



SUBMITTAL DATA

For

Highlands Building at Pinnacle Hills

Sold to

Comfort Systems USA

Prepared for

IMEG

Product: Humidifier

Qty: 1

Tag(s): AHU-1 Humidifier

Prepared by

Harrison Energy Partners

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6-2-26

System **Pharmacy Humidifier** Tag(s) AHU-1 Humidifier

Materials

Model	Description	Qty
UR020HM1U4	HEATERSTEAM 20KG/H 460V 3PH TITANIUM pGDX USA	1
SHOSE00040	RUBBER STEAM HOSE, 40 MM (PER FOOT)	10
SABBESI2U0	ULTIMATE SAM MANIFOLD, 23.75 x 47.50 IN., 66 LBS/HR	1
SAKIT40100	KIT STEAM INLET DIAMETER 40 180 DEG.	1
SAKIX80100	KIT STEAM INLET EXTENSION 150	1
SAKV10DTU0	KIT DRAIN TEMP VALVE 1/2 NPT INLET 1 NPT OUTLET 140 DEG F	1
PC-301	DUCT MOUNT DIFF. PRESS SW	1
DPDC111000	DUCT SENSOR TEMP. -10T60GR.C. (OUT RES.NTC) / HUMID. RH 10-90% (OUT 0-1VDC - 4-20MA)	1
DPDC111000	DUCT SENSOR TEMP. -10T60GR.C. (OUT RES.NTC) / HUMID. RH 10-90% (OUT 0-1VDC - 4-20MA)	1
HCTXRC0000	KIT REMOTE TERMINAL PGDX UR4	1

Design Data

Duct Width	68"	Duct Height	50"
Air Flow	5000 CFM	Air Velocity	211.8 FPM
Outside Air	0F @ 10%RH	Outside Air Mix	20%
Entering Distributor	55F @ 75%RH	Leaving Distributor	55F @ 93%RH
Space	70F @ 55%RH	Load	38 lbs/hr

UR020HM1U4 Steam Humidifier Data

Height	35.0"	Width	27.2"
Depth	17.5"	Weight	213.8 lbs
Water Inlet	3/4"G Male	Water Drain	40mm
Steam Outlets	1x40mm	Capacity	44.0 lbs/hr
Voltage	460V 3 Phase	Power	15.10 kW
Outlet Max Pressure	8 in.WC	Drain Tempering	< 140 DegF
Bacnet & Modbus	Integrated		

SHOSE00040 Steam Hose Data

Inside Diameter	40mm
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SABBESI2U0 USAM Manifold Data

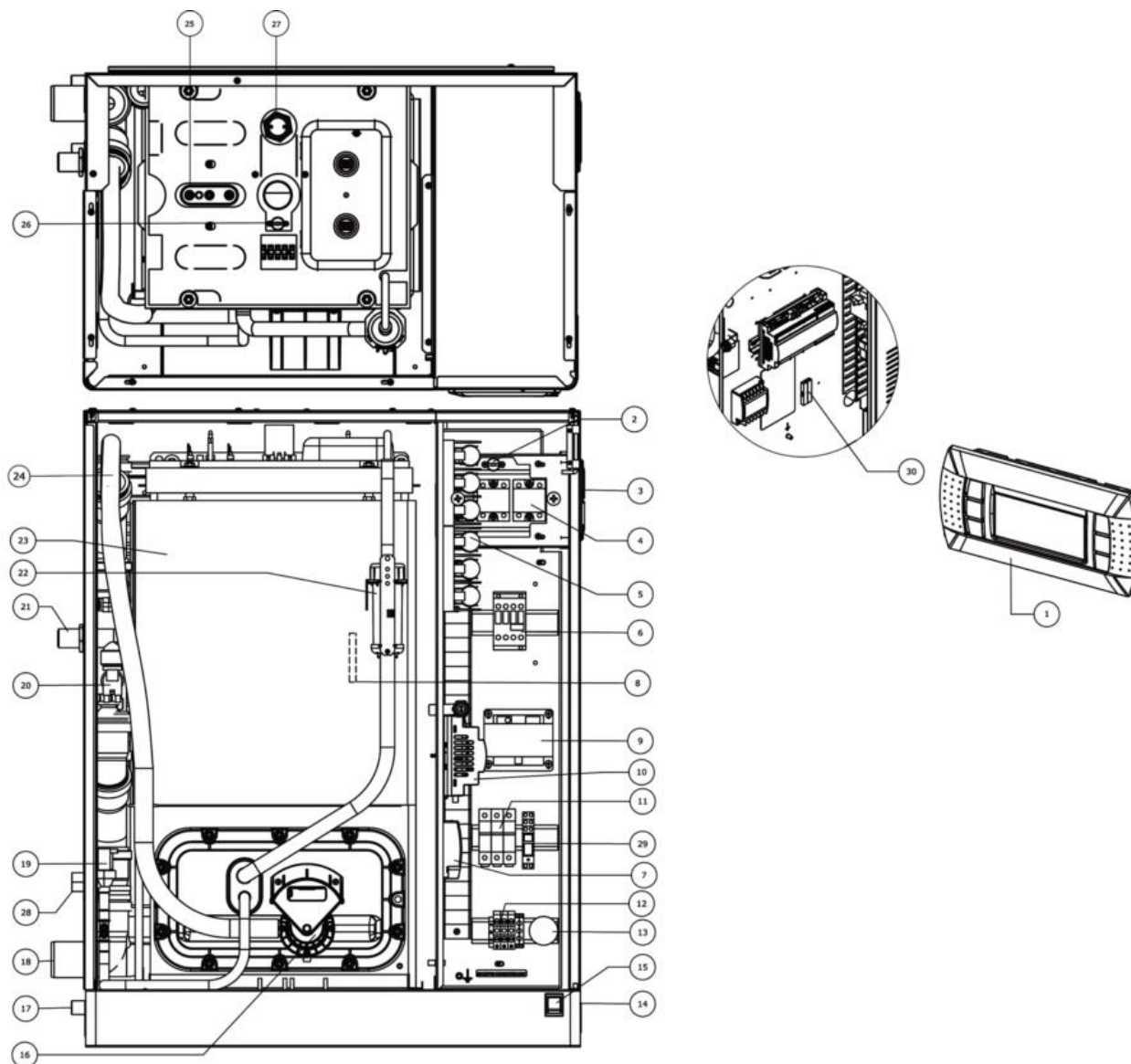
Width	23.75"	Height	47.50"
Uprights	3	Upright O.D.	1.5"
Upright Spacing	6"	Feed	Bottom
Unit Capacity	66 lbs/hr	Steam Loss	7.4%
Absorption Distance	27.3" @ 55F	Back Pressure	0.09 in.WC

SAKIT40100 Inlet Adaptor Data

Back Pressure	0.07 in.WC
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Submittal Data

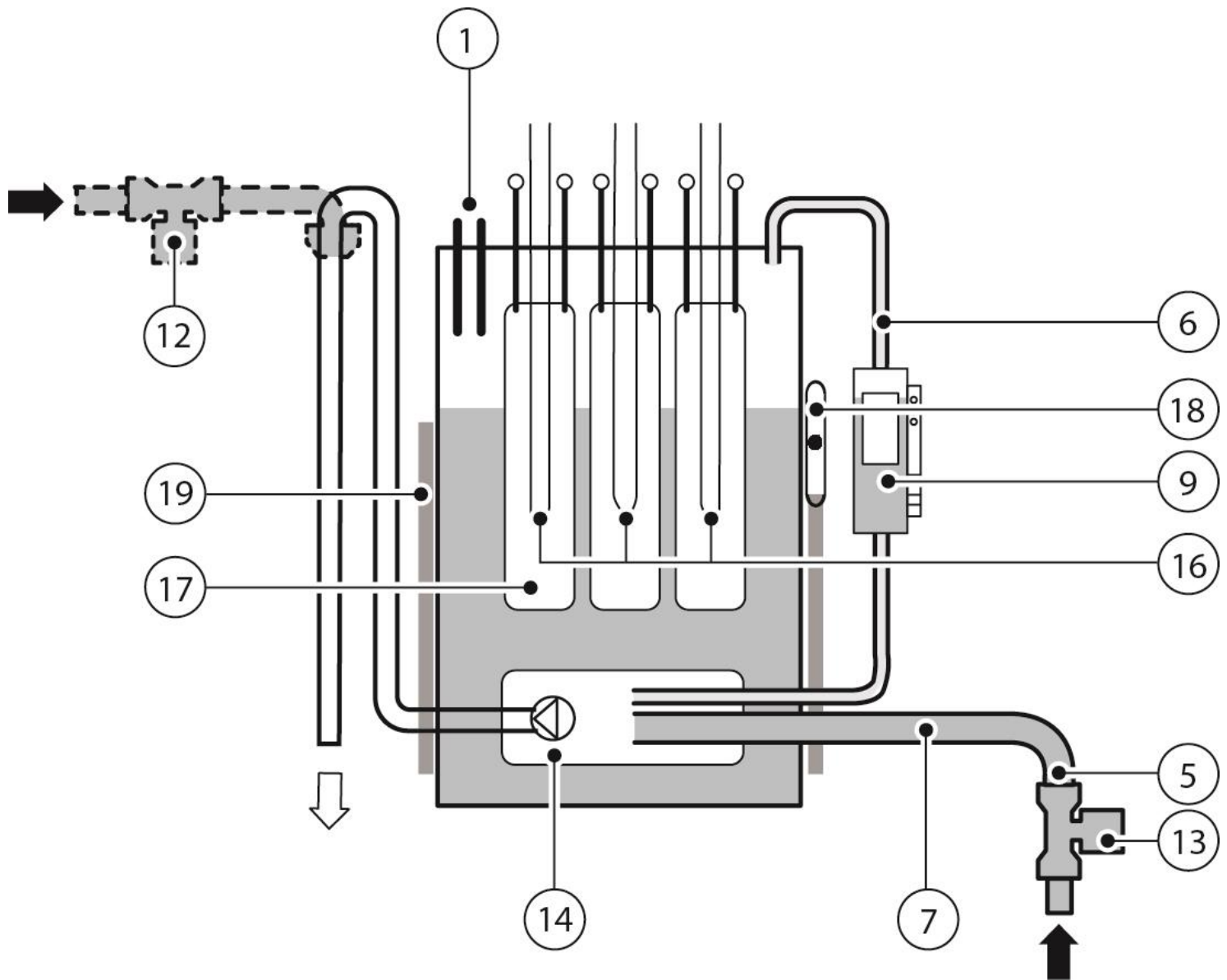
System Components UR020to UR080



1	Display	16	Drain pump
2	SSR thermal protector (Klixon)	17	Drain collection tank (Ø 19 mm)
3	Cooling fan	18	Drain
4	Solid state relay (SSR)	19	Fill valve
5	Heater fuses (where envisaged)	20	Drain tempering valve (where envisaged)
6	Contactor	21	Drain tempering inlet (where envisaged)
7	Motor protector (THP)	22	Level sensor
8	NTC probe socket	23	Boiler
9	Transformer	24	Drain pipe
10	Control board	25	Heater
11	Fuse carrier (F1, F2, F3)	26	Boiler thermal protector (Klixon)
12	Power cable terminal block	27	Foam detection sensor
13	RF interference suppressor (where envisaged)	28	Water fill
14	Power cable inlet	29	Drain pump relay
15	ON/OFF switch	30	X3-X4 (for external drain tempering valve)Europe only

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Hydraulic Components UR020 to UR080

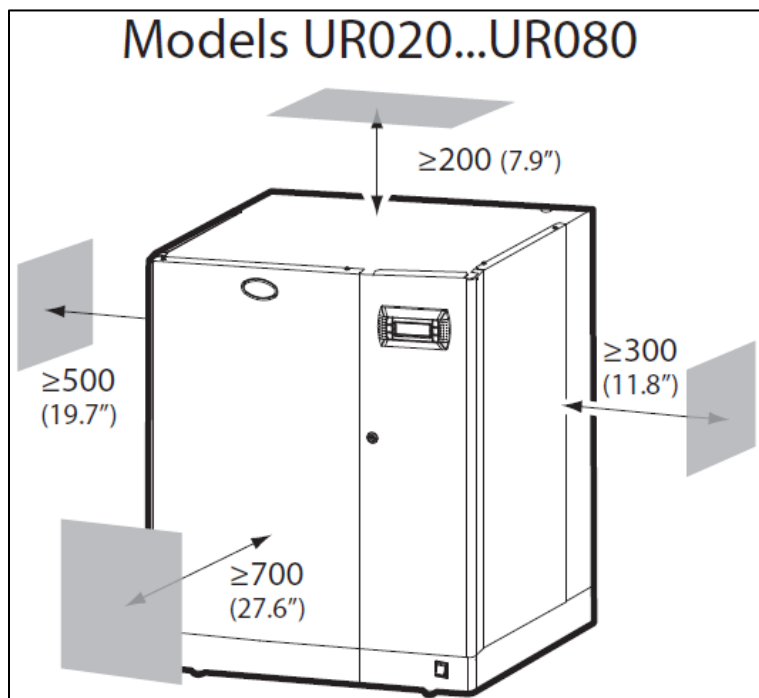


1	Anti-foaming sensor	11	Drain tube tempering
2	Overfill diaphragm	12	Drain valve tempering
3	Fill diaphragm	13	Inlet valve
4	Feed tank	14	Drain pump
5	Electrodes for conductivity measurement	15	Anti-adhesive film
6	Equalizer pipe	16	Over temperature sensors (PTC)
7	Feed pipe	17	Heaters
8	Fill-up pipe	18	Water temperature sensor (NTC)
9	Level sensor	19	Thermal insulation
10	Overflow pipe/drain		

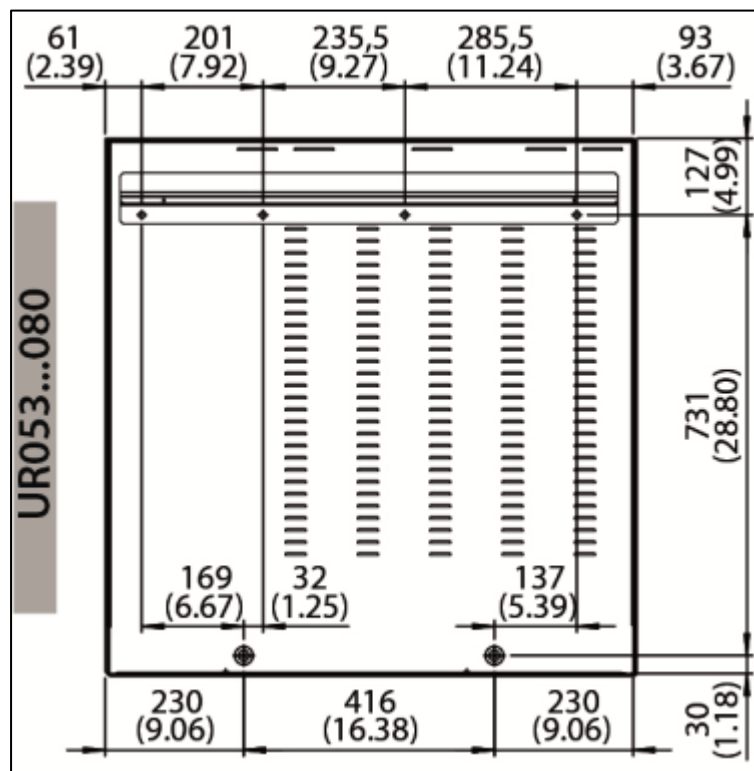
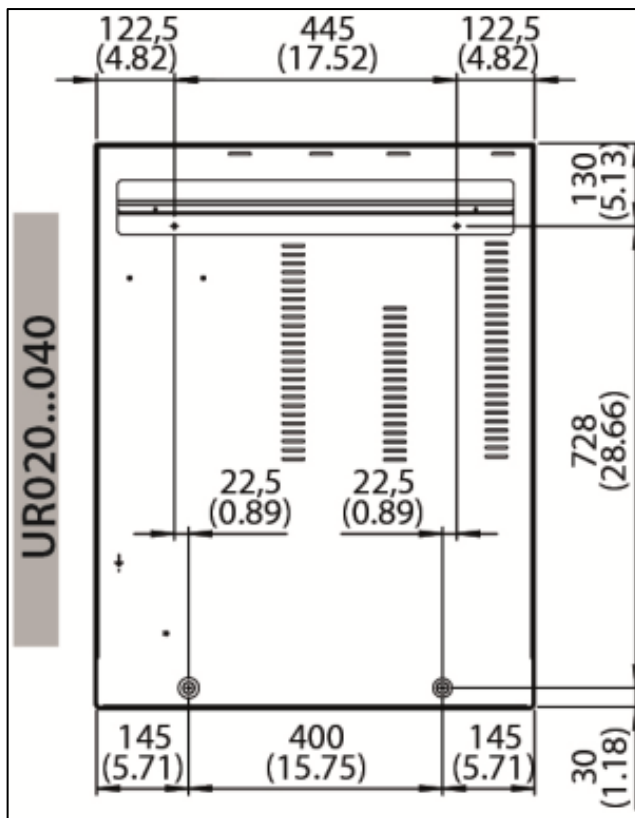
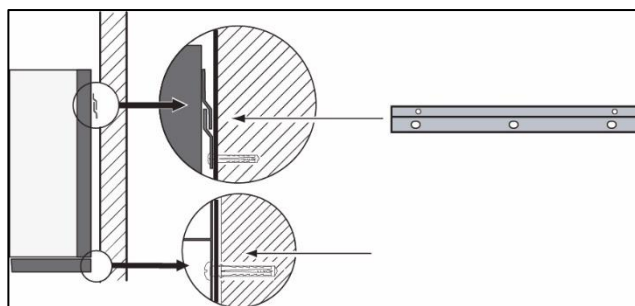
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Mounting UR020 to UR080

Clearances



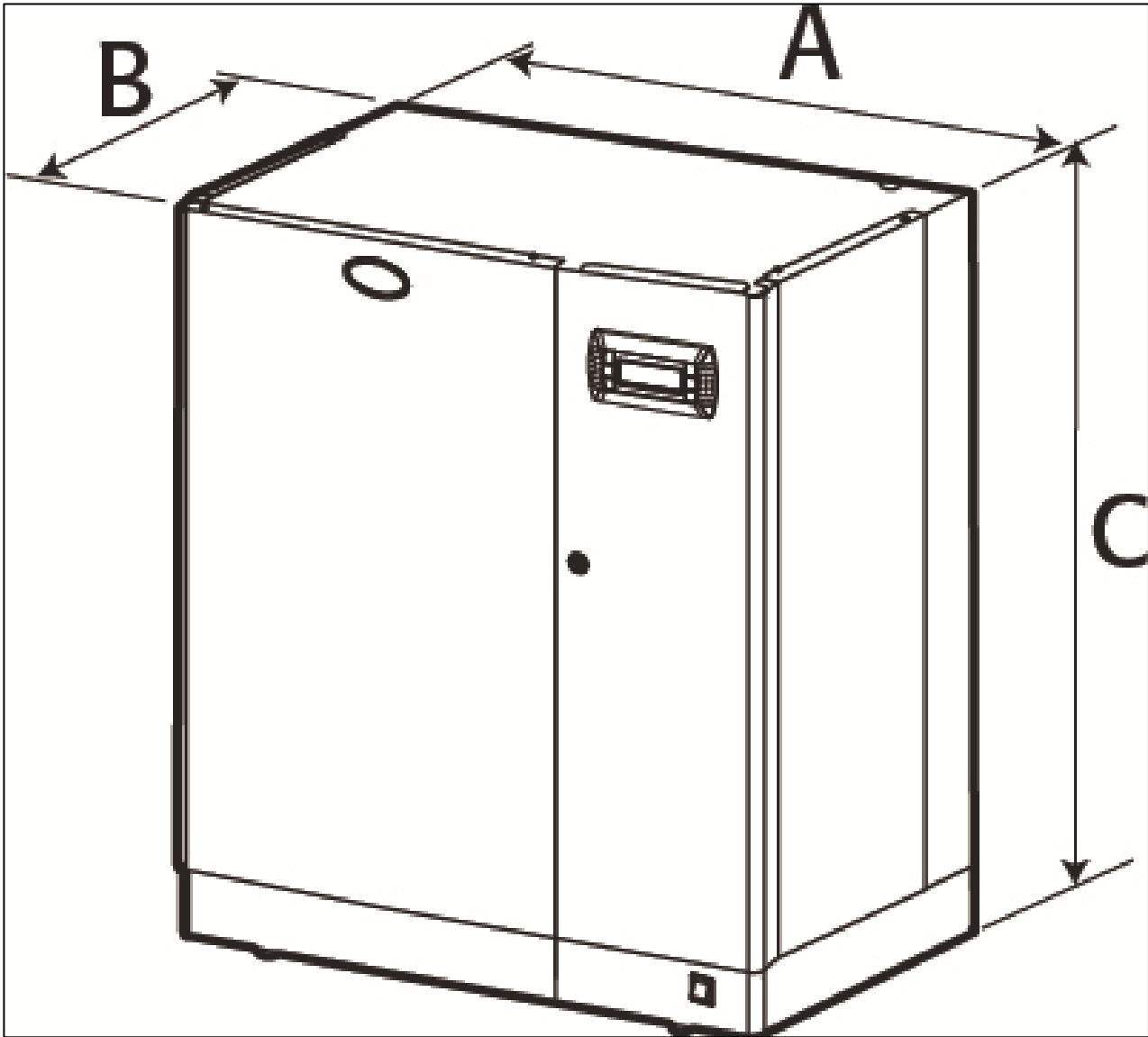
Mounting



		UR020...40	UR053...80
Size			
mm (in)	A	690 (27.16)	876 (34.48)
	B	445 (17.51)	445 (17.51)
	C	888 (34.96)	888 (34.96)
		UR020...40	UR053...80
Weights			
kg (lb)	packaged	73(160.9)	98(216.0)
	empty	63(138.8)	87(191.8)
	installed*	97(213.8)	155(341.7)

Submittal Data

Dimensions, weights



		UR020...40	UR053...80
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mm (in)	A	690 (27.16)	876 (34.48)
	B	445 (17.51)	445 (17.51)
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	empty	63(138.8)	87(191.8)
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Supply water characteristics

The supply water for the electric heater humidifier must not be corrosive, must not emit bad odors, and must not contain too much lime to avoid excessive deposits. The water, supplied from mains of drinking water or demineralized water, must have the following characteristics:

LIMIT VALUES FOR THE HEATER HUMIDIFIER WATER

		Min	Max
Specific conductivity at 20°C /68°FH	σ_{20} - $\mu\text{S}/\text{cm}$	0	1500
Total dissolved solids	TDS – mg/l	-1	-1
Fixed residual at 180°C/ 356°FH	TDS – mg/l	-1	-1
Hydrogen ion activity	pH	6	8.5
Total hardness	TH– mg/l CaCO ₃	0 (2)	400
Temporary hardness	mg/l CaCO ₃	0 (3)	300
Chlorides	ppm Cl	=	50(4)
Iron + Manganese	mg/l Fe+Mn	=	0.2
Silica	mg/l SiO ₂	=	20
Residual Chlorine	mg/l Cl-	=	0.2
Calcium sulphate	mg/l CaSO ₄	=	100
Metallic impurities	mg/l	0	0
Solvents, diluents, detergents, lubricants	mg/l	0	0

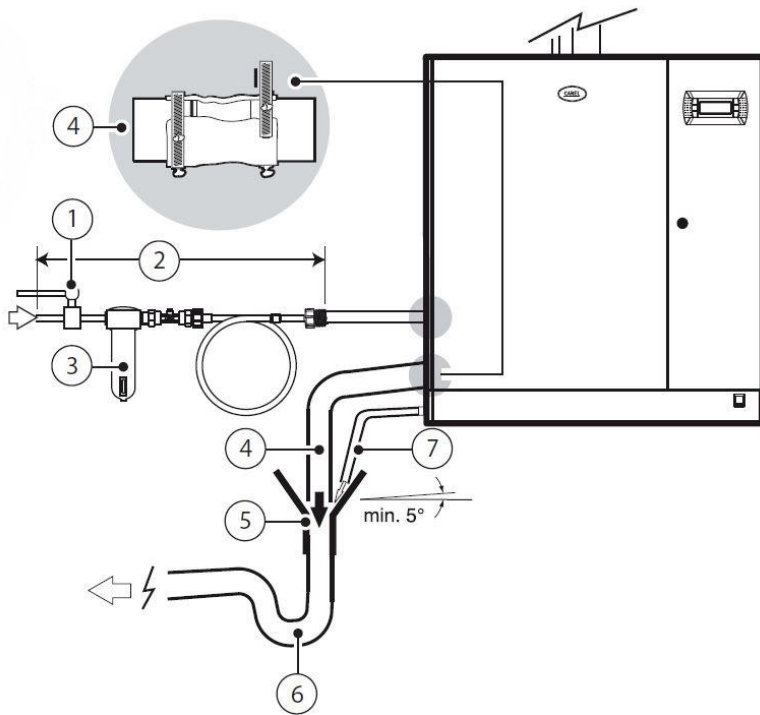
1. Values depending on the specific conductivity; in general: $\text{TDS} \approx 0,93 * \sigma_R, 20^\circ\text{C}$; $\text{R180} \approx 0,65 * \sigma_R, 20^\circ\text{C}$;
2. Not lower than 200% the content of chloride in mg/l Cl- ;
3. Not lower than 300% the content of chloride in mg/l Cl- ;
4. It could be necessary to intervene on the drain rate to avoid a concentration in the boiling water higher than 300 mg/l Cl-;

Important: treating the water with water softeners or polyphosphates dispensers is not allowed; it allows for reduced maintenance but favors the concentration of dissolved salts in the water in the cylinder, and possible operation irregularities due to the formation of foam. Should this be impossible to avoid, it requires dilution with ordinary mains water in such a quantity as to guarantee at least 60% of its initial hardness value, and not less than 5°F. Water treatment with reverse osmosis demineralizers is allowed.

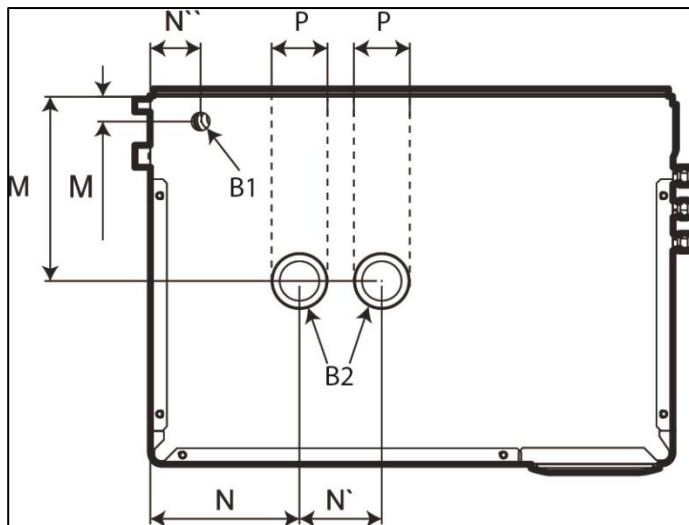
Submittal Data

Hydronic Connections

Models UR020...UR080

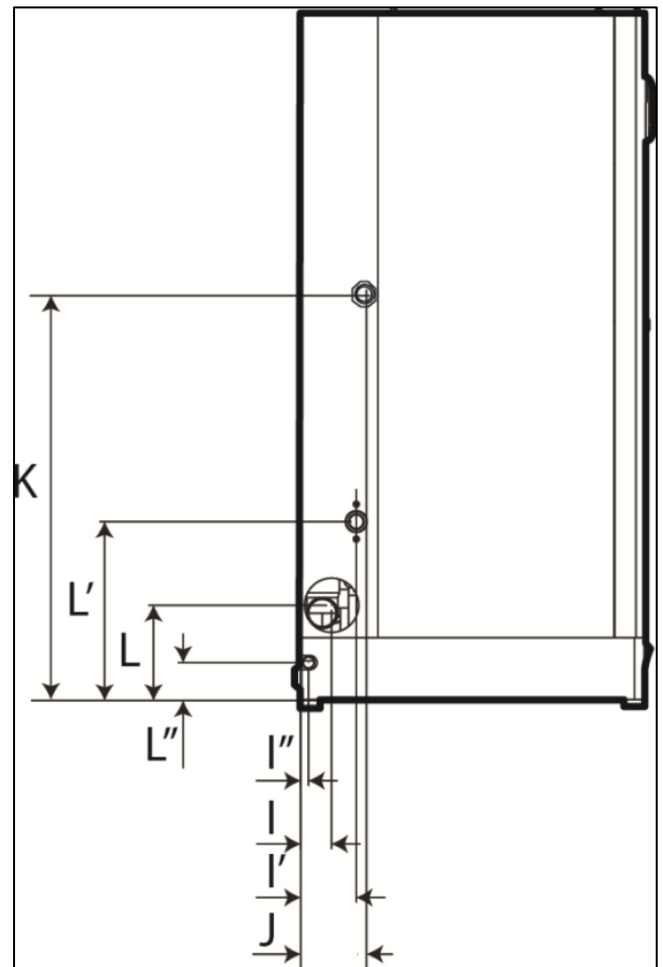


1	Manual valve (1/2" minimum)	Supplied by installer
2	Flexible fill hose (3/4")	Supplied with unit
3	Water filter (minimum 5 micron)	Supplied by installer
4	drain pipe (40mm resistant to temperatures of 100 ° C (212 ° F))	Supplied by installer
5	Open funnel (ensure continuity interruption in the drain piping)	Supplied by installer
6	P-trap (to prevent the return of odors)	Supplied by installer



size mm (in)	Models UR020...UR040	Models UR053-UR080
M	172 (2.0)	172 (6.8)
M'	31 (1.2)	52 (2.0)
N	273 (10.7)	260 (10.2)
N'	---	190 (7.4)
N''	46 (1.8)	52 (2.0)
P	60 (2.4)	60 (2.4)

B1	Set up for steam distributor condensate drain pipe
B2	Steam outlet



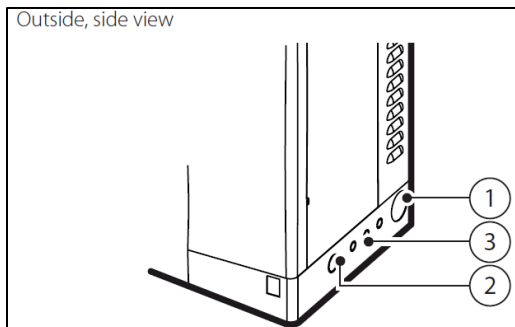
mm (in)			
I	50 (1.96)	L'	230 (9.0)
I'	120 (4.72)	L''	54 (2.1)
I''	20 (0.78)	J	132 (5.2)
L	122 (4.8)	K	571 (22.5)

Water fill	Water fill	Water drain	Water drain
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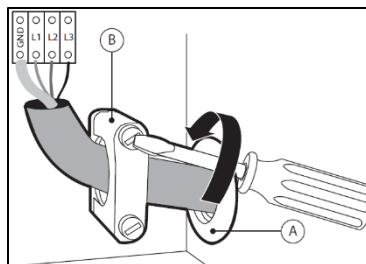
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Power Connections

Outside, side view



Inside View



Key:

1. power supply cable inlet;
2. inlet (after removing the knock-out) for other uses;
3. probe cables inlet (after removing the knock-outs).

Model	Output (2-4) (kg/h) (lbs/hr)	Power (2) (KW)	Code	Voltage (1) (@50/60 Hz)	Elements (n° x W)	Type of connection	Current (A)	Cable sect (3) (mm2)	Fuse-line (A/type)
UR020	20.0 (44)	16.2	W	208	3 x 5407	Δ	3 x 45.0	16	60 / rapid
	20.0 (44)	15.1	K	230	3 x 5038	Δ	3 x 37.9	16	60 / rapid
	20.0 (44)	15.2	L	400	3 x 5079	Y	3 x 22.0	6	32 / rapid
	20.0 (44)	15.1	M	460	3 x 5022	Y	3 x 18.9	6	25 / rapid
	20.0 (44)	15	N	575	3 x 5008	Y	3 x 15.1	6	20 / rapid
UR027	27.0 (59.5)	19.8	K	230	3 x 6612	Δ	3 x 49.8	16	60 / rapid
	27.0 (59.5)	20	L	400	3 x 6666	Y	3 x 28.9	10	50 / rapid
	27.0 (59.5)	20.2	M	460	3 x 6717	Y	3 x 25.3	6	32 / rapid
	27.0 (59.5)	19.8	N	575	3 x 6599	Y	3 x 19.9	6	25 / rapid
UR040	40.0 (88)	30.5	L	400	6 x 5079	Y	3 x 44.0	16	50 / rapid
	40.0 (88)	30.1	M	460	6 x 5022	Y	3 x 37.8	16	50 / rapid
	40.0 (88)	30	N	575	6 x 5008	Y	3 x 30.2	10	50 / rapid
UR053	53.0 (117)	40	L	400	6 x 6666	Y	3 x 57.7	25	80 / rapid
	53.0 (117)	40.3	M	460	6 x 6717	Y	3 x 50.6	16	60 / rapid
	53.0 (117)	39.6	N	575	6 x 6599	Y	3 x 39.8	16	60 / rapid
UR060	60.0 (132)	45.7	L	400	9 x 5079	Y	3 x 66	25	80 / rapid
	60.0 (132)	45.2	M	460	9 x 5022	Y	3 x 56.7	25	80 / rapid
	60.0 (132)	45.1	N	575	9 x 5008	Y	3 x 45.3	16	50 / rapid
UR080	80.0 (176)	60	L	400	9 x 6666	Y	3 x 86.6	50	125 / rapid
	80.0 (176)	60.5	M	460	9 x 6717	Y	3 x 75.9	35	100 / rapid
	80.0 (176)	59.4	N	575	9 x 6599	Y	3 x 59.6	25	80 / rapid

- (1) tolerance allowed on rated mains voltage: -15%, +10%; (2) tolerance on rated values: +5%, -10% (EN 60335-1); (3) when sizing the power cables, always refer to local regulations in force. The humidifier's power line must feature a disconnect switch and fuse protecting against short-circuits, to be fitted by the installer; (4) instant max nominal steam output: the average steam production may be influenced by external factors such as: room temperature, water quality, steam distribution system; (5) please refer to the wiring diagrams

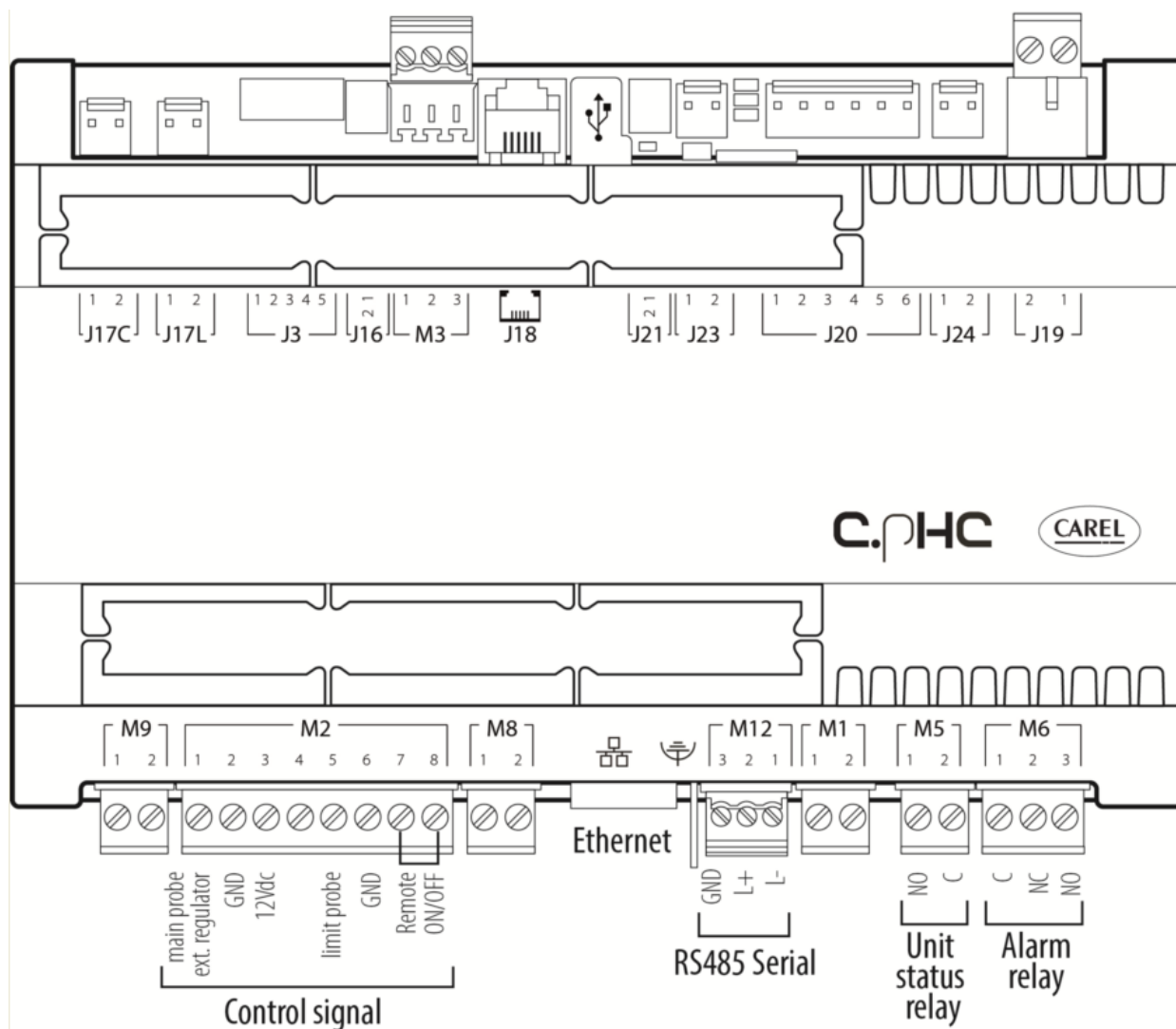
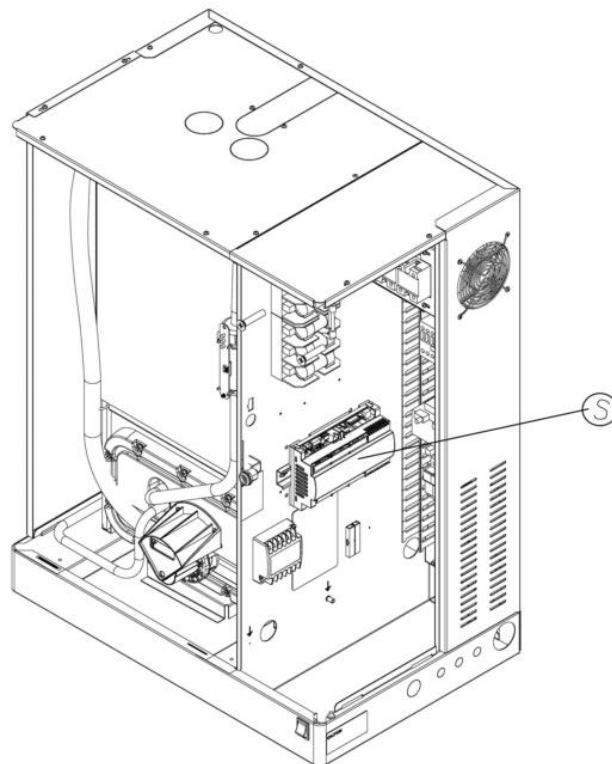
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Controller

The control board (S) is inside of the electrical panel in the dividing wall.

The auxiliary connections (probes, remote terminal, and alarm) are made by inserting the cables form the outside into the electrical panel.

To do this, use cables gland located on the base of the unit to the base of the unit to the pin-in screw terminals on the control board.



Submittal Data

Controller Specifications

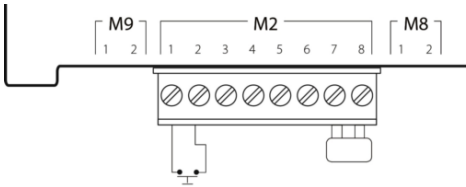
Terminal		Function	Electrical specifications
M1	M1.1	GND (G0)	
	M1.2	Controller power supply	24Vac +10%/-15% 50/60Hz
M2	M2.1	Main room probe signal input or signal from external controller	0/1V, 0/10V, 2/10V, 0/20mA, 4/20mA, NTC 10 kΩ a 25 °C
	M2.2	GND	
			+12 Vdc, maximum current that can be delivered 50 mA; Protection against short-circuits
	M2.3	Probe power supply (+G)	
	M2.4	Digital input for backup/rotation function	Maximum current output: 5 mA; Maximum voltage with contact open: 13 Vdc
	M2.5	Limit humidity probe signal input	0/1V, 0/10V, 2/10V, 0/20mA, 4/20mA, NTC
	M2.6	GND	
	M2.7	GND	
	M2.8	Remote on/off contact digital input	Maximum current output: 5 mA; Maximum voltage with contact open: 13 Vdc
M3	M3.1	Fieldbus	Tx/Rx-
	M3.2		Tx/Rx+
	M3.3		GND
M5 common	M5.1	Unit status contact (NO)	250 Vac; 2 A with resistive load; 2 A with inductive load
	M5.2	Unit status contact	
M6	M6.1	Alarm common	250 Vac; 2 A with resistive load; 2 A with inductive load
	M6.2	NC alarm contact	
	M6.3	NO alarm contact	
M8	M8.1	Production request analogue output	Output voltage range: 0-10 V max 10 mA
	M8.2	GND	
M9	M9.1	Backup and rotation contact common	250 Vac; 2 A with resistive load; 2 A with inductive load
	M9.2	Backup and rotation NO contact	
M11		Ethernet port	
M12	M12.1	BMS 485	Tx/Rx-
	M12.2		Tx/Rx+
	M12.3		GND
		Earth connection	
J18		pLAN/display terminal	
J19	J19.1	Auxiliary/blower contact (NO)	250 Vac; 2 A with resistive load; 2 A with inductive load
	J19.2	Auxiliary/blower contact common	
		USB Port (type A)	
		Ethernet RJ45 Port	

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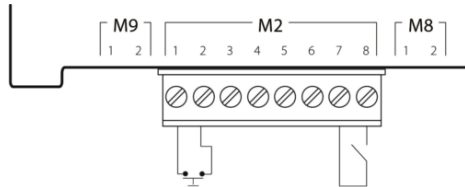
Control Connections

Below are some configurations of controls connections.

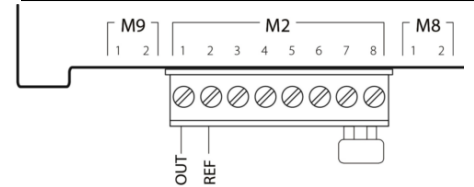
HUMIDISTAT (ON/OFF operation)



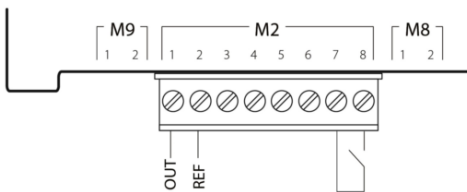
HUMIDISTAT and REMOTE CONTACT (ON/OFF operation)



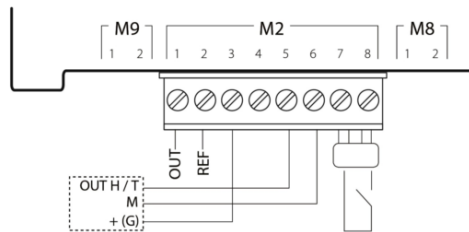
EXTERNAL PROPORTIONAL CONTROLLER (modulating operation)



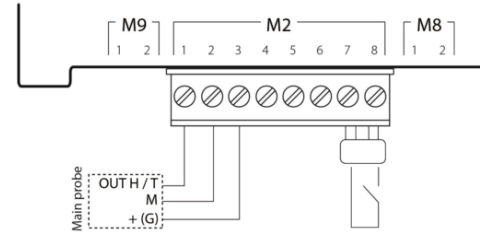
EXTERNAL PROPORTIONAL CONTROLLER and REMOTE CONTACT (modulating operation)



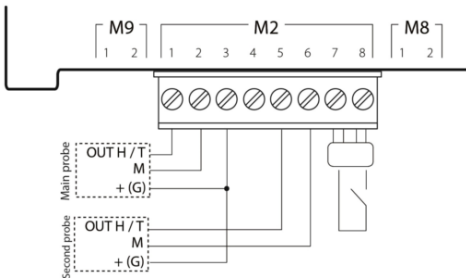
EXTERNAL PROPORTIONAL CONTROLLER and REMOTE CONTACT (modulating operation) with LIMIT PROBE



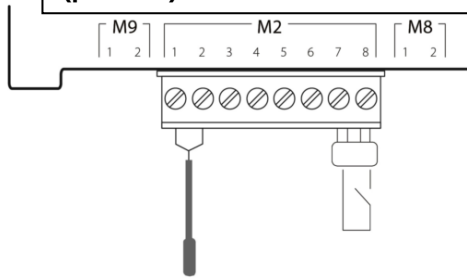
CONTROL WITH ONE HUMIDITY PROBE



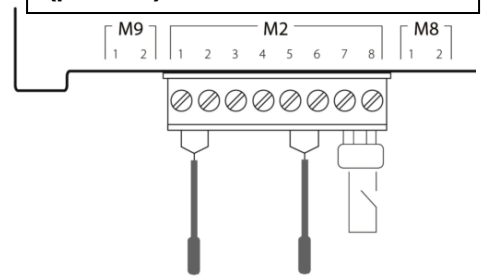
CONTROL WITH ONE HUMIDITY PROBE AND LIMIT PROBE



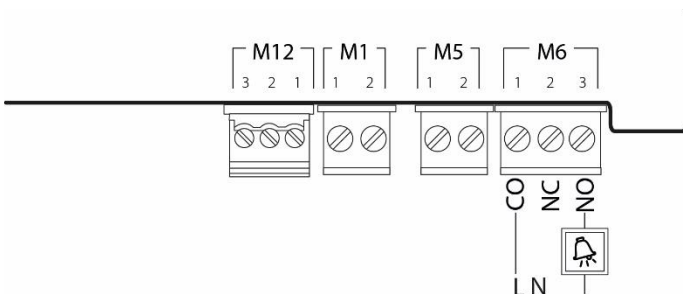
CONTROL WITH ONE NTC TEMPERATURE PROBE (passive)



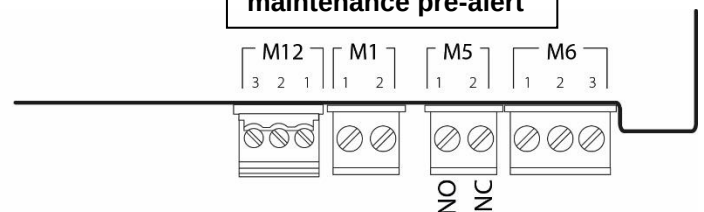
CONTROL WITH TWO NTC TEMPERATURE PROBES (passive)



Alarm contact



Unit status contact / maintenance pre-alert

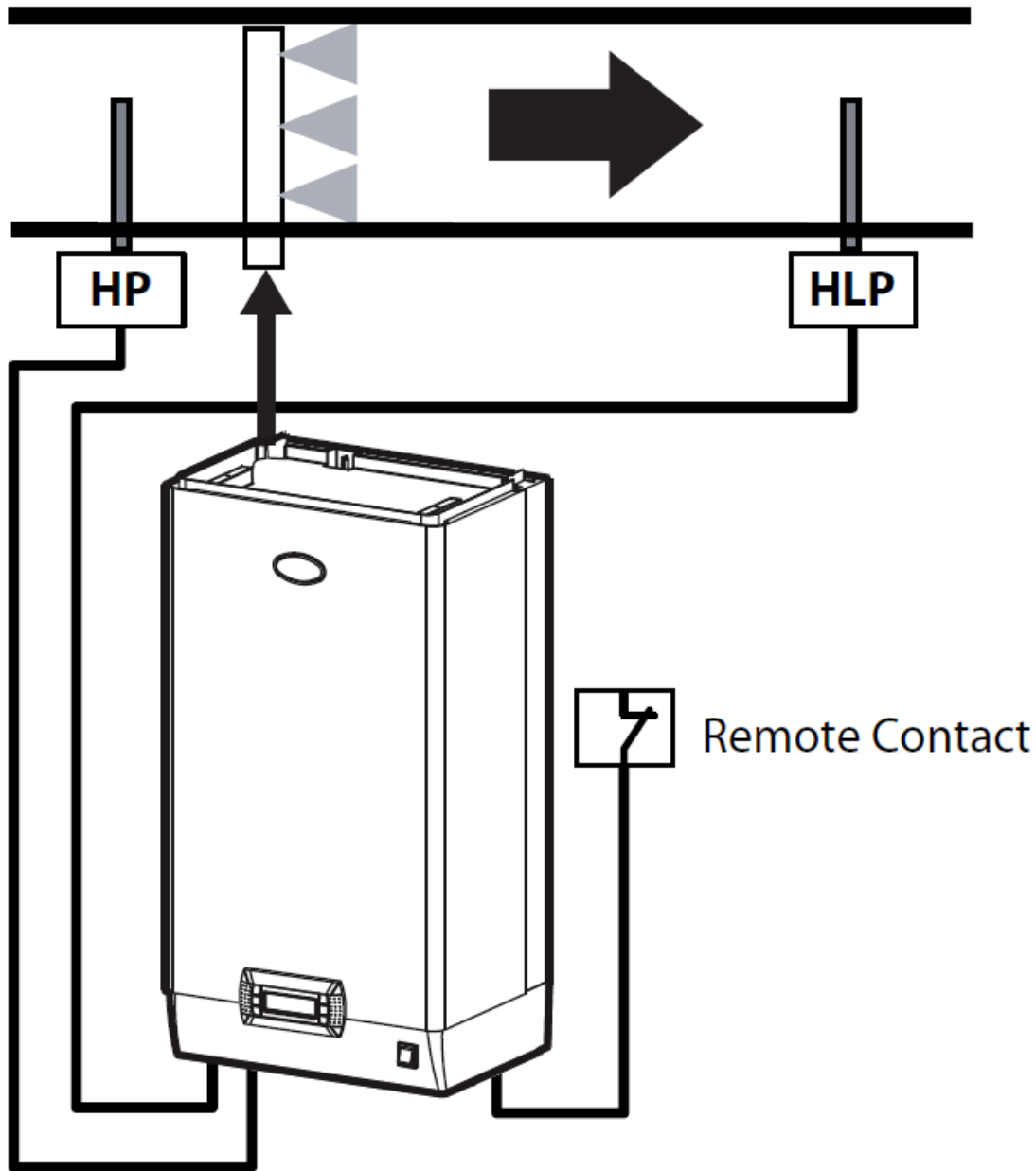


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Control location

Control with humidity probes

The main control board, connected to an environment humidity control probe, adjusts the steam production according to the humidity measured. You can connect a second humidity probe on the outlet: in this configuration, typical of air treatment plants, the main control board continues to adjust the steam production according to humidity, which depends however on the value of the relative humidity measured in the outlet pipe.



Key:

HP	Environment humidity regulating probe (intake/environment humidity probe)
HLP	Humidity limit probe (outlet humidity probe)
Remote Contact	Remote contact

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Control Wiring

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.

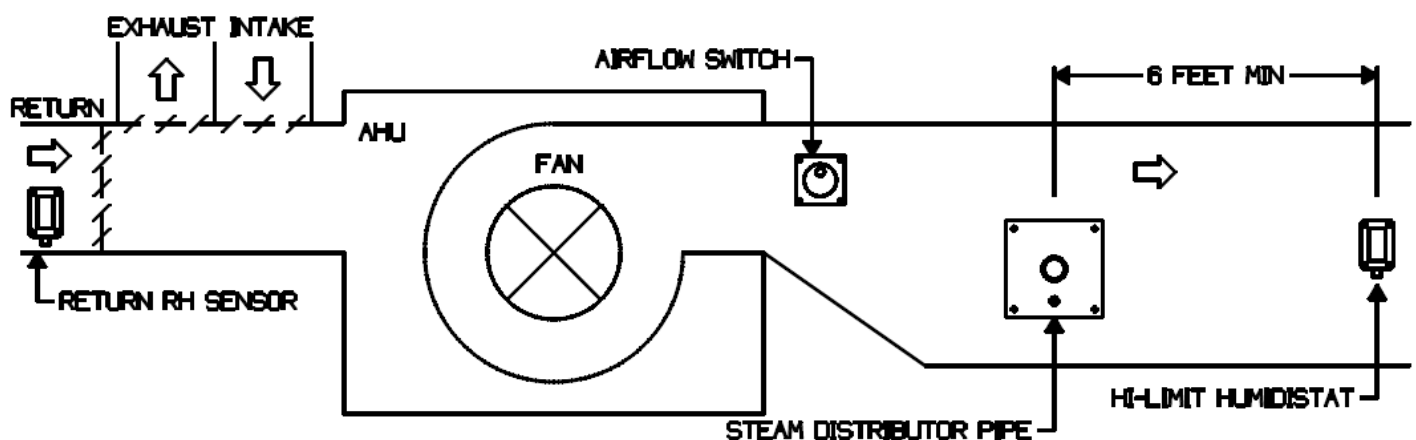
Controls Placement

(see following diagram)

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 airflow, 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 over humidification of the duct that could result in condensation.



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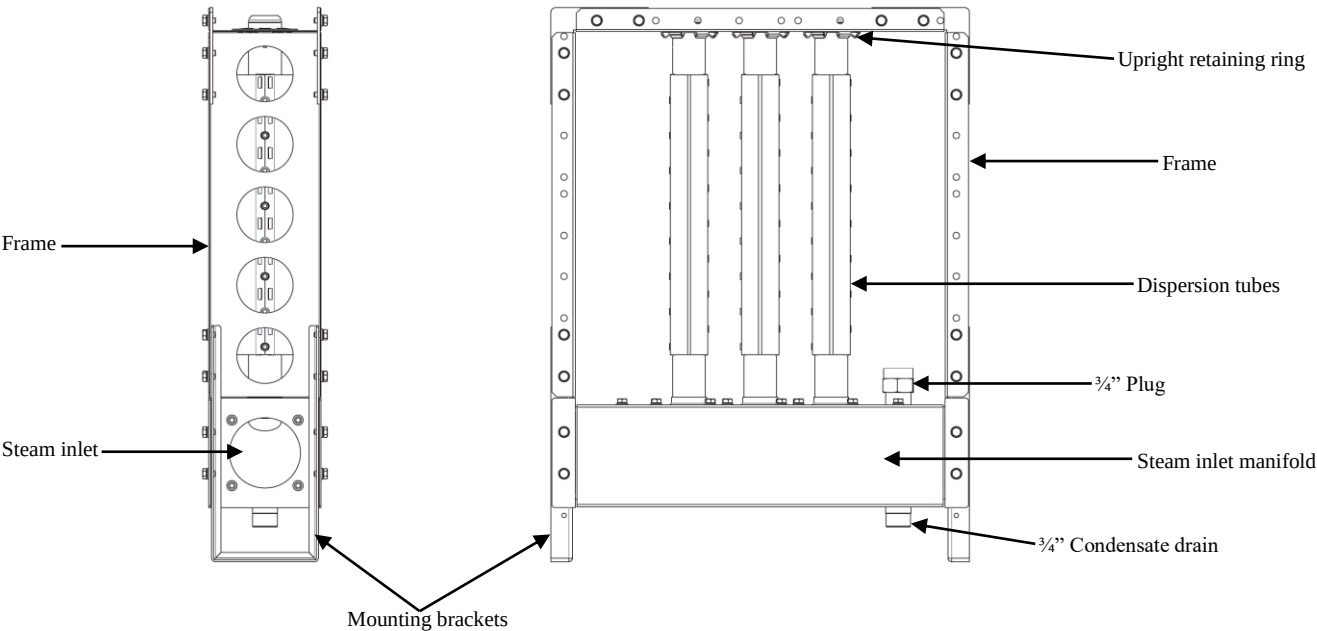
Technical features	MODEL						
	UR020	UR027	UR040	UR053	UR060	UR080	
Number of heaters	6	6	6	6	9	9	
Steam							
Connection Ø mm (in)	40 (1.6)			2 x 40 (2x1.6)			
delivery pressure limits Pa (PSI)	0...2000 (0...0.290)						
Supply water							
connection	3/4" G						
temperature limits °C (°F)	1...40 (33.8...104)						
pressure limits (MPa)	0.1...0.8 (1...8 bar)						
hardness limits (°fH)	≤ 40						
instant flow rate (l/min - Gallon/min)	4	4	4	10	10	10	10
Drain water							
Connection Ø mm (in)	50 (2)						
typical temperature °C (°F)	≤100 (212)	Tempered water (all North America models)				60 (140)	
instant flow rate (l/min - Gallon/min)	17.5 (50 Hz) - 24.3 (60 Hz) (4.6 - 6.4)						
drain tempering instant flow rate (l/min - Gallon/min)	54,3 (60Hz) (14.3)						
Environmental conditions							
room operating temperature °C (°F)	1...40 (33.9...104)						
room operating humidity (% rH)	10...60						
storage temperature °C (°F)	-10...70 (33.8...158)						
storage humidity (% rH)	5...95						
protection rating	IP20						
System							
type	c.pHC						
voltage / auxiliary frequency (V / Hz)	24 / 50/60						
maximum auxiliary power (VA)	90						
probe inputs (general characteristics)	selectable input signal: 0...1 Vdc, 0...10 Vdc, 2...10 Vdc, 0...20 mA, 4...20 mA						
	input impedance: 60 kΩ with signals: 0...1 Vdc, 0...10 Vdc, 2...10 Vdc						
	50 Ω with signals: 0...20 mA, 4...20 mA						
power supply for active probes (general features)	24 Vdc (24 Vac rectified), I _{max} = 250 mA						
	12 Vdc 5%, I _{max} = 50 mA						
alarm relay outputs (general features)	250 V 2 A (2 A)						
	type of micro-switching action 1C						
remote enabling input (general characteristics)	dry contact; max resistance 50 Ω; V _{max} =24 Vdc; I _{max} =5 mA						
serial communication	three-lead RS485 / Fieldbus / BMS						
USB port	USB type A						
Ethernet port	Ethernet						

Product Documentation for: SAB USAM_Submittal

Submittal Data

Description Of The Components

SAB (Bottom feed unit)



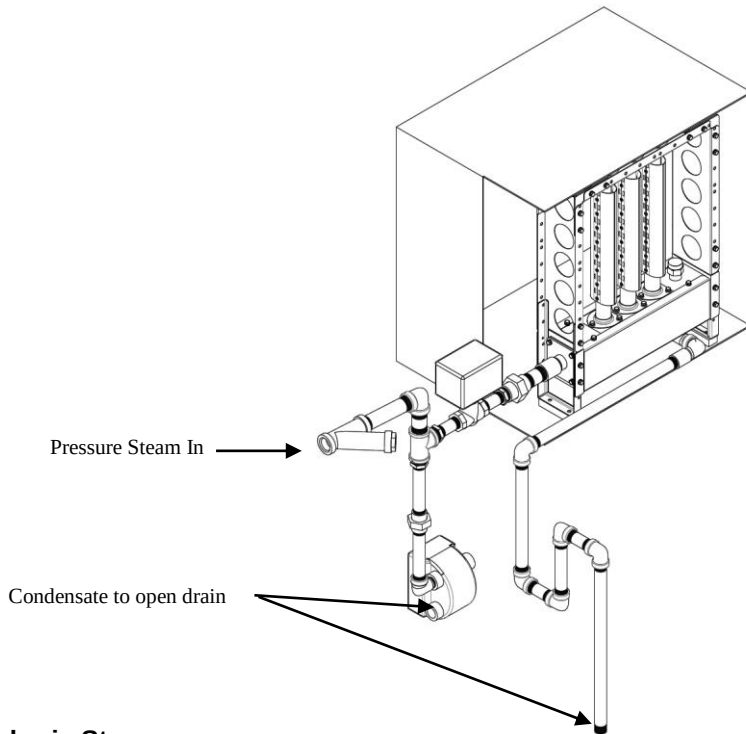
Submittal Data

How it works

Operationally, the ultimateSAM Humidification System discharges steam into the duct or air handler. The method by which the steam discharge is controlled depends upon whether the steam comes from a pressurized source or an atmospheric source.

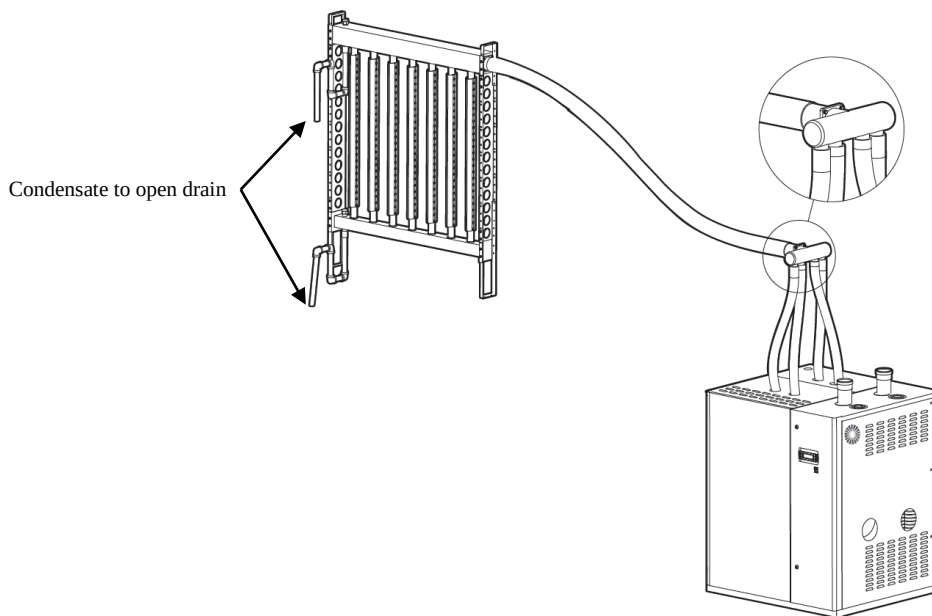
Pressurized Steam

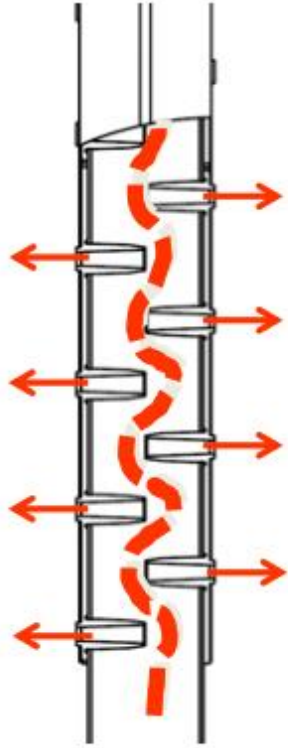
For pressurized steam supplies, the steam flow rate is controlled by the valve/actuator. The control valve opens or closes in response to a control signal that is sent to the actuator. Both electronic and pneumatic actuators are configured so that there is a linear relationship between the steam flow rate and the control signal



Atmospheric Steam

For atmospheric steam supplies, the flow rate is controlled by the rate at which the humidifier produces steam. All of the steam generated by the humidifier is discharged by the ultimateSAM distributor into the duct or AHU. The control signal for the actuator or atmospheric humidifier is either generated by a humidistat or a humidity sensor and controller. The controller can be either stand-alone or part of a Building Automation System.





Anti-condensation nozzles

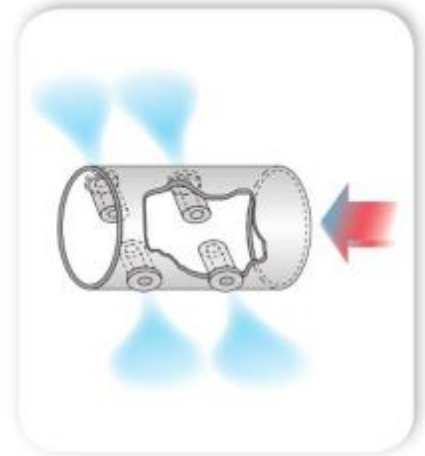
To achieve a very short absorption distance and ensure only dry steam is delivered into the AHU/duct, the uprights and pipes (AISI 304) have nozzles (Ryton - PPS) that take steam from the inside of the pipe, away from the wall where condensate may form.

Pipe insulation

The uprights and pipes can be ordered with air-cushion insulation. An AISI 304 steel structure isolates the steam pipe from direct contact with the air in the AHU/duct, thus achieving a 30% reduction in condensate formation.

Condensate separator manifold for SA0* single pipe models

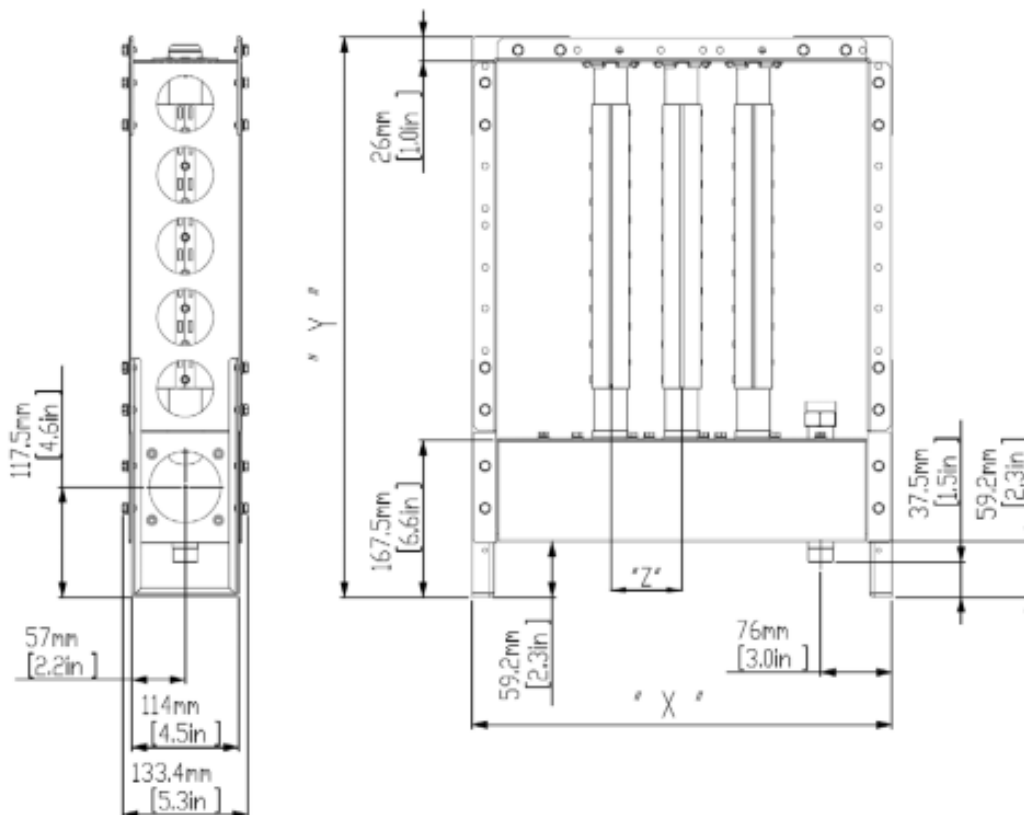
On single pipe versions the manifold also acts as a condensate separator. The lower ensures that the steam follows a specific path, separate from any condensate, which is drained through the discharge terminal. Only dry steam enters the distribution pipes.



TECHNICAL DOCUMENT

BOTTOM FED MANIFOLD GENERIC DIMENSIONS

CODE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
mm	447	599	751	903	1055	1207	1359	1511	1663	1815	1967	2119	2271	2423	2575	2727	2879	3031
(in)	(17.75)	(23.75)	(29.75)	(35.75)	(41.75)	(47.75)	(53.75)	(59.50)	(65.50)	(71.50)	(77.50)	(83.50)	(89.50)	(95.50)	(101.50)	(107.50)	(113.50)	(119.50)
mm	598	750	902	1054	1206	1358	1510	1662	1814	1966	2118	2270	2422	2574	2726	2878	3030	
(in)	(23.75)	(29.75)	(35.75)	(41.75)	(47.50)	(53.50)	(59.50)	(65.50)	(71.50)	(77.50)	(83.50)	(89.50)	(95.50)	(101.50)	(107.50)	(113.50)	(119.50)	
# OF UPRIGHTS																		
"Z"	2 / 3	3 / 5	4 / 7	5 / 9	6 / 11	7 / 13	8 / 15	9 / 17	10 / 19	11 / 21	12 / 23	13 / 25	14 / 27	15 / 29	16 / 31	17 / 33	18 / 35	19 / 37



- NOTES:

- "X" dimension refers to the humidifiers width
- "Y" dimension refers to the humidifiers Height
- "Z" dimension refers to Spacing and number of Uprights
- Inch dimensions shown are rounded up to next 1/4" increment

- **Manifold code example: SABDE*******

-SA = Short Absorption

-B = Bottom Fed

-D = 35.75 width

-E = 41.75 Height

-CONSULT SUBMITTAL DOCUMENT GENERATED FOR SPECIFIC MANIFOLD CHARACTERISTICS



Description:
BOTTOM FEED MANIFOLD - SAB DIMENSIONS

Document Code:

TD SA 1001

Date:
15-OCT-2018

Rev:

3

Part No:
SAB*****

Page

1/1

Submittal Data

Weights

Weight in kg (lb) Bottom-feed, "S" Upright configuration (SAB**S****)

Ht. Co de	Width Code														
	A	B	C	D	E	F	G	H	I	J	N	O	P	Q	R
A	7.5 (17)	8.5 (18)	9.0 (20)	9.5 (21)	10.0 (22)	11.0 (24)	11.5 (25)	12.0 (27)	12.5 (28)	13.5 (29)	16.0 (35)	16.5 (36)	17.0 (37)	17.5 (39)	18.5 (40)
B	8.5 (19)	9.5 (21)	10.5 (23)	11.0 (25)	12.0 (26)	13.0 (28)	14.0 (30)	14.5 (32)	15.5 (34)	16.5 (36)	20.0 (44)	21.0 (46)	21.5 (48)	22.5 (50)	23.5 (51)
C	9.5 (21)	10.5 (23)	11.5 (26)	12.5 (28)	14.0 (31)	15.0 (33)	16.0 (35)	17.5 (38)	18.5 (40)	19.5 (43)	24.0 (53)	25.0 (55)	26.5 (58)	27.5 (60)	28.5 (63)
D	10.0 (22)	11.5 (25)	13.0 (28)	14.5 (32)	15.5 (35)	17.0 (38)	18.5 (41)	20.0 (44)	21.0 (47)	22.5 (50)	28.0 (62)	29.5 (65)	31.0 (68)	32.5 (71)	33.5 (74)
E	11.0 (24)	12.5 (28)	14.5 (31)	16.0 (35)	17.5 (39)	19.0 (42)	21.0 (46)	22.5 (49)	24.0 (53)	25.5 (57)	32.5 (71)	34.0 (75)	35.5 (78)	37.0 (82)	39.0 (85)
F	12.0 (26)	13.5 (30)	15.5 (34)	17.5 (38)	19.5 (43)	21.5 (47)	23.0 (51)	25.0 (55)	27.0 (59)	29.0 (63)	36.5 (80)	38.5 (84)	40.0 (88)	42.0 (92)	44.0 (97)
G	12.5 (28)	15.0 (33)	17.0 (37)	19.0 (42)	21.0 (47)	23.5 (51)	25.5 (56)	27.5 (61)	30.0 (66)	32.0 (70)	40.5 (89)	42.5 (94)	45.0 (99)	47.0 (103)	49.0 (108)
H	13.5 (30)	16.0 (35)	18.5 (40)	20.5 (45)	23.0 (51)	25.5 (56)	28.0 (61)	30.0 (67)	32.5 (72)	35.0 (77)	44.5 (98)	47.0 (103)	49.5 (109)	52.0 (114)	54.0 (119)
I	14.5 (31)	17.0 (37)	19.5 (43)	22.0 (49)	25.0 (55)	27.5 (61)	30.0 (66)	33.0 (72)	35.5 (78)	38.0 (84)	48.5 (107)	51.5 (113)	54.0 (119)	56.5 (125)	59.5 (131)
J	15.0 (33)	18.0 (40)	21.0 (46)	24.0 (52)	26.5 (59)	29.5 (65)	32.5 (72)	35.5 (78)	38.5 (84)	41.0 (91)	53.0 (116)	55.5 (123)	58.5 (129)	61.5 (135)	64.5 (142)
K	16.0 (35)	19.0 (42)	22.0 (49)	25.5 (56)	28.5 (63)	31.5 (70)	35.0 (77)	38.0 (84)	41.0 (91)	44.5 (98)	57.0 (125)	60.0 (132)	63.5 (139)	66.5 (146)	69.5 (153)
L	16.5 (37)	20.0 (44)	23.5 (52)	27.0 (59)	30.5 (67)	34.0 (74)	37.0 (82)	40.5 (89)	44.0 (97)	47.5 (104)	61.0 (134)	64.5 (142)	68.0 (149)	71.5 (157)	74.5 (164)
M	17.5 (39)	21.0 (47)	25.0 (55)	28.5 (63)	32.0 (71)	36.0 (79)	39.5 (87)	43.0 (95)	47.0 (103)	50.5 (111)	65.0 (143)	69.0 (151)	72.5 (160)	76.0 (168)	80.0 (176)
N	18.5 (40)	22.5 (49)	26.0 (58)	30.0 (66)	34.0 (75)	38.0 (84)	42.0 (92)	46.0 (101)	49.5 (109)	53.5 (118)	69.5 (152)	73.0 (161)	77.0 (170)	81.0 (178)	85.0 (187)
O	19.0 (42)	23.5 (51)	27.5 (61)	31.5 (70)	36.0 (79)	40.0 (88)	44.0 (97)	48.5 (106)	52.5 (116)	56.5 (125)	73.5 (162)	77.5 (171)	82.0 (180)	86.0 (189)	90.0 (198)
P	20.0 (44)	24.5 (54)	29.0 (64)	33.5 (73)	37.5 (83)	42.0 (93)	46.5 (102)	51.0 (112)	55.5 (122)	60.0 (132)	77.5 (171)	82.0 (180)	86.5 (190)	91.0 (200)	95.0 (210)
Q	21.0 (46)	25.5 (56)	30.0 (66)	35.0 (77)	39.5 (87)	44.0 (97)	49.0 (108)	53.5 (118)	58.5 (128)	63.0 (139)	81.5 (180)	86.5 (190)	91.0 (200)	95.5 (211)	100.5 (221)

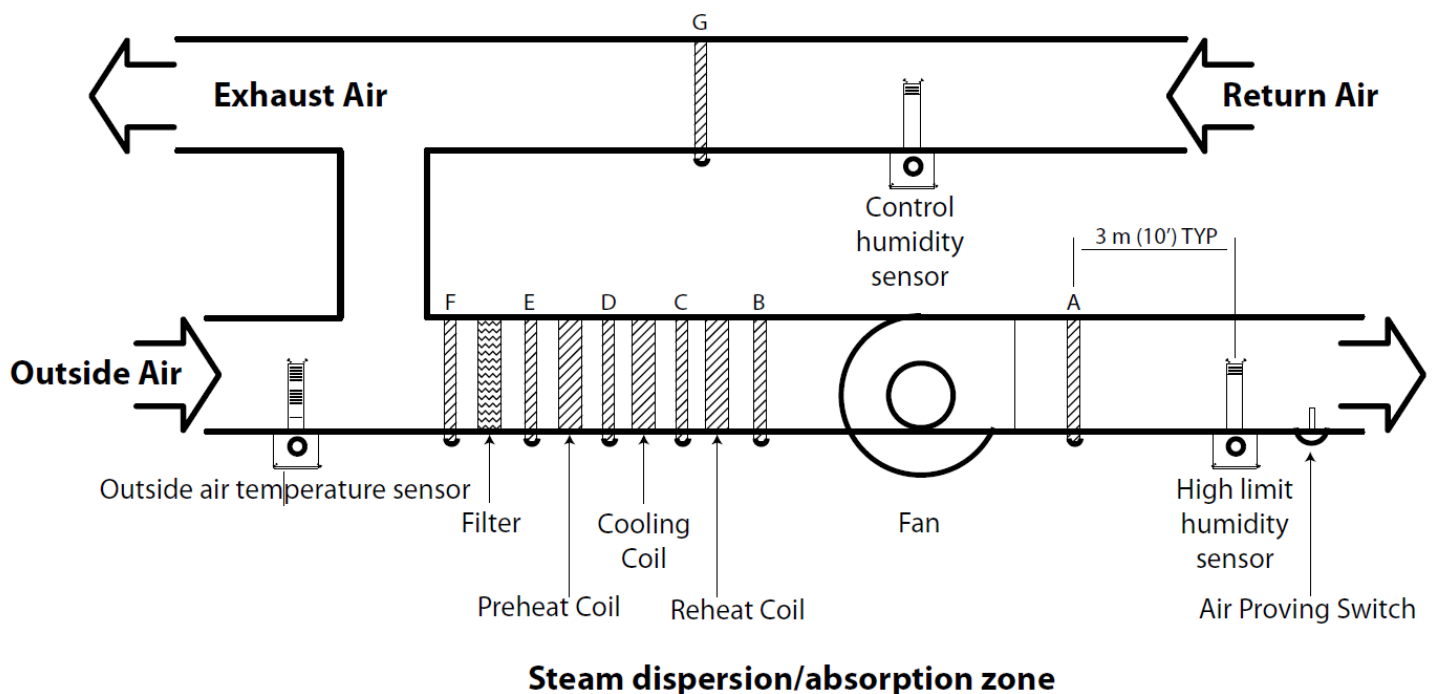
Submittal Data

Positioning

Properly locating the ultimateSAM Direct Steam Humidification System and its controls in your air handler or duct is very important - most steam absorption problems are the result of improper installation. Possible locations (A-G) for the distributor are shown below. For additional assistance, contact Carel.

Locations:

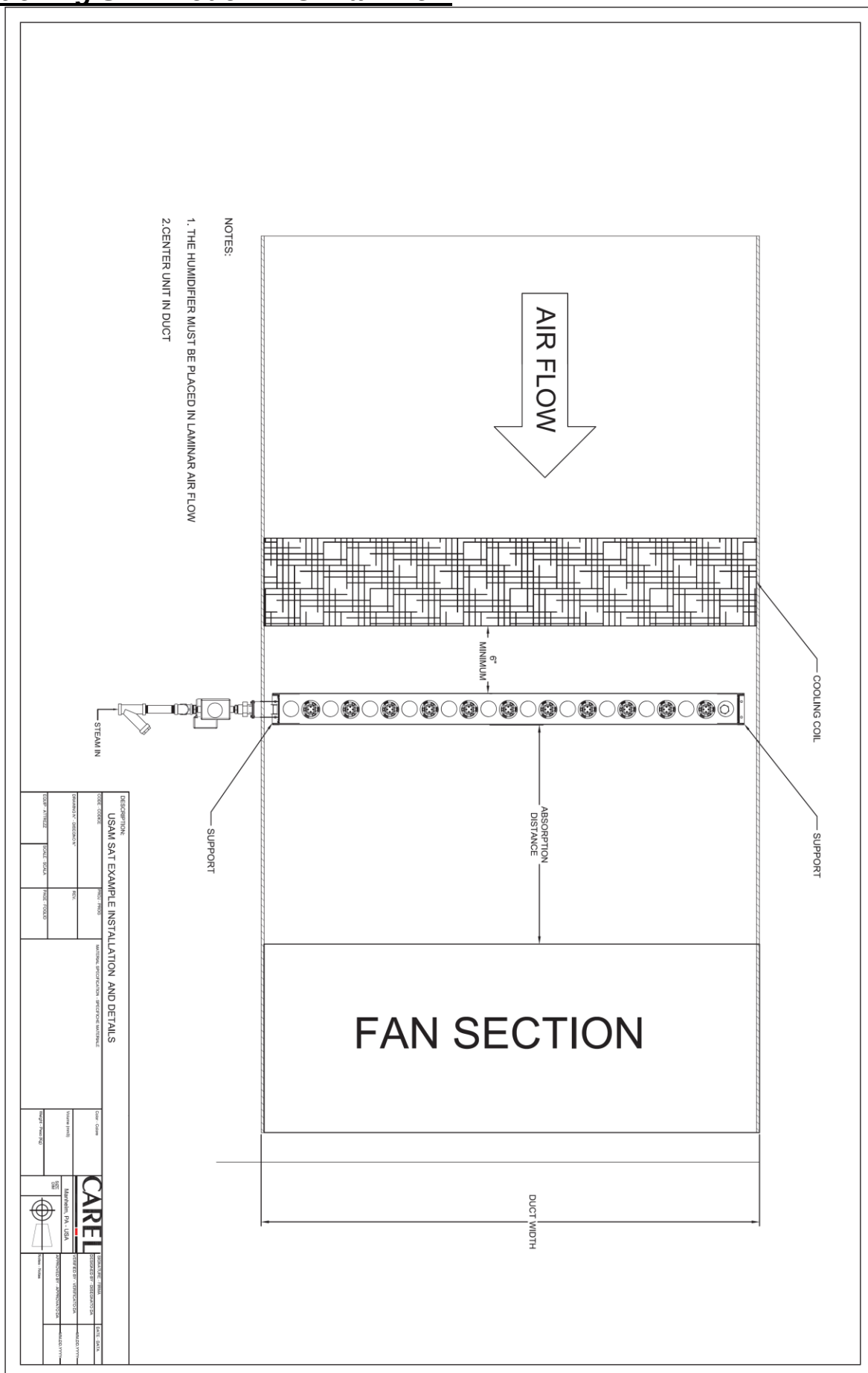
- A. BEST: locate distributor far enough from fan to avoid turbulence. Maintain adequate evaporation distance.
- B. GOOD: provided there is enough distance from the distributor to the fan inlet for proper evaporation.
- C. OK: provided there is enough distance from the distributor to the heating coil for proper evaporation (particularly if the heating coil is electric).
- D. POOR: workable only if the cooling coil is inactive during humidifier operation. An active cooling coil will remove the moisture the humidifier is trying to put in.
- E. POOR: same problems as C&D plus the air may be very cold, increasing evaporation distance or causing condensation.
- F. POOR: same problems as C, D, & E plus the filters may get wet producing an unsafe condition with growth of biologicals.
- G. POOR: only workable if the system is 100% recirculated air with no exhaust.



Positioning SAB Model AHU Elevation View



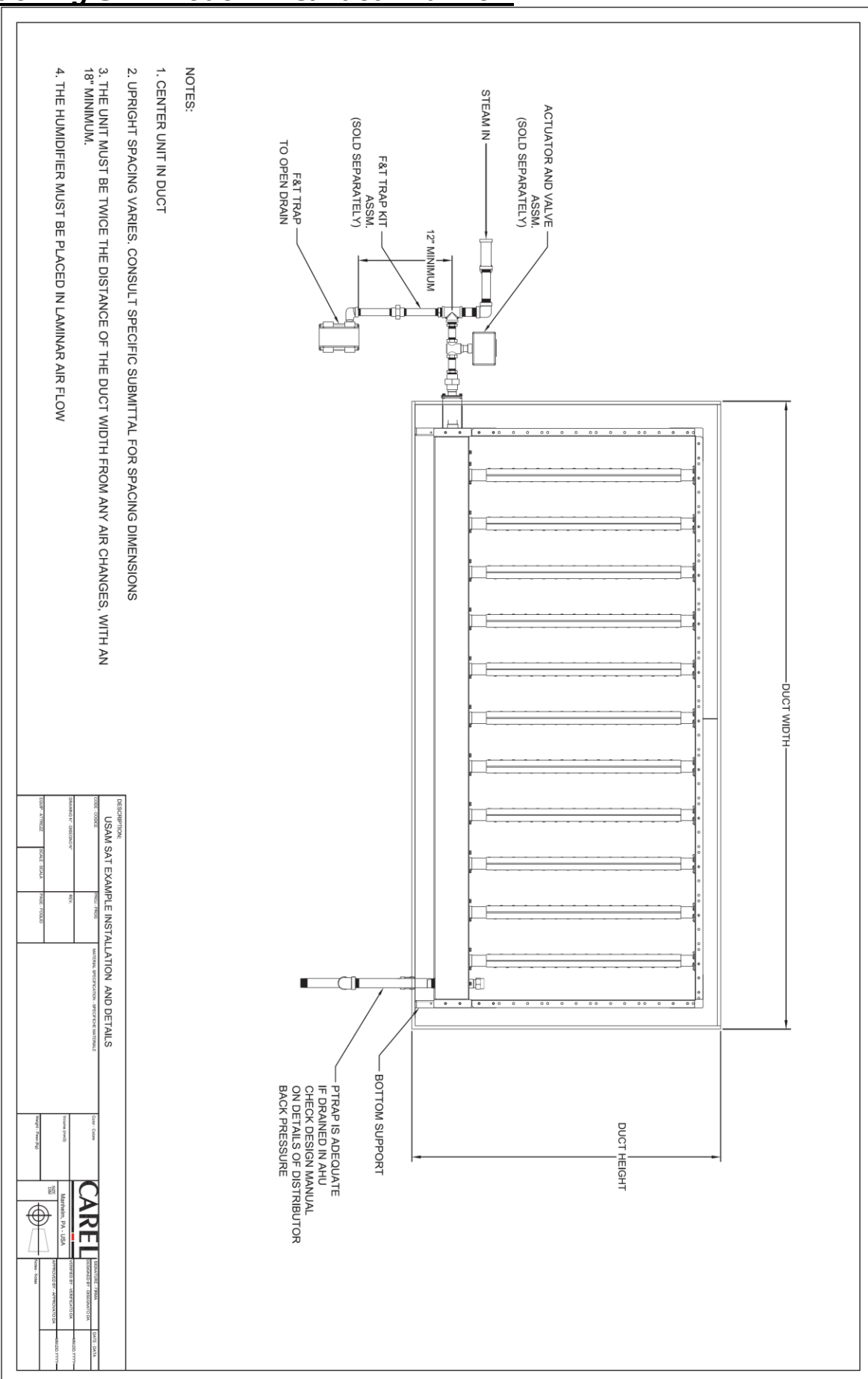
Positioning SAB Model AHU Plan View



Positioning SAB Model Duct Elevation View

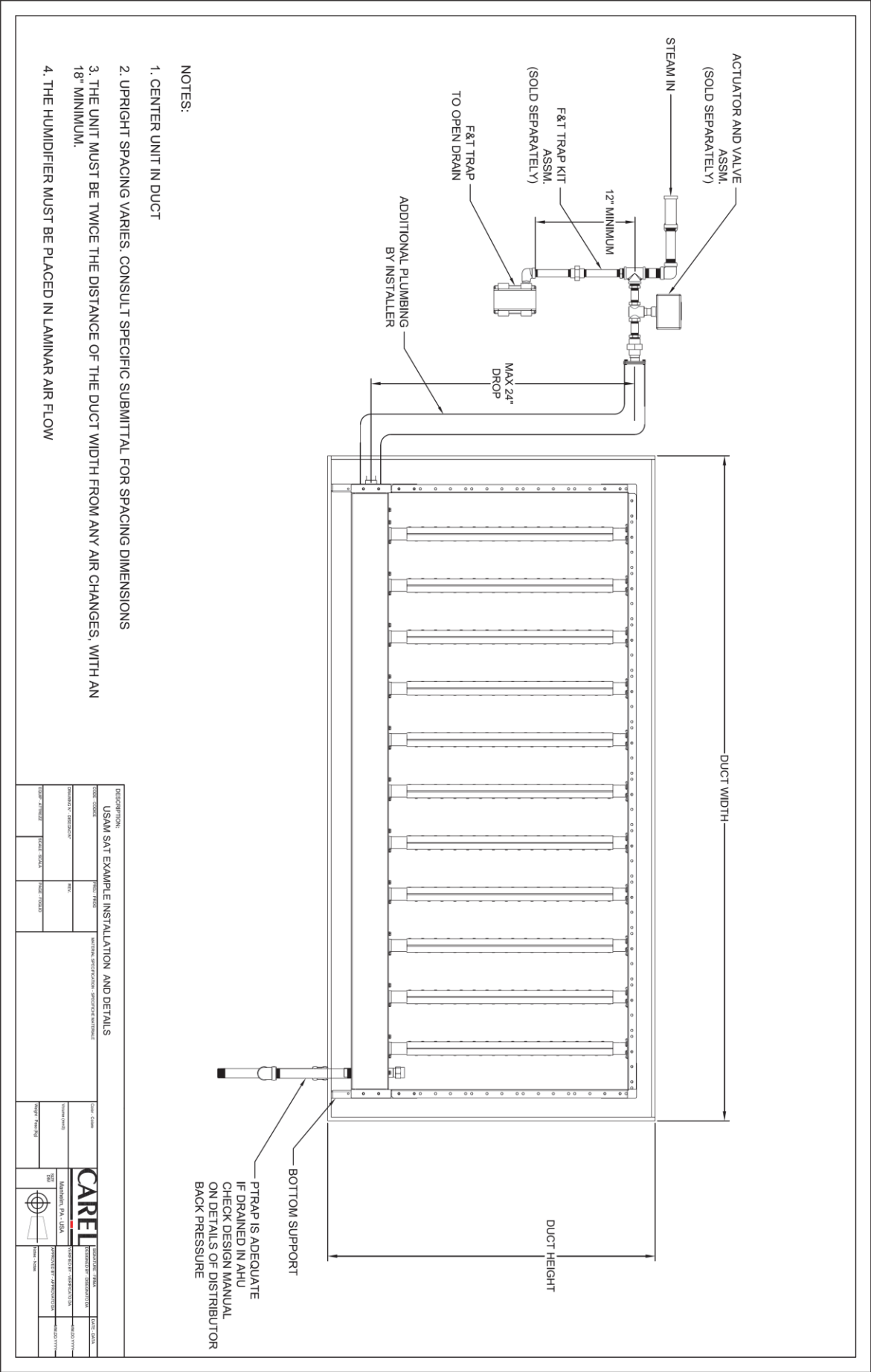


Positioning SAB Model AHU/Duct End View



Submittal Data

Positioning SAB Model AHU/Duct End View Option 2

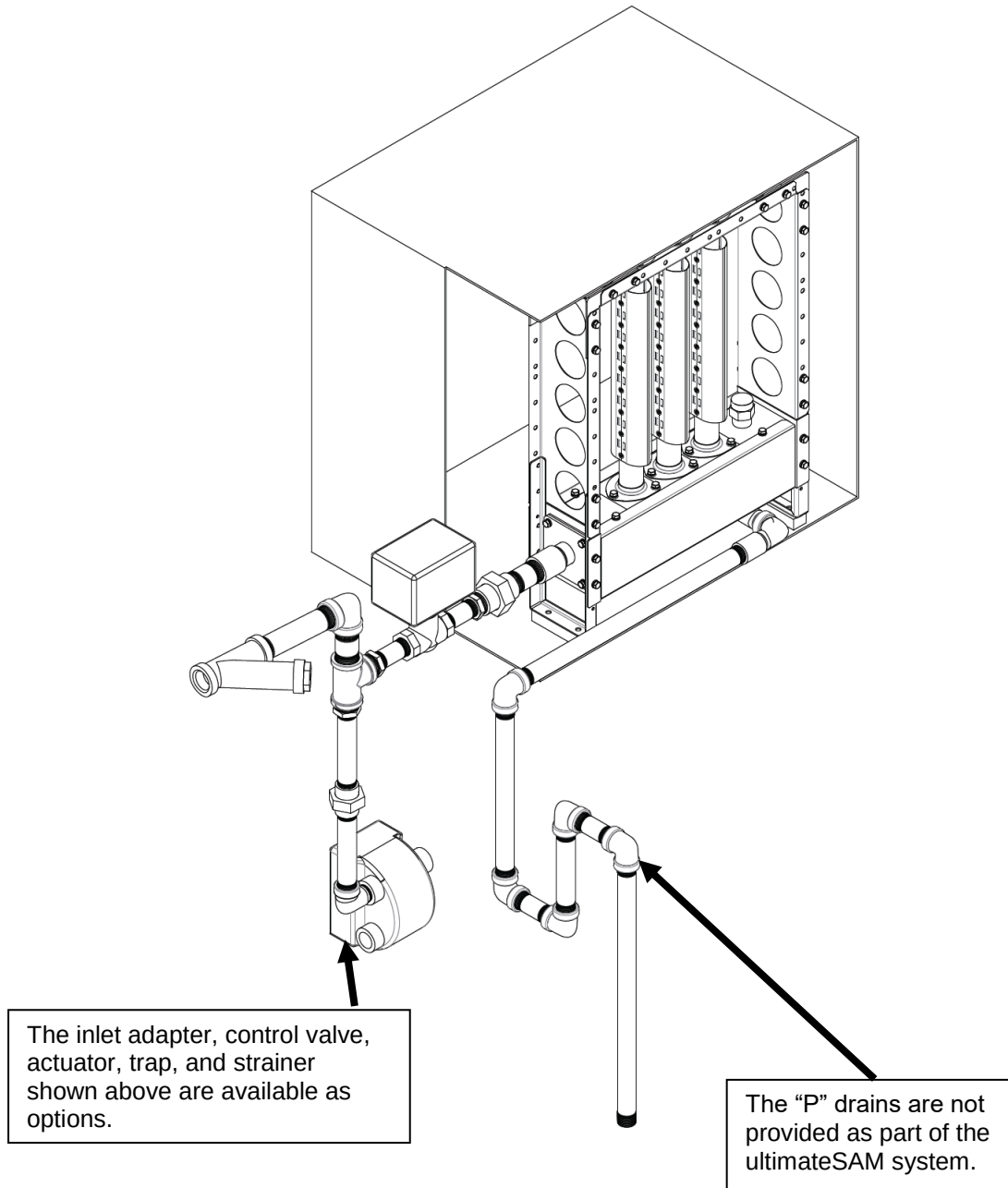


Submittal Data

Mounting

Note: The inlet adapter, control valve, actuator, trap, and strainer shown below are available as options. The “P” drains are not provided as part of the ultimateSAM system.

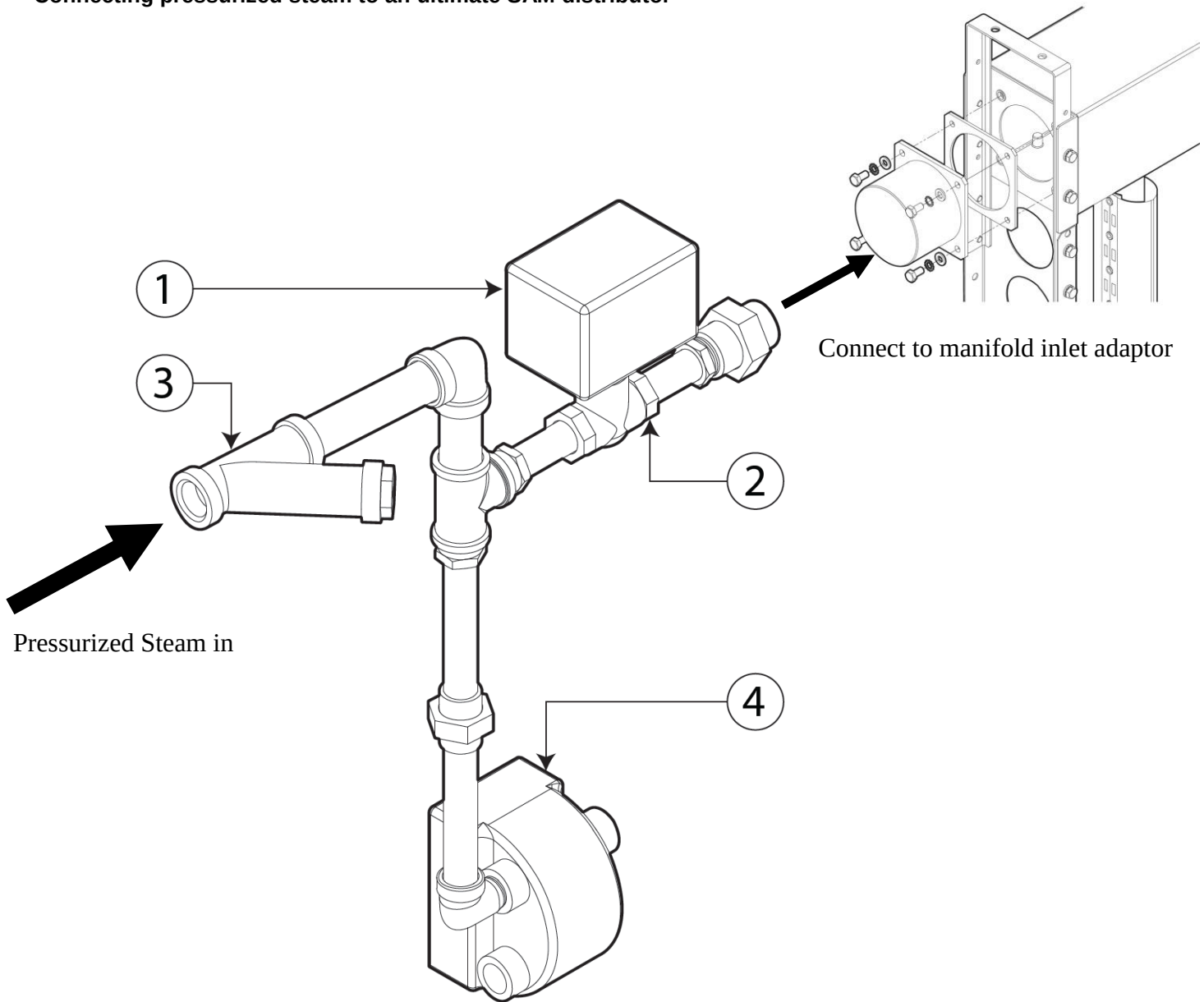
- Attach any optional inlet and/or drain connections to the distributor that will need to pass through the wall of the duct.
- Unless the distributor has been assembled inside the duct or AHU, cut an opening in the duct through which the distributor can be inserted. The opening can be in either the side or bottom of the duct, depending on accessibility.
- Cut out any additional openings in the duct or AHU as needed for the inlet and/or drain connections.
- If desired, shim the inlet side of the distributor so that condensate in the header with flow toward the drain pipe. A 1% grade (~1 cm per meter, ~1/8” per foot) is suggested.
- Secure the bottom pedestals to the duct.
- Secure the top corners of the side channels to the walls of the duct or AHU. • Face off all sides of the duct, as necessary, so that air flow is directed through the uprights as much as possible.



Submittal Data

Plumbing

Connecting pressurized steam to an ultimate SAM distributor



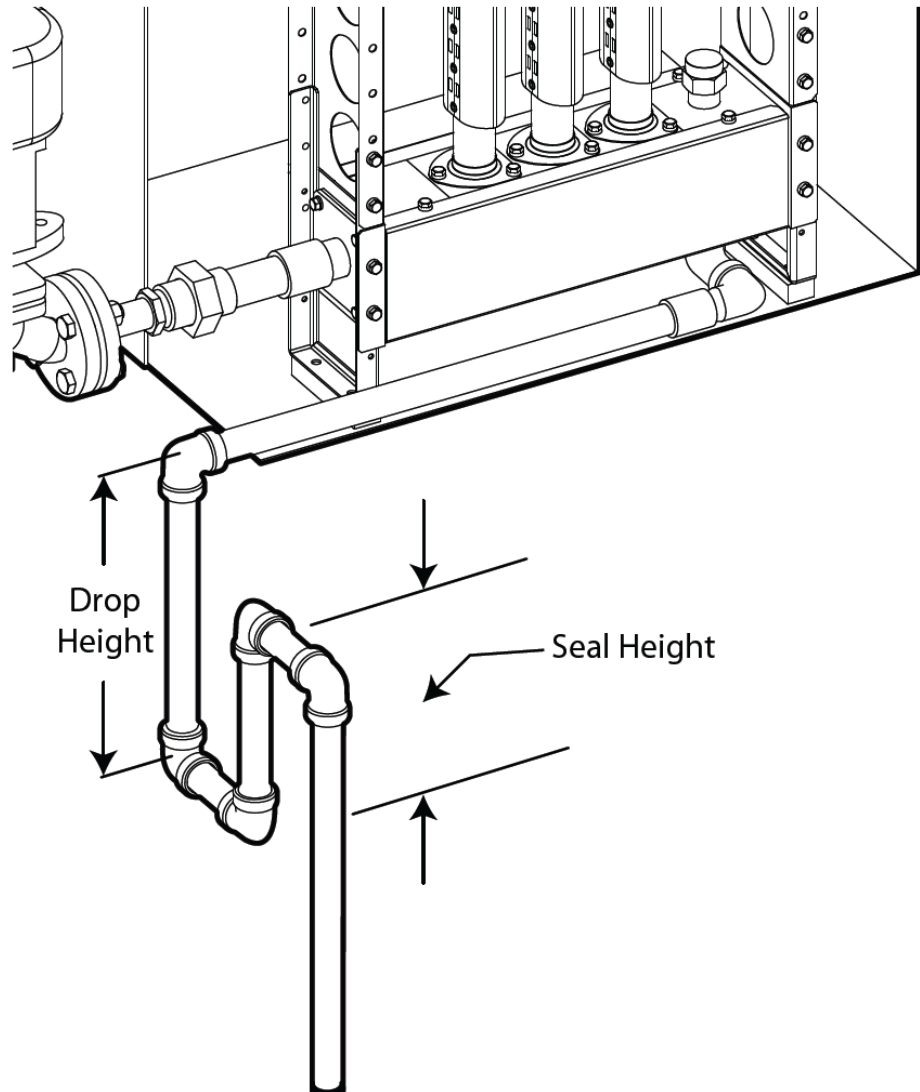
- For threaded control valves (2), SAKV****U*, with an optional fitting kit, SAKR****U*, attach the fittings to the valve as shown above.
- Attach the optional actuator (1), SAKA*****, to the control valve.
- Connect the valve/actuator assembly to the inlet adapter on the distributor header. For optimal performance, the valve should be attached directly to the inlet. If a connecting pipe is needed between the valve and inlet, the length of the pipe should be as short as possible. The actuator should be oriented in the upright position.
- Assemble the fittings and components included in the optional trap and strainer kit (3 & 4), „SAKT****“, and attach the trap assembly to the valve. For steam operation, strainers should be installed in the horizontal position, although it is acceptable to mount the strainer pointing downward. The horizontal position prevents water from collecting in the bonnet thereby reducing the risk of airborne droplets.

Submittal Data

Plumbing

Installing P-traps on header drains

SAB/SAT Models



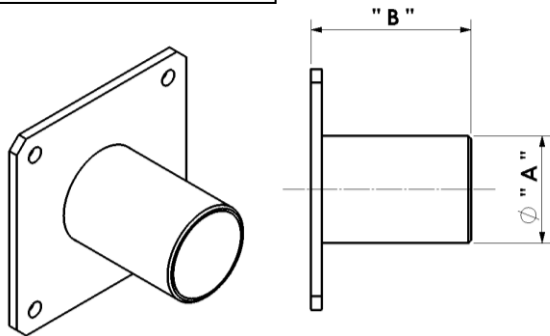
A condensate trap should be installed on the $\frac{3}{4}$ " pipe connection provided on the bottom of each header (SAT model has two). The connection is $\frac{3}{4}$ " male NPT. Given the minimal pressure inside the header, a P-trap is generally suitable for the header drains. The fittings and pipe for the P-trap (shown in Fig.3.a) are not included with the ultimateSAM distributor. If P-traps are used on the drains, the seal height should be sufficient such that the water column creates a pressure at least 500 Pa (50 mm or 2" H₂O) greater than the static pressure in the header. (Refer to the design manual for more information on static pressure of the header.) While a seal height of 150mm (6") is adequate for most installations where the condensate trap drains into a sump inside the duct, check the design manual for details on the back pressure generated by distributor being installed.

Note: Check local requirements regarding the minimum recommended seal height and drop height for the installation.

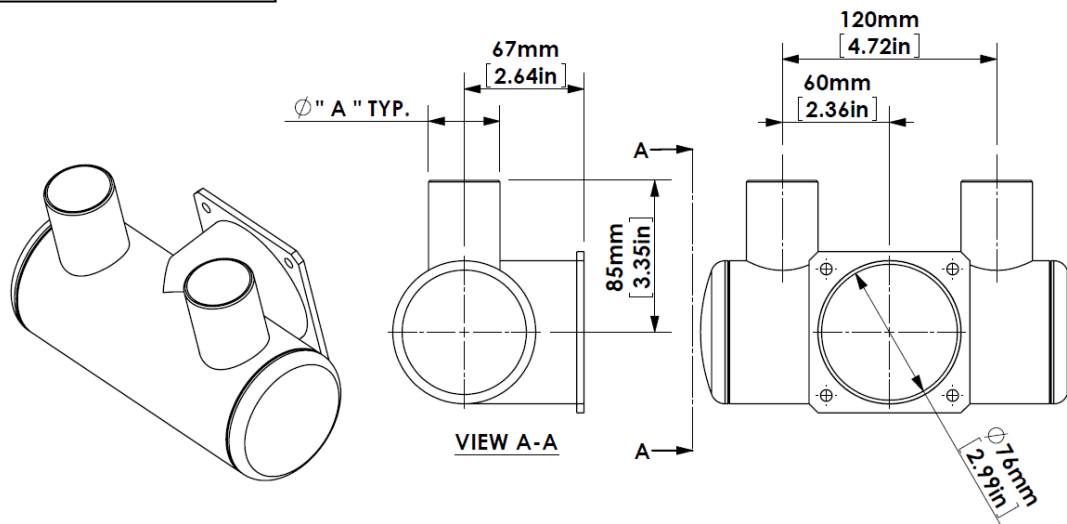
Product Documentation for: SAKIT Inlet Adaptor

TECHNICAL DOCUMENT

SINGLE PORT INLET SAKIT40100 SAKIT80100



DUAL PORT INLET SAKIT40200



INLET FLANGE WITH TUBE

KIT CODE	DESCRIPTION	" A " DIAMETER	" B "	FITTING WEIGHT
SAKIT40100	KIT STEAM INLET DIAMETER 40mm SINGLE PORT	40mm (1.57in)	60mm (2.36in)	0.314 Kg (0.69 lbs)
SAKIT40200	KIT STEAM INLET DIAMETER 40mm DUAL PORT	40mm (1.57in)	--	1.172 Kg (2.58 lbs)
SAKIT80100	KIT STEAM INLET DIAMETER 80mm SINGLE PORT	80mm (3.15in)	80mm (3.15in)	0.354 Kg (0.78 lbs)

NOTE: EACH KIT INCLUDES GASKET AND FASTENERS



Description:
SINGLE & MULTI-PORT STEAM INLETS - DIMENSIONS
Document Code:

Date:
11-MAR-2014
Rev:
1

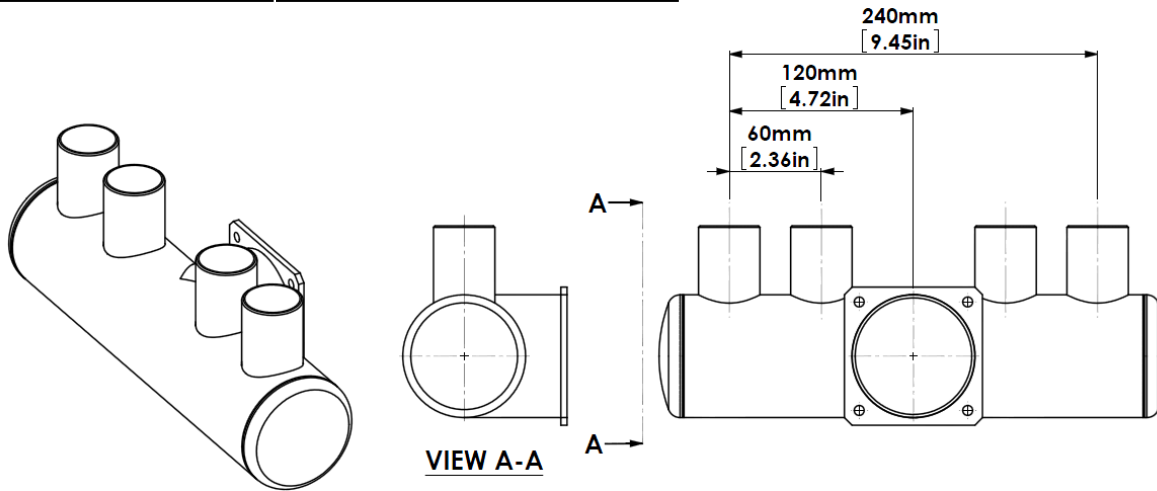
Part No:
SAKIT%
Page
1

TD_SA_1011

TECHNICAL DOCUMENT

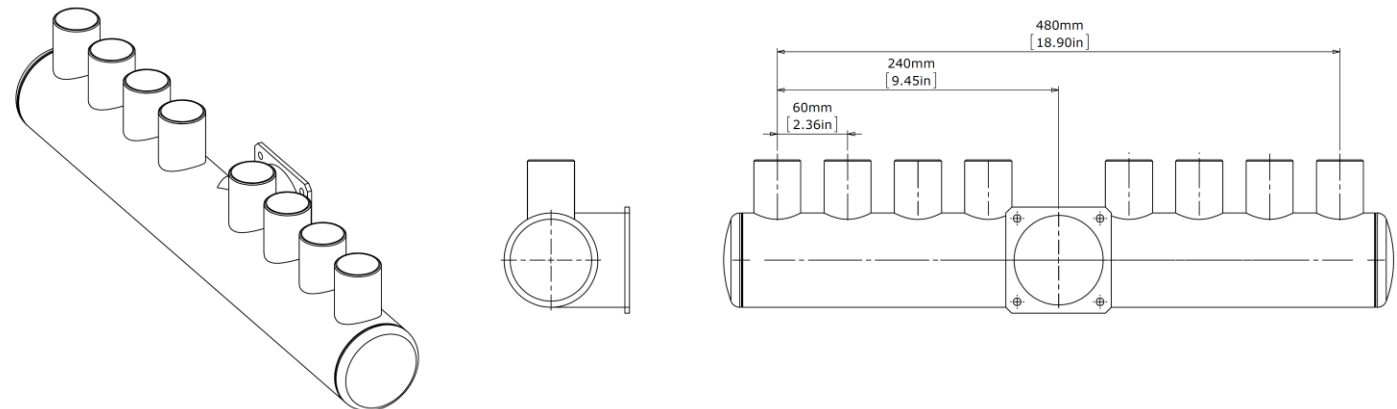
FOUR PORT INLET SAKIT40400

SOME DIMENSIONS ARE COMMON
BETWEEN 2 AND 4 PORT INLETS



EIGHT PORT INLET SAKIT40400

SOME DIMENSIONS ARE COMMON
BETWEEN 2 AND 8 PORT INLETS



INLET FLANGE WITH TUBE

KIT CODE	DESCRIPTION	" A " DIAMETER	" B "	FITTING WEIGHT
SAKIT40400	KIT STEAM INLET DIAMETER 40mm FOUR PORT	40mm (1.57in)	--	1.745 Kg (3.84 lbs)
SAKIT40800	KIT STEAM INLET DIAMETER 40mm EIGHT PORT	40mm (1.57in)	--	3.8kg (8.38 lbs)

NOTE: EACH KIT INCLUDES GASKET AND FASTENERS.



Description:
SINGLE & MULTI-PORT STEAM INLETS - DIMENSIONS
Document Code:

Date:
11-MAR-2014
Rev:
1

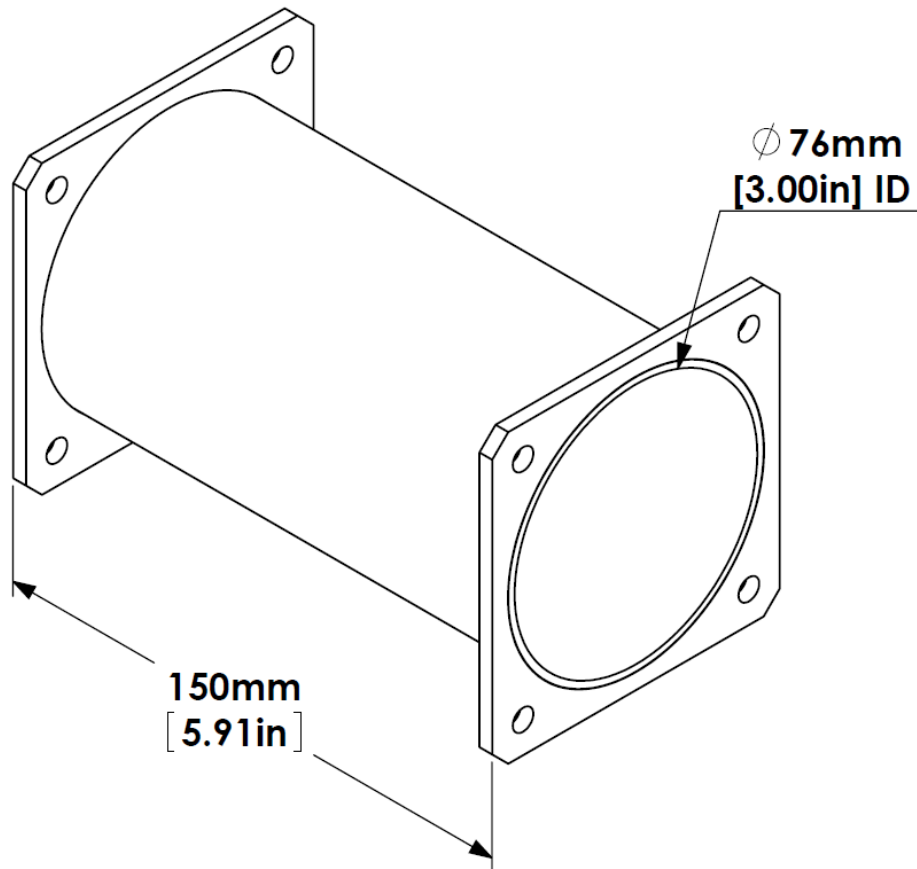
Part No:
SAKIT%
Page
2

TD_SA_1011

Product Documentation for: SAKIX Inlet Extension

TECHNICAL DOCUMENT

INLET EXTENSION SAKIX80100

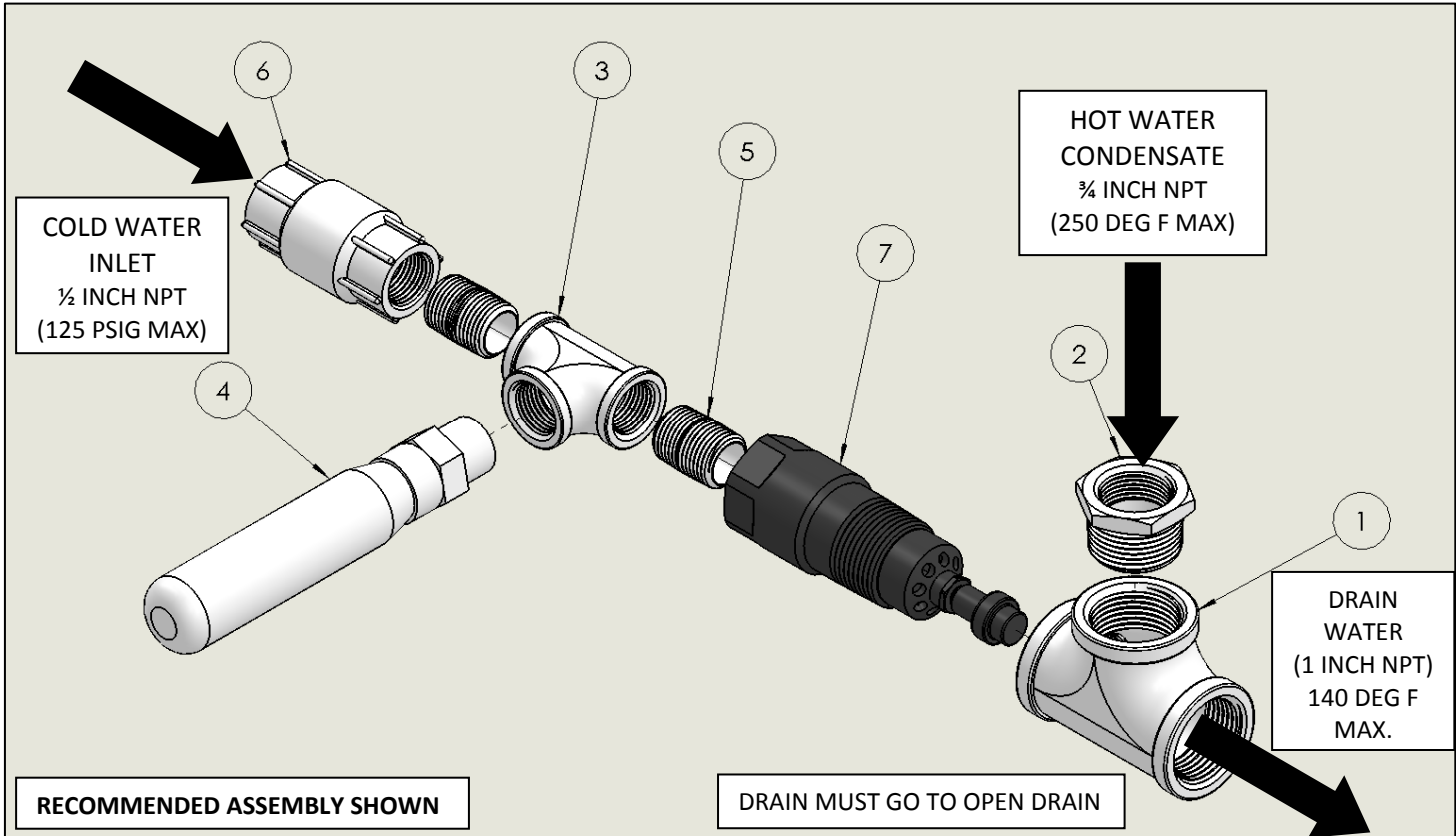


NOTES:

1. EACH KIT INCLUDES GASKET AND FASTENERS.
2. PART WEIGHT = 0.715Kg (1.57 LBS)

Product Documentation for: TD-SA-1063-DTV_rev0

TECHNICAL DOCUMENT



ITEM	SUPPLIED BY - PART	DESCRIPTION	QTY.
1	INSTALLER	1 INCH NPT TEE PIPE FITTING	1
2	INSTALLER	1 INCH X 3/4 INCH NPT HEX ADAPTER	1
3	INSTALLER	1/2 INCH NPT TEE PIPE FITTING	1
4	INSTALLER	1/2 INCH WATER HAMMER ARRESTOR	1
5	INSTALLER	1/2 INCH NPT CLOSE NIPPLE	2
6	INSTALLER	1/2 INCH CHECK VALVE	1
7	CAREL PART SAKV10DTU0	1/2 INCH FNPT X 1 INCH MNPT DRAIN TEMPERING VALVE, SET AT 140 DEG F	1

NOTE:

1. Installation to be performed by a qualified plumber to meet local and state plumbing codes.
2. Additional manufacturer installation instructions provided with the DTV.
3. Full open temperature occurs at 140° F (60° C) and the closing temperature is approximately at 130° F (54.4° C).
4. The maximum condensate flow that can be tempered is 15.7 gpm, assuming 50 psig cold water pressure at 60° F (15.6° C) , 0 psig drain pressure, and a condensate temperature at 212° F (100° C).

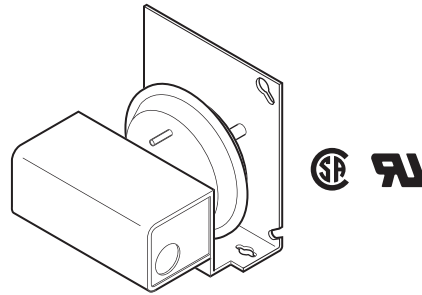
Product Documentation for: PC-301 Sensor

Two-Position Air Flow Pressure Switch

This switch provides low or line voltage control of pressure for air and non-combustible gases. It controls static pressure, total pressure, or differential total pressure.

Features:

- High/low pressure taps.
- Adjustable from 0.07 to 1 in. (1.8 to 25.4 mm) W.C.
- Universal mounting.
- Agency approved.



Model Chart

Model No.	Description
PC-301	Refer to Specifications.

Specifications

Setpoint

Factory setting	0.07 in. (1.8 mm) W.C.
Field adjustment	0.07 to 1 in. (1.8 to 25.4 mm) W.C.
Sensing element	Neoprene diaphragm.
Differential	0.04 in. (1 mm) W.C. at minimum setpoint to 0.1 in. (3 mm) W.C. at maximum setpoint.

Environment

Ambient temperature limits	Shipping and storage: -40 to 140°F (-40 to 60°C). Operating: 35 to 140°F (2 to 60°C).
Humidity	5 to 95% RH, non-condensing.
Locations	NEMA Type 1.
Maximum pressure	12 in. (305 mm) W.C.

Electrical switch

Type	Snap action SPDT.
Ratings	Refer to Maximum Electrical Switch Ratings Table.
Connections	Refer to Figure 1.
Wiring	Coded screw terminals.
High pressure taps	One barbed fitting for 3/8 in. O.D. plastic tubing.
Low pressure taps	One barbed fitting for 1/4 in. O.D. plastic tubing.

Case All metal with 1/2 in. conduit opening.

Mounting In vertical position on any surface free of vibration.

Dimensions 6-3/8 H x 4-3/4 W x 4-3/8 D in. (162 x 121 x 111 mm).

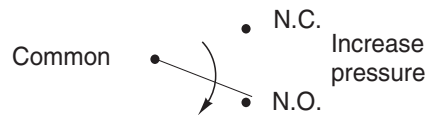
General Instructions Refer to F-16160.

Maximum Electrical Switch Ratings.

Vac	Full Load Amps	Locked Rotor Amps	Pilot Duty (VA)	Non-Inductive Amps
24 V	—	—	60	—
120 V	6.25	37.5	300	
240 V	3.1	18.6		
277 V	2.7	16.2		10

Accessories

Model No.	Description
AP-302	Duct static pressure sensing tip for pressure 1 in. (25.4 mm) W.C. and up.
AP-305	Duct static pressure sensing tip for pressure 0.01 in. (0.3 mm) W.C. and up.
AT-208	Duct mounting bracket for probes other than AP-302 and AP-305.

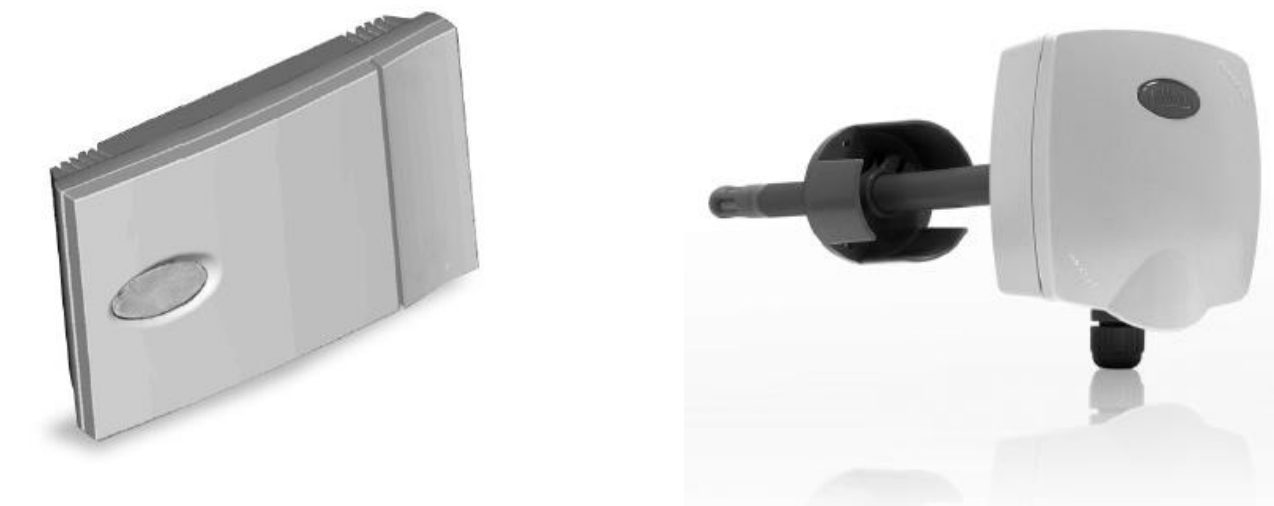
Typical Applications

N.O. makes on increase of pressure.

Figure 1 Switch Action for PC-301 Switch.

Product Documentation for: TD_DPWC111 and DPDC111

DPWC111000 and DPDC111000



1 and 2 series	3 Type	4 Measurement	5 Humid. Sensor	6 Temp. Sensor	7 Type Output	8 and 9 Custom	10 Packaging
----------------	--------	---------------	-----------------	----------------	---------------	----------------	--------------

1 and 2 Series: DP (Digital sensors)

3- Type: W = Wall P = Industrial environment D = Duct

4- Measurement: T = Temperature H = Humidity C = Temperature and Humidity.

5- Type of humidity sensor: 0 = Not present; 1 = 10 to 90% rH; 2 = 0 to 100% rH.

6- Type of temperature sensor: 0 = Not present; 1 = NTC.

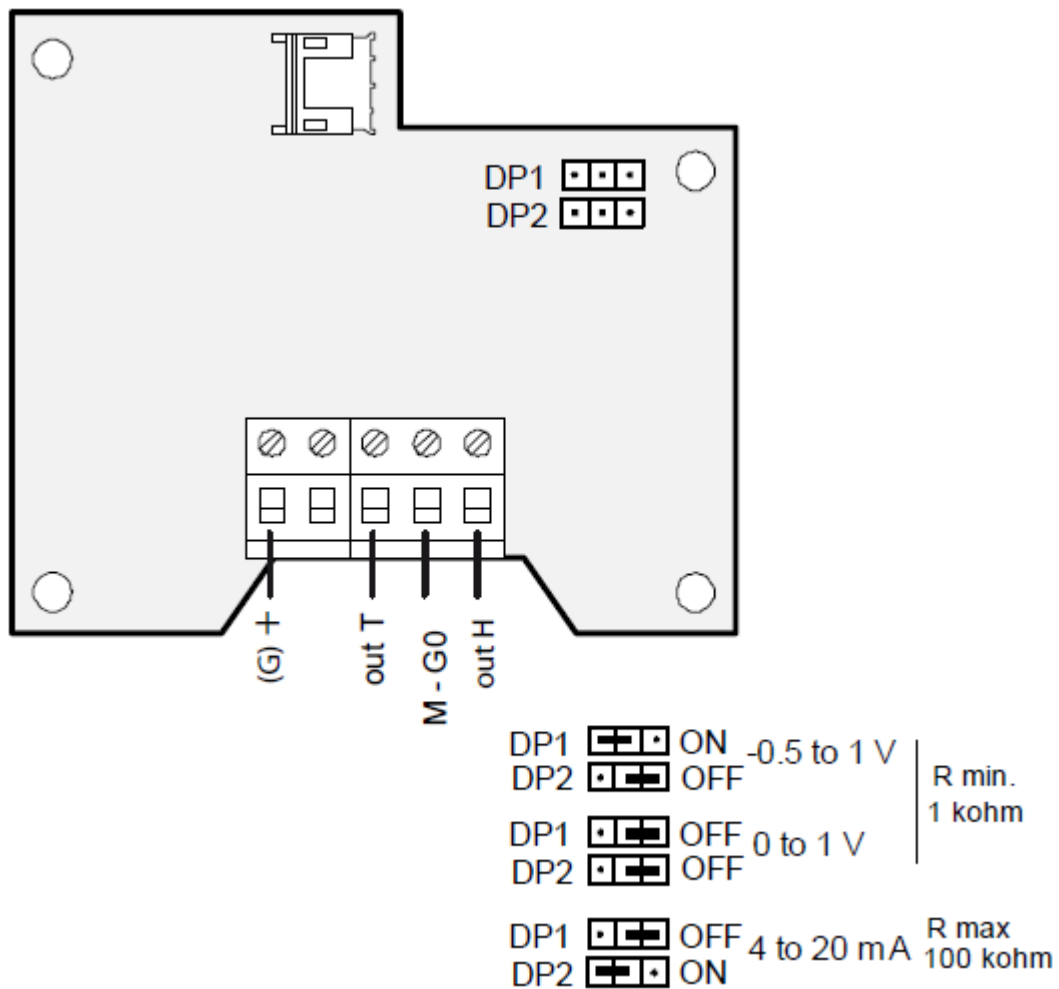
7- Type of output: 0 = 0 to 1 Vdc or 4 to 20 mA output; 1 = 0 to 1 V or 4 to 20 mA and NTC resistive output; 2 = 0 to 10 Vdc output; 3 = Modbus/Carel RS485 serial output, not optically-isolated; 4 = Modbus/Carel optically-isolated RS485 serial output; 5 = 0 to 10 V and NTC resistive output.

8 and 9 Custom features:

10- Packaging: 0 = Single; 1 = Multiple; N = Neutral; * = Customized

DP SERIES	Power supply: 18 to 32 Vdc / 12 to 24 Vdc, (0 to 1 Vdc and 4-20 mA output)
DPWC111000	"ROOM" Temperature (-10T60 °C) and humidity (10 to 90% rH)
DPDC111000	"DUCT" Temperature (-10T60 °C) and humidity (10 to 90% rH)

CONNECTION



KEY;

+ (G) = power supply (12 to 24 Vac or 8 to 32 Vdc).

out T = temperature output

M(G0) = reference for both power supply and outputs

out h = humidity output 0 to 1 Vdc and 4 -20 mA

Jumpers for configuring the outputs: on models with two active outputs both are configured in the same way.

Dimensions

