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

LiveSteam

Installation and Operation Manual

Includes installation, operation maintenance and troubleshooting information for your LiveSteam humidifier

condair

1506160-H | 13 March 2025

Thank you for choosing Condair.

INSTALLATION DATE (MM/DD/YYYY)

MODEL #
SERIAL #
CYLINDER #

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CAUTION: Servicing

- Disconnect main power before any servicing.
- The plumbing and electrical compartments contain high voltage components and wiring. Access should be limited to authorized personnel only.
- During and following operation of the humidifier, the steam and components in contact with the steam such as the blower pack, steam lines, steam distributors, and condensate lines can become hot and can burn if touched.
- Condair 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 Condair.

CAUTION: Electrical

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

CAUTION: Plumbing

- Plumbing to be performed by a licensed plumber.
- Drain water from humidifier can be very hot. Do not drain to public sink.
- All plumbing 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.
- Do not mount on floor.
- LiveSteam produces steam at atmospheric pressure no devices which could block steam output should be connected to the steam outlet.
- Steam lines must be installed so that no restriction can produce backpressure in the humidifier.
- Regardless of selecting on/off or modulating control method, Condair humidifiers must have a closed circuit across its on/off security loop control terminal to operate. Condair highly recommends the use of a duct high limit humidistat.

Installation

Receiving & Unpacking Equipment

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

Location of the humidifier in an air conditioning system

Reference the following systems for humidifier location:

Up flow affect

The up flow affect is a result of the air velocity versus the steam velocity leaving the orifices of the distributor.
The air velocity is a product of the volume flow rate through a present cross sectional area. The steam velocity leaving the orifices is directly proportional on the internal pressure, inside the distribution tube. This pressure is reduced when two or more distributors are in use.

The following up flow guidelines has been established from testing:

Velocity	Inlet Steam Pressure	Up Flow Distance
500	15	2 ft
1000	15	1 ft
500	30	4 ft
1000	30	2 ft

These up flow distances are only guidelines. Every application presents a multitude of variables which may shorten or lengthen the up flow distance. The location of the distributor may need to be changed if condensation occurs.

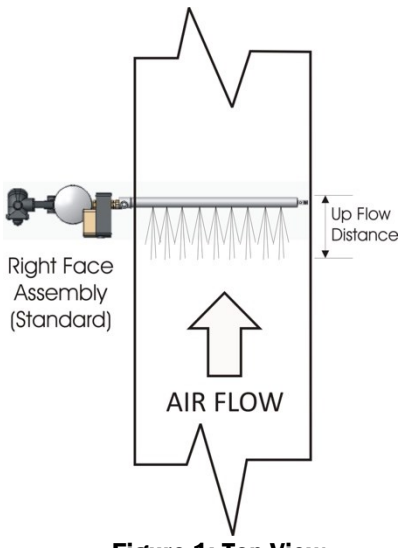


Figure 1: Top View

System 1 - Air Handling Unit

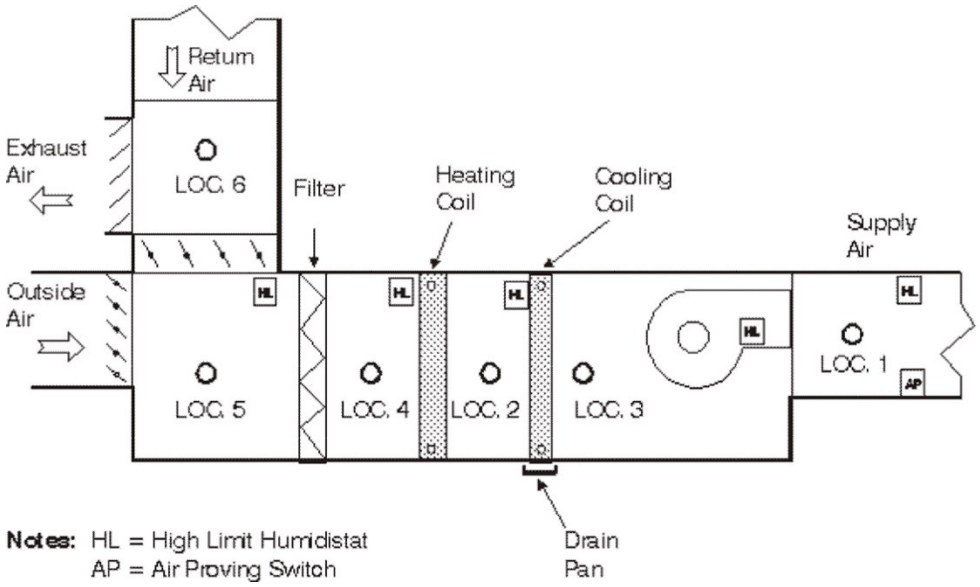
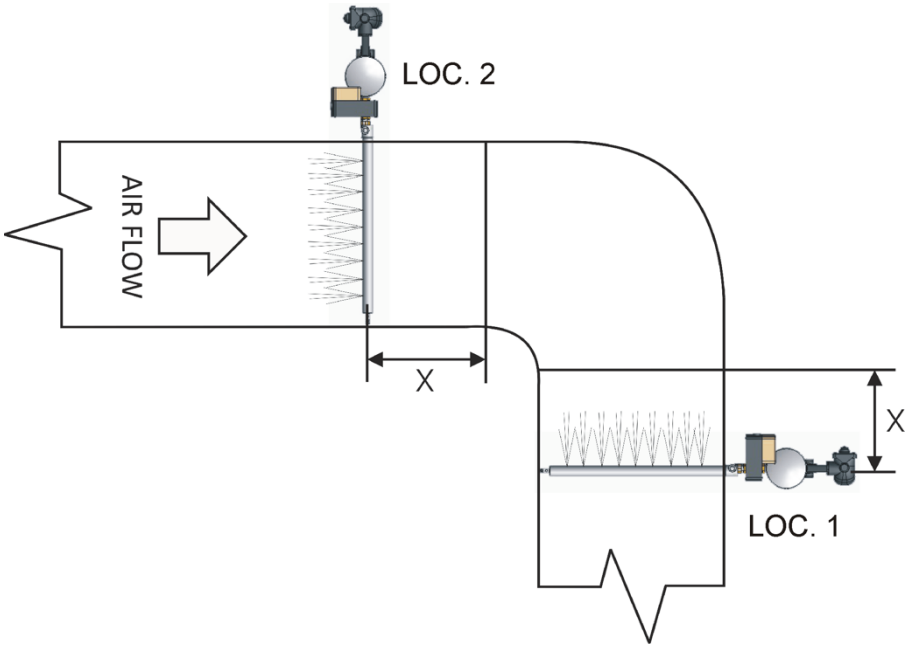


Figure 2: Air Handling Unit

Table 1: Air Handling Unit

Location	Advantages	Disadvantages
LOC. 1	MOST recommended. Assuming there is sufficient straight duct for absorption.	High velocity may create long absorption distances.
LOC. 2	Warm air from heating coil. Good absorption will help evaporate steam.	Cooling coils designed for water. Possible capacity drop due to condensation on the coil.
LOC. 3	Warm air. Good absorption.	If absorption distance is too long it may wet the fan.
LOC. 4	Heating coils will help evaporate steam. Air is mixed well.	Absorption may be a problem. No drain pan on heating coil. Cold air.
LOC. 5	Not Recommended.	Filters may get saturated. Cold air.
LOC. 6	Not Recommended.	Outside air may cause condensation problems. Problematic RH control.

System 2 - In Duct Near An Elbow



Note: If not calculated, dimension "X" is minimum 6' before or after bend or transition. See up flow effect on page 6 for calculation.

Figure 3: In Duct Near An Elbow

Table 2: In Duct Near An Elbow

Location	Advantages	Disadvantages
LOC. 1	MOST recommended. More air on the outside of the turn.	Uneven air flow in the duct.
LOC. 2	Even air flow over the whole duct.	Possibility of wetting of the turning vanes.

Warning: This type of distributor may produce a whistling noise as the pressurized steam decompresses within the distributor and is introduced into the airstream. This noise may be increased with higher pressure applications. For noise dampening recommendations, please consult the factory.

System 3 - Multi-Zone System

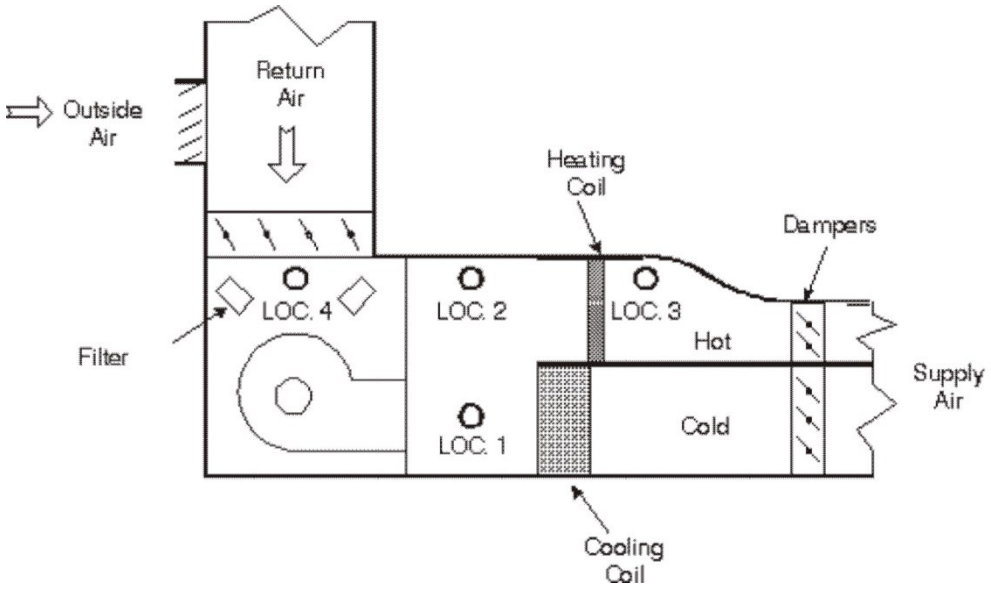


Figure 4: Multi-zone System

Figure 3: Multi-zone System

Location	Advantages	Disadvantages
LOC. 1	Maximum absorption distance to dampers.	Possible loss of capacity to condensate on cooling coils.
LOC. 2	Heating coil will help absorb steam.	Minimum distance to the dampers could result in wetting.
LOC. 3	Warm air.	Minimum distance to the dampers could result in wetting.
LOC. 4	Not recommended.	Filters may get saturated. Cold air.

If one zone requires most of the air quantity supplied to the system, this zone should be the location for the humidifier. Humidity will eventually equalize when the system has been in operation for a while.

System 4 - Dual Duct

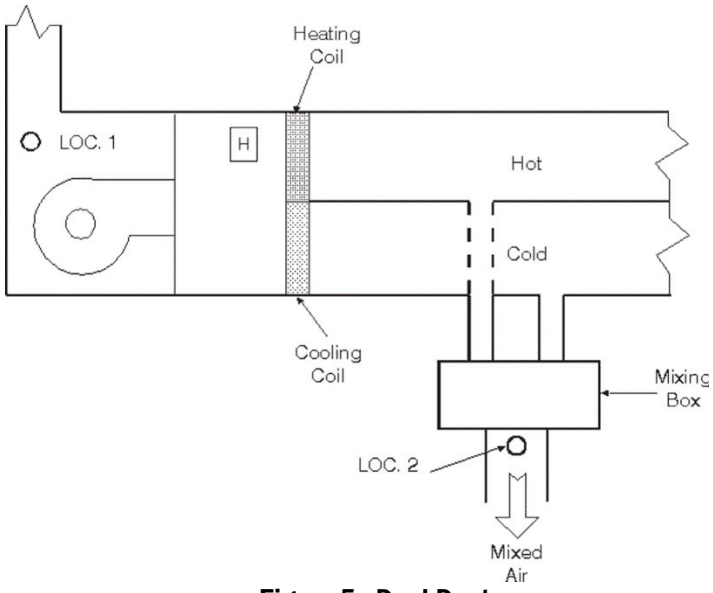


Figure 5: Dual Duct

This system usually requires two steam distributors. The primary load (LOC.1) will go upstream of the fan. The humidistat is located after the fan and before the hot and cold decks. The secondary load (LOC. 2) will go downstream to the mixing boxes and will be controlled by a humidistat in the space. Please consult your Condair agent if absorption distance is a problem. High limit humidistat is recommended in the mixed air duct.

System 5 - Primary And Secondary Distributors

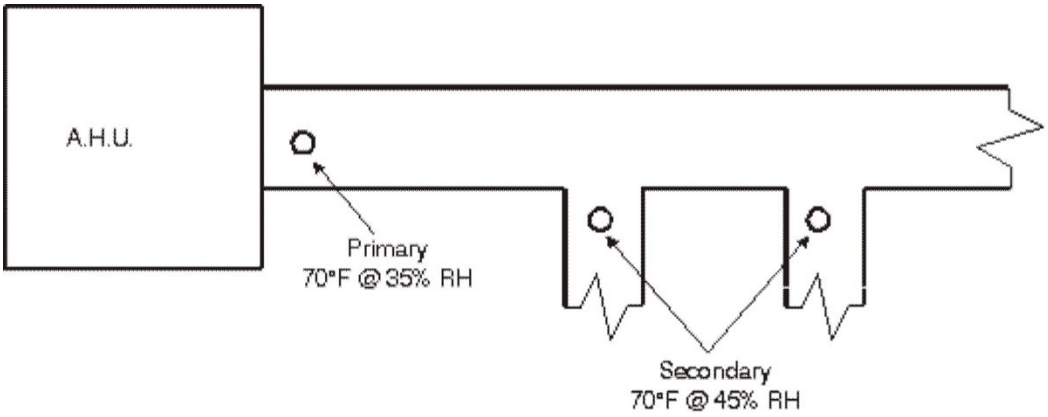


Figure 6: Primary and Secondary Distributors

On occasion you may need a secondary load to reach a higher RH level in one part of your operation (i.e. Hospitals). In this case, the primary load will maintain the normal space condition (70°F at 35% RH) and the secondary load will satisfy the higher RH level (70°F at 45% RH) needed for that zone. High limit humidistats are recommended for each duct.

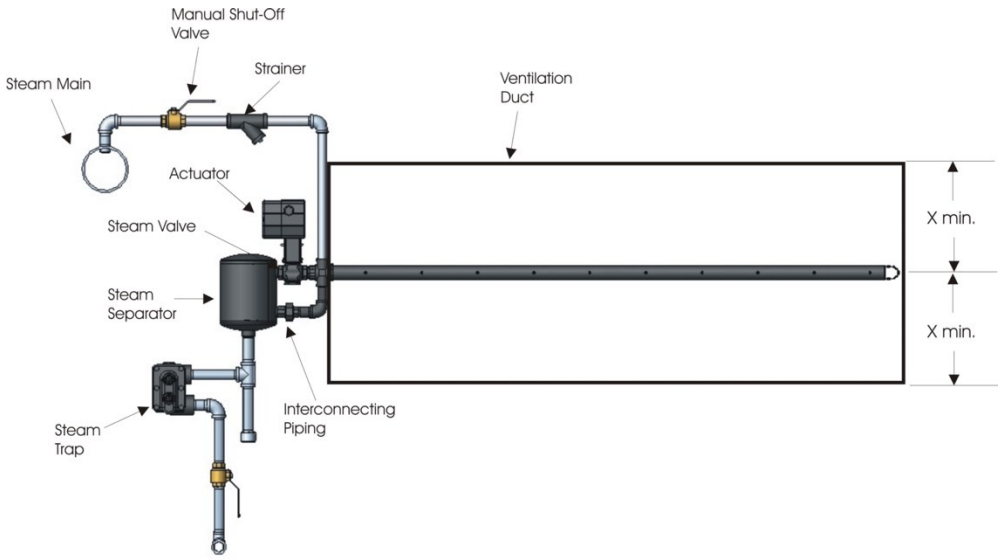
Steam and Condensate Piping

1. Steam supply must be taken from the top of the main supply to the humidifier. Do not take from the sides or the bottom. See Figure 8.
2. For removal of condensate from the steam trap the condensate line should not be under pressure. Condair recommends a check valve be installed after the steam trap if the condensate return line is pressurized.
3. Proper design and sizing of steam supply lines should be performed by a qualified firm.

Assembly Of Single Distributor Humidifier

Note: Follow all general instructions provided with valve and actuator.
All single distributor humidifiers will be assembled at the factory if the interconnecting piping option is selected at time of order.

1. Match the separator/valve assembly with the correct distributor assembly (Condair will tag both assemblies).
2. The o-ring in the tube adaptor should be lubricated (use silicone based lubricant).
3. Slide the distributor into the tube adapter. Make sure that the o-ring is not damaged. Tighten tube adapter. The adapter should be hand tightened plus ¼ turn (25 in-lbs ± 5 in-lbs).



NOTES:
1. All shaded areas by Nortec.
2. Dimension "X" is 6" for LS1 and LS2 distributors, 9" for LS3 distributors.
3. Distributors LS1-12 and LS2-12 are supplied without support bracket.
4. Interconnecting pipe must be ordered at time of purchase, for factory assembly.

Figure 7: Single Distributor Humidifier

4. The union halves come together and are tightened to make a snug fit. The humidifier is ready to be installed in the duct. Single tube comes factory assembled, multi-tube must be field assembled.

5 It is also possible to install distributor in the duct and then attach the separator/valve assembly.

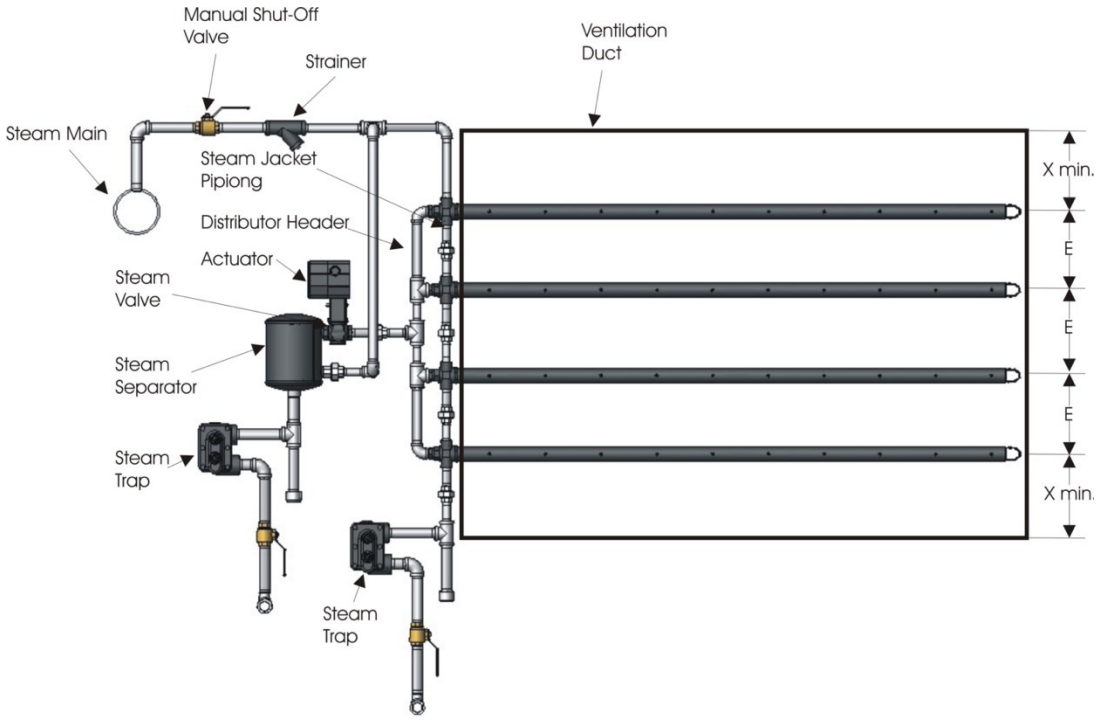
6 Follow the steps listed in “Installation Of LiveSteam Humidifier” section to complete installation.

Assembly Of Multiple Distributor Humidifier

Make a plan of distributors’ layout (if not already done). See Figure 8. Multiple distributor humidifiers require field assembly. The following steps should be taken into consideration:

1 Match the separator valve assembly with the correct distributors (Condair will tag both assemblies).

2 To ensure the same output from each dispersion tube, connect steam supply from separator close to the middle of distributor header.



NOTES:
1. All shaded areas by Nortec.
2. Dimension “X” is 6” for LS1 and LS2 distributors, 9” for LS3 distributors.
3. Distributors LS1-12 and LS2-12 are supplied without support bracket.

Figure 8: Multiple Distributor Humidifier

3 Steam jacket piping has to be secured to the distributor header to avoid possible separation. Use gear clamp or similar device.

4 Distributors have to be equally spaced in the duct. Distance to the top and bottom of the duct should be one half of “E” but not less than 6" for LS1 and LS2 distributors and not less than 9" for LS3 distributors.

5 Use additional steam trap if total length of distributors of Type LS1 exceeds 40’, Type LS2 exceeds 30’, and Type LS3 exceeds 20’. See Figure 9.

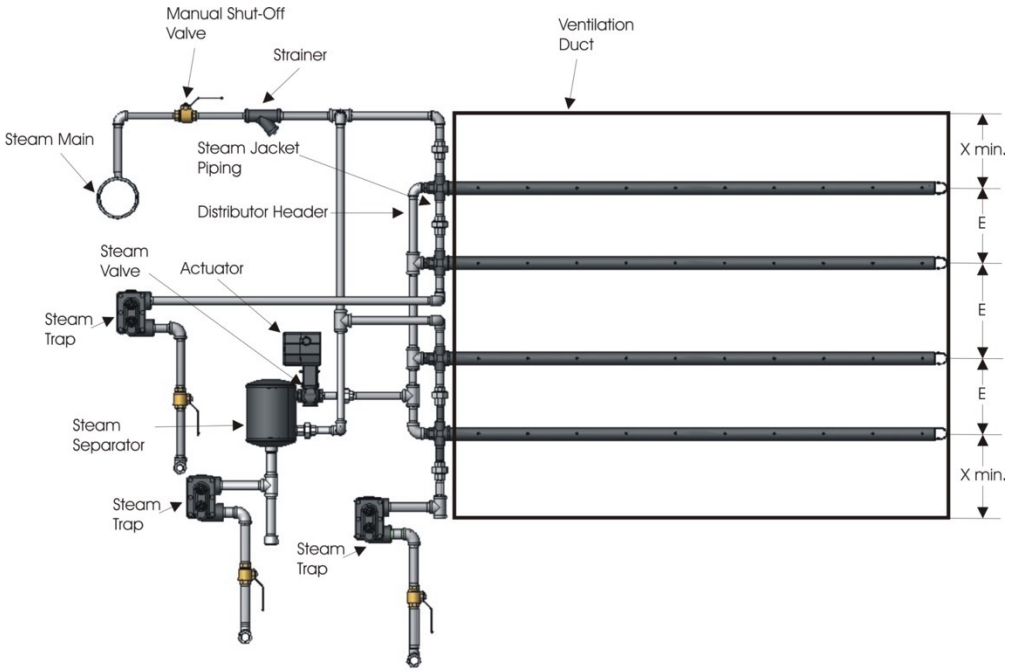


Figure 9: Multiple Distributor Humidifier with Multiple Traps

6 Follow the steps listed in "Installation Of LiveSteam Humidifier" section to complete installation.

Installation Of Livesteam Humidifier

Note: Follow all general instructions provided with valve and actuator.
To complete installation follow the steps listed below.

1 Steam outlets of distributor should face into the air stream unless distributor is insulated. Condair's standard is right face.

2 Distributors must be mounted level. There is a support bracket at the end of the distributor to secure to the duct wall. See Figure 11 to 14 for installation tips.

3 The steam distributor in a Single Distributor Humidifier should be centered in the duct.

4 The steam distributor should be mounted in a straight section of duct. Please consult your Condair agent if absorption distance is a problem. For calculation of absorption distance please refer to Condair manual Form #163D.

5 Do not locate the steam distributor within 10 feet of high efficiency filters, otherwise the filter will become saturated.

6 Cut a hole in the side of the duct large enough to insert the steam distributor. Duct plates are provided to seal any opening.

7 Install actuator. During installation follow instructions shipped with actuator.

8 For ease of maintenance, provide shut-off a valve before humidifier (between strainer and steam main). It can also be used to minimize heat gains during the non-humidification period.

9 Install strainer before entering system and steam trap. Connect to steam and condensate return mains.

10 Wire (electric) or install control tubing (pneumatic) to the valve actuator.

11 Industry standards recommend the use of drain pans under the steam distributor.

12 Condair recommends the use of a temperature switch. Valve will not open until the distributor has reached its operating temperature. This is optional and must be ordered.

13 Condair recommends the use of an air proving switch to prevent wetting in the duct. Humidifier will not operate if there is no air movement in the duct.

14 A high limit duct humidistat, which prevents saturation and wetting in the duct, is recommended downstream 12-14 feet from the humidifier and set at 80 to 90% RH.

Changing Orientation Of Single Distributor Humidifier

Unless otherwise specified at the time of order placement, all uninsulated single tube distributors will be shipped with right face assembly and steam outlets facing the air stream (See Figure 10). The steam flow direction can be changed by opening the union and disengaging the nipple / elbow assembly from the steam distributor, turning the tube assembly 180º and reinstalling the nipple / elbow assembly.

Warning: LS distributors are designed to be supported by the steam piping connected to the unit. Failure to properly support steam piping can result in stresses on the tube adapter and damage the o-ring.

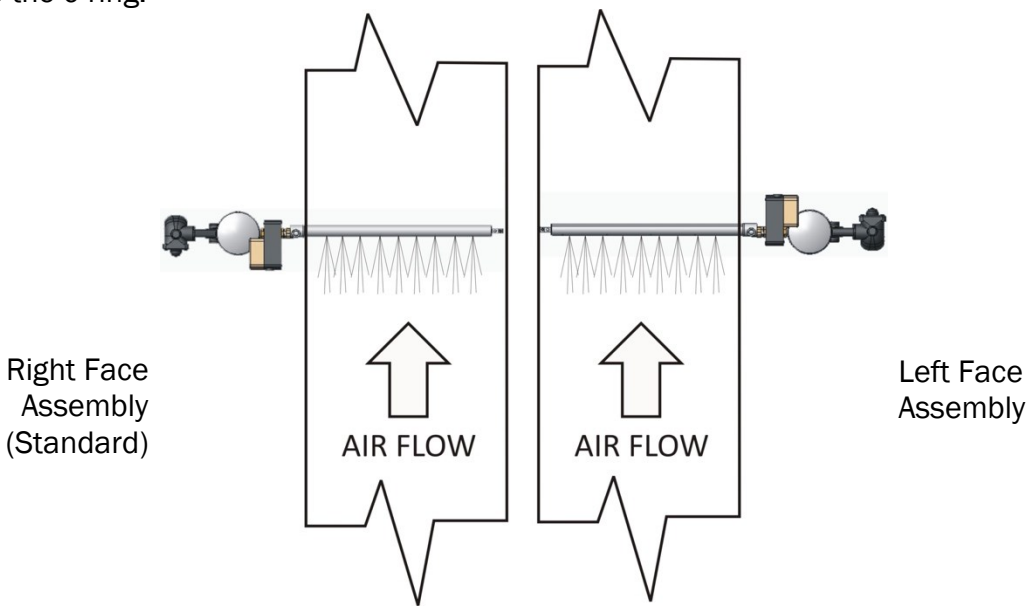


Figure 10: Right / Left Face Assembly

Insulated Steam Distributors

When the steam distributor is insulated the distributor should discharge in the direction of air flow. This is to prevent condensation build-up on the steel insulation jacket.

Duct Support Bracket

Duct support bracket allows for easy installation in the various duct configurations (Figure #11,12,13,14).
It is designed to be used with maximum bolt size of 3/8" (M10). LS1 and LS2 distributors that are 12” (30.5 cm) long are not supplied with duct support brackets.

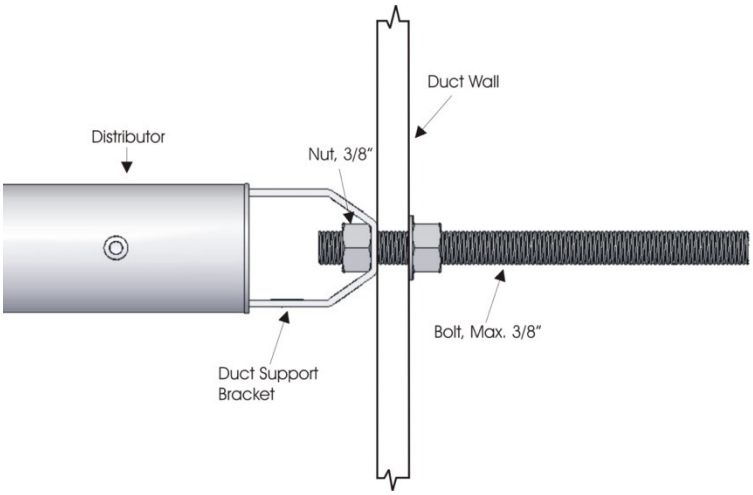


Figure 11: Duct Support Bracket Flush with Duct Wall

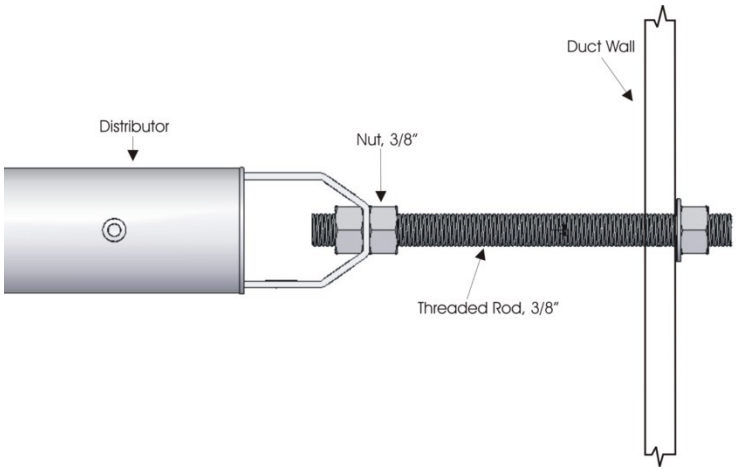


Figure 12: Duct Support Bracket Away from Duct Wall

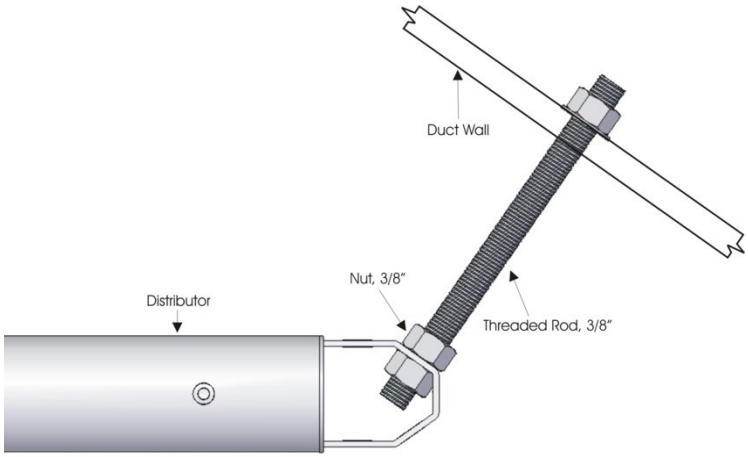


Figure 13: Duct Support Bracket with Angled Duct Wall

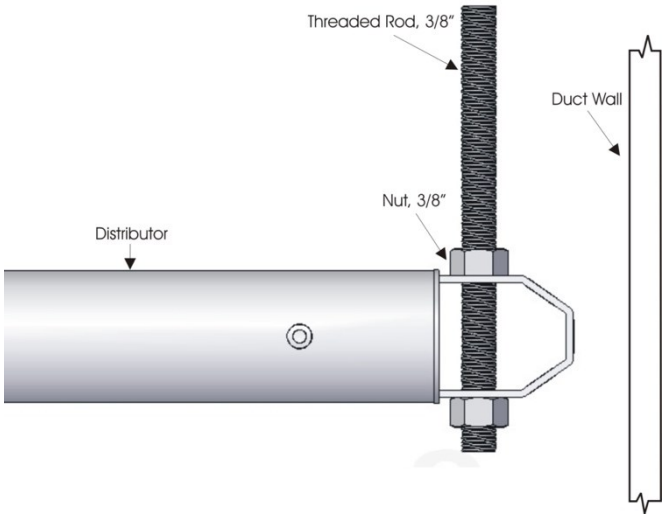


Figure 14: Duct Support Bracket with Horizontal Duct Wall

Pressurized Nortec SAM-e

Plumbing

Steam Line

Warning: Proper design and sizing of steam lines should be performed by a qualified technician.

Condensate Return Line

When pressurized steam (2-50 psi) enters the Nortec SAM-e, steam expansion reduces pressure down to almost atmospheric pressure. Therefore condensate cannot be lifted after the F+T trap. A high temperature condensate pump may be used to achieve this.

Condensate from the Nortec SAM-e must always be returned to an atmospheric condensate return main.

Long condensate runs (more than 20 ft.) should be oversized for better flow. Refer to Figure 33 and 34.

For proper trap installation, refer to Figure 15.

Installing Actuator To Steam Valve

Dura Drive P/N	Condair P/N	Assembly Instructions
MS51-7203 DURA DRIVE ACTUATOR	150 7552 0-10VDC, 150 7553 4-20mA, 150 7554 On/Off	For 1-1/2" Bronze Valve for incoming pressures from 35 to 50 psi, and 2" Bronze Valve for incoming pressures from 20 to 50 psi.

LiveSteam Steam Injection Humidifiers
Start-up Checklist

General Information

Humidifier Serial Number: _____ Tag / Zones Served: _____

Humidifier Steam Pressure: _____ psig

Actuator Control Signal: ☐ 0 – 10 Vdc ☐ 4 – 20 mA ☐ On/Off

Inspection

- ☐ Manual shutoff valve installed upstream of wye strainer
- ☐ Piping connected securely
- ☐ Plug installed and tight on wye strainer
- ☐ Steam traps installed
- ☐ Steam traps primed (bucket trap only)
- ☐ Actuator installed correctly (see attached sheet)
- ☐ Controls Wired

Start-up Procedure

1. Open manual valve slowly allowing steam to enter.
2. Flush lines of existing condensate and debris.
3. Clean strainer screen.
4. When system has warmed allow valve to full open position.
5. Ensure that Pressure Reducing Valve (PRV) is functioning correctly, and pressure does not exceed max listed on separator.
6. Inspect for leaks in piping.
7. Inspect for steam leaking into duct (sign that actuator is not properly installed).
8. Apply signal to actuator, inspect valve motion for smooth operation.
9. Test controls, including high limit and air-proving switch (if applicable).
10. Inspect distributor for leaks.
11. Shut system off at manual valve and when safe empty strainer screen.
12. Reopen valve slowly to warm system and leave valve at full open.
13. Set controls to automatic.
14. System is ready to operate.

Certification

- ☐ Steam system installed in accordance with local codes
- ☐ Steam piping is free of leaks
- ☐ Actuator correctly installed and stroked
- ☐ Controls functioning properly

Installed by: _____
(Company Name and Business Address)

Inspected by: _____
(Company Name and Business Address)

Signed: _____ Date: _____
(Inspector Signature)

Installing Schneider Actuator to Steam Valve

Step 1

Ensure all components are accounted for:

1. Connecting Pin
2. Stem Extension
3. Set Screw
4. Lock Washer
5. Jam Nut
6. Actuator

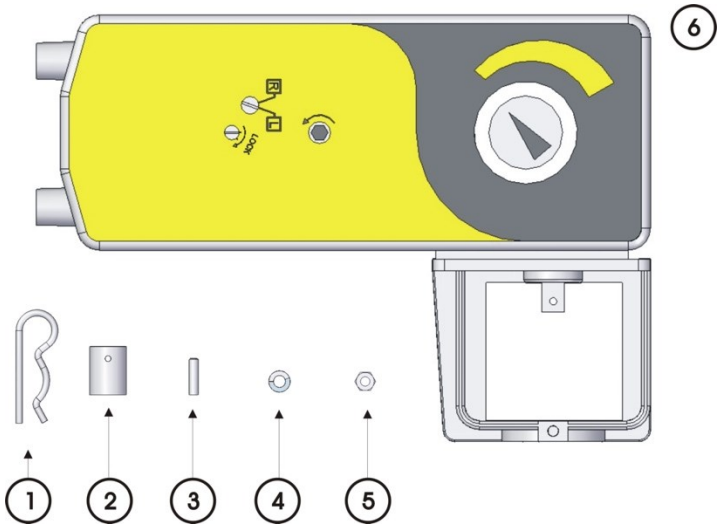


Figure 15: Step 1

Step 2

1. Thread jam nut on to valve stem all the way.

2. Place lock washer over valve stem so that it seats against jam nut.

3. Thread stem extension on valve stem compressing the lock washer.

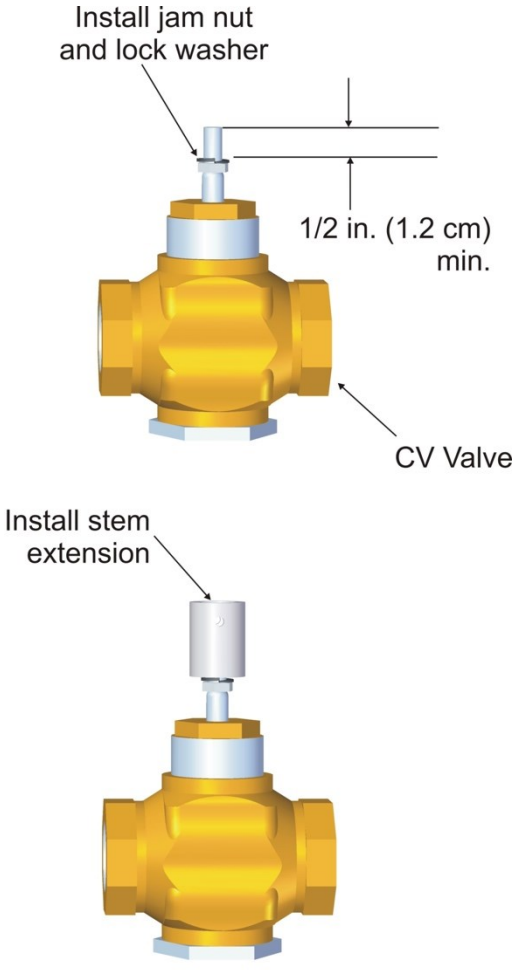


Figure 16: Step 2

Step 3

1. Insert hex wrench as illustrated.

2. Rotate wrench 1 ½ turns counter-clockwise.

3. Lock actuator by tightening locking mechanism with a slotted screwdriver.

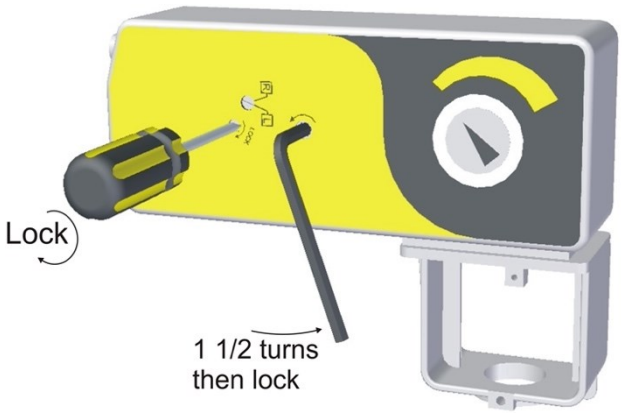


Figure 17: Step 3

Step 4

1. Thread actuator on to valve.

2. Tighten valve mounting nut.

3. Manually raise valve stem to up position (Closed).

Figure 18: Step 4

Step 5

1. Align stem extension hole with actuator plunger hole.

2. Insert connecting pin.

3. Tighten jam nut against valve stem.

4. Insert set screw into actuator on most accessible side.

5. Tighten 20-25 in./lbs.

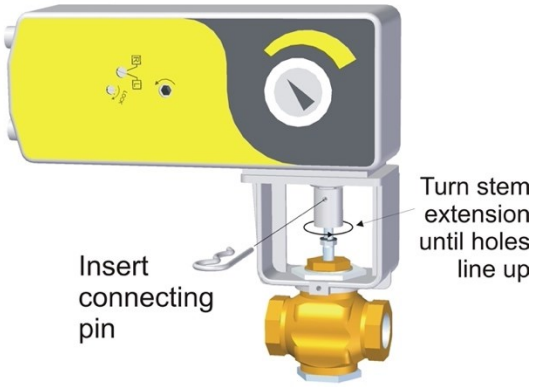


Figure 19: Step 5

Step 6

1. Release actuator by loosening locking mechanism.
2. Refer to wiring diagram for wiring instructions.
3. Apply power to actuator and ensure proper operation of valve and actuator.
4. Ensure proper response to control signal.
5. The actuator should be putting tension on the stem and holding it closed (up position).

Dura Drive P/N	Condair P/N	Assembly Instructions
MS51-7103 DURA DRIVE ACTUATOR	150 7549 0-10VDC, 150 7550 4-20mA, 1507551 On/Off	For Bronze ½”- 2” and St. St. ½”- 3/4” Valves, for incoming pressures from 2 to 50 psi for all valves except for 1-1/2” which would be 2 to 34 psi, and 2” which would be 2 to 19 psi

Step 1

Ensure all components are accounted for:

1. Connecting pin
2. Stem Extension
3. Jam Nut
4. Actuator

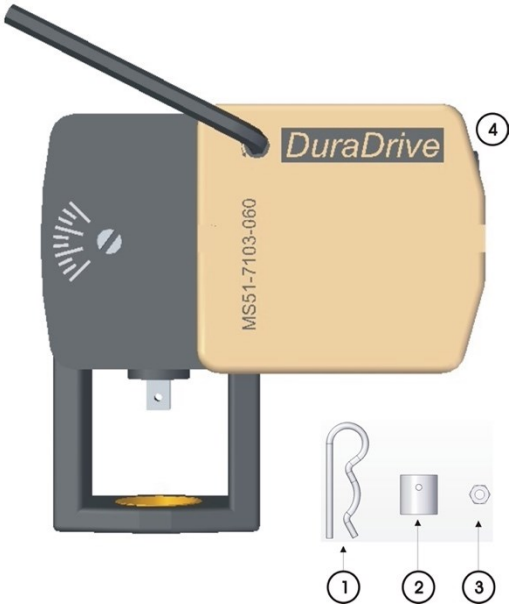


Figure 20: Step 1

Step 2

1. Thread jam nut on to valve stem all the way.

2. Thread stem extension on valve stem.

3. Manually raise valve stem to up position (Closed).

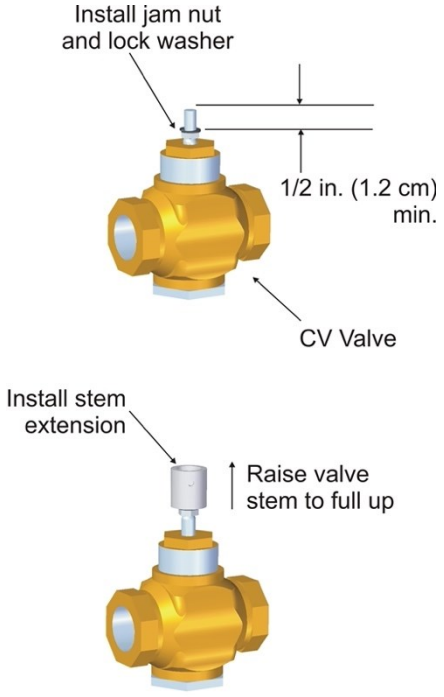


Figure 21: Step 2

Step 3

1. Insert hex wrench as illustrated.

2. Rotate wrench 2 turns counter-clockwise.

3. Lock actuator by pressing wrench towards actuator and rotating 1/8 turn clockwise.

Figure 22: Step 3

Step 4

1. Thread actuator on to valve.

2. Tighten valve mounting nut.

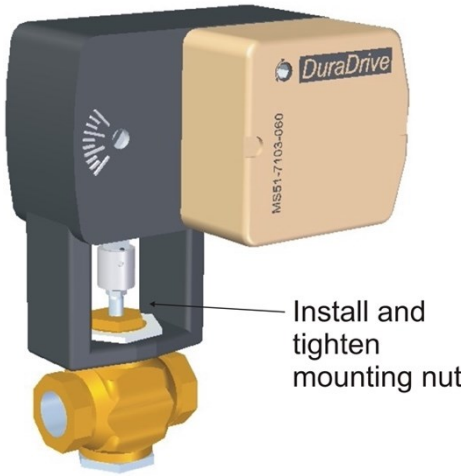


Figure 23: Step 4

Step 5

1. Align stem extension hole with actuator shaft hole.

2. Insert connecting pin.

3. Tighten jam nut against valve stem.

4. Release Actuator by turning hex key 1/8 turn counter-clockwise.

5. The actuator should be putting tension on the stem and holding it closed (up position).

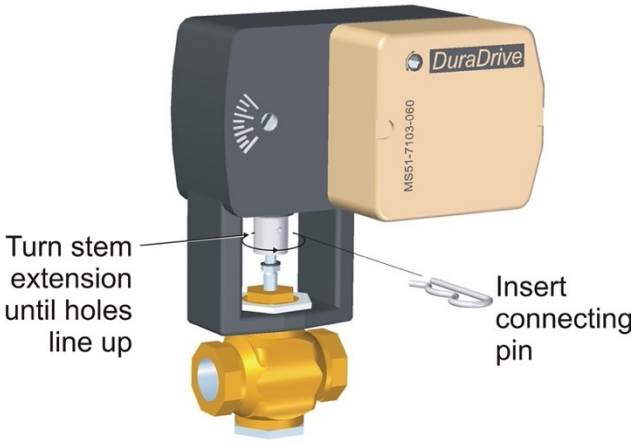


Figure 24: Step 5

Step 6

1. Refer to wiring diagram for wiring instructions.
2. Apply power to actuator and ensure proper operation of valve and actuator.
3. Ensure proper response to control signal.

Dura Drive P/N	Condair P/N	Assembly Instructions
MS61-7203 DURA DRIVE ACTUATOR	150 7556 0-10VDC, 150 7557 4-20mA, 150 7558 On/Off	For 1”- 2” St. St. Valves, for incoming pressures from 2 to 50 psi

Step 1

Ensure all components are accounted for:

1. Actuator
2. Hex Wrench
3. Stem Extension Kit
4. Linkage Assembly

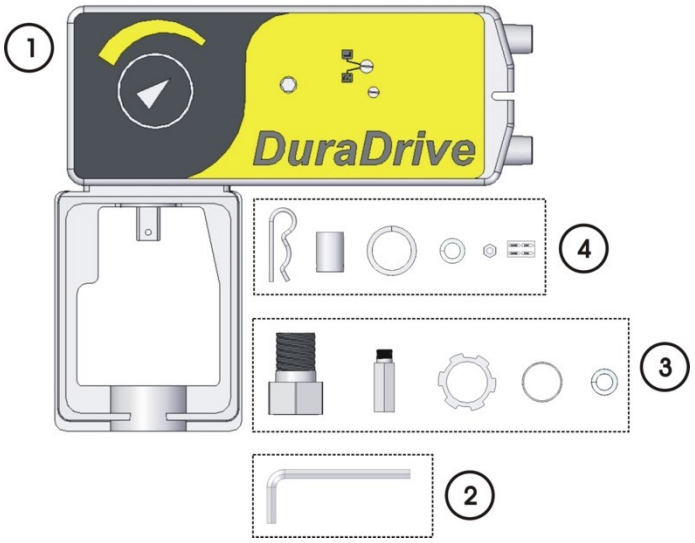


Figure 25: Step 1

Step 2

Linkage Kit Includes:

1. Connecting Pin
2. Stem Extension
3. Large Lock Washer
4. Small Lock Washer
5. Nut (Not Used)
6. Sticker

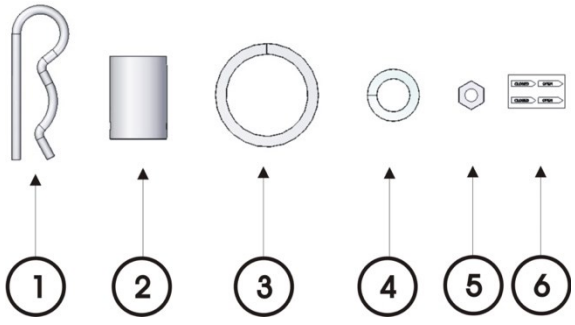


Figure 25: Step 1

Step 3

Stem Extension Kit Includes:

1. Spacer
2. Stem Extender
3. Valve Mounting Nut
4. Copper Ring (not used)
5. Lock Washer

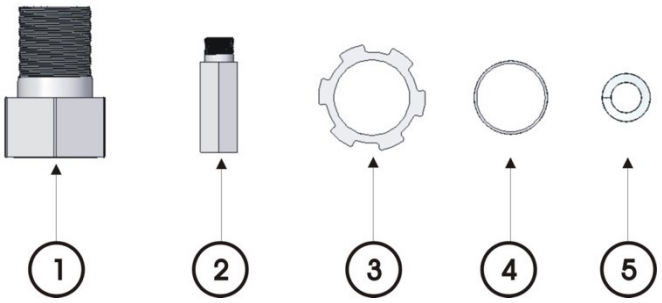


Figure 26: Step 3

Step 4

Thread the two stem extensions together with the lock washer as shown in the illustration.

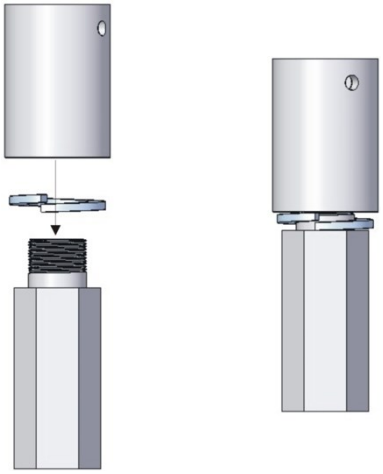


Figure 27: Step 4

Step 5

1. Thread the spacer on to the valve.

2. Tighten the spacer as far down as possible.

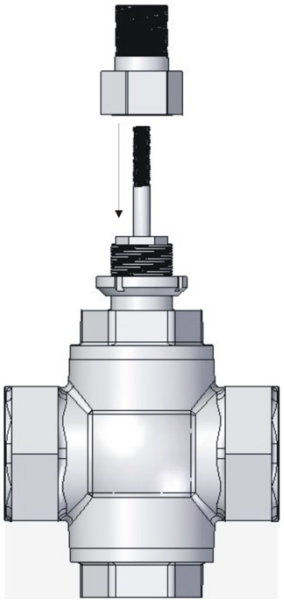


Figure 28: Step 5

Step 6

1. Thread Extension Assembly from Step 4 on to valve stem.

2. Hand tighten as far down as possible.

3. Manually position the valve in the fully open position.

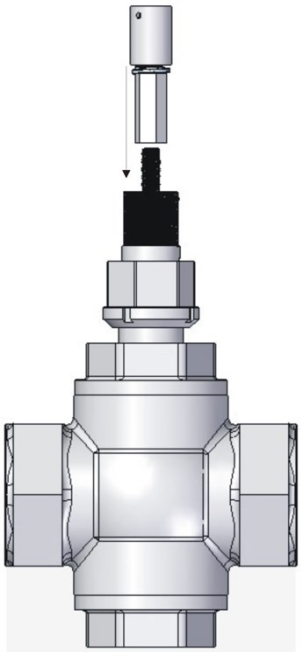


Figure 29: Step 6

Step 7

Pre-loading Actuator:

1. Insert Hex wrench as illustrated.

2. Rotate 1 ½ turns counter-clockwise.

3. Lock Actuator by turning locking mechanism clockwise with a slotted screwdriver.

Figure 30: Step 7

Step 8

1. Insert valve with extension into actuator.

2. Loosely thread Valve Mounting Nut and Lock Washer on to Spacer as illustrated.

3. Adjust Stem Extension by rotating to align holes on valve stem extension and actuator.

Figure 31: Step 8

Step 9

1. Insert Connecting Pin through hole in Stem Extension and actuator plunger.

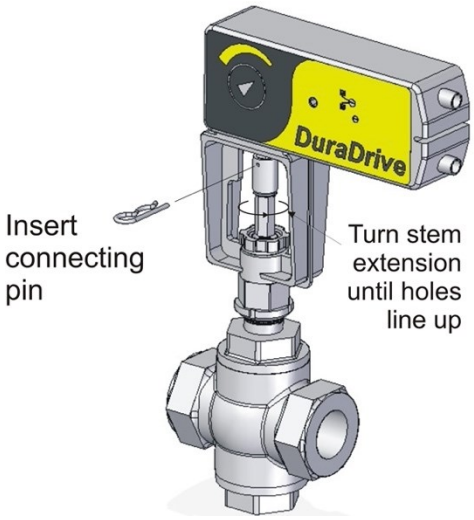


Figure 32: Step 9

Step 10

1. Tighten Valve Mounting Nut compressing Lock Washer.

2. Tighten Stainless Steel Jam Nut on actuator against the Spacer.

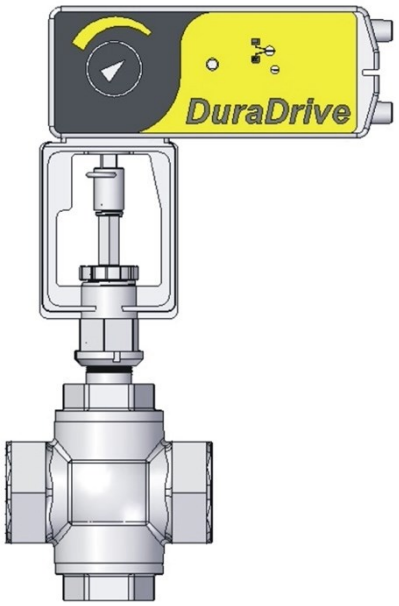


Figure 33: Step 10

Step 11

1. Release actuator by loosening locking mechanism.

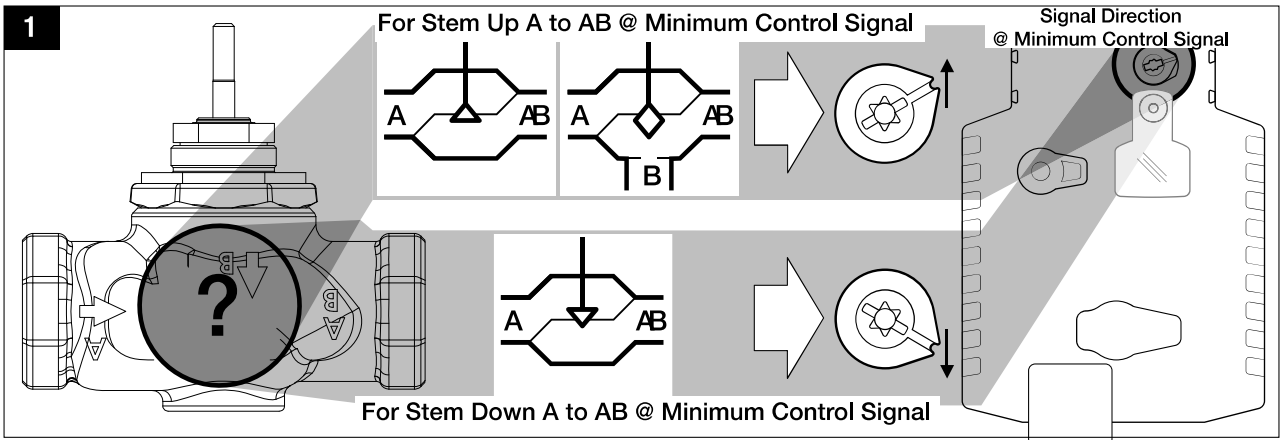
2. Refer to wiring diagram for wiring instructions.

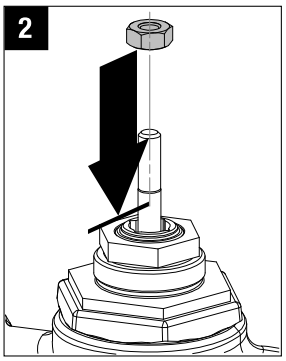
3. Apply power to actuator and ensure proper operation of valve and actuator.

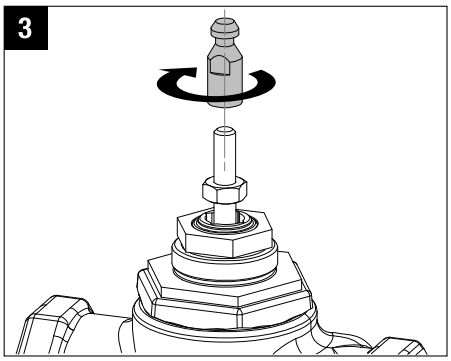
4. Ensure proper response to control signal.

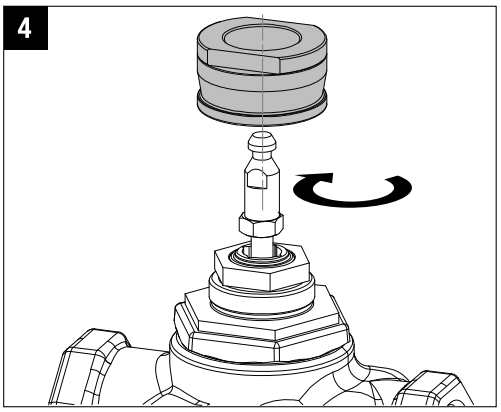
5. The actuator should be putting tension on the stem and holding it closed (up position)

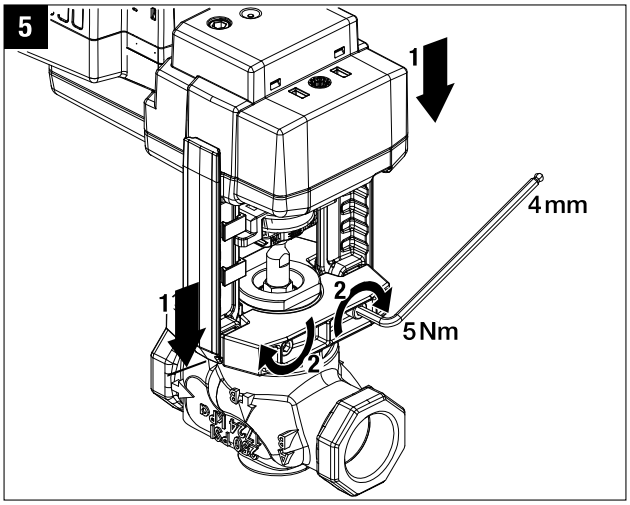
Installing Belimo Actuator to Steam Valve

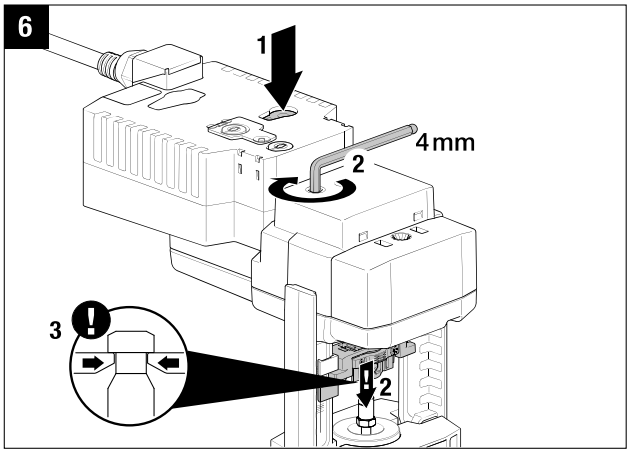


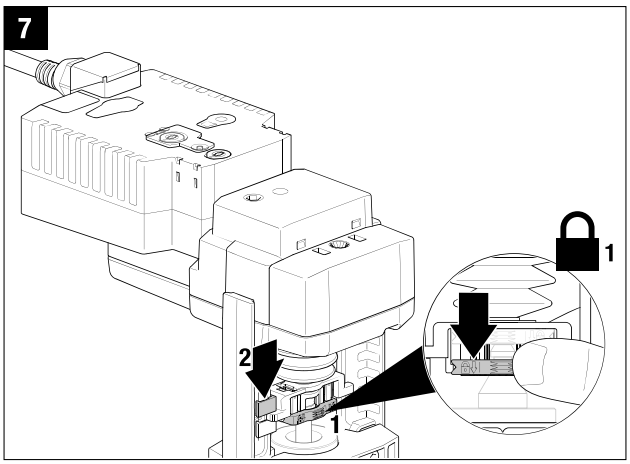


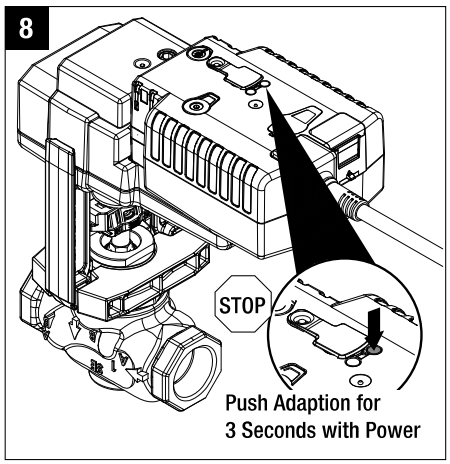


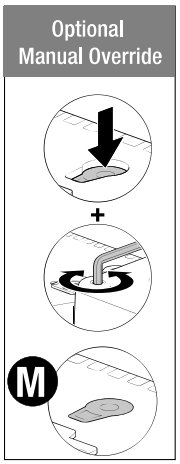












0-10V DIGITAL HUMIDISTAT

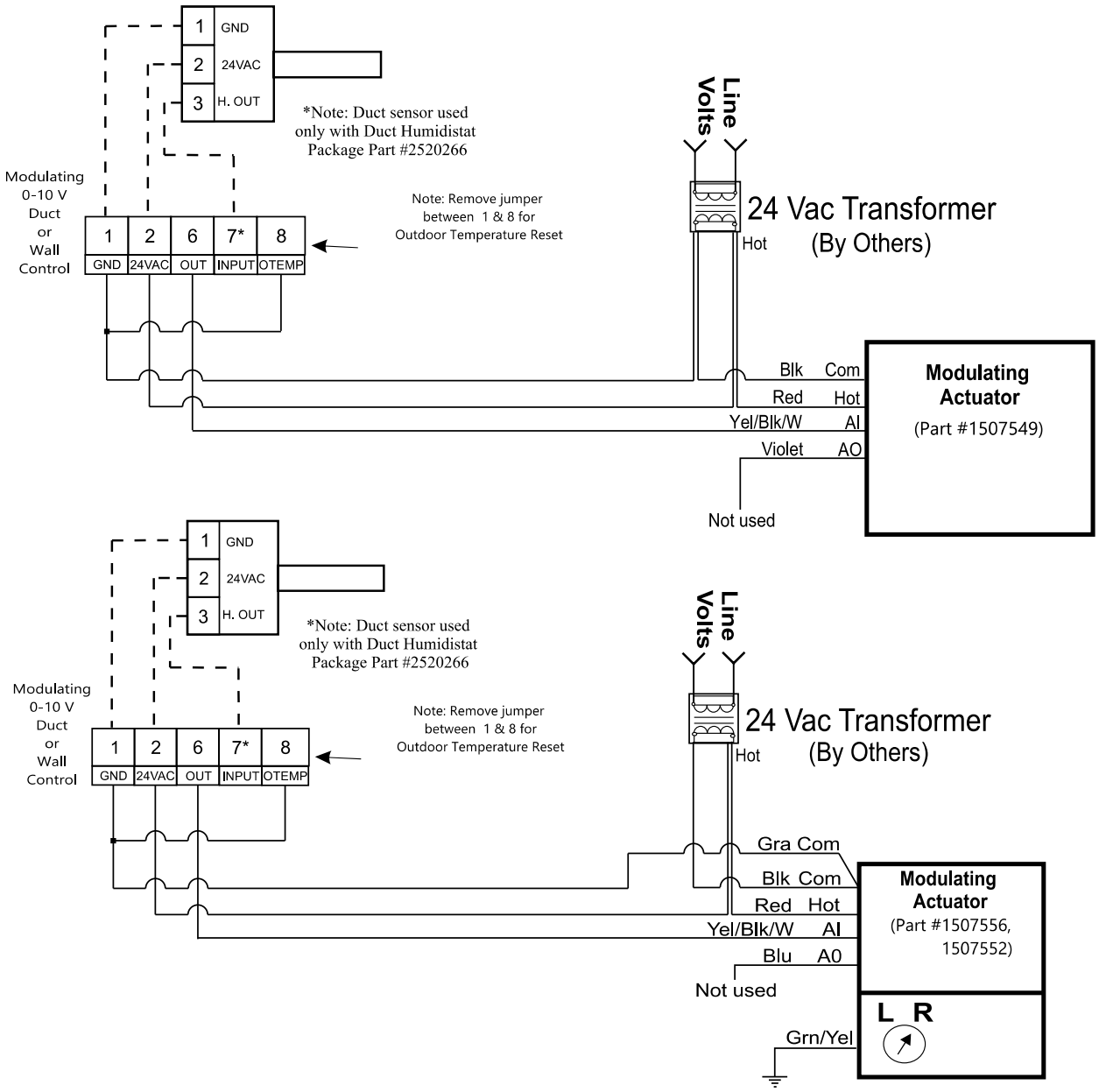
Wiring Diagram for Livesteam

Part #	Description
1510142	0-10V Digital Wall Humidistat
2520266	0-10V Digital Duct Humidistat pkg.

Warning: Failure to wire the humidistat in accordance with the wiring diagram could permanently damage the electronics. Such errors will void the warranty.

Cabling between controls and unit should be shielded 18 AWG

HUMIDISTAT TO ACTUATOR CONNECTIONS



condair

0-10V Digital Humidistat for LiveSteam

Wiring Diagram/Installation Instruction

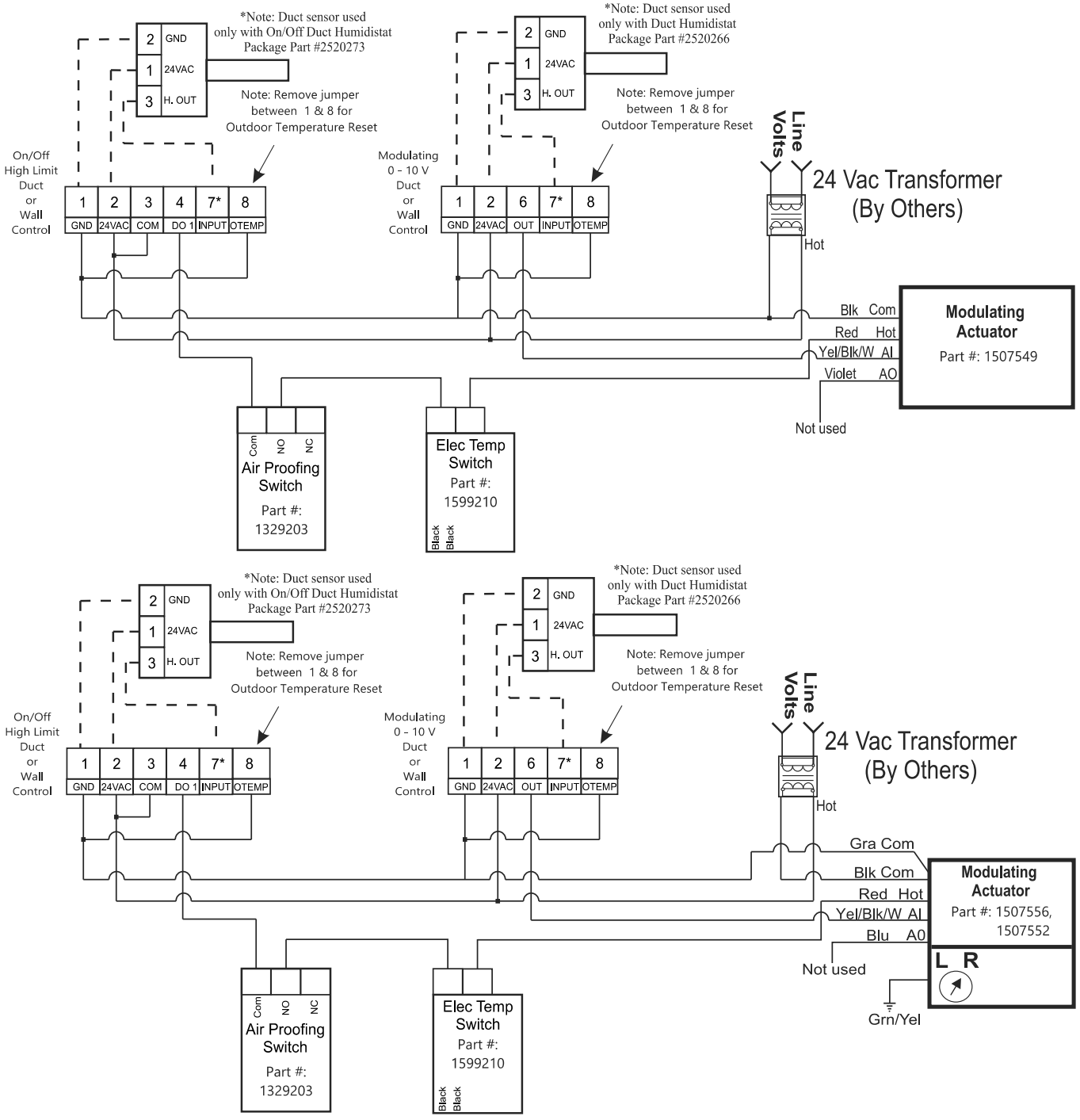
Part Number: 2520531 **Revision: F** **Date:** 2023.06.19

Wiring Diagram for LiveSteam

Modulation Control with On/Off Inputs

Warning: Failure to wire the humidistat in accordance with the wiring diagram could permanently damage the electronics. Such errors will void the warranty.

Cabling between controls and unit should be shielded 18 AWG



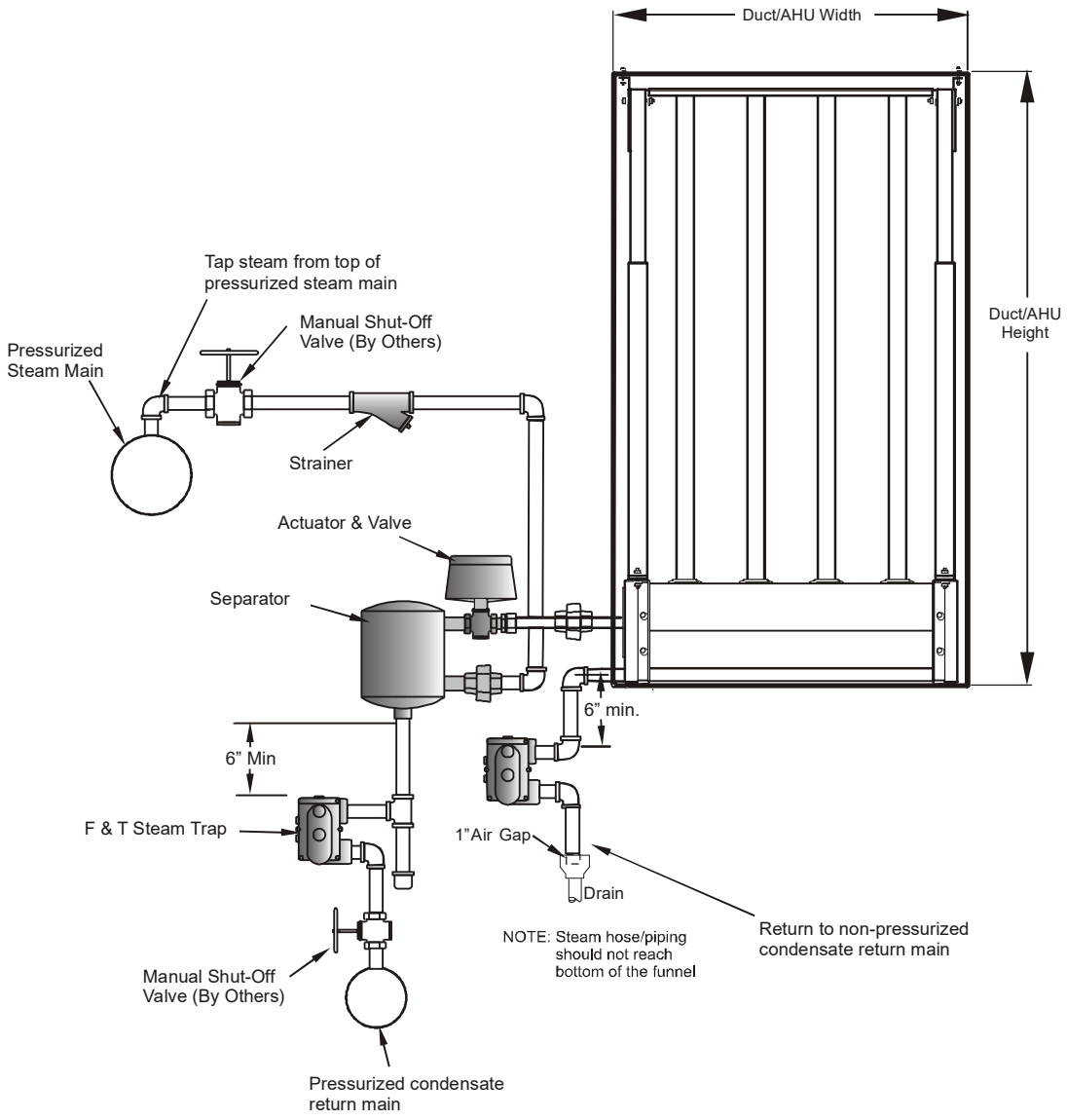
Controls for LiveSteam Application

Wiring Diagram/Installation Instruction

Part Number: 2571675 **Revision: D** **Date:** 19/06/2023

Nortec SAM-e with Pressure Steam

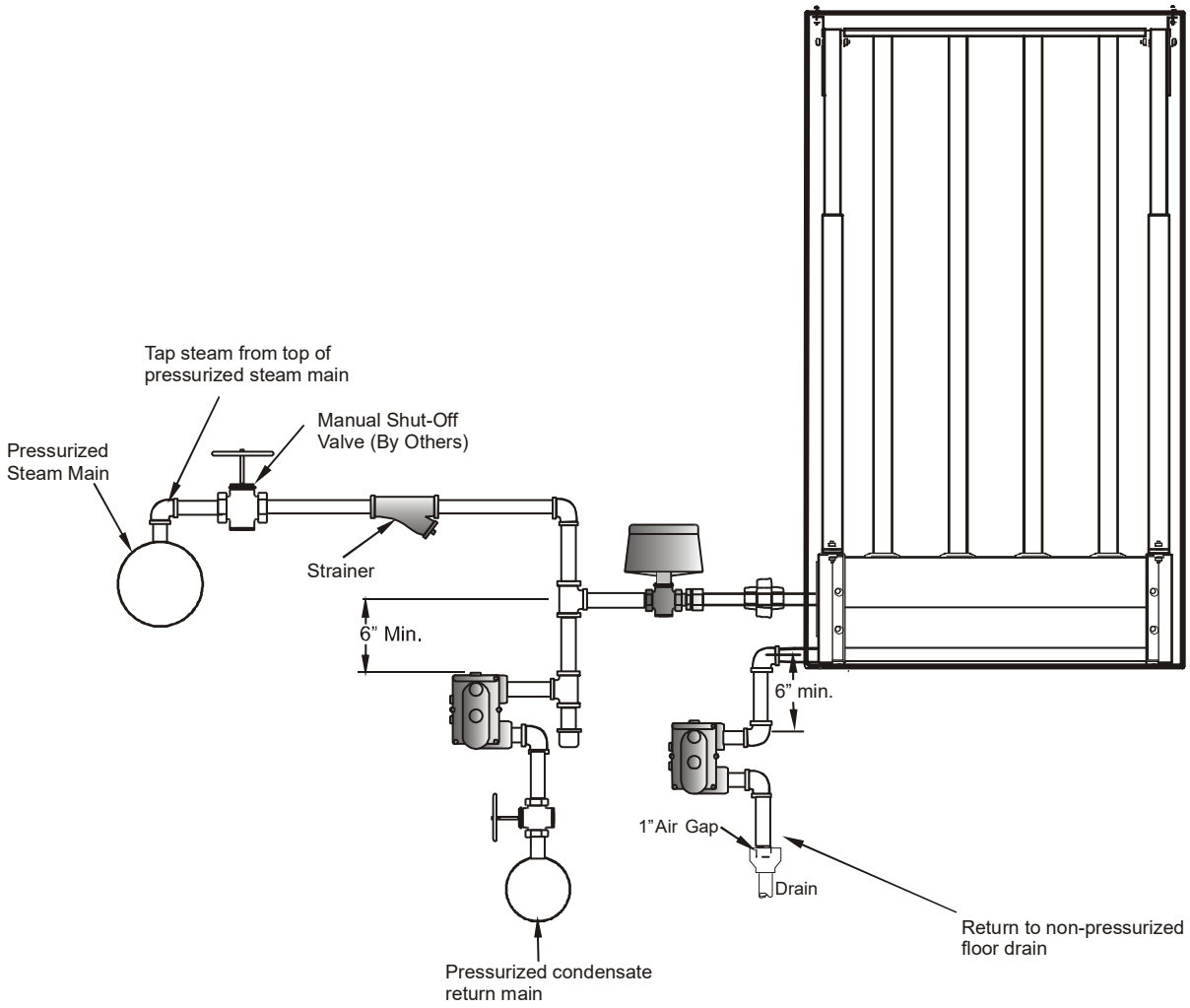
Pressurized Plumbing with External Separator



- Steam components in grey are provided by Condair.
- Tap steam from top of pressurize steam main to avoid excess condensate.
- Condensate from separator to be returned to pressurized condensate main.
- Condensate from Nortec SAM-e to be returned to atmospheric floor drain.

When pressurized steam enters the Nortec SAM-e, the pressure drops down to almost atmospheric pressure. Therefore, it must be drained atmospherically, and the use of a condensate pump (rated for 212ºF) must be used to raise the condensate to a higher elevation.

Pressurized Plumbing without External Separator



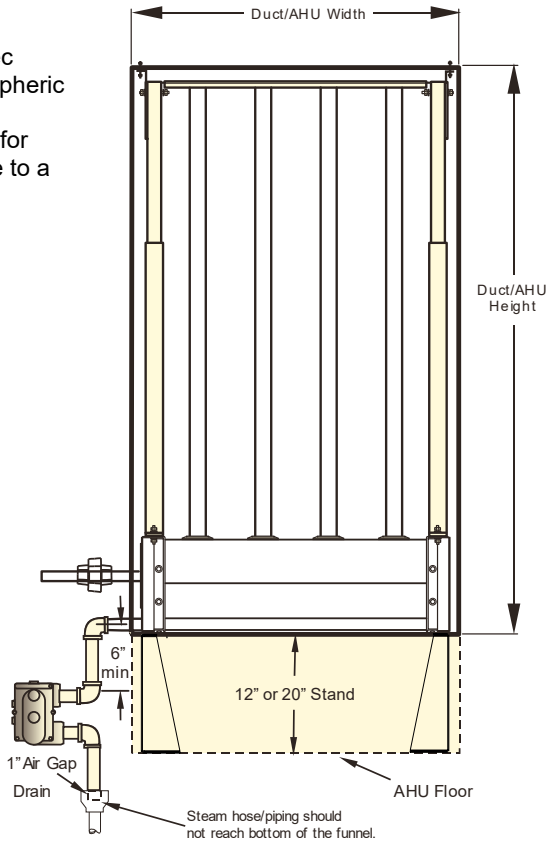
Note: The Nortec SAM-e header functions as a steam separator, therefore an external steam separator is not required.

- Steam components in grey are provided by Condair.
- Tap steam from top of pressurize steam main to avoid excess condensate.
- Condensate from Nortec SAM-e to be returned to atmospheric floor drain.

When pressurized steam enters the Nortec SAM-e, the pressure drops down to almost atmospheric pressure. Therefore, it must be drained atmospherically, and the use of a condensate pump (rated for 212ºF) must be used to raise the condensate to a higher elevation.

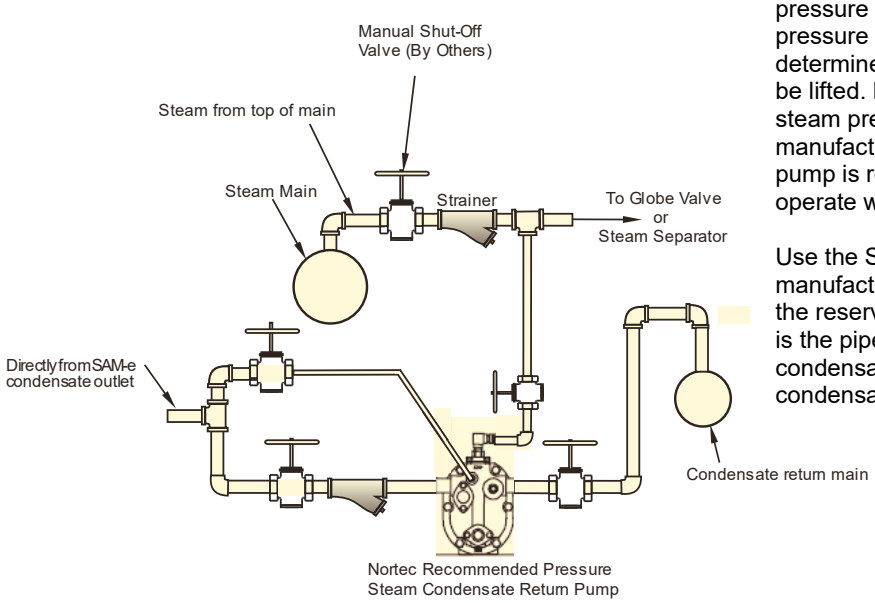
Pressurized Plumbing Drain Options

Note: When pressurized steam enters the Nortec SAM-e, the pressure drops down to near-atmospheric pressure. Thus, the unit must be drained atmospherically and a condensate pump (rated for 212 ºF) must be used to elevate the condensate to a higher point.



Return to non-pressurized condensate return main.
When using a pump for pressurizing the condensate to pressurized condensate return main, the F&T trap and air gap are not needed.

OR

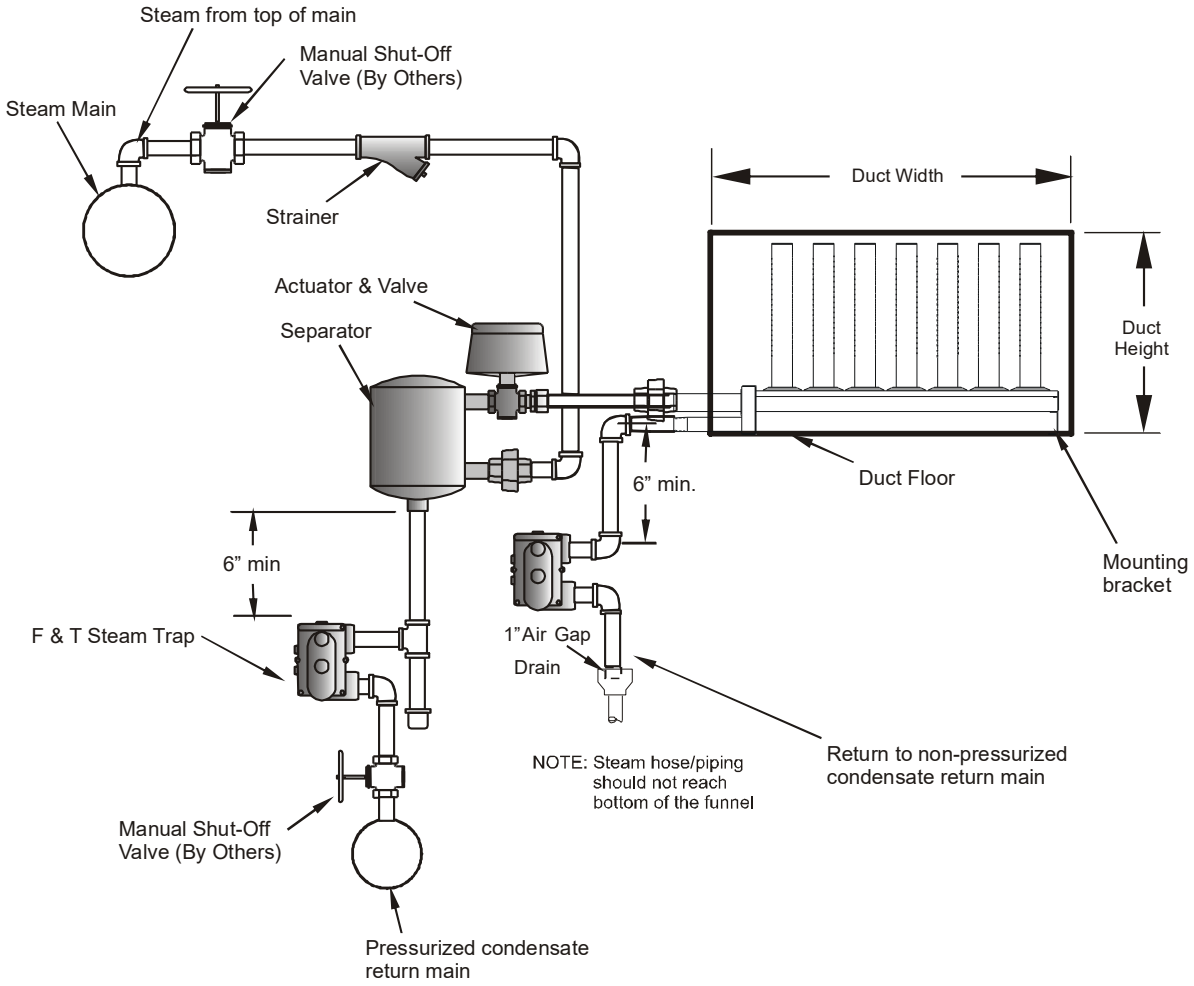


Note: Delta Supply pressure to exhaust pressure to the Condair recommended pressure steam condensate return pump will determine the amount of condensate that can be lifted. Minimum and maximum supply steam pressure can be found in the manufacturer's manual provided. Ensure the pump is receiving sufficient steam pressure to operate with your application.

Use the Size of Reservoir table from the manufacturer's manual provided to determine the reservoir diameter and length. The length is the pipe length from the Nortec SAM-e condensate outlet to the pressure steam condensate return pump inlet.

Nortec Mini SAM-e with Pressurized Steam

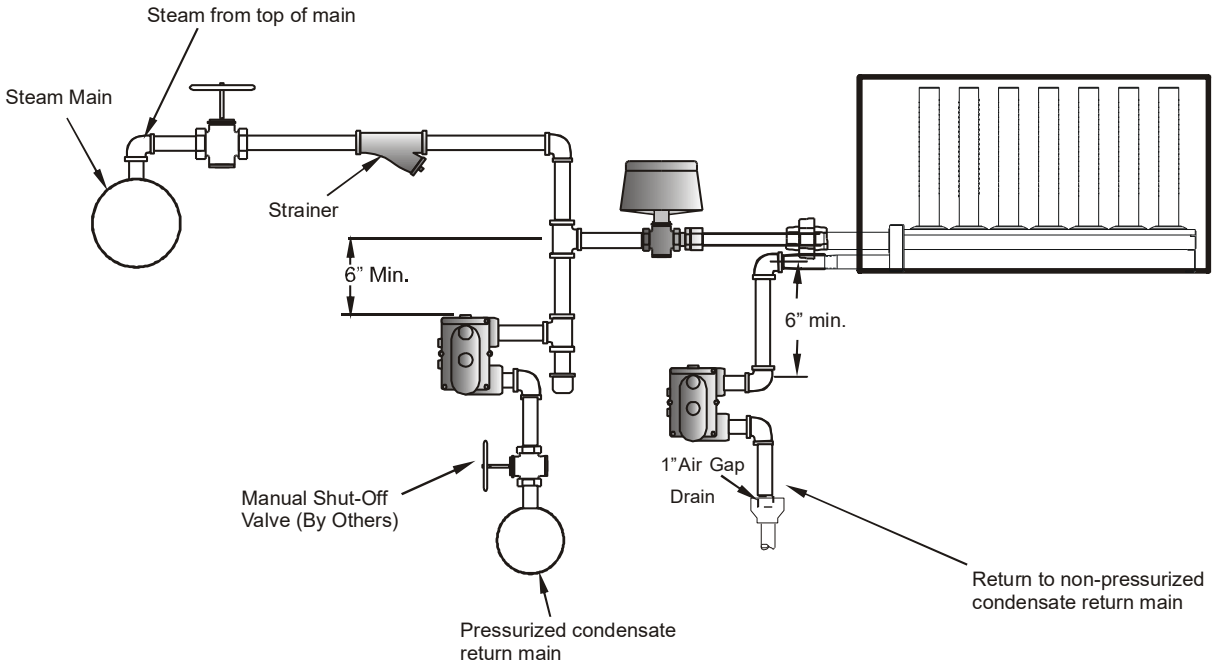
Nortec Mini SAM-e Pressurized with External Separator



- Steam components in grey are provided by Condair.
- Tap steam from top of pressurize steam main to avoid excess condensate.
- Condensate from separator to be returned to pressurized condensate main.
- Condensate from Nortec SAM-e to be returned to atmospheric floor drain.

When pressurized steam enters the Nortec SAM-e, the pressure drops down to almost atmospheric pressure. Therefore, it must be drained atmospherically, and the use of a condensate pump (rated for 212ºF) must be used to raise the condensate to a higher elevation.

Nortec Mini SAM-e Pressurized without External Separator



- Max steam pressure of 15 psig when no separator is used.
- Steam components in grey are provided by Condair.
- Tap steam from top of pressurize steam main to avoid excess condensate.
- Condensate from separator to be returned to pressurized condensate main.
- Condensate from Nortec SAM-e to be returned to atmospheric floor drain.

When pressurized steam enters the Nortec SAM-e, the pressure drops down to almost atmospheric pressure. Therefore, it must be drained atmospherically, and the use of a condensate pump (rated for 212ºF) must be used to raise the condensate to a higher elevation.

Maintenance

Elements Of LiveSteam Humidifier

Tube Adapter - consists of 3 pieces (See Figure 35). To maintain proper seal hand tighten tube adapter nut, plus ¼ turn. Additional o-ring is shipped with this manual. If o-ring has to be replaced do so as follows:

1. Disconnect actuator.
2. Dismount union by the separator.
3. Replace o-ring in the tube adapter.
4. Lubricate o-ring with silicone based lubricant.

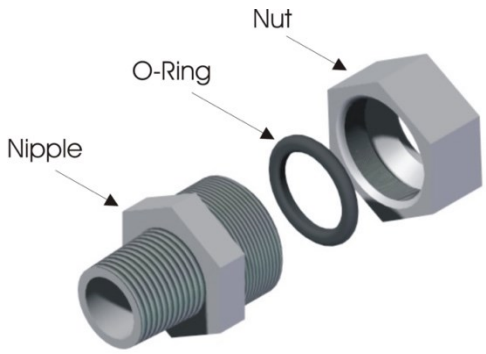


Figure 35: Adapter Assembly

Strainer - Should be cleaned shortly after the system has begun operating (3 to 7 days) and then annually.

Separator - No maintenance required.

Distributor - No maintenance required.

Valve - Should be inspected annually to confirm that steam is not leaking from the stem packing, and the valve closes tightly. Repack if necessary.

Valve Seat - Lap seat if necessary.

Pneumatic Actuator - Should be inspected annually to confirm that the diaphragm is not leaking air, and the valve operates properly.

Electric Actuator - Should be inspected annually to confirm that the valve operates properly.

Steam Trap - Should be inspected annually. Clean and inspect seats and replace required gaskets if necessary.

Temperature Switch - Should be inspected once a year to ensure proper operation. Test by supplying steam, which should open at 200ºF.

Maintenance Schedule

Date	Personnel	Description

Troubleshooting Guide

s	Cause / Solution
Distributor Discharges Water	Condensate return line not draining: 1. Back pressure on condensate line. 2. Dirty steam trap - repair or replace. 3. Steam trap is wrong type. Steam supply: 1. Steam pressure is too low (under 2 psi). 2. Steam main flooding due to boiler discharging water with steam. 3. Steam supply not taken at top of main. 4. Distributor not level.
Humidifier Leaks Water From Tube Adapter	1. Tighten tube adaptor. 2. Defective o-ring in tube adapter - replace o-ring. 3. Is the o-ring lubricated?
Over Humidifying	1. Valve stem adjusted too tight and sticking. 2. Valve spring broken. 3. Foreign matter is preventing the valve from closing. 4. Valve is installed incorrectly. 5. Steam pressure exceeds rating of valve spring. 6. Controller out of calibration.
Under Humidifying	1. Boiler pressure is inadequate. 2. Steam piping is either undersized or piped incorrectly. 3. Strainer is plugged. 4. Valve is not fully opened. (Check for leaking air in actuator.) 5. Humidifier is undersized. 6. Controller is out of calibration. 7. Excess amounts of outside air. 8. Open doors, window, loading / shipping docks.
Humidity Swings	1. Controller is malfunctioning. 2. Poor location of humidity sensor. 3. Humidifier is oversized. 4. Boiler pressure swings too widely 5. Pressure reducing valve is not working properly (if installed).
Spitting During Start-Up	1. Add temperature switch. 2. Are drip legs installed? 3. Was the piping supplied undersized? 4. Is the boiler carrying too much condensate? 5. Is the boiler undersized or does it have the incorrect pressure?

Condensate In Duct	1. Mounting too close to devices (elbows, dampers, etc.) in duct. 2. Duct surface temperature is too low. 3. Oversized humidifier. 4. Malfunctioning or lack of safety high limit humidistat.

Valve Cross Reference Table

Valve Body Part Number	Condair PN	Size	Cv
VB-7263-04-31	1594300	0.5"	0.1
VB-7263-0-4-33	1594302	0.5"	0.22
VB-7263-0-4-1	1594304	0.5"	0.4
VB-7263-000-4-35	1594306	0.5"	0.75
VB-7263-0-4-2	1594310	0.5"	1.3
VB-7263-0-4-3	1594314	0.5"	2.2
VB-7263-000-4-38	1594316	0.5"	2.8
VB-7263-0-4-4	1594318	0.5"	4.4
VB-7263-0-4-5	1594322	0.75"	5.5
VB-7263-0-4-6	1594324	0.75"	7.5
VB-7263-0-4-7	1594330	1.0"	10
VB-7263-0-4-8	1594332	1.0"	12
VB-7263-0-4-9	1594341	1.25"	20
VB-7263-0-4-10	1594350	1.5"	28
VB-7263-0-4-11	1594360	2.0"	40
VBS-9263-0-6-31	1594201	0.5"	0.1
VBS-9263-0-6-33	1594203	0.5"	0.22
VBS-9263-0-6-01	1594205	0.5"	0.4
VBS-9263-0-6-35	1594206	0.5"	0.75
VBS-9263-0-6-36	1594207	0.5"	0.95
VBS-9263-0-6-02	1594208	0.5"	1.3
VBS-9263-6-0-37	1594209	0.5"	1.75
VBS-9263-0-6-03	1594210	0.5"	2.2
VBS-9263-0-6-38	1594211	0.5"	2.8
VBS-9263-0-6-04	1594213	0.5"	3.6
VBS-9263-0-6-45	1594221	0.75"	4.3
VBS-9263-0-6-05	1594222	0.75"	5
VBS-9263-0-6-06	1594223	0.75"	6.2
VA7006EC	1594432	1.0"	10
VA7008EC	1594440	1.5"	24
VA7009EC	1594450	2.0"	40

Actuator Close-Off Pressure

1507549, 1507550, 1507551 - 1/2 to 2 in, SS 1/2 to 3/4 in							
Valve	1/2"	3/4"	1"	1-1/4"	1-1/2"	1-3/4"	2"
Bronze	50 psig (345 kPa)	50 psig (345 kPa)	50 psig (345 kPa)	50 psig (345 kPa)	34 psig (234 kPa)	N/A	19 psig (131 kPa)
SST	50 psig (345 kPa)	50 psig (345 kPa)	N/A	N/A	N/A	N/A	N/A

1507552, 1507554 - Bronze 2 in							
Valve	1/2"	3/4"	1"	1-1/4"	1-1/2"	1-3/4"	2"
Bronze	N/A	N/A	N/A	N/A	50 psig (345 kPa)	N/A	50 psig (345 kPa)

1507556, 1507557, 1507558 - 1 to 2 in SS							
Valve	1/2"	3/4"	1"	1-1/4"	1-1/2"	1-3/4"	2"
Warren SST	N/A	N/A	50 psig (345 kPa)	N/A	50 psig (345 kPa)	N/A	50 psig (345 kPa)

Warranty

Condair Inc. or Condair Ltd. (depending on the entity that supplied the product, and hereinafter collectively referred to as CONDAIR) warrant for a period of two years after installation or 30 months from the manufacturer's ship date, whichever date is earlier, that CONDAIR's manufactured and assembled products, not otherwise expressly warranted, are free from defects in materials and workmanship. Notwithstanding the foregoing, the products listed below have an alternate warranty period:

- GS/GSTC Series heat exchanger(s) are warranted to be free from defects in materials and workmanship for a period of 3 years from installation or 40 months from the manufacturer's ship date, whichever is earlier.
- SAM-e Short Absorption Manifolds, except for the coupling seals, are warranted to be free from defects in materials and workmanship for a total period of 10 years from the manufacturer's ship date.
- Humilife RH, RH2+ and WH humidifiers are warranted to be free from defects in materials and workmanship for a period of 5 years from the manufacturer's ship date. CONDAIR may, at its discretion, replace individual components or Humilife RH units as a whole.
- Spare 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.
- No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulations.

CONDAIR's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. CONDAIR's factory. The replacement parts are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer. Procedure:

1. Customer Requests Warranty as per instructions on the CONDAIR Warranty Form.
2. CONDAIR reviews the warranty claim and will respond in one of two ways:
    a. Warranty Accepted – Replacement Part or credit granted.
    b. Warranty Declined – Response with justification will be provided to the customer.
3. In some cases, CONDAIR may request the part to be returned, freight prepaid by the customer, as part of the warranty acceptance or warranty determination process. Some reasons include:
    a. Part must be analyzed to determine the root cause of failure.
    b. Part must be returned to the supplier for claim/investigation.

    When parts are requested to be returned, replacement parts will be sent by CONDAIR to the customer against an invoice from CONDAIR paid by the customer. The cost of the replacement parts will be reimbursed to the customer with a credit note after the parts are received and analyzed by CONDAIR, if the warranty is accepted.

The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to CONDAIR 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, with the exception of a purchased extended warranty described below, must be in writing, and signed by an officer of CONDAIR.

CONDAIR makes no warranty and assumes no liability unless the equipment is installed in strict accordance with the installation manual in effect at the date of purchase, and by properly qualified and licensed professionals capable of installing such equipment.

CONDAIR 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.

CONDAIR makes no warranty and assumes no liability whatsoever for damage to the products, humidifier, supply lines, drain lines, steam distribution systems, or the building as a whole caused by freezing.

CONDAIR reserves the right to change the design, specifications, and performance criteria of its products without notice or obligation.

Extended Warranty

Extended warranties are available to purchase under the conditions listed above. Extended warranties must be purchased at the time of the original equipment order.

www.condairparts.com

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