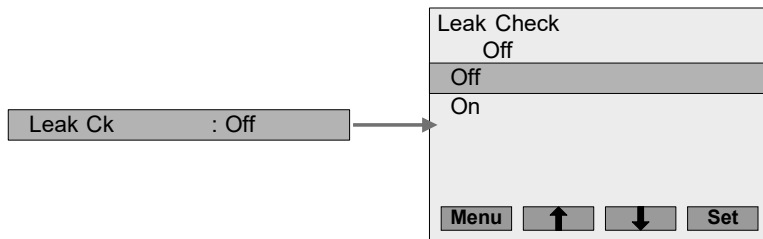
Language

Sets the language to use for the software menu. (Default = English)



Contrast

Adjusts the contrast of the LCD display to improve visibility under different lighting conditions. (Default = 10)



Leak check

Sets whether the controller should monitor tank level during periods of no demand. If on a fault will be generated if water level drops with no demand. (Default = Off)

Control Setting

Control Setting allow you to set the type of external controls the humidifier is connected to. In most cases the Nortec SETC humidifier is factory configured to operate with the external controls that were specified for the site. Press **Set** while highlighting **Control Setting** in the **Main Menu**.



CAUTION: Improper control configuration can result in over humidifying which can result in damage to property.

(Control Settings Continued)

Control Setting		
Source	: Analog	
REG Mode	: Demand	
MOD Mode	: Dual CH	
Multi Mode	: Standalone	
CNT Type	: 0-10	
LIM Type	: 0-10	Only present if Mod Mode set to Dual CH
Short CD	: On	
Short CD Tm	: 30 s	Only present if Short CD set to On
Time Prop.	: Off	
Manual Cap	: 100%	
Mult Unit Op Range		Only present if Multimode set to Master or Slave
Modbus Settings		
Press Base	: On	
Supply Press.	: 15 psi	Only present if Press Base set to On
RH Settings		Only present if REG Mode set to RH (P) or RH (PI)
<input type="button" value="Menu"/> <input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="Set"/>		

Source
Analog
Analog
Digital

Source

Configures the humidifier to either accept analog control signals from a humidistat or digital signals from a Building Management System

REG Mode : Demand

Regulation Mode
Demand
Demand
On/Off
RH (P)
RH (PI)

REG Mode

Configures the type of control used with the humidifier. RH(P) is proportional only internal control based on a transducer signal. **RH (PI)** is proportional control with an integral.

MOD Mode : Single CH

MOD Mode
Single CH
Single CH

MOD Mode

Configures the humidifier to either operate with a single channel (control only) or dual channel (control and high limit). If an On/Off high limit humidistat is used set **MOD Mode** to Single CH.

Multi Mode : Standalone

Multi Mode
StandAlone
Standalone
Slave

Multi Mode

Use **Multi Mode** to configure the humidifier to operate as one humidifier of a group controlled by a single control signal / transducer signal. See **Multi Unit Op. Range** later in this section. (Default = Standalone)

(Control Settings Continued)

CNT Type : 0-10

CNT Type
0-10 V
0-5 V
1-5 V
0-10 V
2-10 V
0-16 V
32-16 V
0-20 mA
4-20 mA

Menu ↑ ↓ Set

CNT Type

Configures the Volt or amp range of the control signal connected to the humidifier

LIM Type : 0-10V

LIM Type
0-10 V
0-5 V
0-10 V
2-10 V
0-16 V
3.2-16 V

Menu ↑ ↓ Set

LIM Type

Configures the Volt or amp range of the high limit control signal connected to the humidifier. The type of control, VDC or mA, must be the same as that of **CNT Type**.

Short CD : Off

Short Cycle Delay
Off
Off

Menu ↑ ↓ Set

Short Cycle Delay

Sets whether the humidifier must stay off for a fixed period of time (set by the **Short CD Tim** parameter) whenever demand falls below the On threshold to prevent short cycling. (Default = Off)

Short CD Tm : 30 s

Short Cycle Delay Time
30 s
30 s

Menu ↑ ↓ Set

Short CD Tim

Specifies the minimum time the humidifier must remain in idle whenever demand drops to the off condition. It is only checked if **Short CD** is set to On. (Default = 30 s)

Time Prop. : Off

Time Proportioning
Off
Off

Menu ↑ ↓ Set

Time Prop

Sets whether the humidifier will run in time proportioning mode when demand is less than 15%. **On** results in the humidifier turning on and off for short periods of time to simulate low output. (Default = Off)

Manual Cap : 100%

Manual Capacity
100%
100%

Menu ↑ ↓ Set

Manual Cap

Reduces the maximum capacity of the humidifier to a percentage of its full capacity. Use up/down buttons to increase/decrease and press Set to save the setting. (Default = 100%)

(Control Settings Continued)

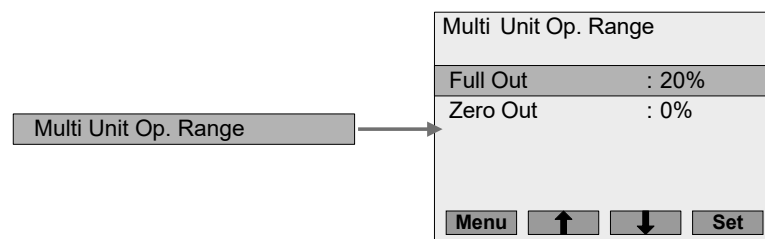
Multi Unit Op. Range

The Nortec SETC can be configured to network up to sixteen (16) humidifiers (or equivalent of 10,500 lb/hr) using a master slave configuration. To operate the Nortec SETC in a staged modulation system;

- The humidifiers must be connected in parallel (daisy chained) using the linkup terminal (J2a) on the Nortec SETC driver board (See Staged Modulation Wiring on page 31).
- One humidifier must be designated the master and all others as slave units (see Multi Mode on page 54 for software configuration). The master unit must be the unit to which external controls / transducers and safety loop are connected.
- Each humidifier in the system including the master must have the range of demand signal in which it will operate configured (see below). Example, for four humidifiers with equal capacity set the master to operate between 0% and 25%, set the first slave for 26% to 50%, set the second slave for 51% to 75%, and set the third slave for 76% to 100%.

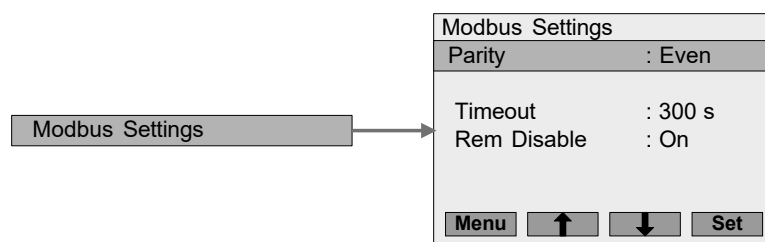
The **Multi Unit Op. Range** submenu is used to configure the humidifier's operating range when **Multi Mode** in the **User Defined Settings** menu is set to either **Master** or **Slave**. The menu is not displayed if the humidifier is set to **Standalone** operation. Access the **Multi Unit Op. Range** submenu by pressing the menu button while **Multi Unit Op. Range** is highlighted in the **Control Settings** menu.

NOTE: The **Multi Unit Op. Range** submenu is only displayed if the humidifier has been configured as either a **Master** or **Slave**. It is not displayed in **Standalone** mode.



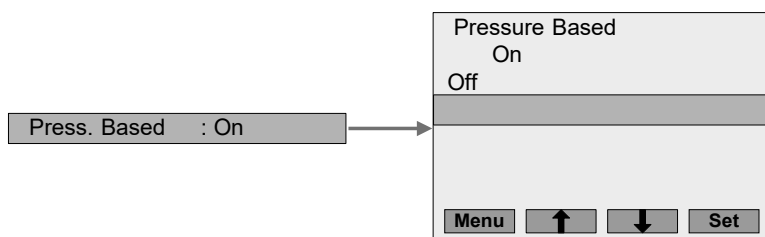
Multi Unit Op. Range

Full Out sets the system demand at which the humidifier should output its full capacity. **Zero Out** sets the system demand at which the humidifier should shut off.



Modbus Settings

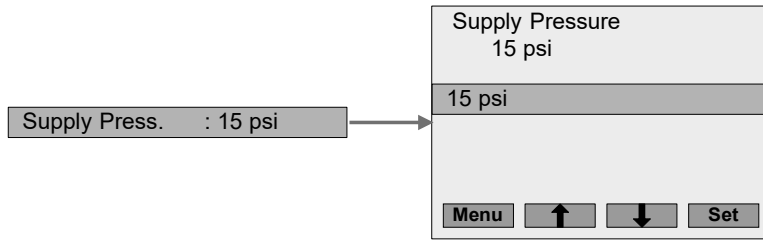
Allows configuration of communication parameters. Selecting an item brings up a screen that allows the value to be changed by using the up/down arrow keys. **Rem Disable** allows the user to turn the humidifier on if it has been remotely disabled.



Pressure Based

Configures the humidifier to use steam supply pressure to calculate system output. If set to off the output displayed is based on a supply pressure of 15 psi.

(Control Settings Continued)



Supply Press

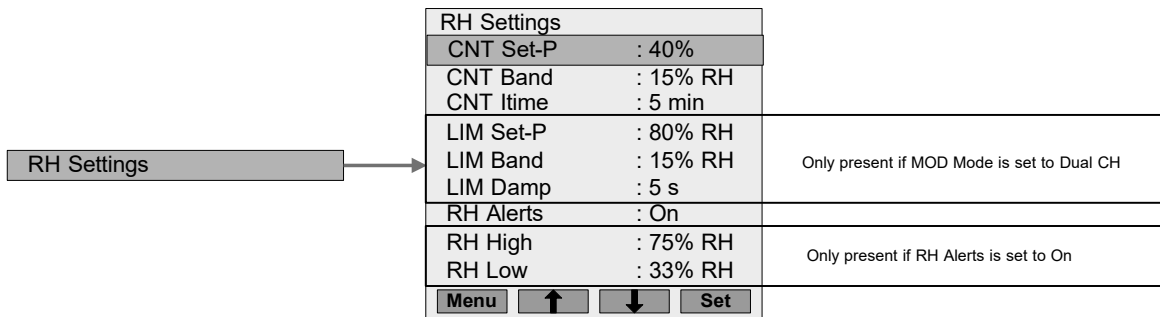
Sets the steam supply pressure for the humidifier to use in displaying its steam output. It is only displayed if **Press Based** is set to On. (Default = 15 psi)



Note: The **RH Settings** menu selection will only be displayed in the **Control Settings** menu if **REG Mode** is set to **RH (P)** or **RH (PI)**.

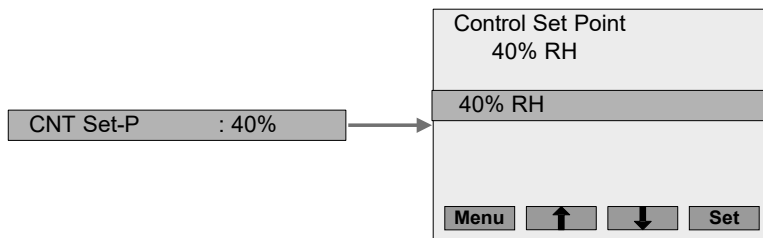
RH Settings

The **RH Settings** submenu is used to adjust setpoint, the proportional band, and the integral time if **REG Mode** is set to **RH (P)** or **RH (PI)** and the humidifier is connected to humidity sensors. Access the **RH Settings** submenu by pressing the menu key while **RH Settings** is highlighted in the **Control Settings** menu.

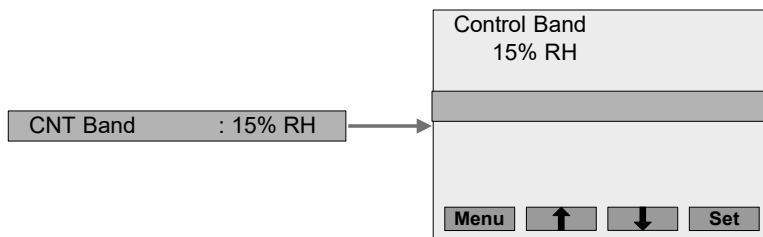


CNT Set-P

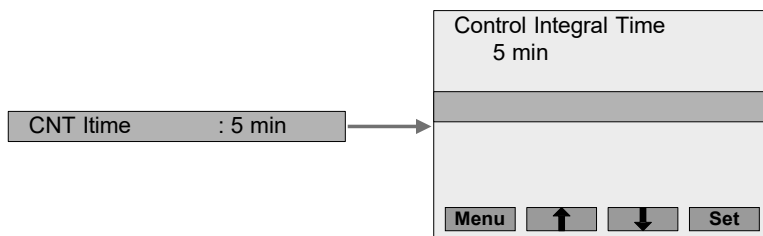
Sets the humidity setpoint value. The humidifier will attempt to maintain this humidity level in the space where the control transducer is installed.



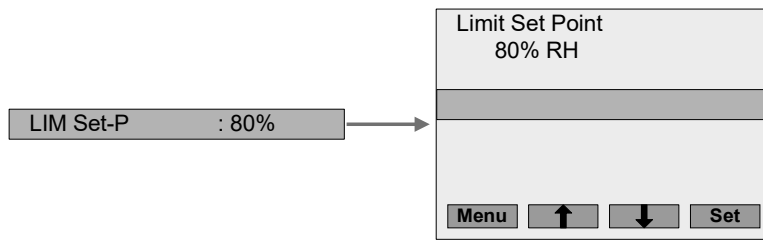
CNT Band should not normally be changed. The **CNT Band** setting adjusts the band within which the humidifier will modulate between 0 and 100% output. (Default = 15%)



Int Time should not normally be changed. **Int Time** adjusts the frequency at which the controller corrects for proportional control error. It is only displayed if **REG Mode** is set to **RH (PI)** (Default = 5 min)

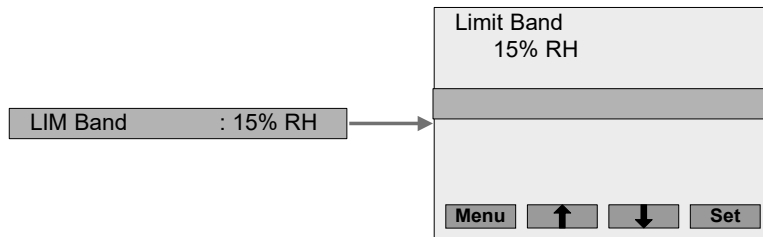


(RH Settings Continued)



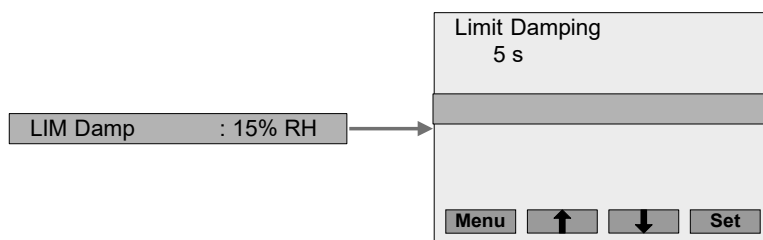
LIM Set-P

Sets the duct high limit setpoint value. As RH in the duct approaches the high limit the output of the humidifier will be throttled back to prevent wetting the duct. (Default = 80%)



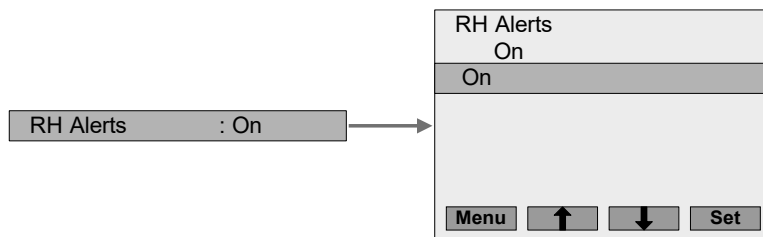
LIM Band

Should not normally be changed. The **Lim Band** setting adjusts the band within which the humidifier will throttle down the humidifier output from 100 to 0%. (Default = 15%)



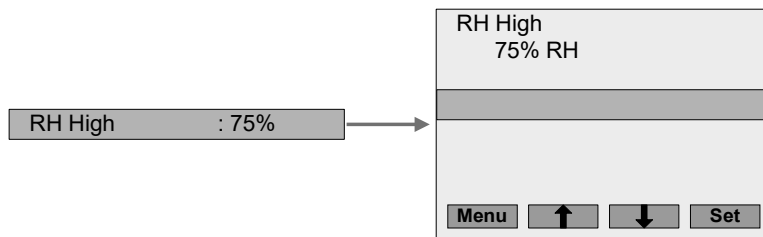
Limit Damping

Sets the number of seconds the sensed RH must exceed the limit band before output is throttled down. (Default = 5 s)



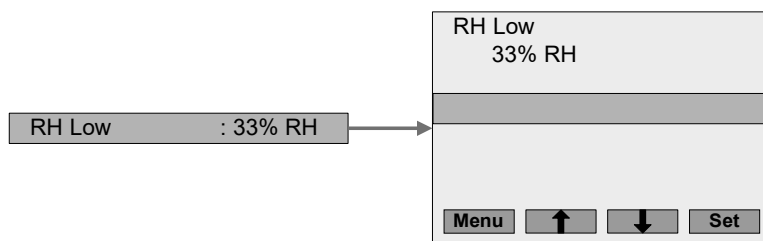
RH Alerts

Sets whether the humidifier will display warnings when humidity rises above or falls below configured limits. (Default = Off)



RH High

Sets the RH level above which the humidity must rise before a warning is generated. Warning is only generated if **RH Alerts** is set to on.

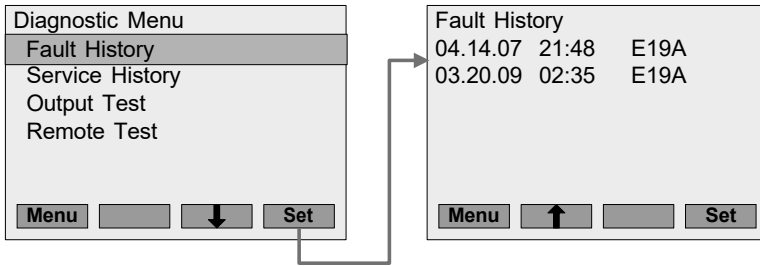


RH Low

Sets the RH level below which the humidity must fall before a warning is generated. Warning is only generated if **RH Alerts** is set to on.

Diagnostic Menu

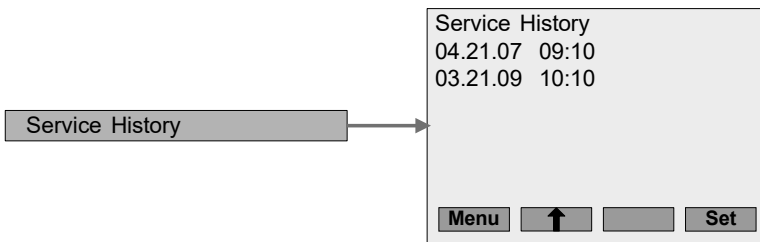
The **Diagnostic Menu** provides a historical list of errors and service recorded by the humidifier's software as well as providing the ability to manually activate humidifier components for troubleshooting purposes. Press **Set** while highlighting **Diagnostic Menu** in the **Main Menu**.



Fault History

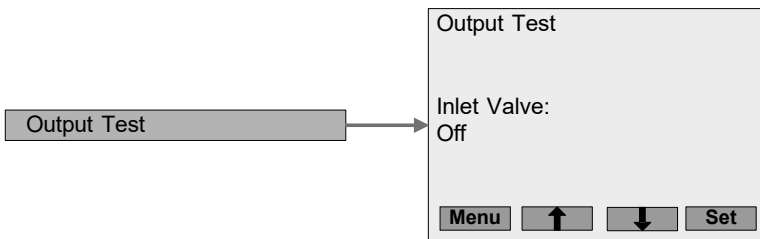
Displays a list of faults which the controller has recorded. It shows the date and time at which the faults occurred. Refer to Table 13:

Troubleshooting Warnings and Faults for meaning of codes and suggested actions to correct faults.



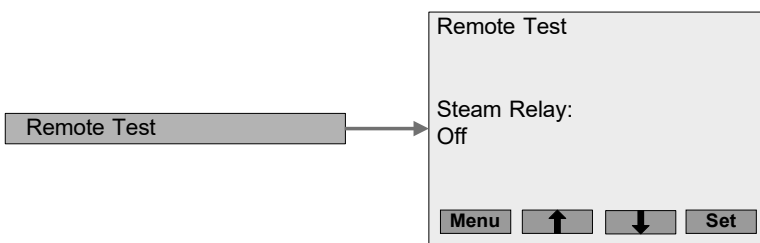
Service History

Displays a list of service that has been performed on the humidifier. It displays the date and time of service.



Output Test

Provides a means for activating all humidifier components (inlet valve, drain pump, etc.) for diagnostic purposes. Components can be activated one at a time. Scroll to component to be tested using **up/down** buttons, press **Set** once to activate, press again to turn off.



Remote Test

Provides a means for testing of remote fault relays to confirm they are operating correctly. Relays can be activated one at a time. Scroll between relays with **up/down** arrow buttons and press **Set** once to turn on relay, press again to turn it off.

SEP Humidifier Configuration

The Nortec SEP 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 SEP's control board. The blowdown of the Nortec SEP can also be adjusted by using a potentiometer on the Nortec SEP's control board. See Figure 48: Nortec SEP Control Board Jumpers for location of jumpers and the blowdown adjustment potentiometer.

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

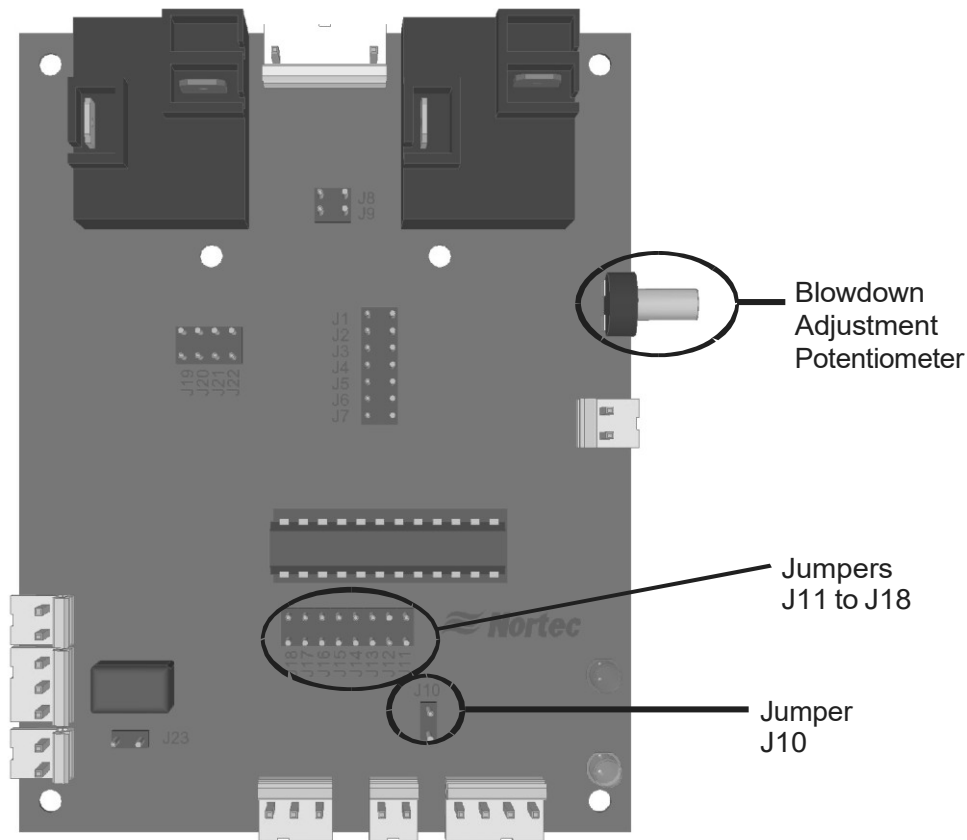
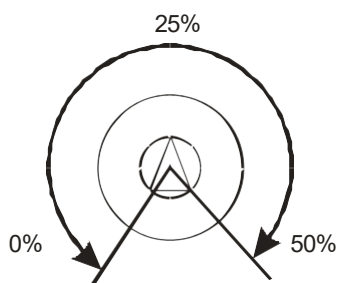


Figure 48: Nortec SEP Control Board Jumpers

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



Blowdown Adjustment



Sets the amount of water as a percentage of steam produced that will be drained to control mineral concentration in the tank. The blowdown adjustment potentiometer is located on the side of the control board as shown in Figure 48. It can adjust the blowdown between 0% and 50% of steam produced. (Factory setting = 25% blowdown).

Note: 0% blowdown should never be used even with Deionized water. Minimum recommended setting is 5%.

On/Off or Modulating Control (J10)

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

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

Nortec SEP Model (J11 to J13)

The Nortec SEP model is configured using Jumper 11 to 13. The jumper setting is configured at the factory and should not be adjusted in the field.

Table 8: SEP Model Configuration

Resulting Control	J11	J12	J13
SEP 50/100	0	0	0
SEP 175	1	0	0
SEP 250	0	1	0
SEP 375	1	1	0
SEP 525	0	0	1
SEP 750	1	0	1
SEP 1050	1	1	1

Full Tank Blowdown (J14 and J15)

The Nortec SEP can be configured to periodically drain the tank to help flush minerals and scale. Jumpers 14 and 15 control blowdown frequency. Hours are accumulated on a weighted basis (1 hour at 50% demand = 0.5 hrs). (Default = J14 and J15 installed, no full tank blowdown)

Table 9: Full Tank Blowdown Jumper Configuration

Resulting Control	J14	J15
No Full Tank Blowdown	1	1
96 hours between FTBD	0	0
48 hours between FTBD	1	0
24 hours between FTBD	0	1

Modulation Offset (J16)

The Nortec SEP 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 16. (Factory setting = Jumper removed, 0-10 VDC or 0-20 mA control signal)

J16 Removed – Controller is configured for a 0-10 VDC or 0-20 mA control signal.

J16 Installed – Controller is configured for a 2-10 VDC or 4-20 mA control signal.

Note: For mA control a 500Ω resistor is required between terminals 3 and 4 on the low voltage control terminal.

Table 10: Control Jumper Configuration

Resulting Control	J10	J16
On/Off	1	No Affect
Modulating 0-10 VDC or 0-20 mA	0	0
Modulating 2-10 VDC or 4-20 mA	0	1

Drain Water Cooling (J17)

The Nortec SEP can be configured to cool drain water by activating the fill valve whenever the drain pump is activated. To disable drain water cooling remove jumper J17. (Factory setting = jumper installed, drain water cooling active)

J17 Removed – The fill valve is not activated together with the drain pump.

J17 Installed – The fill valve activated together with the drain pump to cool drain water.

Float Check (J18)

Whenever the Nortec SEP is first powered it performs a float check to ensure water level detection is working properly. The float check can be deactivated via jumper 18. (Factory setting = jumper removed, float check is performed)

J18 Removed – A float check is performed whenever the Nortec SEP is powered on.

J18 Installed – A float check is not performed whenever the Nortec SEP is powered on.

Maintenance and Servicing

64 Required Maintenance

- 64 Service Warning / Fault
- 65 Maintenance Schedule
- 66 Cleaning the Tank
- 67 Cleaning the Heat Exchanger
- 68 Cleaning the Float Chamber
- 68 Resetting Service Reminder

69 Maintenance Shutdown and Extended Shutdown

70 Nortec SETC/P Maintenance Checklist

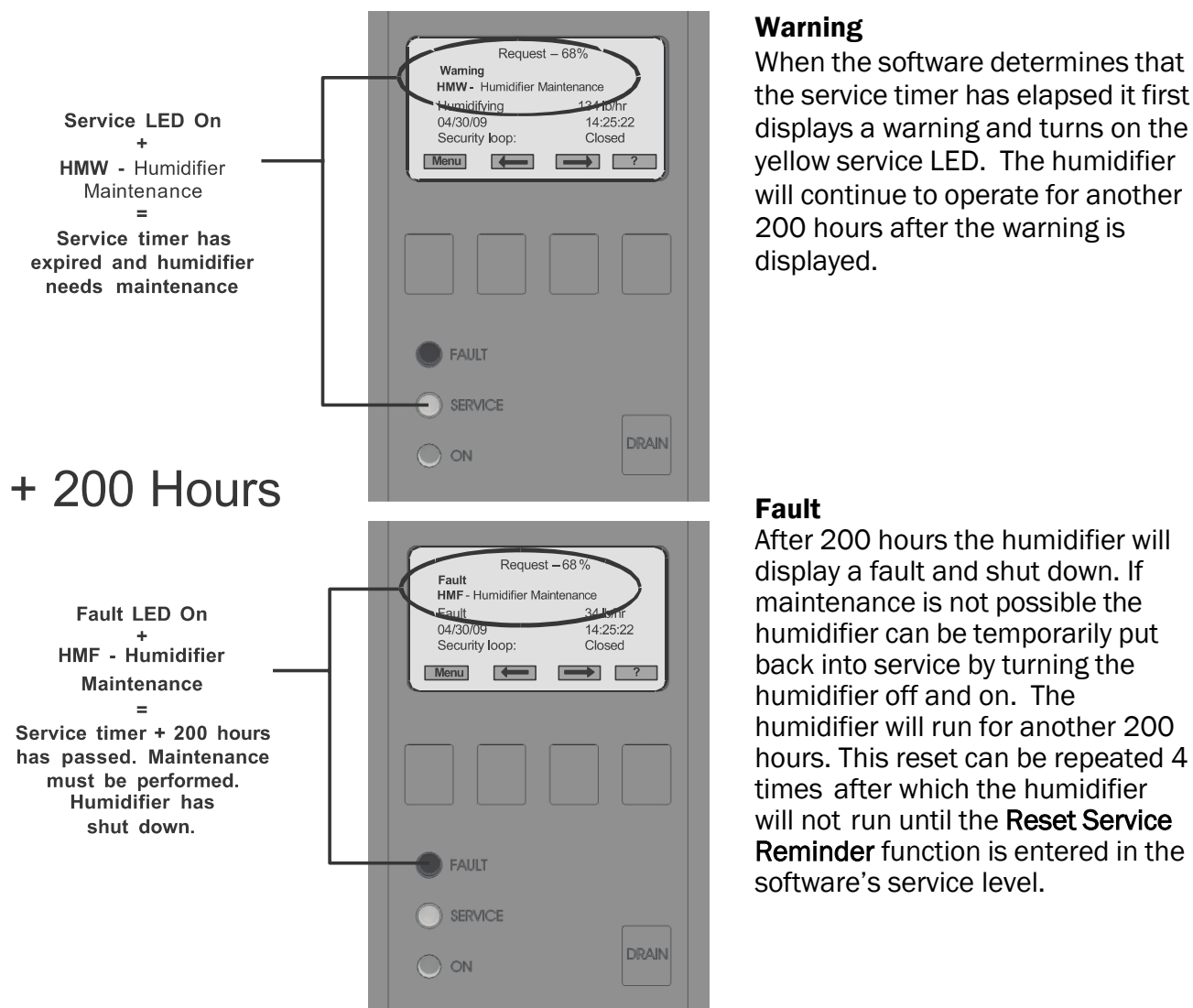
Required Maintenance

Caution: Power to the humidifier should always be turned off using the dedicated external disconnect before removing the door or side panel, or before doing any service work on the humidifier.



Service Warning / Fault

The Nortec SETC controller includes a timer that monitors the humidifier's operating hours and generates a warning when service is required. Optimal maintenance time is dependent on water supply conditions and humidifier usage. The default factory service reminder is equivalent to 500 hours of operation at 100% output. Failure to perform maintenance when the service warning is displayed will cause the unit to lock out. Condair is not responsible for any damages resulting from, or attributed to not performing required maintenance. (See Manufacturer's Warranty).



Warning

When the software determines that the service timer has elapsed it first displays a warning and turns on the yellow service LED. The humidifier will continue to operate for another 200 hours after the warning is displayed.

Fault

After 200 hours the humidifier will display a fault and shut down. If maintenance is not possible the humidifier can be temporarily put back into service by turning the humidifier off and on. The humidifier will run for another 200 hours. This reset can be repeated 4 times after which the humidifier will not run until the **Reset Service Reminder** function is entered in the software's service level.

Figure 49: Service Warning / Fault

Maintenance Schedule

Regular maintenance is required to keep the Nortec SE Series humidifier operating at its peak capacity and efficiency. Follow the maintenance schedule shown in Table 11: Nortec SE Humidifier Maintenance Schedule to ensure long humidifier life and peak performance.

Table 11: SE Humidifier Maintenance Schedule

Item	30 Days After Start-up	When Service Light is Lit	End of Season	What to Do
Tank	✓	✓	✓	<ol style="list-style-type: none"> 1. Remove service door and inspect for scale. 2. Remove scale deposits from tank walls using plastic scraper. 3. Collect scale deposits from tank bottom using wet vac or scraper and bucket.
Heat Exchanger	✓	✓	✓	<ol style="list-style-type: none"> 1. Remove service door and inspect for scale. 2. Remove scale deposits from tank walls using plastic scraper. 3. Collect scale deposits from tank bottom using wet vac or scraper and bucket. 4. Once per season remove heat exchanger, clean, and inspect.
Gaskets	✓	✓	✓	<ol style="list-style-type: none"> 1. Inspect for cracking or damages. 2. Remove any scale deposits before re-installing.
Float Chamber	✓	✓	✓	<ol style="list-style-type: none"> 1. Remove float chamber, and float chamber lid. 2. Clean any scale deposits from walls and float magnets. 3. Re-install magnets.
Heater System			✓	<ol style="list-style-type: none"> 1. Inspect for dust and dirt build-up. 2. Blow clean with compressed air.
Fill System	✓		✓	<ol style="list-style-type: none"> 1. Inspect for leaks at float chamber and fill valve.
Drain System	✓		✓	<ol style="list-style-type: none"> 1. Inspect for leaks at drain pump, auxiliary drain, and internal vacuum break.
Steam Trap			✓	<ol style="list-style-type: none"> 1. Inspect for deposits and float operation. 2. Replace thermal disk if necessary. 3. Clean all ports and inside of trap body.
Wye Strainer			✓	<ol style="list-style-type: none"> 1. Remove service plug and clean out collector screen.
Steam Valve			✓	<ol style="list-style-type: none"> 1. Inspect actuator operation. 2. Perform leakage test to ensure that valve is closing properly.
Boiler Pressure			✓	<ol style="list-style-type: none"> 1. Inspect Pressure Reducing Valve operation. Pressure must not exceed 15 psig



Note: After performing the first maintenance on the Nortec SETC it is possible to increase or decrease the service period to match water conditions. If the tank, heat exchanger, and float chamber are relatively clean and free of scale increase the service period. If there is a lot of scale and it is difficult to remove then reduce the service period and consider increasing the blow down setting. (See Nortec SETC Configuration)

Cleaning the Tank

The tank, heat exchanger, and float chamber should be cleaned at least once per season to remove scale and mineral deposits which can reduce unit efficiency. In areas with high mineral content in the water, cleaning should be more frequent.

Warning

- Disconnect main power at the external disconnect before any servicing.
- Tank and piping may be hot, take care when handling.
- Avoid using de-scaler chemicals or caustic chemical which can damage the tank or heat exchanger.



- 1 Follow Maintenance Shutdown and Extended Shutdown procedure on page 69. Give the unit some time to cool down to avoid injury when servicing.
- 2 Remove the cabinetry covers on the front (all models) and top (Nortec SE 525 – 1050 models) by removing the Phillips type screws and lifting the covers.
- 3 Remove the tank maintenance doors on the front (all models) and top (Nortec SE 525 – 1050 models) by applying anti seize compound to nuts and using 1/2 in. socket. Remove excess anti seize compound.
- 4 Inspect the tank door gaskets. Remove any scale from the gaskets, the tank door gasket surface, and tank gasket surface.
- 5 Using a plastic scraper, such as those used for car windshields, remove scale adhered to tank walls and visible portions of the heat exchanger. Remove this scale from the unit. A wet vacuum can be used for this purpose.
- 6 Inspect the heat exchanger. If significant scale build-up has occurred, follow the cleaning

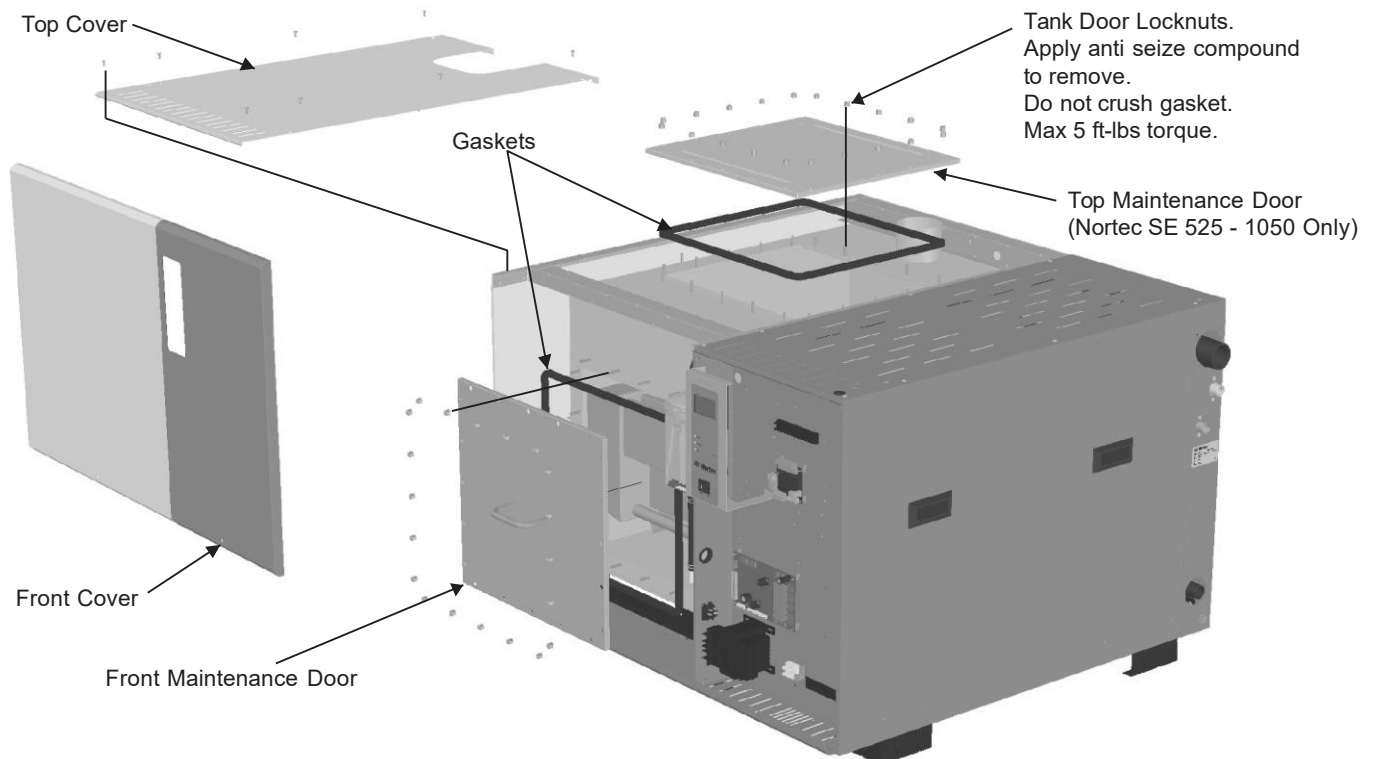


Figure 50: Tank Access For Cleaning

- 7 Reinstall the tank door gaskets and tank doors. When tightening the tank door nuts, take care not to over tighten. The tank door nuts should only be torqued to 5 ft-lbs to prevent crushing the gasket underneath.

Cleaning the Heat Exchanger

- 1 Follow Maintenance Shutdown and Extended Shutdown procedure on page 69. Give the unit some time to cool down to avoid injury when servicing.
- 2 Remove the cabinet cover on the right side by removing the Phillips type screws and lifting the covers.
- 3 Disconnect the union that transports steam into the heat exchanger and remove the F&T trap by disconnecting the two unions that hold it in place.
- 4 Apply anti seize compound to heat exchanger nuts and remove with 1/2 in. socket. Remove excess anti seize compound.
- 5 Remove the heat exchanger(s) by pulling on the handle and sliding the heat exchanger out of the unit.
- 6 Note: Heat exchangers are heavy, use proper lifting technique when removing them. It is helpful to have an assistant help remove the heat exchanger.
- 7 Inspect the heat exchanger gaskets. Remove any scale from the gaskets, the heat exchanger gasket surface, and tank gasket surface.
- 8 Using a plastic scraper, such as those used for car windshields, remove scale adhered to the heat exchanger.
- 9 Reinstall heat exchanger gaskets and heat exchanger. When tightening nuts, take care not to over tighten. Only torque nuts to 5 ft-lbs to prevent crushing the gasket underneath.

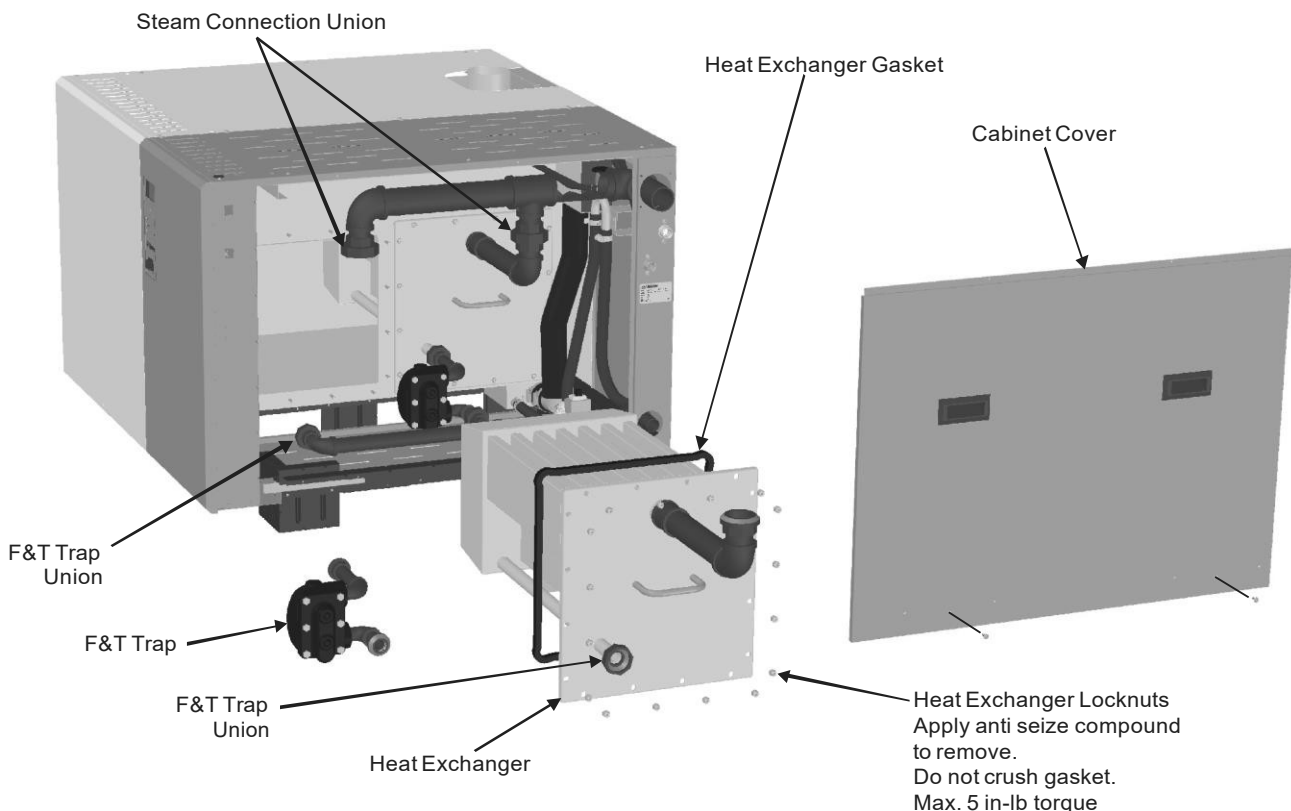


Figure 51: Heat Exchanger Removal

Cleaning the Float Chamber

- 1 Follow Maintenance Shutdown and Extended Shutdown procedure on page 69. Give the unit some time to cool down to avoid injury when servicing.
- 2 Remove the cabinet covers on the front of the unit by removing the Phillips type screws and lifting the covers.
- 3 Disconnect the electrical connection to the float board.
- 4 Remove the hose clamps and the hoses from the top and bottom of the float chamber.
- 5 Remove the reusable tie-wrap from the float chamber by inserting a small screw driver into the top of the buckle.
- 6 Squeeze both sides of the mounting bracket to release the float chamber from the slots on the support bracket.
- 7 Use a screw driver to remove the 3 screws from top of the float chamber and remove the lid. Using a small brush or plastic scraper remove any scale from the inside of the chamber.
- 8 Re-installation is the reverse of removal.

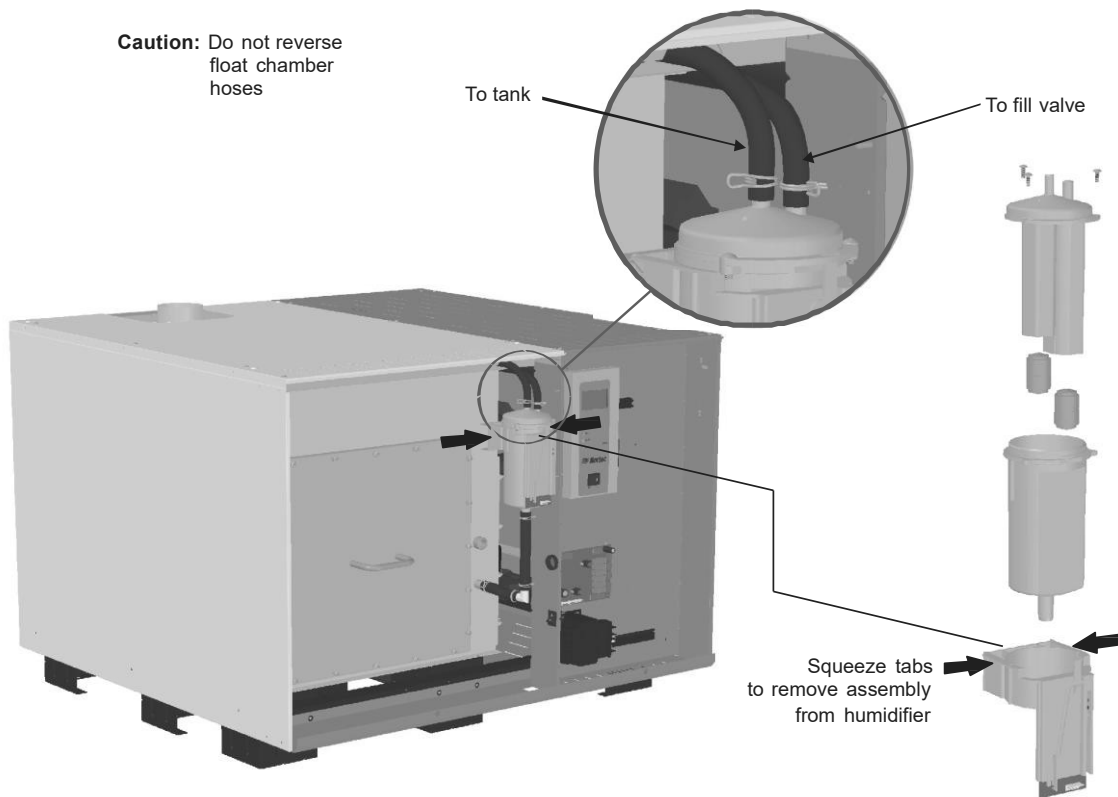


Figure 52: Float Chamber Cleaning

Resetting Service Reminder

After completing maintenance of the Nortec SETC reset the service reminder by following the procedure outlined in Reset Service Reminder on page 50.

NOTE: If the “Service Reminder” is not reset the humidifier may fault out on the Humidifier Maintenance Fault despite the fact that the maintenance has been performed.



Maintenance Shutdown and Extended Shutdown

The following procedure should be followed to shut down the humidifier for maintenance or should it be required to disconnect power to the humidifier for a period of extended shut-down.

When performing maintenance, the Nortec SETC models include a Tank Pre-Clean feature. Tank Pre-Clean will activate the drain pump to flush out some of minerals in the bottom of the tank, then refill partially with cold water to cool the tank, and finally drain the contents of the tank. This cycle will cool the tank, as well as flush out some deposits.

- 1** Nortec SETC - Activate Tank Pre-Clean as described in Tank Pre Clean on page 50 or press and release the drain button to simply drain the tank. Nortec SEP - Turn the On/Off/Drain switch to Drain.
- 2** Nortec SETC - If preclean was activated wait until the LCD display indicates the preclean is complete otherwise wait until no water is coming out from the drain. Nortec SEP wait until there is no water coming out from the drain.
- 3** When the tank has completed draining, turn the main power switch to “Off”. Also, shut off the electrical power at the disconnect.
- 4** Close the manual shut-off valve on the steam supply.
- 5** Close the manual shut-off valve on the water supply line.
- 6** Briefly open the manual valve on the auxiliary drain line (if applicable) to drain any remaining water.
- 7** The unit can now be serviced (if maintenance is being performed), or “stored” in this state until the next humidification season. Alternatively, Nortec SETC models can be left in 3 day drain state during an “off-season”.
- 8** To restart the unit follow Start Up Procedure on page 36.



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

Nortec SETC/P Maintenance

Checklist

Model #: _____

Tag: _____

Serial #: _____

System Check

- HMW (Maintenance Warning) HMF (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)

Clean Tank / Heat Exchanger / Float Chamber

- Tank drained.
- Disconnect open, On/Off switch to Off
- Water shut off and manual steam valve closed, cabinet covers removed.
- Anti seize compound applied to tank maintenance door nuts.
- Maintenance doors removed (front and top of 525+).
- Tank maintenance door gaskets cleaned and in good condition.
- Scale removed from tank.
- Heat Exchanger has scale and needs cleaning No Yes
If Yes
 - Steam supply and condensate unions disconnected
 - Anti seize compound applied and heat exchanger nuts removed
 - Heat exchanger removed.
 - Heat exchanger gaskets cleaned and in good condition.
 - Heat exchanger cleaned with plastic scraper.
 - Heat exchanger reinstalled. Nuts torque to 5 ft-lb
 - Steam supply and condensate unions reconnected.
- Tank maintenance doors reinstalled Nuts torque to 5 ft-lb
- Float Chamber removed inspected and cleaned

General Inspection

- 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,
- Cabinet covers replaced, water shut off valve opened, manual steam valve opened, On/Off switch to On, Disconnect Closed
- Nortec SETC only - "Reset Service Reminder" in Software, (Password 0335, Service Level)

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

Company: _____

Troubleshooting

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84 Nortec SEP Wiring Diagram

Organization of Troubleshooting Chapter

The troubleshooting chapter is broken down into 2 sections.

General Troubleshooting

Deals with troubleshooting incorrect humidifier operation, steam line 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 humidifier's control software.

CAUTION: Be aware, when troubleshooting, that the humidifier is powered by high voltage and pressurized steam. 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 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 of this manual.
- Wiring diagram specific for your humidifier is installed on the inside of the humidifier door. A generic copy of the Nortec SETC and Nortec SEP wiring diagram is also included at the end of this chapter for reference purposes.
- When contacting your local representative or Condaire 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 SETC/P humidifier and auxiliary components. For detailed troubleshooting information refer to the manuals that were provided with the auxiliary equipment, to Table 13: Troubleshooting Warnings and Faults, and to Table 14: Troubleshooting Nortec SEP Faults later in this chapter.

Humidifier

Table 12: General Troubleshooting

Symptom	Cause	Corrective Action(s)
Nothing happens when On/Off switch is turned on.	1 Fuse blown	1 Check inline fuse in yellow housing between transformer and driver board. Check and replace fuse on driver board.
	2 Incorrect or no Voltage	2a Check voltage against spec label and correct. 2b Check disconnect and insure humidifier is getting power.
	3 Step Down Transformer not outputting 24VAC	3 Replace the transformer
Humidifier will not humidify or not reaching RH setpoint	1 Safety loop open	1a Check if green led is flashing on the humidifier's display. 1b Check if there is 24 VAC at terminal 2. 1c Check wiring and operation of On/Off devices connected to terminal 1 and 2. Ensure they are closing when they should be.
	2 High limit limiting output	2 Check if the high limit is installed too close to the humidifier and if it is operating correctly.
	3 No signal on Channel 1	3 Check voltage between terminal 3 and 4. For demand configuration 15% of full scale signal must be present for humidifier to start. For transducer configuration the signal must be lower than setpoint for the humidifier to start.
	4 No signal on Channel 2 (For units configured for dual channel operation).	4 Check voltage between terminal 5 and 3. For demand configuration 15% of full scale signal must be present for humidifier to operate. For transducer configuration the signal must be lower than setpoint for the humidifier to start..
	5 Capacity has been manually limited	5 Check Manual Capacity on status screens. Adjust "Manual Cap" in the "Control Setting" menu if necessary.
Humidifier has faulted or has a warning	1 Software has detected an abnormal condition	1 Refer to Table 13troubleshooting warnings and faults.

Steam Distributors

Symptom	Cause	Corrective Action(s)
Distributor spitting out water	1 Distributor not level	1 Use support at end o 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 Condensate line double trapped	5 Condensate lines must not have two traps in sequence. This can cause an air lock and prevent water draining.
	6 Steam line not insulated	6 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.
Condensation in duct	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.
	4 Air proving not installed or not working	4 Check that the humidifier will only operate when there is air moving in the duct.
	5 Improper location of high limit	5 Check that high limit is installed where it can detect high duct humidity.

SAM-e

Symptom	Cause	Corrective Action(s)
Nortec SAM-e spitting out water	1 “P” Trap too close to SAM-e	1 “P” trap must be at least 12 in (30 cm) below header. Relocate if required.
	2 Condensate line not sloped sufficiently	2 Ensure line is sloped sufficiently to carry condensate produced.
	3 Steam line not insulated	3 If steam line is long condensate build up could overload the Nortec SAM-e condensate port. Insulate the steam line to improve efficiency and install condensate traps as required.

Symptom	Cause	Corrective Action(s)
Nortec SAM-e Grommet leaks	1 Distributor tubes not seated properly	1 Push distributor tubes down until support washer is resting on rubber grommet.
	2 Grommet Damaged	2 Replace any damaged grommets

Blower Pack

Symptom	Cause	Corrective Action(s)
Blower not operating Note: Blower pack does not come on unless the humidifier is producing steam.	1 No power to blower pack	1a Check power connection. 1b Check blower pack fuses
	2 On/Off Thermostat not closing	2 Check wiring to thermostat replace if it does not close when it is exposed to steam.

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 $\pm 10\%$. 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.

Nortec SETC Warnings and Faults

The self-diagnostic system built into the SETC is continually monitoring the operation of the humidifier.

Warnings

- When problem symptoms are detected, the Nortec SETC will attempt to take self-corrective actions to try to correct the problem. A warning is displayed on the screen for information purposes and the humidifier continues to operate.
- If the condition which generated the warning is eliminated the warning is cleared from the display.

Faults

- If the humidifier is not able to self correct a problem symptom it will if necessary respond by shutting itself down.
- When this occurs the humidifier illuminates the red “Fault” LED, shuts off the signal to the CV valve actuator, and activates the “Error” relay of the remote relay board.

Clearing a Fault

- Check the fault message that the humidifier is displaying and take any necessary actions to correct the cause(s) as outlined in Table 13, Troubleshooting Warnings and Faults.
- Power cycle the humidifier with the On/Off switch waiting 3 seconds between turning it off and on.

Table 13: Troubleshooting Warnings and Faults

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
CLF	Clock Fault	Red	Controller system clock failure.	1 Software has detected a hardware problem with main control board	1 Restart humidifier, if error occurs within 1 minute replace main control board. If error does not occur then primary power fluctuation may be the cause.
DCF	Drain Ck Fault	Red	The drain pump is activated but water level has not decreased	1 Drain blocked	1 Check water flow at air gap when drain activated. Flow should be > 5 gal (20 l) / min.
				2 Pump not working	2a Check wiring to pump. 2b Activate pump with diagnostic output test and verify pump runs and drains water.

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
DCF (Cont)				3 Floats stuck	3a Watch float board lights while manual drain is activated. Verify lights activate in sequence 3b Remove float chamber and check for scale
FCF	Fill Check Fault	Red	The fill valve has been active for an extended time without increasing a float level.	1 Water supply off or inadequate	1a Ensure water line is open and that adequate water supply and pressure is available.
				2 Fill valve strainer blocked	2a Disconnect water supply line and remove strainer. Clear if obstructed.
				3 Fill Valve not activating	3a Check wiring to fill valve. 3b Activate fill valve with diagnostic output test. Verify water is flowing when activated.
				4 Float board not detecting water	4a Check wiring to float board.
				5 Manual drain switch on or auxiliary drain open.	5a Check that manual drain switch is not on. 5b Check that auxiliary drain valve is closed.
FIF	Float Inconsist.	Red	On startup, the unit registers that the float levels do not increase logically from 1 to 5	1 High water flow from fill valve to float chamber cooling.	1 Check flow from fill valve hose connected to float chamber. Is only a trickle. If not check hose is connected to correct side of fill valve or if orifice is missing in fill valve.
				2. Float chamber or board not in place	2 Check that float board is properly installed in plastic support , that tie wrap is in place, and that float reservoir is in place.
				3 Float level sensor is malfunctioning.	3 Squeeze bottom hose from float chamber and activate fill valve using diagnostic output test. Watch for proper light sequence. Replace assembly if sequence is incorrect.

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
FLF	Float Level	Red	More than one Float Level is registering at the same time	1. Float chamber or board not in place	1 Check that float board is properly installed in plastic support , that tie wrap is in place, and that float reservoir is in place.
FLF (Cont)				2 Float level sensor is malfunctioning.	2 Squeeze bottom hose from float chamber and activate fill valve using diagnostic output test. Watch for proper light sequence. Replace assembly if sequence is incorrect.
FTF	Fill Fault / Warning	Red	The fill valve has been active for an extended time without reaching level 1.	1 Water supply off or inadequate	1a Ensure water line is open and that adequate water supply and pressure is available.
				2 Fill valve strainer blocked	2a Disconnect water supply line and remove strainer. Clear if obstructed.
FTW				3 Fill Valve not activating	3a Check wiring to fill valve. 3b Activate fill valve with diagnostic output test. Verify water is flowing when activated.
				4 Float board not detecting water	4a Check wiring to float board.
			5 Manual drain switch on or auxiliary drain open.	5a Check that manual drain switch is not on. 5b Check that auxiliary drain valve is closed.	
HMF	Maint. Fault / Warning	Red	The Humidifier Maintenance interval and 72 hour window for cleaning has expired	1 Humidifier requires maintenance	1 Perform humidifier maintenance as described Maintenance Schedule on page 65
HMW		Yel	The preset service interval time has expired.	2 Service reminder not reset after maintenance	2 Reset service reminder as described in Reset Service Reminder on page 50
KWF	Keep Warm Fault	Red	Keep Warm activated but tank temperature has not increased within time allotted	1 Tank temperature sensor not detecting warm tank.	1a Check tank to see if hot (caution). 1b Check wiring to tank temperature sensor. 1c Check if sensor closed when tank is hot.

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
KWF (Cont)				2 No steam supply to humidifier.	2a Check that isolation valve is not closed. 2b Check if boiler steam is available. 2c Check if CV valve opens using diagnostic output test.
				3 Condensate not draining from heat exchanger.	3a Check that F&T trap is allowing condensate to drain.
LKF	Leak Fault / Warning	Red	Float level has dropped multiple times while no steam is being produced.	1 Steam leaking through CV valve	1a CV valve actuator not adjusted. Follow Figure 11: CV Valve Actuator Installation on page 16. 1a CV valve defective. Replace CV valve.
LKW				2. Auxiliary drain is leaking.	2a Check that auxiliary drain valve is closed and is not leaking.
				3. Tank or fittings are leaking.	3a Check for leaks from tank, tank covers, and fittings.
LMI	Limit Instable		Limit signal is not stable.	1 High limit humidistat too close to steam distributor	1 Locate the high limit humidistat a minimum of 10 feet (3 m) from the distributor.
				2 High limit humidistat setpoint too low	2 Adjust the high limit setpoint to 85% or more.
				3 Improper Proportional and Integral settings in control	3 Adjust proportional and integral settings to reduce swings in demand signal.
				4 Defective control	4 Replace defective control
MEM	Flash R/W Fault	Red	Controller Memory failure	1 Software has detected a hardware problem with main control board	1 Restart humidifier, if error occurs within 1 minute replace main control board. If error does not occur then primary power fluctuation may be the cause.
MTW	ModBus Timeout		No Modbus signal	1 Loose connection	1 Check connections and polarity of wires.
				2 Incorrect Modbus address	2 Check that Modbus address of humidifier matches that of master.

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
MTW (Cont)				3 Humidifier configured for Modbus but not connected to network	3 Configure controls correctly in “Control Setting” level of software (see Operation Chapter).
				4 Improper wire used	4 Use 120 Ohm impedance shielded twisted pair cable.
				5 Noise preventing humidifier from detecting signal.	5 Eliminate source of noise causing interference.
NSW	No Signal Warning		No communication is detected from Master unit. (This unit is set up as slave)	1 Improper wiring	1 Check wiring connections, polarity, and type of wire used. (See Staged Modulation Wiring (SETC Only) on page 31)
RDW	Remote Disabled		The unit has been remotely disabled through modbus communication or Nortec Online.	1 Network signal received by humidifier to shut down.	1 Normal operation for humidifier on network control Contact network administrator to enable humidifier.
RHW	Rh High Warning		The measured RH is above the RH High alarm setting.	1 Setpoint higher than RH alarm setting	1 If the humidifier is still operating then check and adjust setpoints.
RLW	Rh Low Warning		The measured RH is below the RH Low alarm setting.	1 Humidifier not running	1 Check why humidifier is not running and put it into operation.
				2 Setpoint lower than RH low alarm setting	2 Check and adjust setpoints.
RMW	Rh Limit Warning		Operation is interrupted until an input higher than 3% is received.	1 Sensor not powered	1 Use multimeter to check that sensor is powered.
				2 Sensor not wired correctly	2 Check wiring is secure and wired correctly per instructions in installation chapter.
				3 Defective sensor	3 Check if sensor is outputting corresponding to RH. If not replace the sensor.
				4 RH less than 5%	4 RH less than 5% are interpreted as a broken sensor. Contact Condair Representative for recommendation.

Code	Display Message	LED	System Detected	Cause	Corrective Action(s)
				5 Humidifier control configuration incorrect	5 Check that the humidifier control configuration matches the installed sensor output.
TCF	Tank Cold Fault	Red	The tank has not become hot with the steam valve activated.	1 Tank temperature sensor not detecting warm tank.	1b Check tank to see if hot (caution). 1a Check wiring to tank temperature sensor. 1c Check if sensor closed when tank is hot.
TCW				2 No steam supply to humidifier.	2a Check that isolation valve is not closed. 2b Check if boiler steam is available. 2c Check if CV valve opens using diagnostic output test.
				3 Condensate not draining from heat exchanger.	3a Check that F&T trap is allowing condensate to drain.

Nortec SEP Faults

The self-diagnostic system built into the Nortec SEP can display some fault conditions by flashing the yellow “Service” LED in sequence. The Nortec SEP does not display any warnings.

Faults

- If the humidifier is not able to self correct a problem symptom it will if necessary respond by shutting itself down.
- When this occurs the humidifier illuminates the red “Fault” LED, Flashes the yellow LED in a numerical sequence, shuts off the signal to the CV valve actuator, and activates the “Error” relay of the remote relay board.

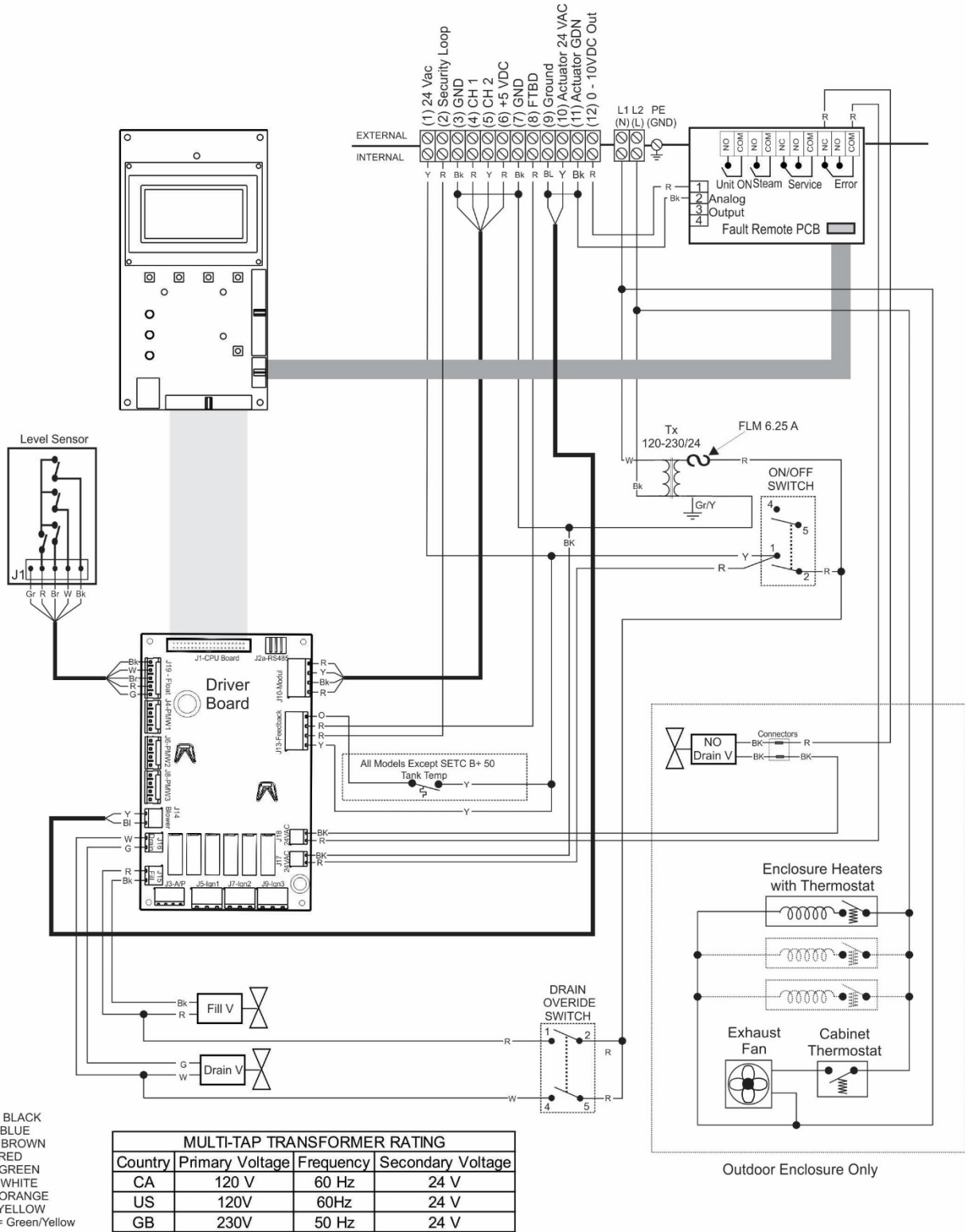
Clearing a Fault

- Count the number of flashes of the yellow LED and take any necessary actions to correct the cause(s) as outlined in Table 14: Troubleshooting Nortec SEP Faults.
- Power cycle the humidifier with the On/Off switch waiting 3 seconds between turning it off and on.

Table 14: Troubleshooting SEP Faults

Number of Flashes / Fault	System Detected	Cause	Corrective Action(s)
One Flash Humidifier Drain Fault	Water level is not dropping when pump is activated.	1 Internal drain blocked	Check if water drains from unit when drain manually activated. If not then; 1a Check restrictor in drain line immediately after pump for blockage. 1b Check pump rotor to see if it is blocked. 1c Check if scale has built up in sump at bottom of tank and caused a blockage.
		2 External drain blocked	2 Check that water can flow freely through drain lines.
Two Flashes Humidifier Fill Fault	Water level not rising or not detected.	1 Water shut off valve closed	1 Open shut off valve
		2 Auxiliary drain leaking	2a Close auxiliary drain valve if unit does not have freeze protection. 2b Check freeze protection valve is closed if freeze protection installed.
		3 Fill valve strainer blocked	3 Clean out strainer on fill valve inlet.
Four Flashes Inconsistent Float Level	Floats have indicated water level not changing in sequence.	1 High cooling flow into float chamber	1a Check that orifice in fill valve is in place. Flow should be very low. 1b Check if tank fill and float cooling lines are reversed. Flow to float chamber should be very low. Tank hoses to centre of float chamber.
		2 Defective float board.	2 Observe LED's on float chamber as tank fills. If LED's do not light in sequence replace float chamber and float board.

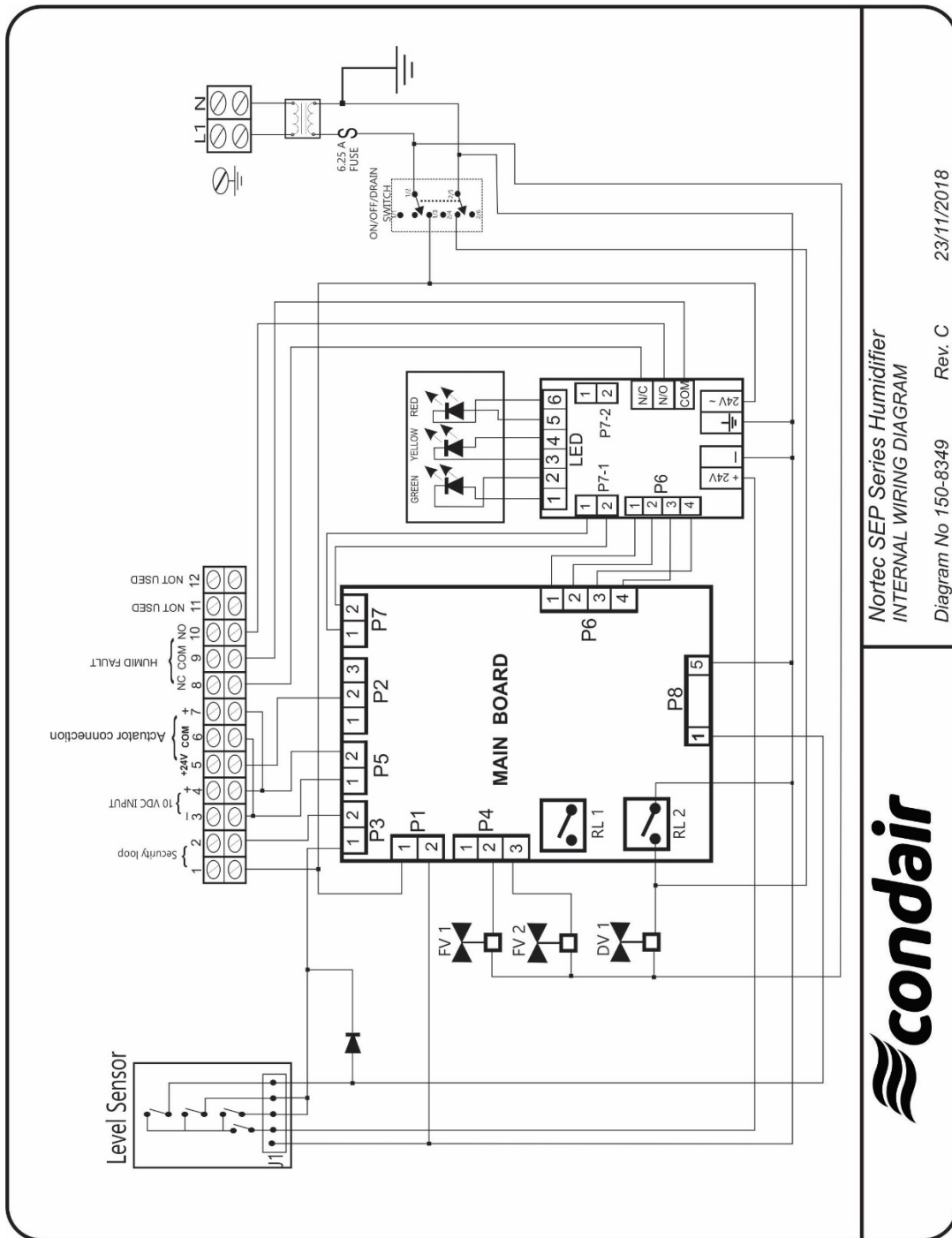
Nortec SETC Wiring Diagram



Nortec SETC B+ Series
 INTERNAL WIRING DIAGRAM
 DIAGRAM No. 2549738 REV. G 23/11/2018

Figure 53: SETC Wiring Diagram

Nortec SEP Wiring Diagram



Nortec SEP Series Humidifier
INTERNAL WIRING DIAGRAM

Diagram No 150-8349 Rev. C 23/11/2018



Figure 54: SEP Wiring Diagram

Spare Parts

Distributor Spare Parts

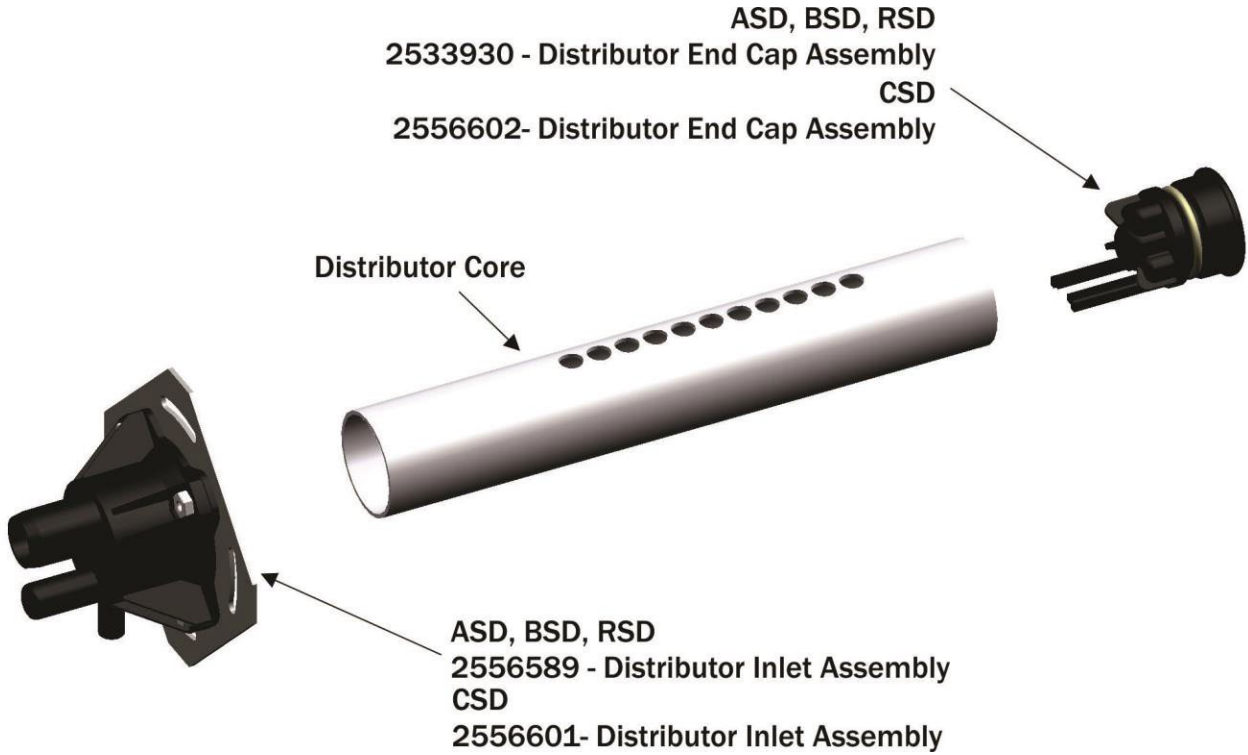


Figure 55: Distributor Exploded View and Spare Parts

Nortec SETC/P 100 – 1050 Plumbing Parts

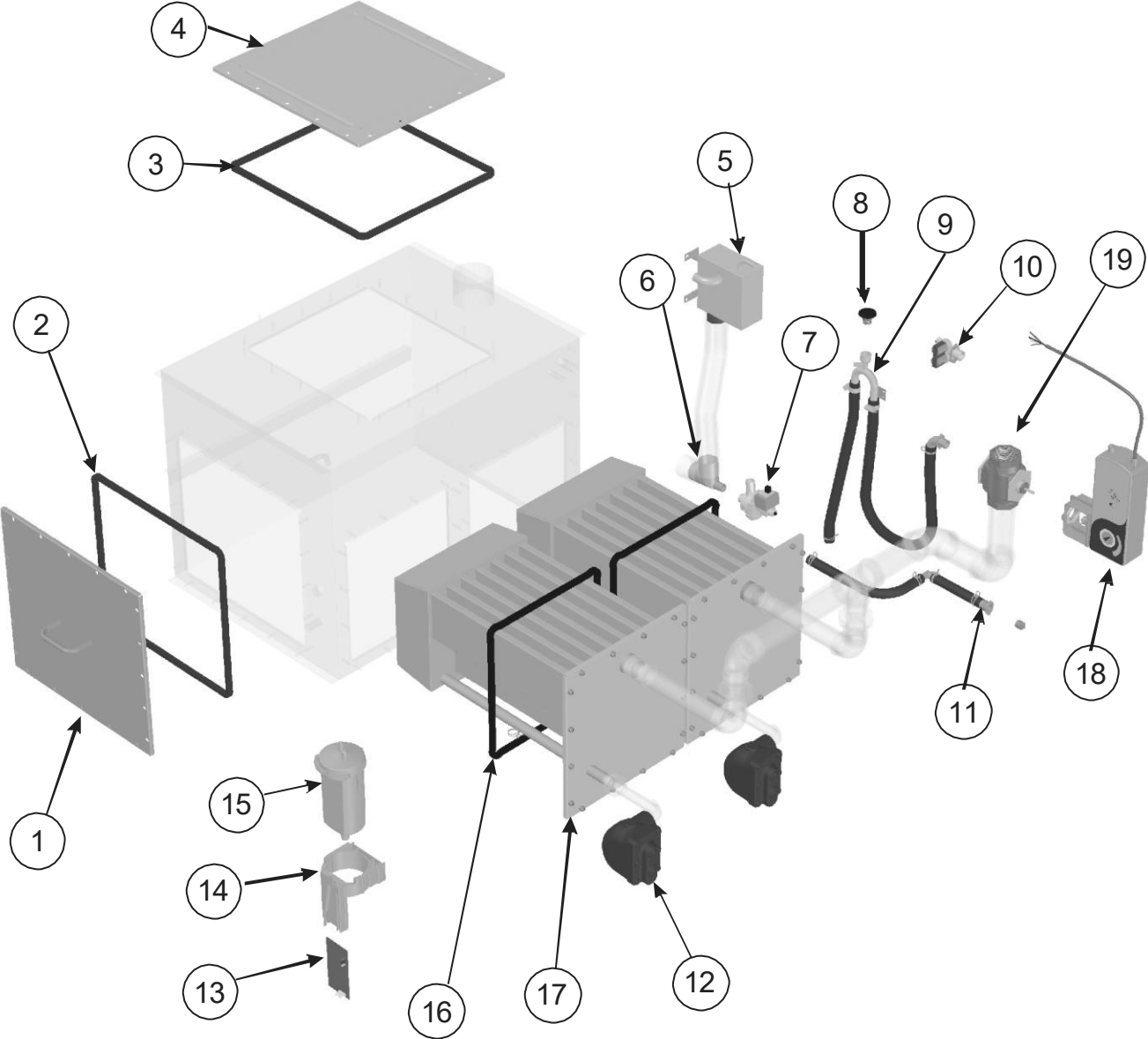


Figure 56: SETC 100-1050 Plumbing Parts

Table 9: Nortec SETC/P 100-1050 Plumbing Parts List

Item	Description	Part No.	100	175	250	375	525	750	1050
1	Cover Plate Assy.	2544439	1	1	1	1	1	1	1
2	O-ring, Clean Out Port	2524361	1	1	1	1	1	1	1
3	O-ring, Clean Out Port,	2524361					1	1	2
4	Cover Plate, Clean Out Port	2547539					1	1	2
5	Fill Box Assy.	2526152	1	1	1	1	1	1	1
6	Lower Mixing Box	1506749	1	1	1	1	1	1	1
7	Drain Pump 24v 60 Hz	1502644	1	1	1	1	1	1	1
8	Vacuum Break Valve 1/2" NPT	1505959	1	1	1	1	1	1	1
9	P-Trap	2526521	1	1	1	1	1	1	1
10	Dual Fill Valve 10.0 l/min & 0.35 l/min	1505759	1	1	1	1	1		
	Dual Fill Valve, 17.0L/Min & 0.35L/Min	1508581						1	1
11	Auxiliary Drain Termination	1506925	1	1	1	1	1	1	1
12	Steam Trap, 15psi	1508849	1	1	1	1	2	2	3
13	Float Board	2511137	1	1	1	1	1	1	1
14	Float Chamber Mounting Bracket	1113777	1	1	1	1	1	1	1
15	Float Chamber	1115933	1	1	1	1	1	1	1
16	O-ring, Heat Exchanger, Large	2524403			1	1	2	2	3
	O-ring, Heat Exchanger, Mini	2524405	1	1					
17	Heat Exchanger Kit, Single	2581131			1	1	2	2	3
	Heat Exchanger Kit, Mini	2581132	1	1					
18	Modulating Actuator 0-10 VDC	1507549	1	1	1	1	1	1	
	Modulating Actuator 0-10 VDC, 2.5 Val	1508472							1
19	Valve 3/4 in. CV 5.5	1594322	1						
	Valve 1 in. CV 10.0	1594324		1					
	Valve 1 in. CV 12.0	1594332			1				
	Valve 1.25 in. CV 20.0	1594341				1			
	Valve 1.5 in. CV 28.0	1594350					1		
	Valve 2.0 in. CV 40.0	1594360						1	
	Valve 2.5 in. CV 65.0	1508473							1

Nortec SETC/P 100 – 1050 Cabinet and Electrical Parts

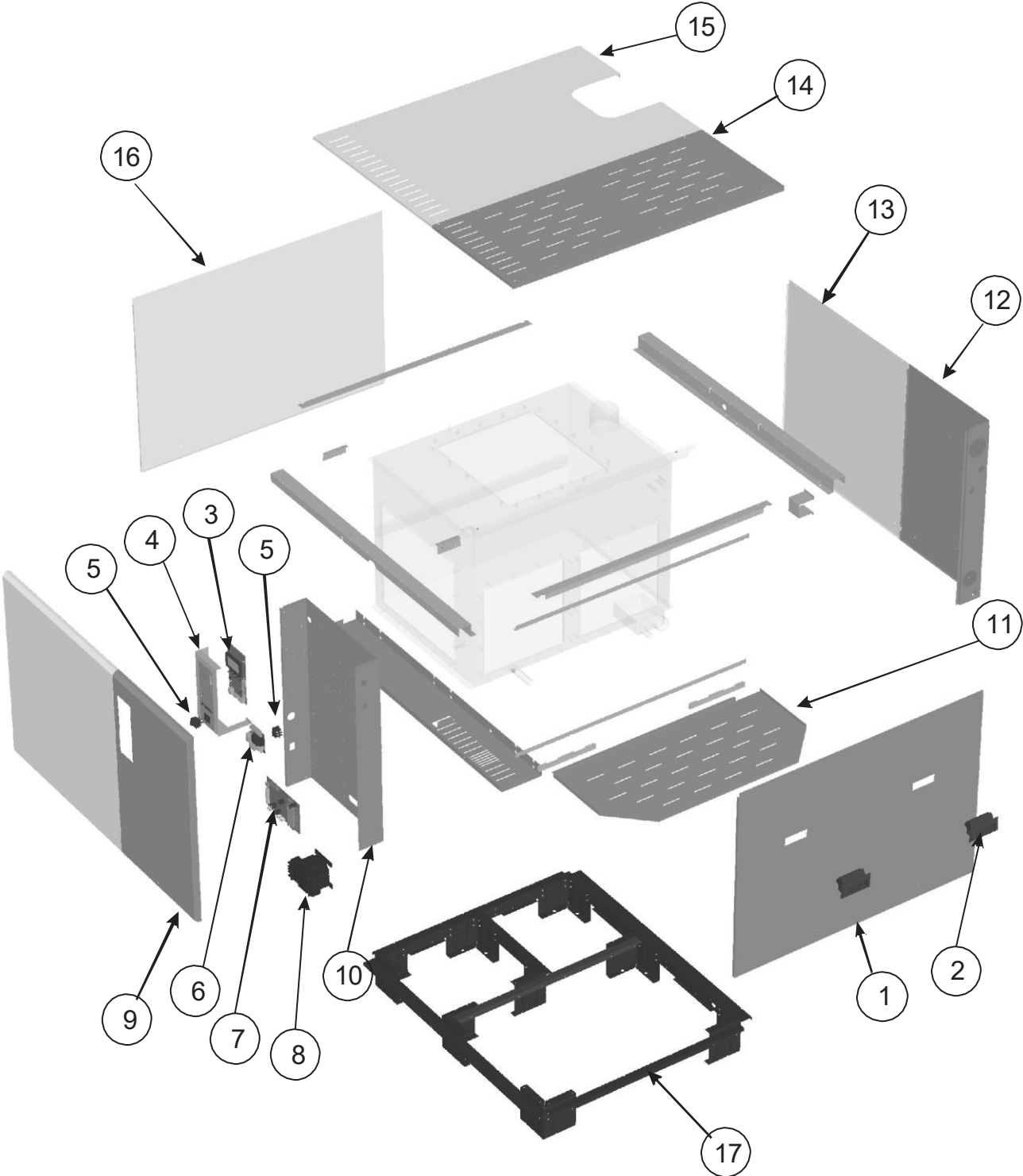


Figure 57: Nortec SETC/P 100-1050 Cabinet and Electrical Parts

Table 10: Nortec SETC B+/P 100 – 1050 Cabinet and Electrical Parts List

Item	Description	Part No.	100	175	250	375	525	750	1050
1	Service Door, Mini	2523709	1	1					
	Service Door, Single	2524402			1	1			
	Service Door, Double	2524401					1	1	
	Service Door, Triple	2523704							1
2	Recessed Handle,	2523444	1	1	1	1	2	2	2
3	Kit Processor Board SE	2553861				1			
Not Shown	Cable , 40 Pin Ribbon	2537230				1			
4	Panel Processor Display,	2544253				1			
Not Shown	Membrane, Nortec	1509735				1			
5	Switch Rocker DPST 10A-250V	2522489				1			
6	Remote Fault Indication Board SETC	2550184				1			
Not Shown	Cable, 10pin Ribbon	2522062				1			
7	PCB Driver Board	2535504				1			
8	Transformer,120/240V, 24V,150VA	2532672				1			
9	Door, Front, GS-SE	2523597				1			
10	Panel, Electrical Cabinet	Reference - Contact Factory							
11	Panel, Elec. Bottom	Reference - Contact Factory							
12	Panel, Rear Elec.	Reference - Contact Factory							
13	Panel, Tank Rear	Reference - Contact Factory							
14	Panel, Elec. Top	Reference - Contact Factory							
15	Panel, Top Tank	Reference - Contact Factory							
16	Panel, Left,	Reference - Contact Factory							
17	Base Assembly	Reference - Contact Factory							

Nortec SETC/P 50 Plumbing Parts

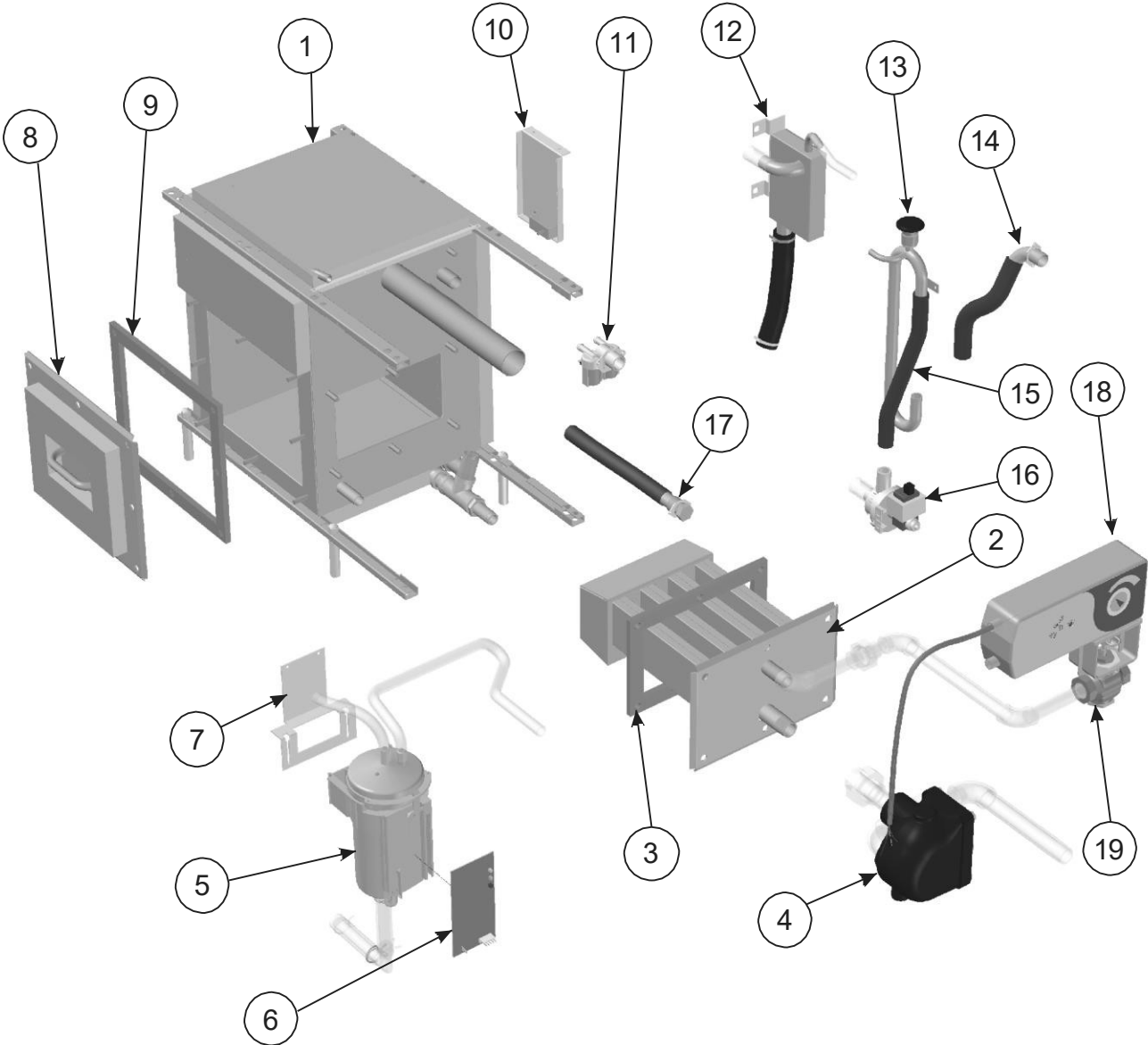


Figure 58: Nortec SETC/P 50 Plumbing Parts

Table 11: SETC B+/P 50 Plumbing Parts

Item	Description	Part No.	Qty
1	Tank Replacement Kit, SE50	2520458	1
2	Heat Exchanger Replacement Kits, SE50	2520460	1
3	Gasket, Tank/H.E. Assembly, SE50	1510179	1
4	F&T Trap Assembly, with Plumbing, SE50	1500181	1
5	Float Chamber Assembly, with Board and Connections, SE50	2520239	1
6	Float Board	2511137	1
7	Bracket, Float Chamber Mount, SE50	2520240	1
8	5 Cover Plate Kit, Clean Out Port, SE50	2520461	1
9	Gasket, Clean Out Port, SE50	1510180	1
10	P Trap Mount Assembly, SE50	2520137	1
11	Dual Fill Valve, 5.5L -.35 L/Min	1704234	1
12	Fill Box Assembly with Connections, SE50	2520235	1
13	Vacuum Break Valve 1/2" NPT	1505959	1
14	Termination Assembly with Connections, SE50	2520236	1
15	P Trap Assembly, Complete, SE50	1510187	1
16	Pump Drain, 24VDC, 60HZ (DPS 25-119)	1502644	1
17	Auxiliary Drain Termination	1506925	1
18	Modulating Actuator 0-10 Vdc	1507549	1
19	Valve 1/2in CV 2.80 / VB7263	1594316	1

Nortec SETC/P 50 Electrical and Cabinet Parts

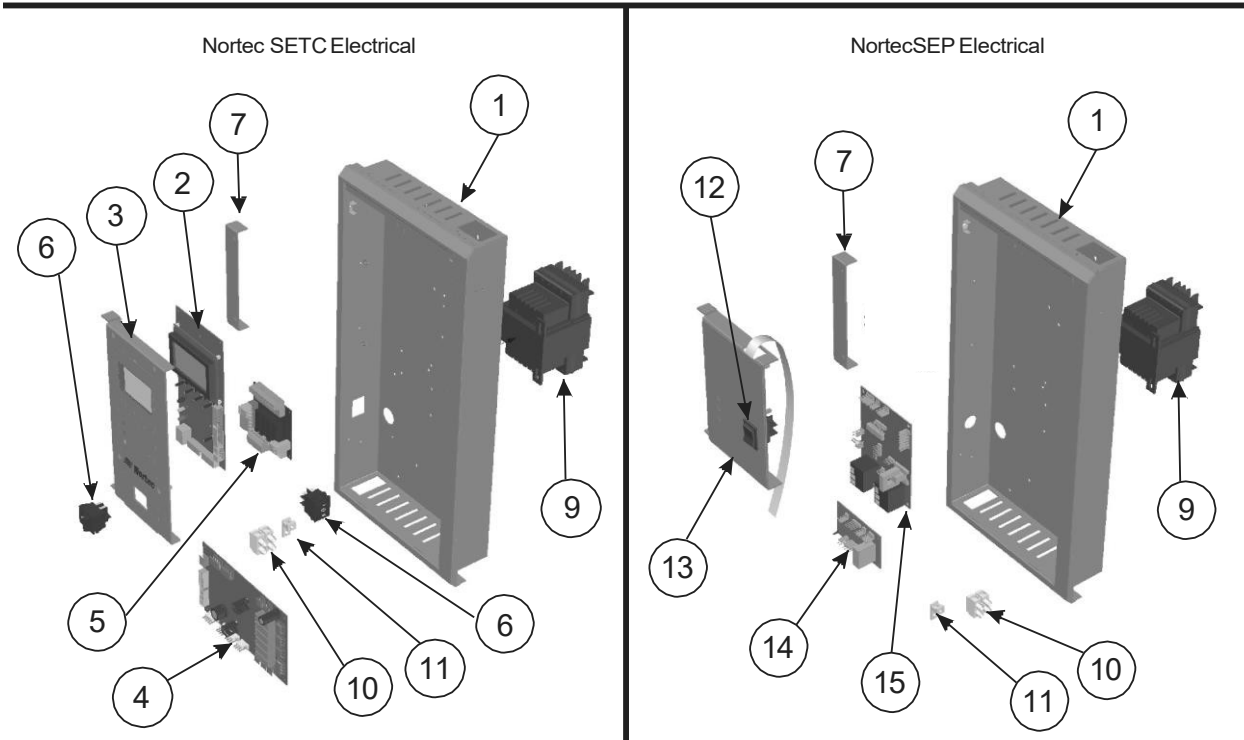
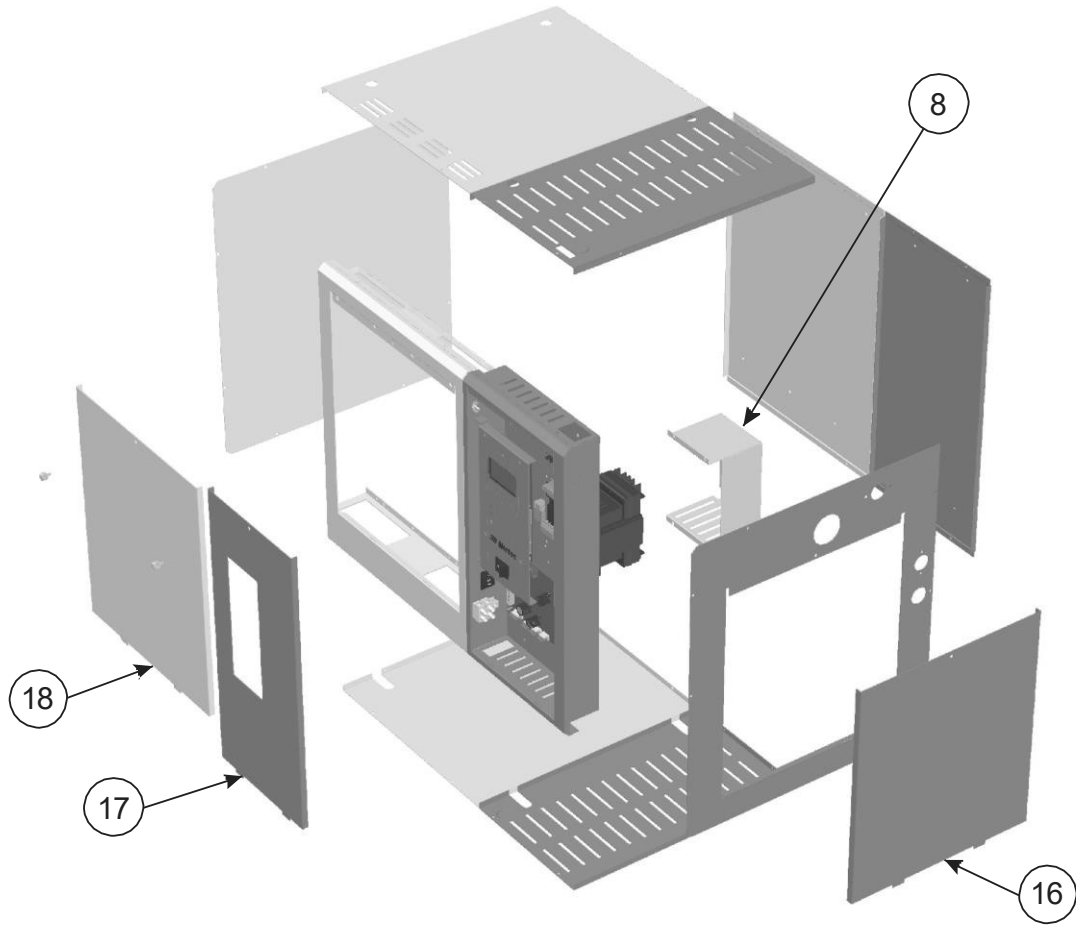


Figure 59: Nortec SETC/P 50 Electrical and Cabinet Parts

Table 12: Nortec SETC B+/P 50 Electrical and Cabinet Parts

Item	Description	Part No.	Qty
1	Panel Assembly, Electrical Front, Cabinet SE50	2520268	1
2	Kit Processor Board SE	2553861	1
Not Shown	Cable, 40 Pin Ribbon	2537230	1
3	Panel Assm, Display, Cabinet, SE 50 B+	2552793	1
4	PCB Driver Board	2535504	1
5	Remote Fault Indication Board SETC	2550184	1
Not Shown	Cable, 10 pin Ribbon	2522062	1
6	Switch Rocker DPST 10A-250V	2522489	2
7	Bracket Assm, Keypad Mnt, SE50	2520272	1
8	Enclosure, Transformer, Cabinet, SE50	2549857	1
9	Transformer, 120/240Vpri, 24Vsec, 150VA	2532672	1
10	Terminal Block 2 Pole	1473002	1
11	Ground Clamp	1323020	1
12	Switch DPDT ON/OFF/DRAIN SETC/SEP	2538961	1
13	SEP Display / Keypad Assembly, SE50	2520279	1
14	SEP, Led Board Assembly	1508619	1
15	SEP Control Board	1508577	1
16	Panel Access, Elect Right, Cabinet, SE50	2520283	1
17 SETC	Panel, Access, Electrical Front SE 50 B+	2552792	1
17 SEP	Panel Access, Elect Front, Cabinet, SE50	2520270	1
18	Panel, Access, Tank Front, Cabinet, SE50	2520267	1

Warranty

Condair Inc. and/or Condair 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 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, drain lines, or steam distribution systems.

THE COMPANY makes no warranty and assumes no liability whatsoever for equipment that has failed due to ambient conditions when installed in locations having climates below 14 °F (-10 °C) during January or above 104 °F (40 °C) during July.

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

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