ultimateSteam

User manual

LEGGI E CONSERVA QUESTE ISTRUZIONI

READ AND SAVE THESE INSTRUCTIONS

CAREL

Technology & Evolution

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IMPORTANT: BEFORE beginning installation:

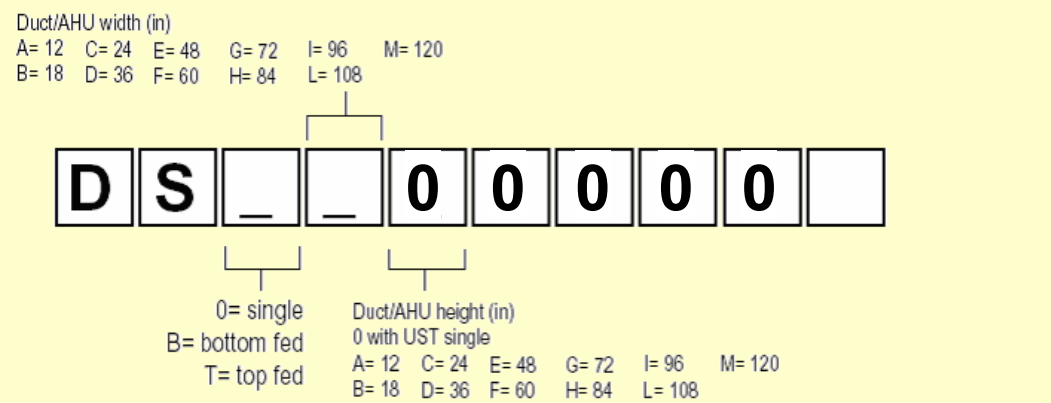
- Check for shipping damage to cartons. Mark the shipping waybill accordingly
- Open cartons and check for any hidden damage. Mark the shipping waybill accordingly.
- Check packing slip to ensure all items have been received. Notify Carel LLC of any shortages or damaged parts. **You must notify Carel LLC within 5 working days of any shortages.**

IMPORTANT: The gray coating on the ***ulimateSteam*** manifolds is NOT packing material. DO NOT SCRAPE IT OFF.

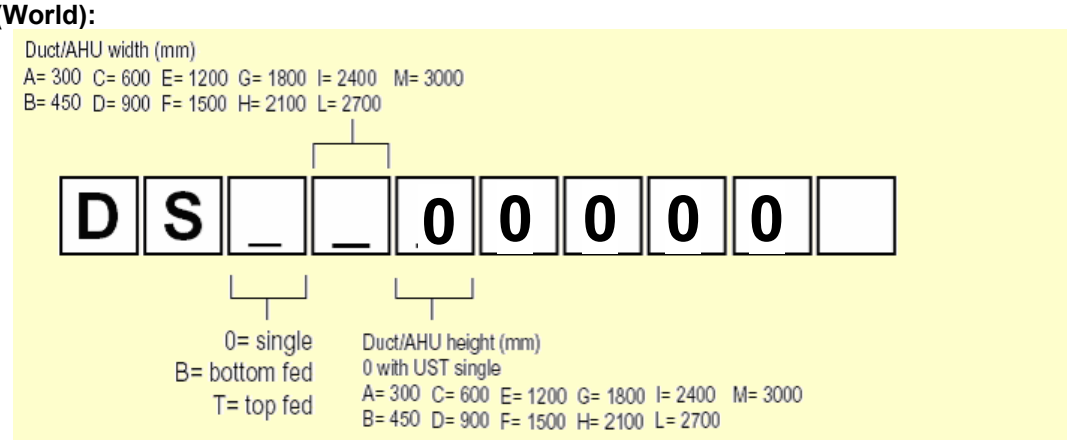
Product Model Numbers and Accessory Codes

ultimateSteam Codes

English units (North America):



Metric units (World):



NOTE: MAX CAPACITY is the maximum capacity of the ultimateSteam manifold assembly. The actual capacity for any project is controlled by the valve capacity.

Humidifiers ordered in metric nomenclature will be labeled in metric units.

Accessory codes

The valves listed in this table are brass, with cast iron fittings

	Max steam pressure, bar				Valve size, inches	Valve CV	Steam valve assembly code	Actuator code	
	0.14	0.34	0.69	1.03				Pneumatic	Electronic
Maximum capacity kg/h	3.05	5	7.59	9.82	1/2	0.4	DSAK24V00A	DSA004P001	DSA004E001
	4.77	7.91	11.82	15.45	1/2	0.63	DSAK24V00B	DSA004P001	DSA004E001
	7.55	12.73	19.09	24.55	1/2	1	DSAK24V00C	DSA004P001	DSA004E001
	12	20	30	39	1/2	1.6	DSAK24V00D	DSA004P001	DSA004E001
	19	31	47	61	1/2	2.5	DSAK24V00E	DSA004P001	DSA004E001
	30	50	76	98	1/2	4	DSAK24V00F	DSA004P001	DSA004E001
	48	79	120	155	3/4	6.3	DSAK34V00G	DSA004P001	DSA004E001
	75	125	190	246	1	10	DSAK44V00H	DSA004P001	DSA004E001
	121	200	303	394	1+1/4	16	DSAK54V00I	DSA004P002	DSA004E002
	189	313	474	616	1+1/2	25	DSAK64V00J	DSA004P002	DSA004E002
	303	501	758	985	2	40	DSAK84V00K	DSA004P003	DSA004E002

The valves listed in this table have a stainless steel trim, with stainless steel fittings

	Max steam pressure, bar				Valve size, inches	Valve CV	Steam valve assembly code	Actuator code	
	0.14	0.34	0.69	1.03				Pneumatic	Electronic
Maximum capacity kg/h	3.05	5	7.59	9.82	1/2	0.4	DSAK24VS0A	DSA004P001	DSA004E001
	4.77	7.91	11.82	15.45	1/2	0.63	DSAK24VS0B	DSA004P001	DSA004E001
	7.55	12.73	19.09	24.55	1/2	1	DSAK24VS0C	DSA004P001	DSA004E001
	12	20	30	39	1/2	1.6	DSAK24VS0D	DSA004P001	DSA004E001
	19	31	47	61	1/2	2.5	DSAK24VS0E	DSA004P001	DSA004E001
	30	50	76	98	1/2	4	DSAK24VS0F	DSA004P001	DSA004E001
	48	79	120	155	3/4	6.3	DSAK34VS0G	DSA004P001	DSA004E001
	75	125	190	246	1	10	DSAK44VS0H	DSA004P001	DSA004E001
	121	200	303	394	1+1/4	16	DSAK54VS0I	DSA004P002	DSA004E002
	189	313	474	616	1+1/2	25	DSAK64VS0J	DSA004P002	DSA004E002
	303	501	758	985	2	40	DSAK84VS0K	DSA004P003	DSA004E002

The valves listed in this table are brass, with cast iron fittings

	Max steam pressure, bar									Valve size, inches	Valve CV	Steam valve assembly code	Actuator	
	1.38	1.72	2.07	2.41	2.76	3.1	3.45	3.79	4.14				Pneumatic	Electronic
Maximum capacity kg/h	30	33	37	41	45	50	54	58	62	1/2	1	DSAK24V0HC	DSA004P002	DSA004E002
	47	53	60	66	73	79	86	93	99	1/2	1.6	DSAK24V0HD	DSA004P002	DSA004E002
	74	82	93	103	113	124	134	145	155	1/2	2.5	DSAK24V0HE	DSA004P002	DSA004E002
	119	132	148	165	181	198	214	230	247	1/2	4	DSAK24V0HF	DSA004P002	DSA004E002
	187	207	233	259	285	311	337	363	390	3/4	6.3	DSAK34V0HG	DSA004P002	DSA004E002
	297	329	370	412	453	494	535	577	618	1	10	DSAK44V0HH	DSA004P003	DSA004E002
	475	526	592	659	725	791	857	923	989	1+1/4	16	DSAK54V0HI	DSA004P003	DSA004E002
	742	823	926	1029	1133	1236	1339	1442	1546	1+1/2	25	DSAK64V0HJ	DSA004P003	DSA004E002

The valves listed in this table have a stainless steel trim, with stainless steel fittings

	Max steam pressure, bar									Valve size, inches	Valve CV	Steam valve assembly code	Actuator	
	1.38	1.72	2.07	2.41	2.76	3.1	3.45	3.79	4.14				Pneumatic	Electronic
Maximum capacity kg/h	30	33	37	41	45	50	54	58	62	1/2	1	DSAK24VSHC	DSA004P002	DSA004E002
	47	53	60	66	73	79	86	93	99	1/2	1.6	DSAK24VSHD	DSA004P002	DSA004E002
	74	82	93	103	113	124	134	145	155	1/2	2.5	DSAK24VSHE	DSA004P002	DSA004E002
	119	132	148	165	181	198	214	230	247	1/2	4	DSAK24VSHF	DSA004P002	DSA004E002
	187	207	233	259	285	311	337	363	390	3/4	6.3	DSAK34VSHG	DSA004P002	DSA004E002
	297	329	370	412	453	494	535	577	618	1	10	DSAK44VSHH	DSA004P003	DSA004E002
	475	526	592	659	725	791	857	923	989	1+1/4	16	DSAK54VSHI	DSA004P003	DSA004E002
	742	823	926	1029	1133	1236	1339	1442	1546	1+1/2	25	DSAK64VSHJ	DSA004P003	DSA004E002

This table shows the codes of the strainer assembly plus the condensate drain, with fittings.

Max pressure Steam	Valve CV	Code	Description
from 0.14 to 1 bar	10 or less	DSAK44T000	1" strainer and trap assembly, cast iron
	Greater than 10	DSAK84T000	2" strainer and trap assembly, cast iron
	10 or less	DSAK44TS00	1" strainer and trap assembly, steel
	Greater than 10	DSAK84TS00	2" strainer and trap assembly, steel
from 1.38 to 4 bar	10 or less	DSAK44T0H0	1" strainer and trap assembly, cast iron
	Greater than 10	DSAK84T0H0	2" strainer and trap assembly, cast iron
	10 or less	DSAK44TSH0	1" strainer and trap assembly, steel
	Greater than 10	DSAK84TSH0	2" strainer and trap assembly, steel

Installation

To install an UltimateSteam humidifier, you should have:

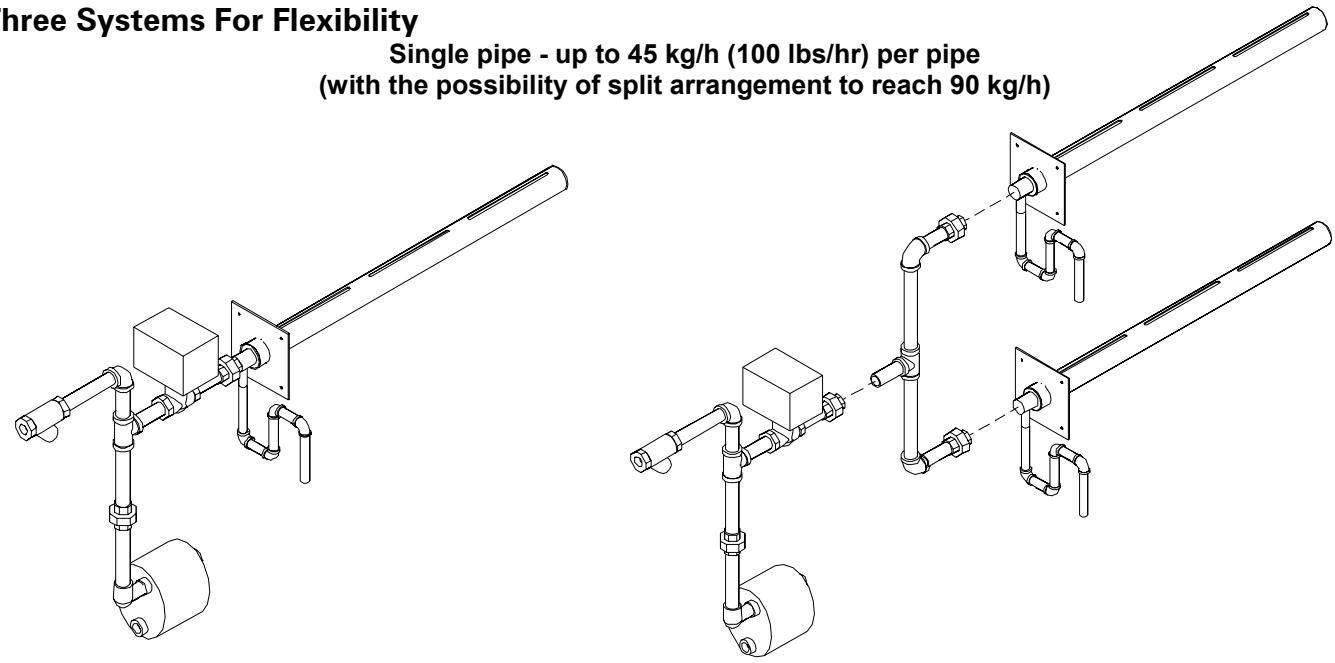
- The UltimateSteam humidifier manifolds, distribution pipes and escutcheon plates
- Steam valve body and plumbing kit
- Steam valve actuator (pneumatic or electronic)
- Steam trap, strainer and plumbing kit
- Humidistats and controls

Tools needed:

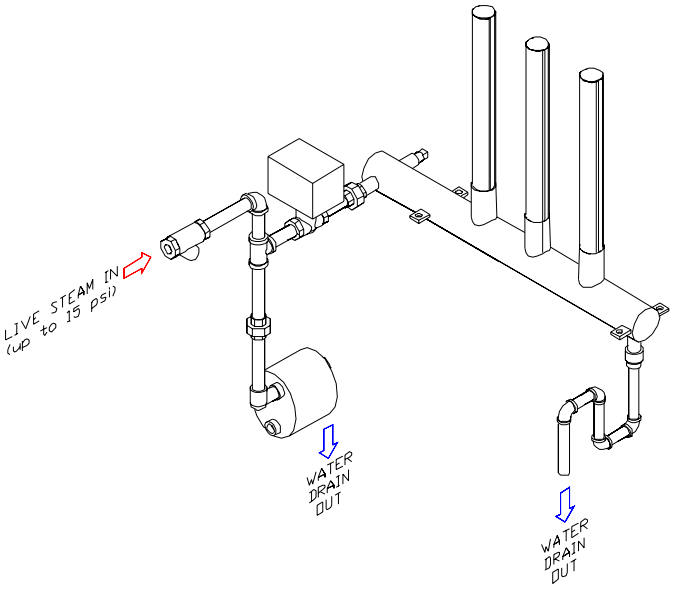
- Sheet metal shears
- Self-tapping sheet metal screws
- Phillips screwdriver and flat blade screwdriver for self-tapping sheet metal screws
- 2 - monkey or pipe wrenches
- Iron pipe thread sealant.

Three Systems For Flexibility

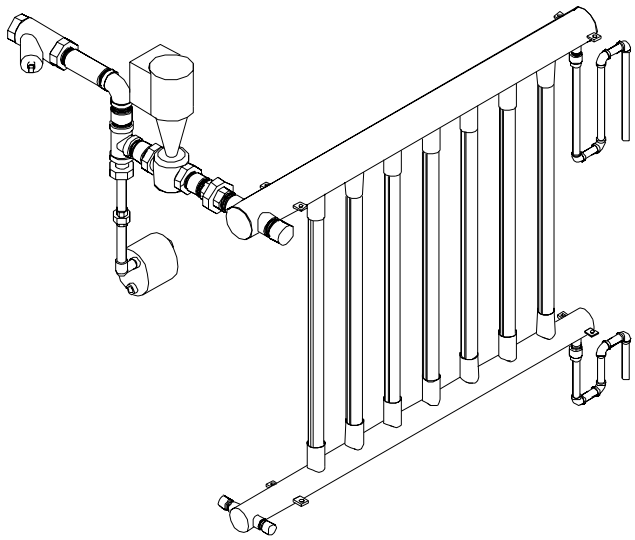
Single pipe - up to 45 kg/h (100 lbs/hr) per pipe
(with the possibility of split arrangement to reach 90 kg/h)



Multi-pipe/bottom feed - up to 245 kg/h (500 lbs/hr)

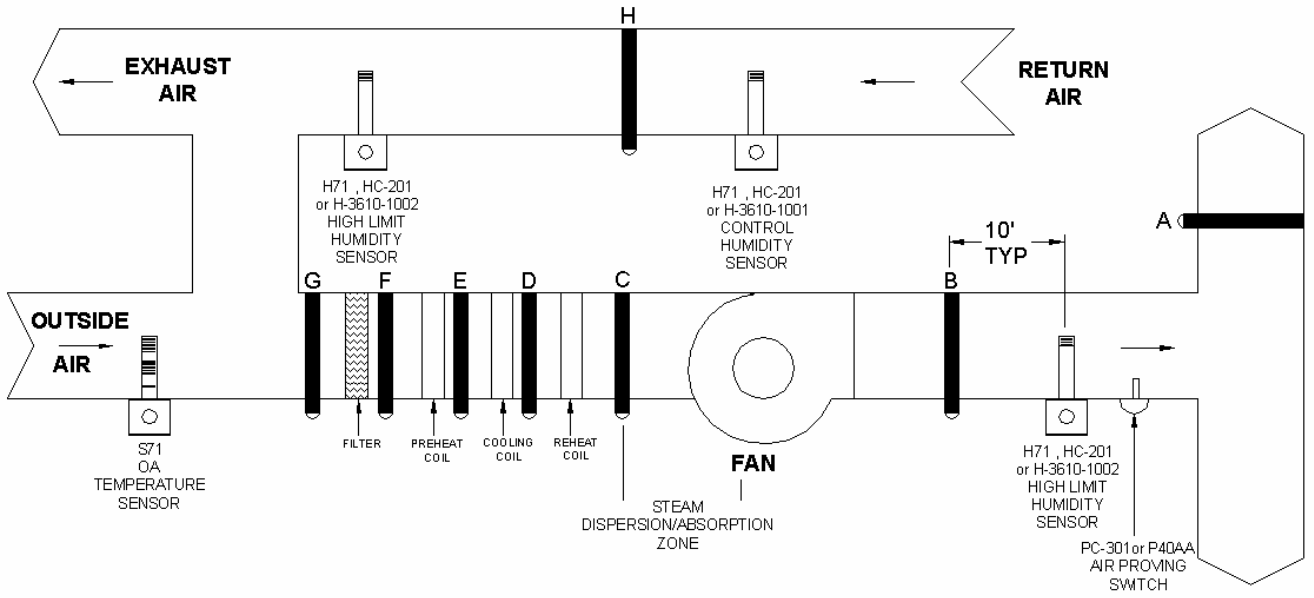


Multi-pipe/topfeed - up to 990 kg/h (2,000 lbs/hr)



Step 1: Locate The UltimateSteam Manifold

Properly locating the UltimateSteam humidifier and its controls in your air handler or duct is very important - most steam absorption problems are the result of improper installation.



Locations:

- A. BEST: locate far enough from elbow to be in laminar air flow. Maintain evaporation distance.
- B. BEST: locate with enough distance for proper evaporation and to avoid turbulence from the fan.
- C. GOOD: providing there is enough distance for proper evaporation from the humidifier manifold to the fan inlet (back of fan doesn't really matter).
- D. OK: providing there is enough distance for proper evaporation from the humidifier manifold to the heating coil (particularly if the heating coil is electric)
- E. POOR: workable if the cooling coil is inactive during humidifier operation. An active cooling coil will remove the moisture the humidifier is trying to put in.
- F. POOR: same problems as C&D plus the air may be very cold, increasing evaporation distance or causing condensation.
- G. POOR: same problems as C, D, & E plus the filters may get wet producing an unsafe conditions with growth of biologicals.
- H. POOR: only workable if the system is 100% recirculated air with no exhaust.

Evaporation Distance (English units only)

The following formula is for approximating evaporation distances in mm (range: 8 - 32°C, 25-95%RH).

$$\frac{\text{(Leaving \%RH - Entering \%RH) x 770}}{\text{(humidifier width x humidifier height) / (duct width x duct height) x 55 / (32 + 9 x temp / 5)}}$$

Accordingly, if you have a 1200 x 910 humidifier in a 1200 x 910 duct with entering condition of 50%RH and leaving condition of 90%RH and duct temperature of 12.8 °C:

$$\frac{\text{(90 - 50) x 770}}{\text{(1200 x 910) / (1200 x 910) x 55 / (32 + 9 x 12.8 / 5)}} = \text{evaporation distance around 308 mm}$$

If the actual humidifier was a smaller size:

$$\frac{\text{(90 - 50) x 770}}{\text{(910 x 610) / (1200 x 610) x 55 / (32 + 9 x 12.8 / 5)}} = \text{evaporation distance around 606 mm}$$

This formula works on velocities up to 10 m/sec.
Be sure to use accurate entering and leaving conditions at the worst point, i.e.: highest differential between the two conditions.

NOTE: The formula proposed must be considered a simplification of the real situation, and must be applied accordingly.

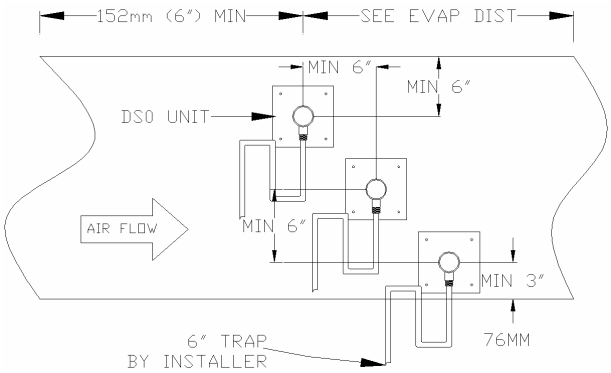
Step 2: Assemble and mount the ultimateSteam manifolds

DS0 Single Manifold Models

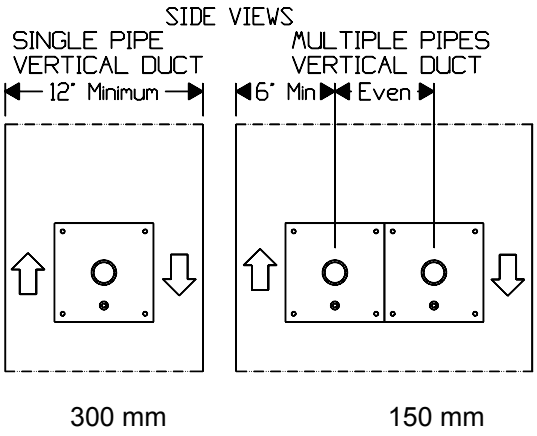
The **DS0** single manifold models do not require any manifold assembly.

Generally the distributor manifolds should be mounted in the center of the air stream. Multiple pipes need to be evenly spaced to cover the duct surface area.

SIDE VIEW

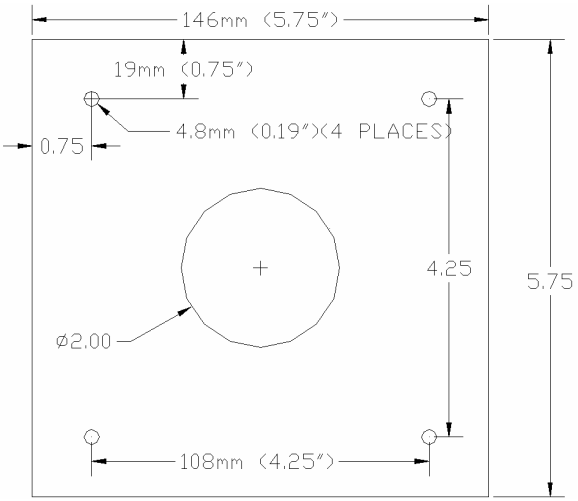


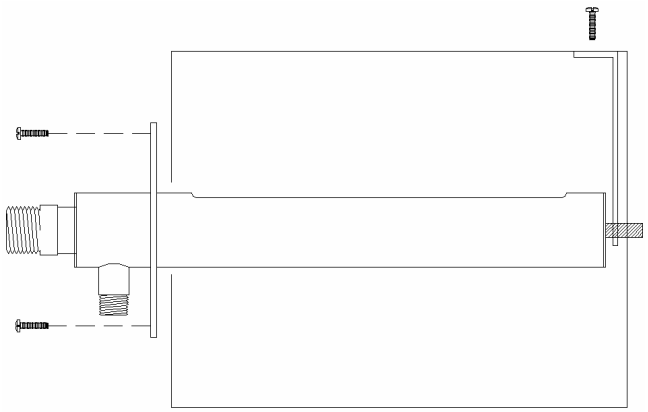
In vertical ducts, the distributor manifolds are mounted in the center with the slots facing up. The airflow may be up or down, but when the airflow is down, maximum velocity is 7.5 m/s.



Installation of the manifold into the duct is simple:

1. Bore a 63.5mm (2 1/2") diameter hole in the side of the duct;
2. Caulk the mounting plate facing the duct;
3. Insert the manifold through the hole and secure the mounting plate with sheet metal screws;
4. Secure the opposite end either by piercing the duct with a threaded rod, or by a hanging strap. End mounting stud is 3/8"-16. (300 & 450mm (12" & 18") models do not have mounting stud). Drain connection is 1/2" MPT. The supply connection depends on the flow-rate (see *Step 3*).



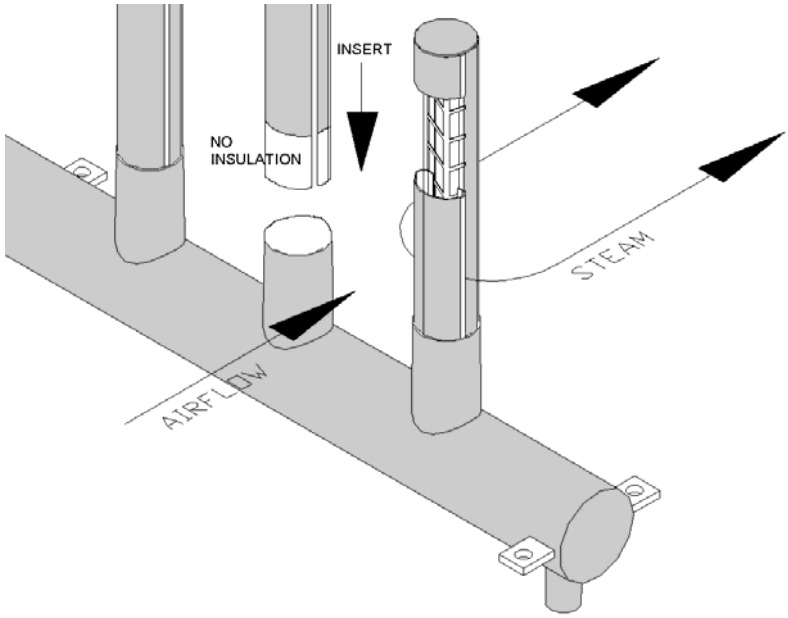


DSB Bottom Fed Manifold Models

Assemble Vertical Manifolds

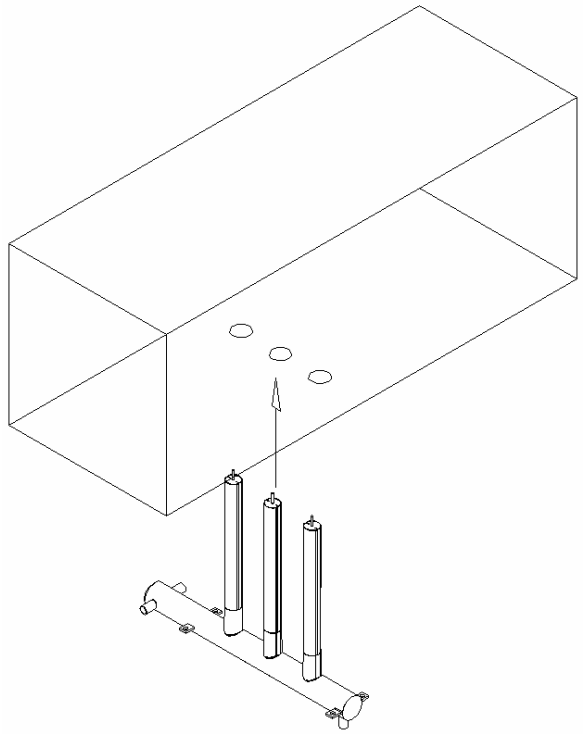
The vertical distribution manifolds are inserted into the bottom feed header by hand (slip fit) and then into the top header if any.

- Vertical slotted discharge manifolds must be installed with the internal fishbone wick ends sloping up as in a "Y".
- Do not force the vertical manifolds into the headers beyond the insulation.
- Do not use any lubricants. Manually reform the ends slightly if necessary.
- Insure discharge slots are perpendicular to the air flow.

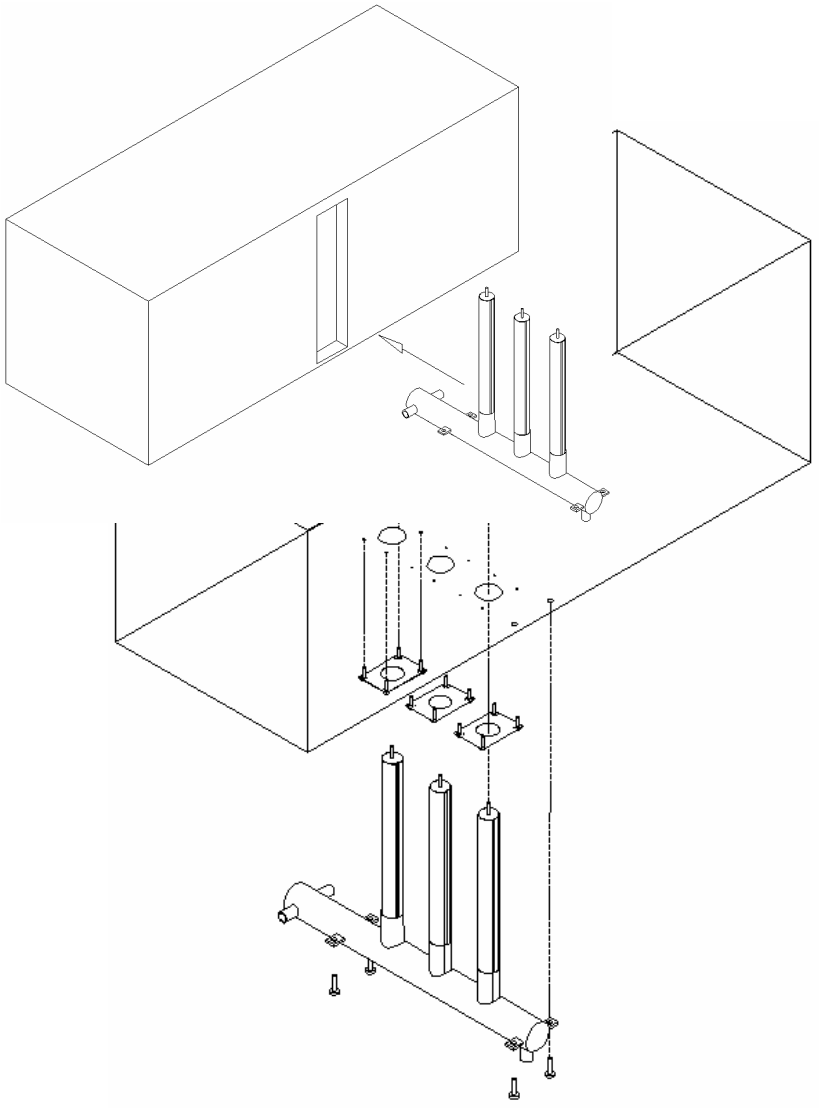


The DSB models have the flexibility of being installed:

1) with the header underneath the duct and only the vertical manifolds in the duct, OR



2) with the entire assembly inside the duct. In air handler installations, clearance must be allowed at the bottom for the steam trap assembly as well as the p-trap draining the header.



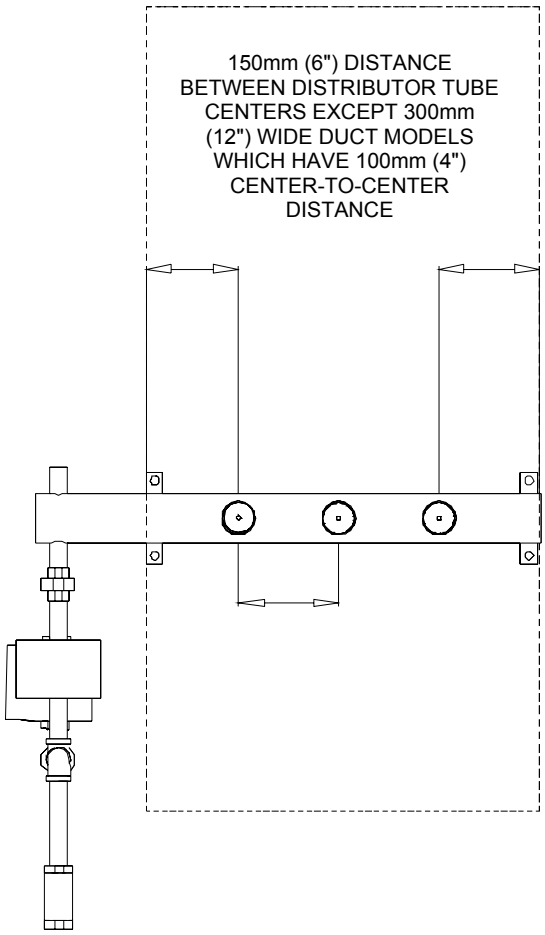
Mounting the manifolds

The DSB systems are mounted to the duct or overhead support using bolts or threaded rod through the 4 mounting tabs (12.7mm (1/2”) diameter holes) on both the top and bottom headers.

Escutcheon plates are mounted using sheet metal screws. All escutcheon plates should be caulked with RTV Silicone caulking before attaching them to the duct.

A top support strap is also supplied (for units with height of 900mm (36”) or more), which fastens across the vertical manifolds and to the duct top or sides.

MAKE SURE HEADER IS LEVEL



The humidifier is generally installed in ducts so that the end of the header sticks out of the duct on the feed side. In air handlers, the entire assembly will be inside the air handler plenum.

Keep a minimum of 150mm (6”) from the last vertical discharge manifolds to the sides of the duct or air handler.

Installation Clamps for DST & DSB

DST UltimateSteam System

Contains: 4-4” clamps and 4-3” clamps

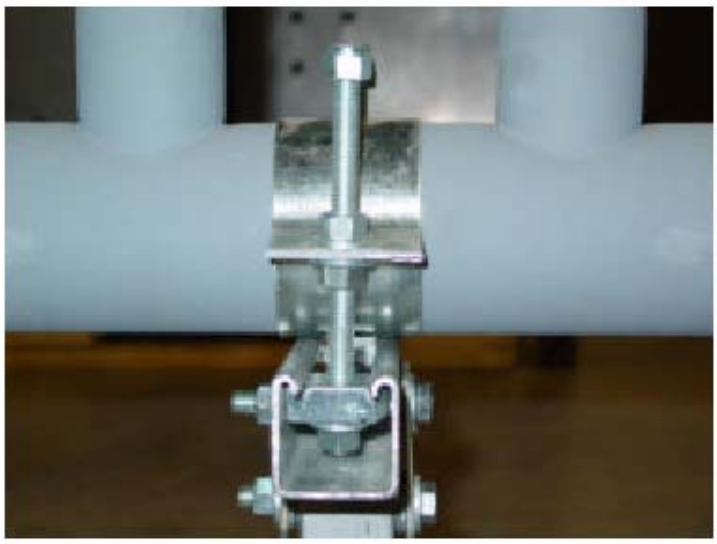
DSB UltimateSteam System

Contains: 4-3” clamps

3” or 4” Clamp

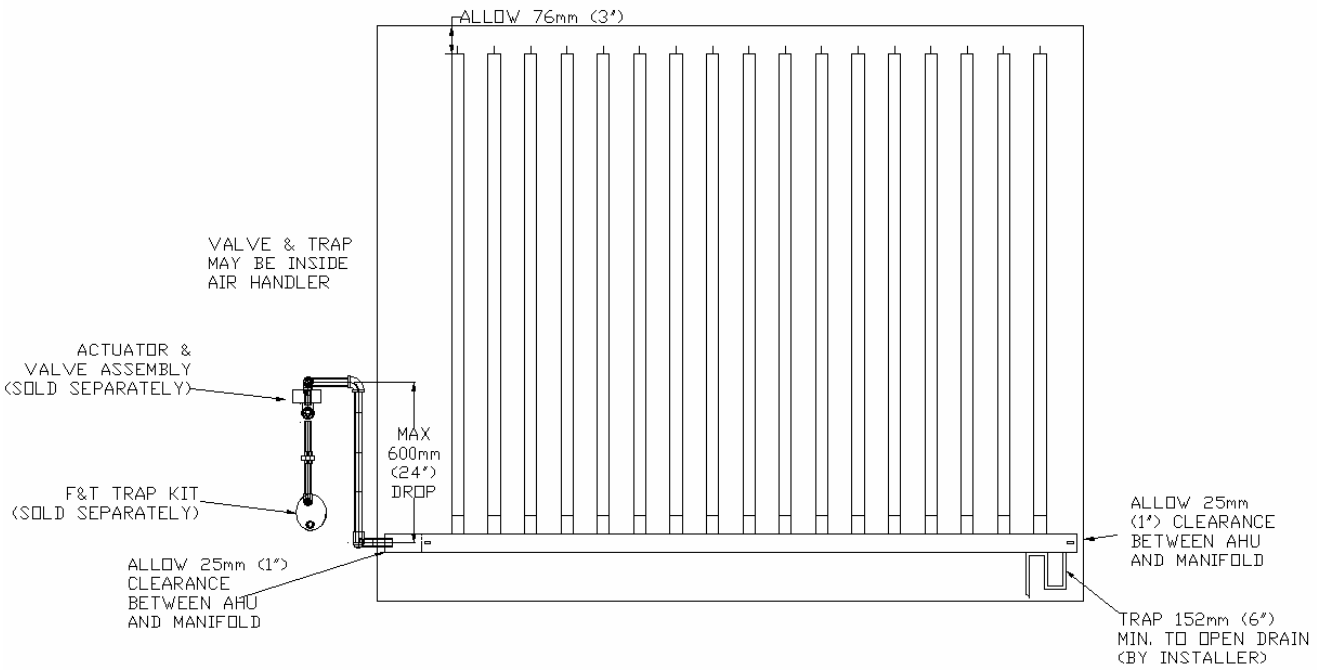
Note: Threaded rod, nuts and other mounting hardware are provided by the installer.

This design allows the UltimateSteam unit to be mounted from the bottom (as shown in the pictures below) or the clamps can be rotated and the unit can be mounted from the face of a coil.

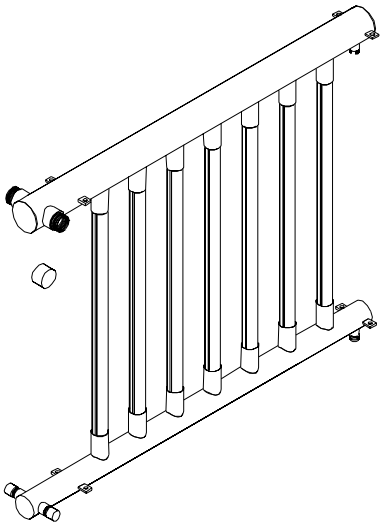


Air Handler Mounting

DSB Model



DST Top-Fed Models



The **DST** models are usually assembled after installation in the duct or air handler, by mounting the bottom header first, then inserting the upright manifolds, then installing the top header and securing the assembly.

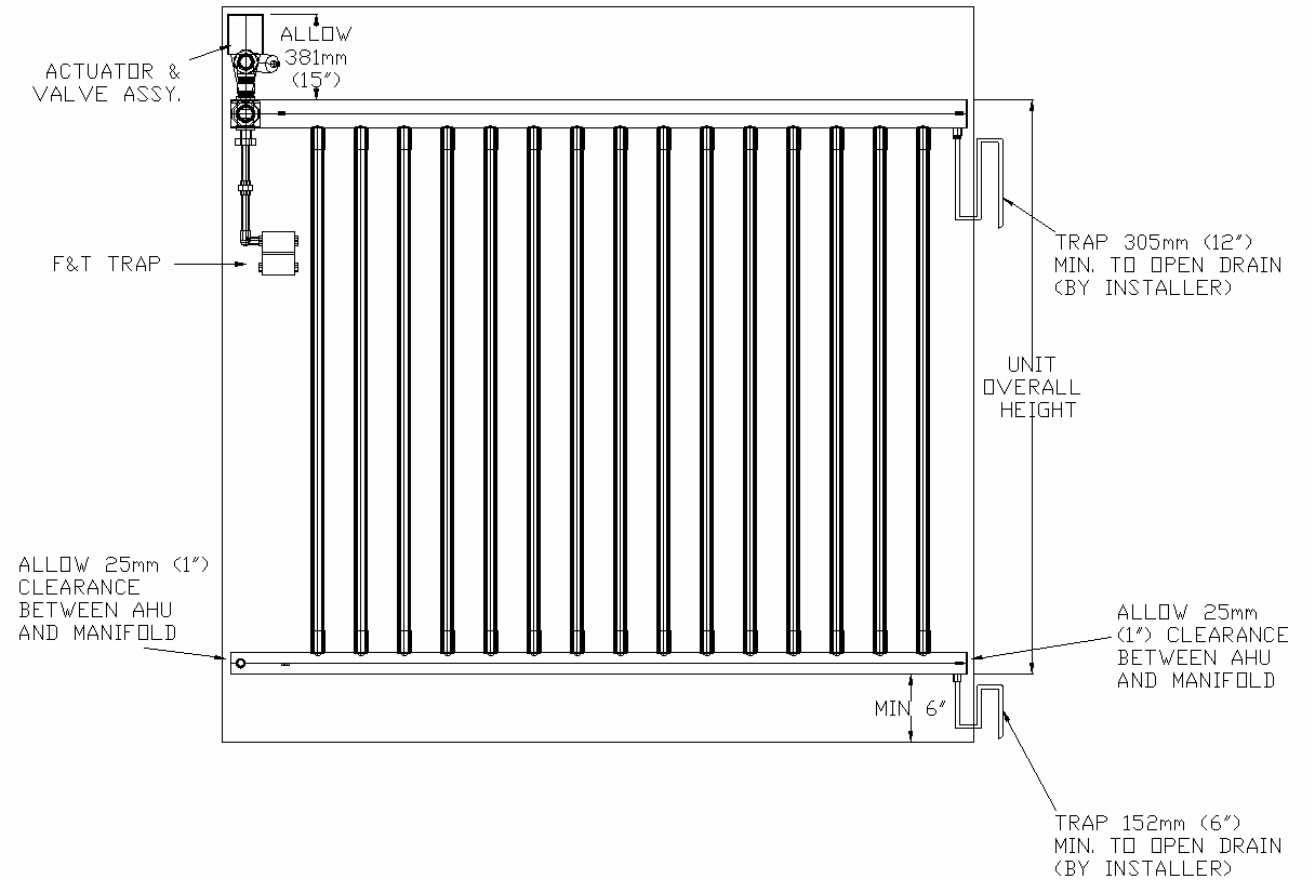
The top and bottom headers are secured, as with the DSB models, either to the plenum top and bottom, or to Unistrut or hanging rods. Unit must be secured so that air velocity does not move it.

NOTE: When the vertical upright steam discharge manifolds (slotted) are installed into the top header, you must run a bead of high temperature RTV silicone around the junction to seal it from dripping.

Air Handler Installation

Installation of the UltimateSteam inside an air handler requires that the system be sized slightly smaller to allow for proper fall to the steam trap and clearances for the valves and actuators.

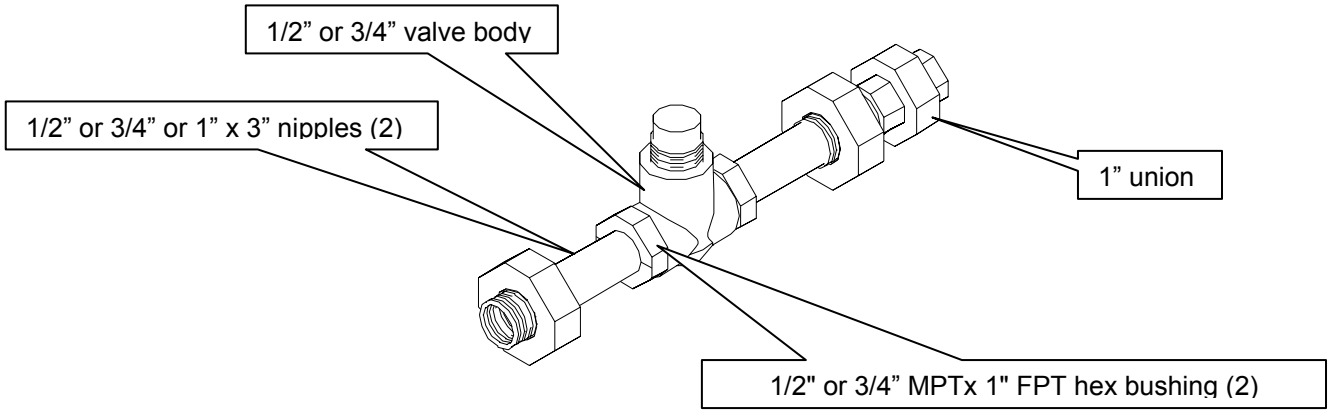
DST Model



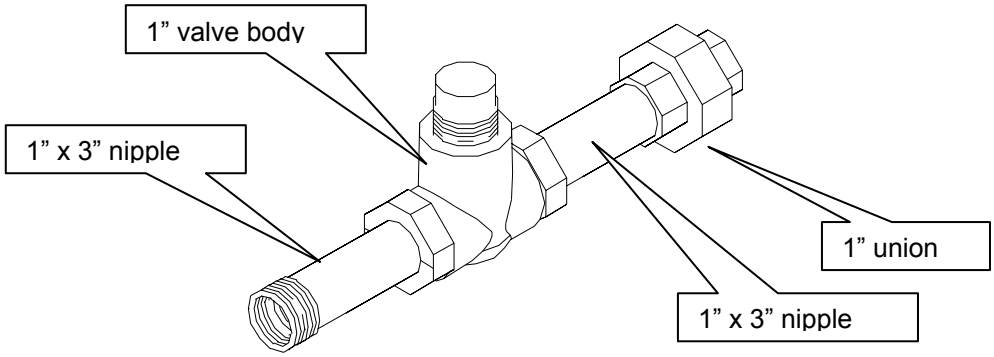
Step 3: Assemble control valve assembly

The DSAKV*** valve kits are are sold as separate items upon request. In the basic version (for pressure up to 1 bar, with cast iron fittings), these include (shipped unassembled):**

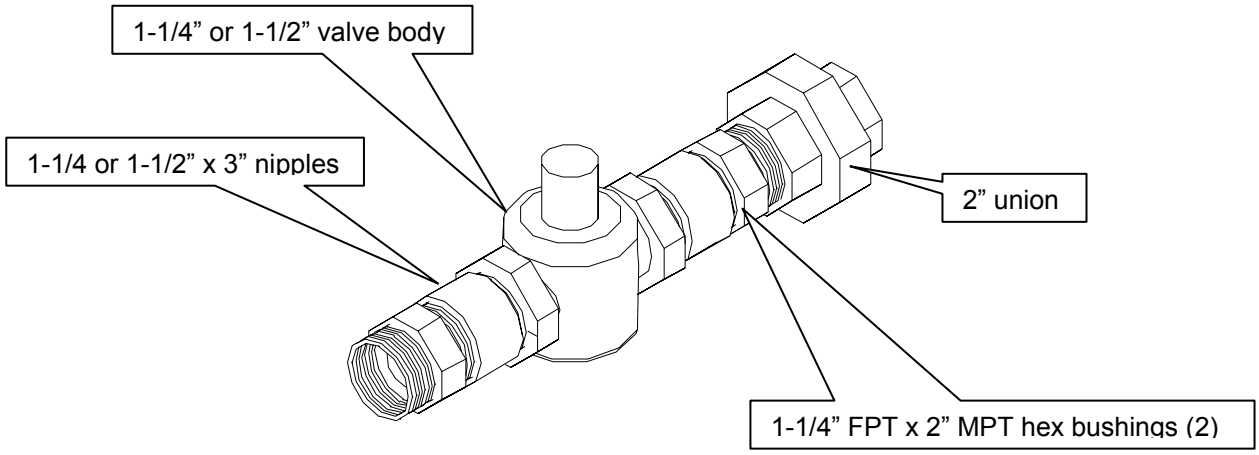
Part Number	Description	Components
DSAK24V00A	1/2" valve size CV= 0.4	(2) 1/2" MPT x 3" nipples (2) 1/2" FPT x 1" MPT hex bushings 1" union
DSAK24V00B	1/2" valve size CV= 0.63	(2) 1/2" MPT x 3" nipples (2) 1/2" FPT x 1" MPT hex bushings 1" union
DSAK24V00C	1/2" valve sizes CV= 1	(2) 1" MPT x 3" nipples (2) 1/2" MPT x 1" FPT hex bushings 1" union
DSAK24V00D	1/2" valve sizes CV= 1.6	(2) 1" MPT x 3" nipples (2) 1/2" MPT x 1" FPT hex bushings 1" union
DSAK24V00E	1/2" valve sizes CV=2.5	(2) 1" MPT x 3" nipples (2) 1/2" MPT x 1" FPT hex bushings 1" union
DSAK24V00F	1/2" valve sizes CV=4	(2) 1" MPT x 3" nipples (2) 1/2" MPT x 1" FPT hex bushings 1" union
DSAK34V00G	3/4" valve size CV= 6.3	(2) 1" MPT x 3" nipples (2) 3/4" MPT x 1" FPT hex bushings 1" union



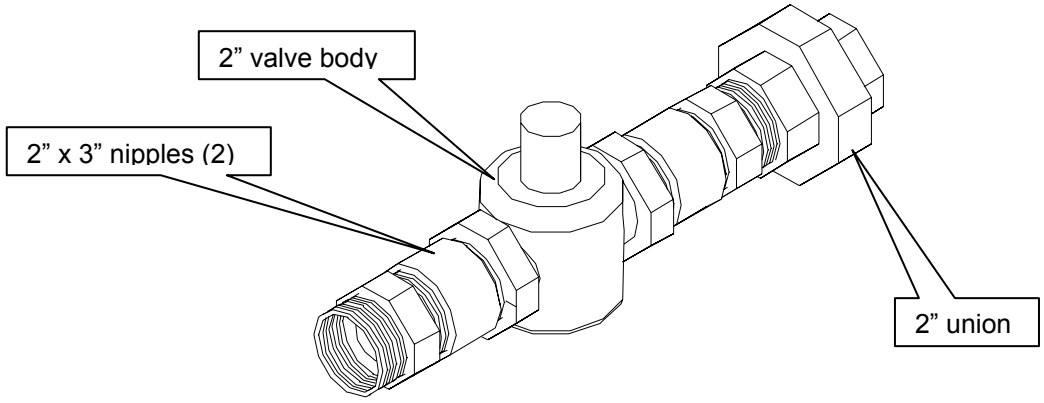
Part Number	Description	Components
DSAK44V00H	1" valve size CV=10	(2) 1" MPT x 3" nipples 1" union



Part Number	Description	Components
DSAK54V00I	1 1/4" valve size CV= 16:	(2) 1-1/4" MPT x 3" nipples (2) 1 1/4" FPT x 2" MPT hex bushings 2" union
DSAK64V00J	1 1/2" valve size CV= 25:	(2) 1-1/2" MPT x 3" nipples (2) 1 1/2" FPT x 2" MPT hex bushings 2" union



Part Number	Description	Components
DSAK84V00K	2" valve size CV= 40:	(2) 2" MPT x 3" nipples 2" union

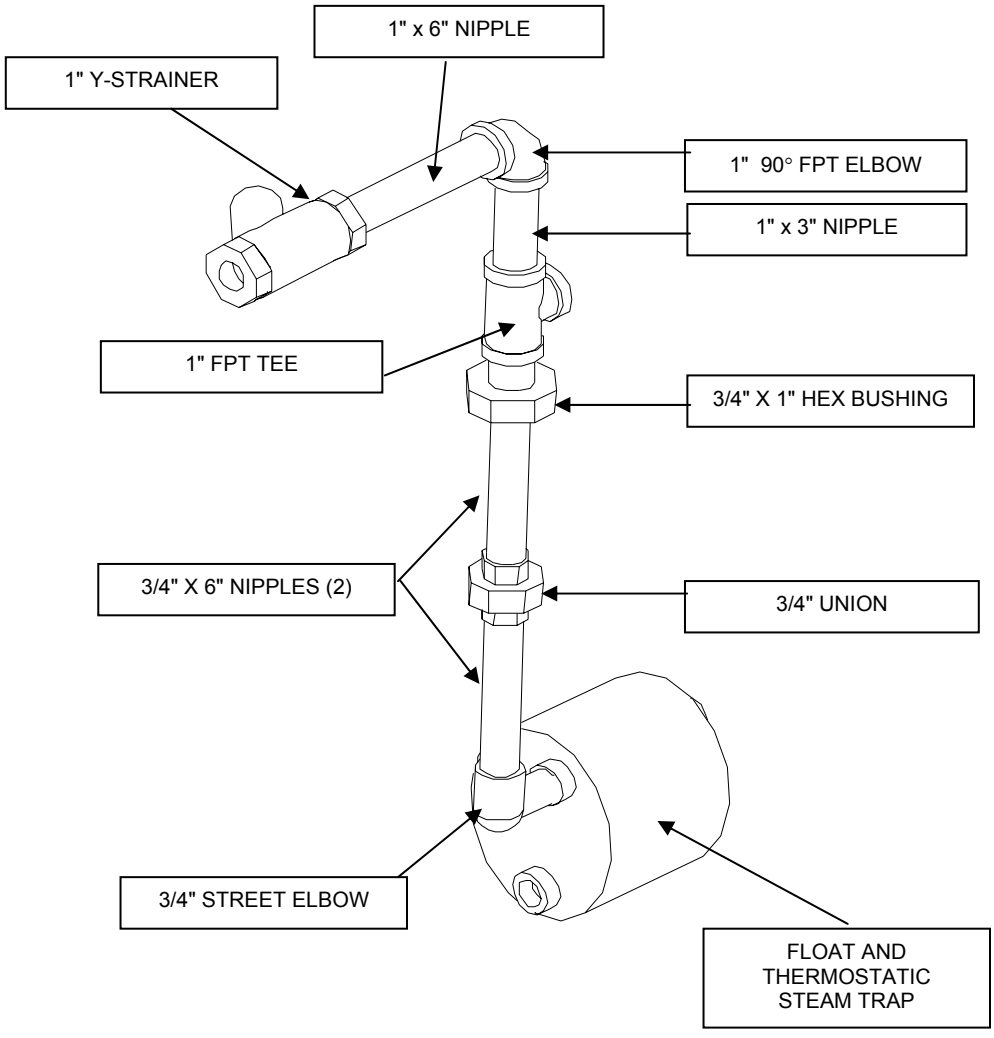


Step 4: Assemble strainer & trap assembly and valve assembly

Using proper pipe thread sealant, assemble the supplied parts as shown.

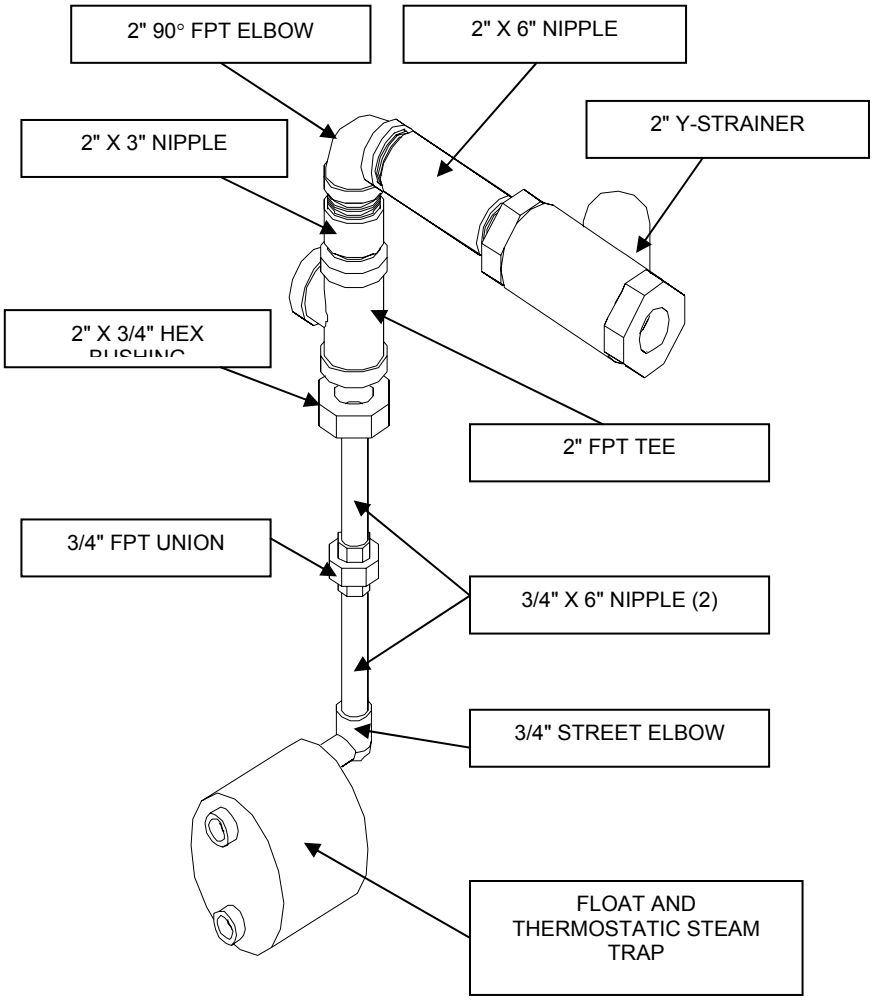
1” Strainer & Trap Assembly

Part Number	Description	Components
DSAK44T000	1" Steam trap & strainer with plumbing kit	1” Y-strainer 1” x 6” nipple 1” x 90° FPT elbow 1” x 3” nipple 1” FPT tee 3/4” x 1” hex bushing (2) 3/4” x 6” nipples 3/4” FPT union 3/4” 90° street elbow 3/4” float & thermostatic trap



2” Strainer & Trap Assembly

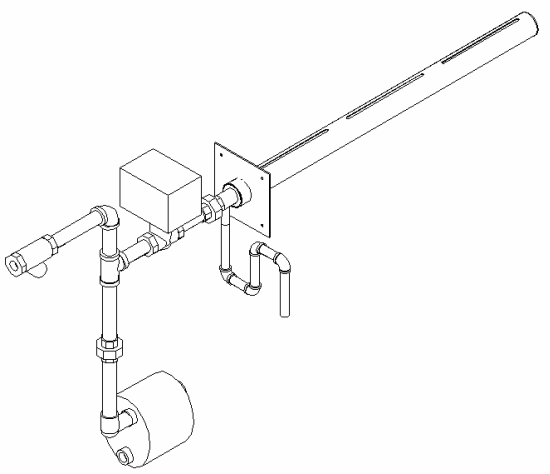
Part Number	Description	Components
DSAK84T000	2" Steam trap & strainer with plumbing kit	2” Y-strainer 2” x 6” nipple 2” x 90° FPT elbow 2” x 3” nipple 2” FPT tee 2” x 3/4” hex bushing (2) 3/4” x 6” nipples 3/4” FPT union 3/4” 90° street elbow 3/4” float & thermostatic trap



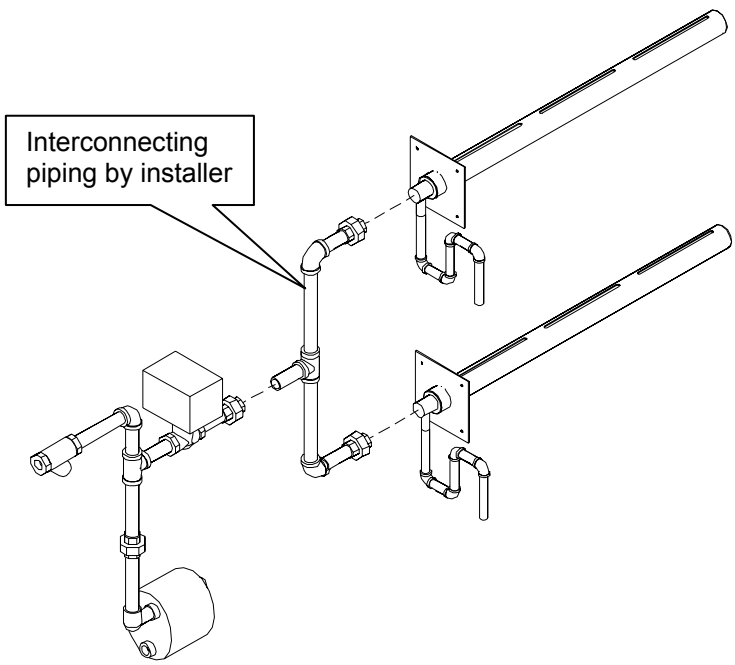
Step 5: Connect control valve & trap to steam supply and manifold

DS0 Single Manifold Models

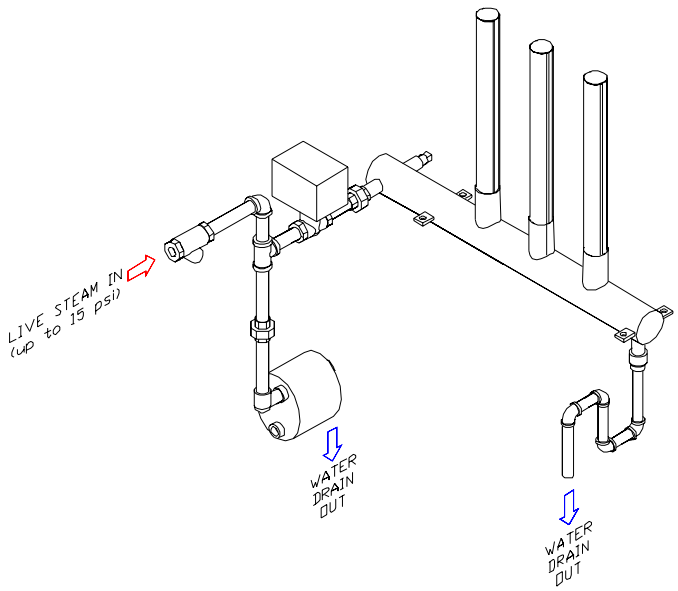
Single Pipe System



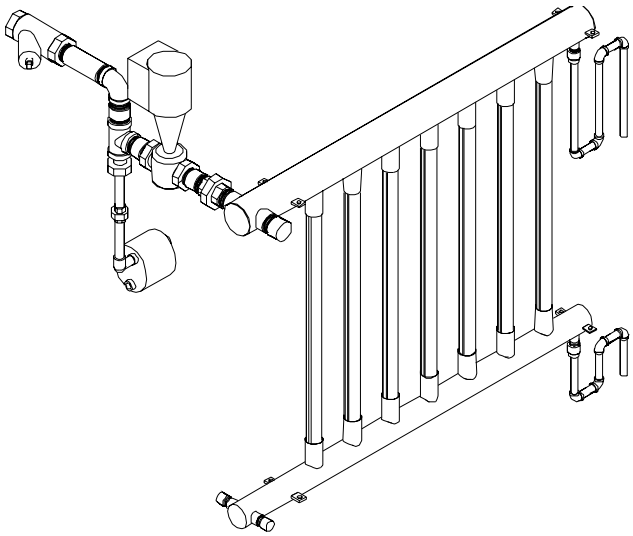
Multiple Single Pipe System



DSB multiple manifold – bottom feed



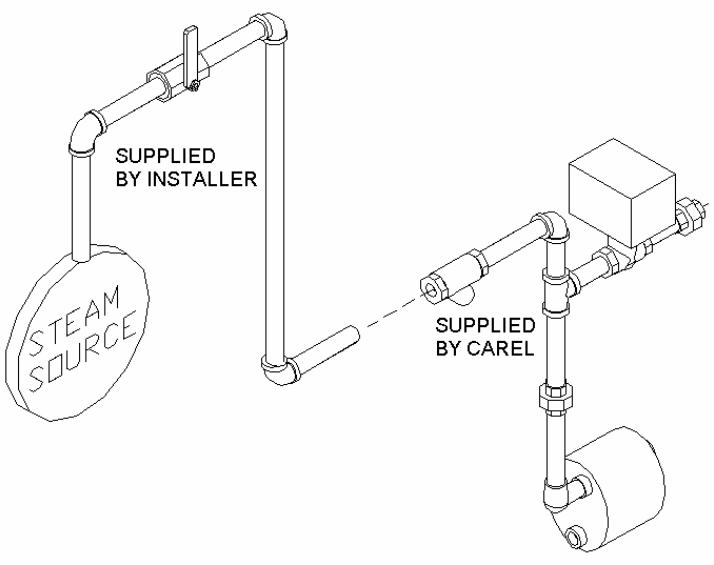
DST mutiple manifold – topfeed



NOTE: all the "P" connections for the steam trap are the installer's responsibility.

Step 6: Final Plumbing of Steam Supply and Condensate Drains

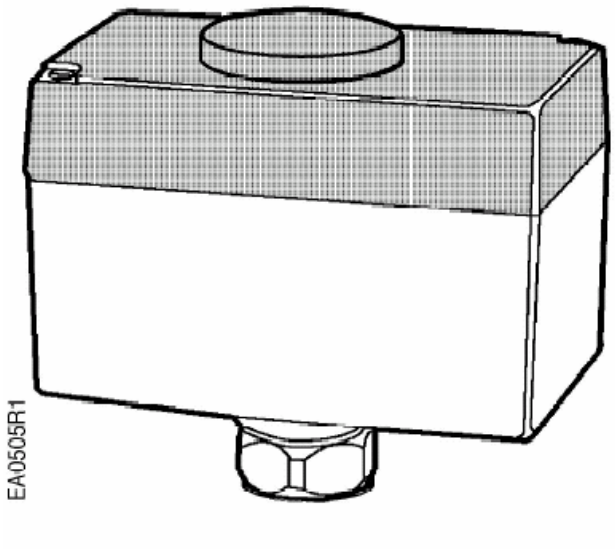
Run a steam line from the top of the steam supply header to the inlet strainer on the strainer/valve assembly. Be sure to install an isolation valve in the steam line leading to the humidifier. Follow standard steam piping codes and procedures, maintaining proper slopes.



Step 7: Mount Valve Actuator DSA004E001 Electronic valve actuator

The DSA004E001 electronic valve actuator is designed to work with steam control valves to provide proportional control of steam output.

WARNING: If mounting the actuator to a valve already in line, close the valves in the piping (upstream first, then downstream).



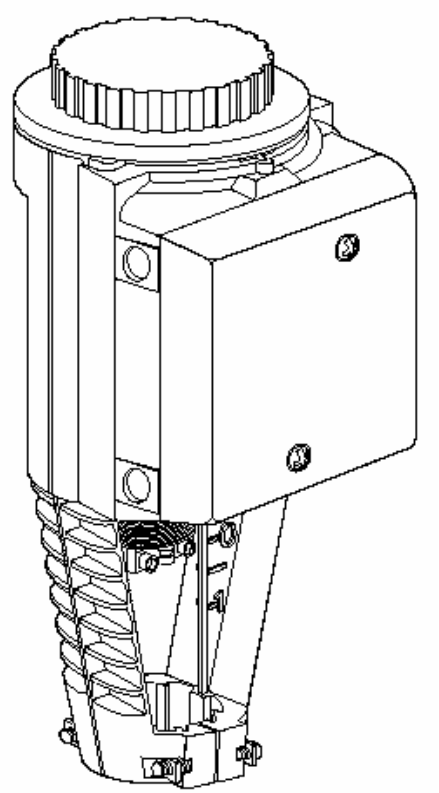
Mounting the actuator to the valve:
1) Mount the actuator vertically above the valve. Mounting on either side is also acceptable, but *do not mount the actuator upside-down below the valve*.
2) If you are attaching the actuator to a new valve, remove the protective plastic cap from the valve stem.
3) Place the actuator on the valve.
4) Use a 1-1/4 inch open end wrench to tighten the coupling piece.
5) Use either a Phillips head screwdriver or a flat blade screwdriver to remove the actuator cover for access to the terminal block, selector plug, and jumper.
6) Attach wires, set the selector plug, and remove the R-M jumper, if necessary. Refer to wiring diagrams for your control scheme wiring.
7) Place the cover on the actuator. The position indicator must be at the "0" to fit into the shaft. If the cover does not fit easily, rotate it 180 degrees.

All wiring must conform to NEC and local codes and regulations. **Use earth ground isolating step-down Class 2 transformers. Do not use autotransformers.**

Determine the supply transformer rating by summing the VA of all actuators used. The maximum rating for Class 2 step-down transformer is 100 VA. It is recommended that no more than 10 actuators be powered by one transformer.

To use a 4-20 mA signal, the circuit board jumper between R and M must be cut. If the circuit jumper between R and M is cut, you cannot wire the R and M terminals on the terminal block to re-establish the connection.

The DSA004E002 electronic valve actuator:



Is designed to work with steam control valves to provide proportional control of steam output.

WARNING: If mounting the actuator to a valve already in line, close the valves in the piping (upstream first, then downstream).

Mounting the actuator to the valve:
1) Remove the plastic cover from the top of the valve stem and bonnet:
2) Turn the control knob on top of the actuator to the MAN position; the small red tab pops out when in this position. Make sure the yoke nuts are loose enough to allow the actuator to slip over the bonnet.
3) Place the actuator onto the valve, putting the valve stem through the bottom of the actuator.
4) Guide the valve stem into the stem retainer of the actuator.
5) Hold the stem retainer in place as you tighten it around the valve stem.
6) Position the actuator to accomodate the wiring. Hold the acutator in place while tightening the yoke nuts.
7) Turn the control knob back to the AUTO position.

DSA004P001 pneumatic valve actuator

(shown attached to valve)

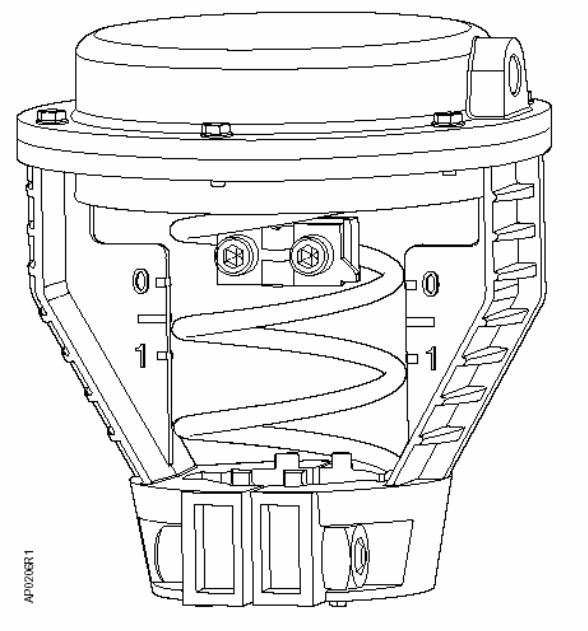
The 1309670AXX pneumatic valve actuator is designed to work with steam control valves to provide proportional control over relative humidity.

WARNING: If mounting the actuator to a valve already in line, close the valves in the piping (upstream first, then downstream).

Mounting the actuator to the valve:
1) Remove the cardboard from the retaining ring in the lower housing.
2) Place the actuator on the valve bonnet and hand tighten.
3) If you need to change the orientation of the actuator, remove the retaining clip in the lower housing and rotate the actuator to the desired position.
4) Attach 1/4-inch poly tubing to the actuator.

The DSA004P002 pneumatic valve actuator

is designed to work with valves from 1 1/4 to 2 inches in size to provide proportional control over humidity.



WARNING: If mounting the actuator to a valve already in line, close the valves in the piping (upstream first, then downstream).

Do not install the actuator upside down:

Mounting the actuator to the valve:
1) Remove the cardboard from the retaining ring in the lower housing.
2) Place the actuator on the valve bonnet and hand tighten.
3) If you need to change the orientation of the actuator, remove the retaining clip in the lower housing and rotate the actuator to the desired position.
4) Attach 1/4-inch poly tubing to the actuator.

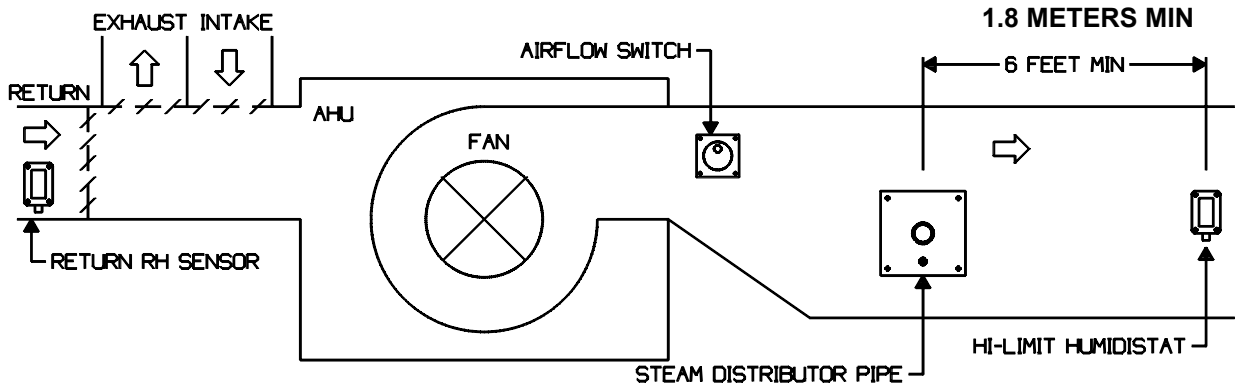
Step 8: Controls Installation

A typical humidifier control system includes a wall or return duct sensor or controller, a high limit duct humidistat, and an air proving switch. Placement of these devices is critical to proper operation of the overall system.

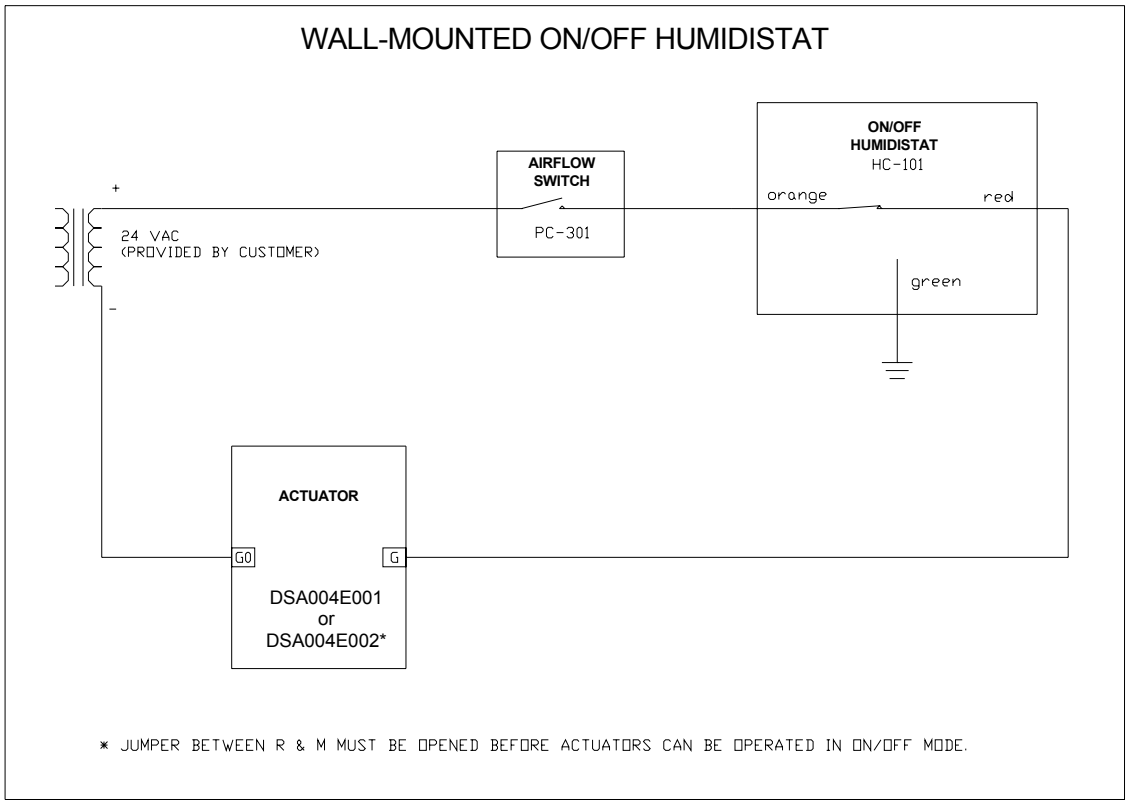
The return air RH sensor must always be located BEFORE any outside air intake, in order to insure accurate sensing of the air from the space. Alternatively, a room RH sensor or humidistat can be used. Room sensors should be located on an inside wall or post and should not be hit by any discharge air streams from ducts. In a 100% outside air system, the RH sensor may be placed in the supply duct, at least 10 feet down stream of the distributor pipe to act as both hi-limit and control.

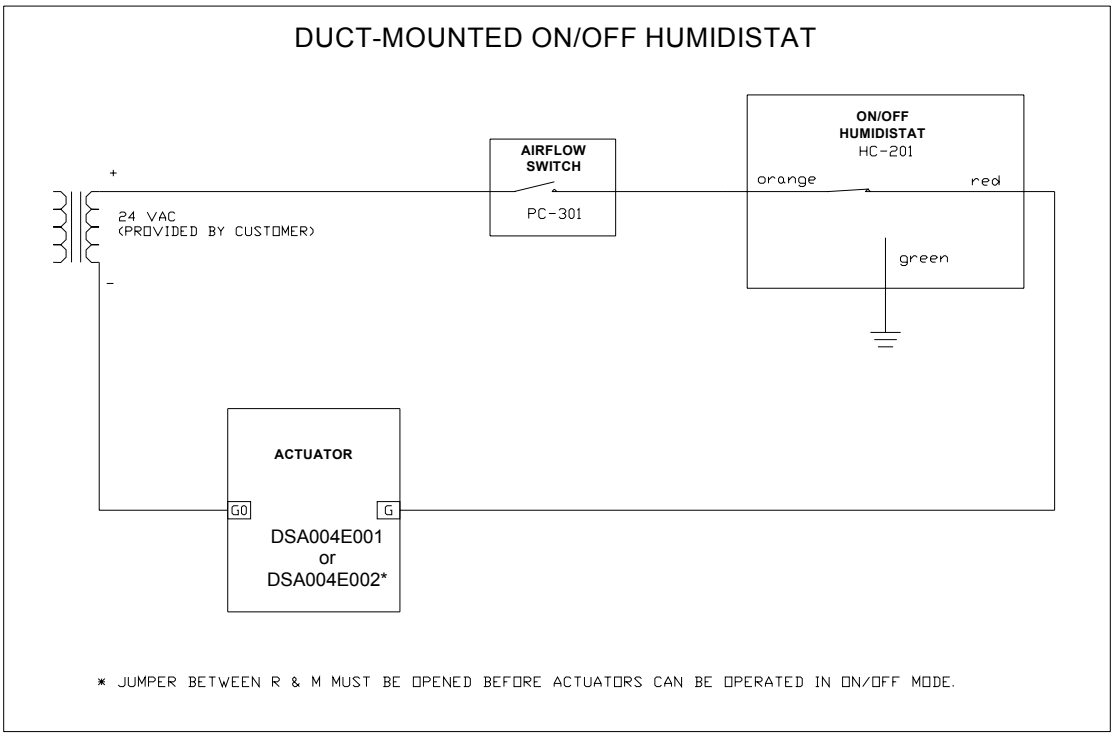
The airflow switch must be positioned to accurately open on a loss of air flow, to prevent the humidifier from running when there is no air to absorb the moisture.

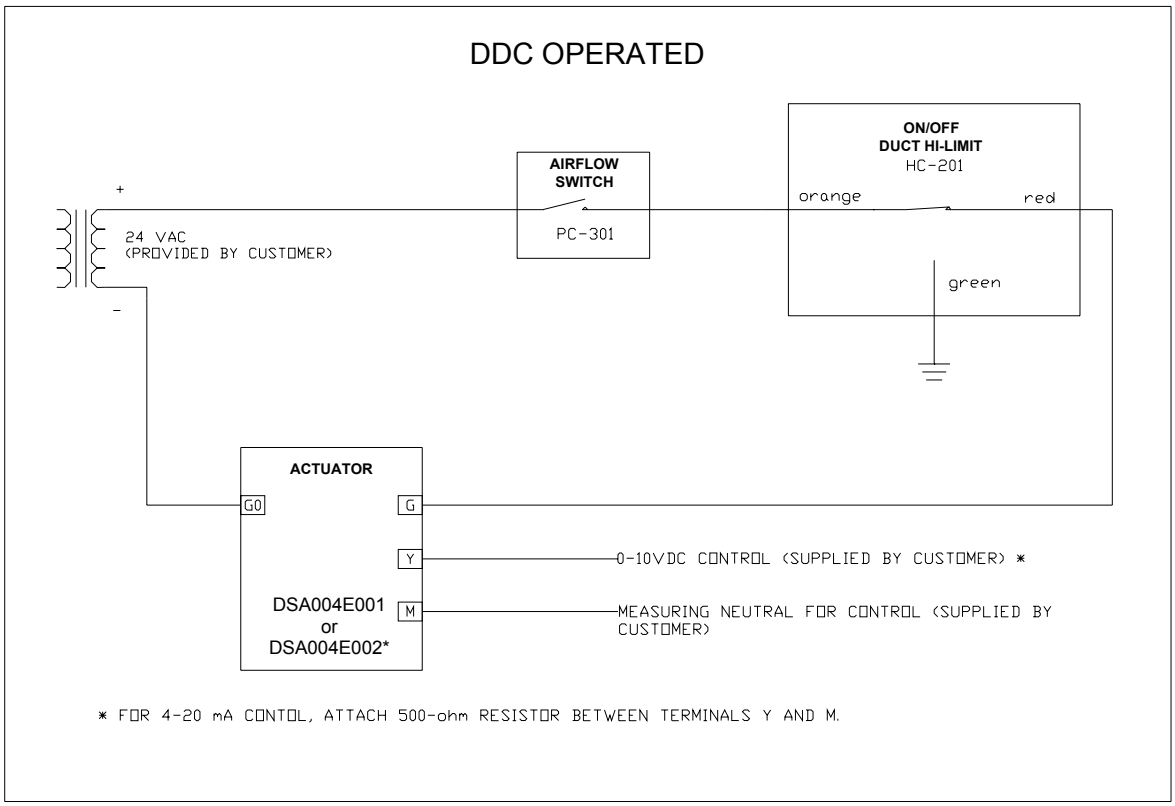
The hi-limit humidistat must be positioned far enough down stream of the steam distributor pipe(s) to prevent it from getting wet, but still allow it to accurately prevent overhumidification of the duct that could result in condensation.



Controls Wiring







Installation Checklist

_____ 1. Humidifier properly assembled with all discharge slots facing the proper direction. (Multipipe systems have the vertical slots in line with the manifolds, 90° to the air flow. Single pipe systems always have the slot facing up on top.)

_____ 2. Humidifier headers secured and level.

_____ 3. Humidifier upright discharge manifolds plumb.

_____ 4. Valve and trap assembly properly assembled and connected to the humidifier header.

_____ 5. P-trap installed on discharge of each header.

_____ 6. Steam feed line properly run, sloped and connected to the valve and trap assembly inlet.

_____ 7. Controls properly wired.

Startup

1. Slowly open the steam isolation valve from the steam supply line. You should be able to hear steam running through the valve. Wait a few minutes for the steam to heat up the entire line to the humidifier and for all condensate to clear through the trap.
2. Verify that the steam trap on the valve/trap assembly of the humidifier is working properly - condensate discharge line should be hot.
3. With air flowing in the duct or air handler, create a humidification demand by increasing the humidity control set point until it exceeds the actual humidity reading.
4. The valve on the humidifier should begin to open and steam should enter the humidifier manifolds.
5. Initially most of the steam will condense as it heats the manifolds. Insure that the P-traps on the manifolds are clear and running to drain without leaking steam. NOTE: On first startup, some steam may leak from the P-traps on the manifolds if they have not been primed (filled with water).
6. Steam should begin exiting the humidifier manifolds.
7. Return the humidity control set point to the desired level.

Startup is complete.

Operation

The operation of the humidifier is simply to discharge steam into the duct or air handler as permitted by the opening and closing of the control valve. Control of the valve is from either the supplied humidistats and controls or from the Building Automation System.

Maintenance

There is no maintenance on the humidifier manifold itself.
Follow maintenance instructions for the control valve and actuator, supplied with those devices.
Follow maintenance instructions for the traps, supplied with those devices.

Trouble-Shooting

Water is spitting from the discharge manifolds.

1. The steam trap on the valve/trap assembly is not functioning. Clean or replace.
2. The header P-traps are not draining. Clean and check plumbing - must run to gravity drain. Check that height of trap exceeds the static pressure of the duct/AHU, especially if under negative pressure.
3. The steam line has been taken from the bottom of the steam source or is not sloped properly. Change line to take off from the top and check proper slopes.
4. The steam main is overloaded with water. Locate cause and correct.
5. Vertical discharge manifolds are not plumb. Make plumb.
6. Horizontal headers are not level. Make level.
7. Vertical discharge manifolds are installed upside down. Reinstall correctly.
8. Check valve sizing to maximum manifold capacity. Resize valve within manifold capacity.

Steam does not discharge from the manifolds when the valve is open.

1. Verify that valve is open. Correct.
2. Verify that steam is available and valves are open. Correct.
3. Verify that the steam pressure has not changed. Too high pressure could jam the valve.
4. Carefully place a mirror or metal object close to one of the steam discharge slots. If it fogs, steam is discharging, but evaporating very quickly. No problem. DO NOT EVER PLACE YOUR HAND OVER OR NEAR THE STEAM DISCHARGE SLOTS.
5. Y-strainer may be clogged. Clean or replace.

Steam valve will not open.

1. Verify power to the valve actuator. Correct.
2. Verify control signal to the valve actuator. Correct.
3. Verify control signal polarity to the valve actuator. Correct.
4. Remove actuator and test to see if it operates. Valve may be jammed - clean or replace.
6. Verify that the steam pressure has not changed. Too high pressure could jam the valve.

Steam valve will not close.

1. Verify control signal to the valve actuator. Correct.
2. Verify control signal polarity to the valve actuator. Correct.
3. Remove actuator and test to see if it operates. Valve may be jammed - clean or replace.
4. Verify that the steam pressure has not changed. Too high pressure could jam the valve.

Steam valve is leaking.

1. Verify full range control signal to the valve actuator. Correct.
2. Verify control signal polarity to the valve actuator. Correct.
3. Remove actuator and test to see if it operates. Valve may be jammed - clean or replace.
4. Verify that the steam pressure has not changed. Too high pressure could jam the valve.

Humidity exceeds set point.

1. Verify full range control signal to the valve actuator is compatible. Correct.
2. Verify control signal polarity to the valve actuator. Correct.
3. Check calibration of controller. Correct.
4. Insure humidity sensors are installed correctly and not located in drafts (wall). Correct.
5. Remove actuator and test to see if it operates. Valve may be jammed - clean or replace.
6. Verify that the steam pressure has not changed. Too high pressure could cause valve to leak.
7. Verify stable boiler pressure. Wide swings in pressure could be fighting the humidity controls.
8. Remove from PID control and place on straight P control.

Humidity remains below set point.

1. Verify full range control signal to the valve actuator is compatible. Correct.
2. Verify control signal polarity to the valve actuator. Correct.
3. Check calibration of controller. Correct.
4. Insure humidity sensors are installed correctly and not located in drafts (wall). Correct.
5. Remove actuator and test to see if it operates. Valve may be jammed - clean or replace.
6. Verify that the steam pressure has not changed. Too high pressure could jam valve. Too low will not meet capacity.
7. Verify stable boiler pressure. Wide swings in pressure could be fighting the humidity controls.
8. Remove from PID control and place on straight P control.
9. Check that air flow switch is not fluttering. Correct.
10. Check that hi-limit controller is not located too close to steam discharge manifolds. Correct.
11. Verify actual amount of outside does not exceed amount used in original load calculations. Correct.
12. Humidifier is undersized. Check humidity load calculations.

Condensate in duct.

1. Verify humidifier capacity versus air volume.
2. See first item in trouble-shooting section of this manual.
3. Verify that hi-limit controller is working. Correct.
4. Verify evaporation distance to obstructions or elbows. Correct.
5. Verify steam valve is not leaking. Correct.
6. Uninsulated duct may be running through an area where ambient temperature is below internal duct dew point. Insulate duct.

Steam leaks from P-traps.

1. Check that height of trap exceeds the static pressure of the duct/AHU, especially if under negative pressure. Correct.
2. Check valve sizing to maximum manifold capacity. Resize valve within manifold capacity.

Technical Specifications

Construction of pipes DS0, DSB and DST and manifolds: Type 316 Stainless Steel
Structure of valve body, supplied separately: ANSI Class 250 as standard
Structure of fittings, strainer and steam trap, supplied separately: cast iron as standard
Insulation of pipes and DS0, DSB and DST manifolds: Proprietary high R value pliable coating, plenum safe, non-toxic
Maximum temperature: 260 °C
Maximum pressure in pipes and DS0, DSB and DST manifolds: 0.07 bar
Control valves:
Electric: Siemens or other, full pressure drop
Pneumatic: Siemens or other, full pressure drop
Steam traps: float & thermostatic standard, inverted bucket when inlet pressure exceeds 1.03 bar
(Carel uses Barnes & Jones traps as standard)

Warranty

All products manufactured by Carel Spa are warranted to the original purchaser to be free from defects in materials and workmanship in the course of normal and reasonable use for a period of 2 years from the date of installation or 2 years and 1 month from the date of shipment, whichever comes first, so long as the product has been installed and operated in accordance with all appropriate manuals and wiring diagrams, and started up by a qualified Carel technician.

Any product or part that is found to be defective will, at the option of Carel Spa be replaced or repaired. Carel Spa reserves the right to inspect any part or installation before replacing or repairing defective parts. After startup of the product, labor for repairs or replacement of parts is not covered by this warranty. Replacement of routinely replaceable parts such steam cylinders and gaskets are not covered by this warranty.

Carel Spa assumes no liability for consequential or inconsequential damage, or damage due to negligence or improper use. Under the terms of this warranty, the original purchaser may have certain legal rights and other rights, which may vary from state to state.

CAREL

Technology & Evolution

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