humiSteam Lite

commercial electrode steam humidifiers

Installation
Operation
User Manual

Read and save these instructions.

CAREL

Warning!

L'installazione del prodotto deve obbligatoriamente comprendere la connessione di messa a terra, usando l'apposito morsetto giallo-verde in morsettiera. Non utilizzare il neutro come connessione a terra.

The product must be installed with the earthconnected, using the special yellow-green terminal on the terminal block. Do not use the neutral for the earth connection.

Le produit doit être installé avec la connexion terre branchée, en utilisant la signalisation et les bornes spécifiques (jaune/vert) à la mise à la terre. Ne pas utiliser le neutre comme mise à la terre.

Das Produkt muss geerdet werden. Verwenden Sie hierfür den gelb-grün Anschluss an der Klemmleiste. Verwenden Sie nicht den Null-Leiter für die Erdung.

La instalación del producto debe obligatoriamente incluir la conexión de la toma de tierra, utilizando el borne amarillo/verde del regletero. No utilizar el neutro como conexión a tierra.

IMPORTANT

BEFORE INSTALLING OR HANDLING THE HUMIDIFIER PLEASE CAREFULLY READ AND FOLLOW THE INSTRUCTIONS AND SAFETY STANDARDS DESCRIBED IN THIS MANUAL AND ILLUSTRATED ON THE LABELS ATTACHED TO THE MACHINE.

This humidifier produces non-pressurized steam by means of electrodes immersed in the water contained in the cylinder-boiler (hereafter called the **cylinder**). The electrodes pass current through the water, which also provides resistance, heating the water into steam, which is used to humidify environments or industrial processes, using special distributors.

The quality of the water used affects the process of evaporation, so the humidifier may be supplied with untreated water, **as long as this is drinkable and not softened or demineralized**; the evaporated water is automatically replaced using a fill valve. This humidifier has been designed exclusively to directly humidify rooms or ducts, using a distribution system. The installation, use and maintenance operations must be carried out according to the instructions contained in this manual and on the labels applied internally and externally.

The conditions of the environment and the power supply voltage must comply with the specified values.

All other uses and modifications made to the humidifier that are not authorized by the manufacturer are considered incorrect.

Liability for injury or damage caused by the incorrect use of the humidifier lies exclusively with the user.

Please note that the humidifier contains powered electrical devices and hot surfaces.

All service and/or maintenance operations must be performed by specialist and qualified personnel who are aware of the necessary precautions and are capable of performing the operations correctly.

Disconnect the humidifier from the main power supply before accessing any internal parts.

The humidifier must be installed in accordance with the local standards in force.

The local safety standards in force must be applied in all cases.

The humidifier is made up of metallic and plastic parts. All parts must be disposed of according to the local standards on waste disposal.

Certification: the quality and safety of CAREL products are assured by CAREL's **ISO 9001** certified design and production system, as well as listings from UL, cUL, CE, TUV, ETL and others.

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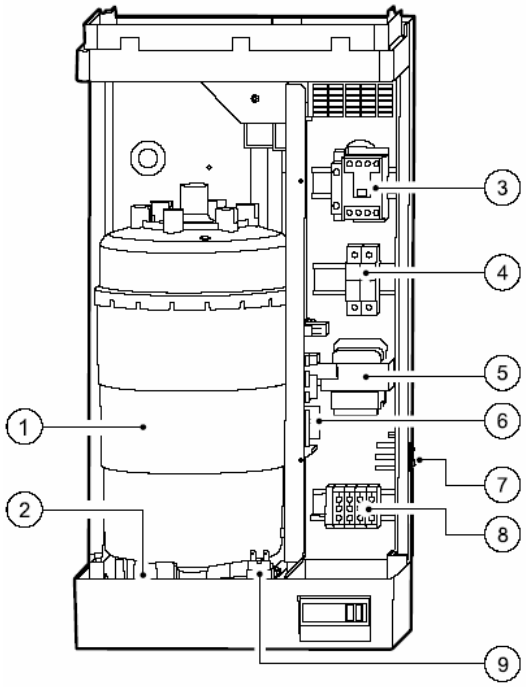
IMPORTANT: BEFORE beginning installation:

- 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 of any shortages or damaged parts. **You must notify CAREL USA within 5 working days of any shortages.**

Models and Description of the Components

Model Selection							
UE	**003**	**P**	**D**	**000**	**U**	**1**	**0**
UE = Electrode	**Capacity (KG)**	**P Control**	**Power supply**	**Version number**	**USA**	**Cylinder Type**	**Internal Use**
	003 = 7 lbs/hr	**On/off**	**U = 208/1**	**Internal use only**		**1 = Disposable Standard Conductivity**	
	005 = 11 lbs/hr		**D = 230/1**			**2 = Disposable Low Conductivity**	

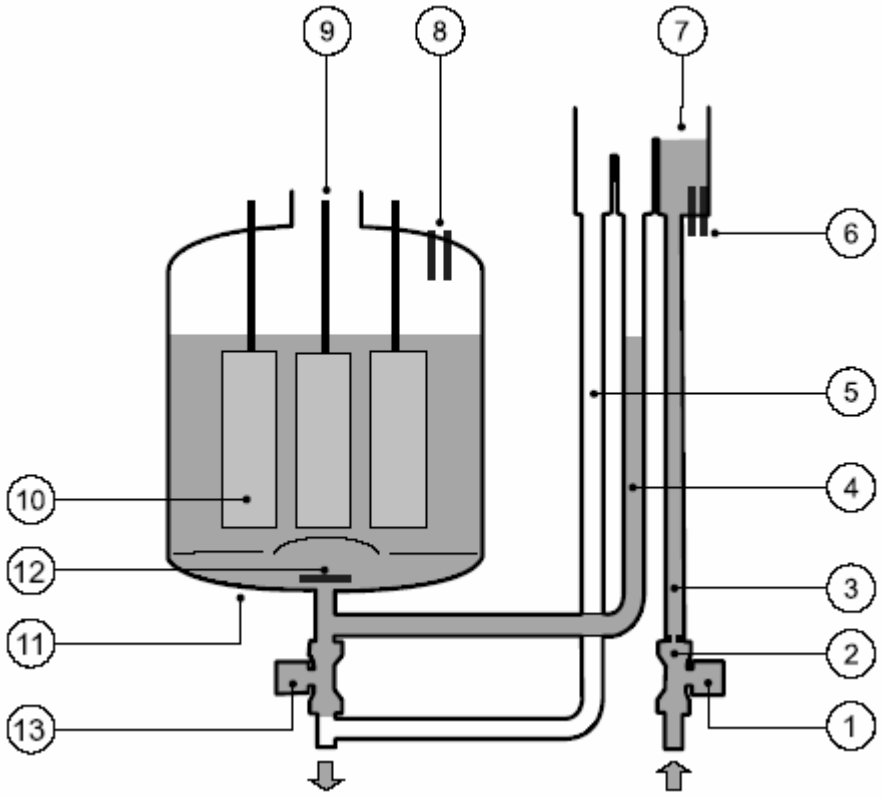
Example: UE003PD000U1 is a 7 lb/hr, 230/1 unit, and disposable standard conductivity cylinder



UE003, UE005	
No.	**Description**
1	Steam generator cylinder
2	Water drain valve
3	Power contactor
4	Fuses
5	Power transformer
6	Relay board
7	On/Off and Manual drain switch
8	Wiring terminal block
9	Water fill valve

How the HumiSteam Works

HumiSteam is an electrode humidifier. It produces steam for humidification by passing electrode current through the water in the steam generator cylinder between metal electrodes. There are no heater elements. Steam output is directly proportional to the conductivity of the water, and the amount of electrode immersed in the water.



On a call for humidity, the HumiSteam controller will open the water fill valve (1) and allow water to enter the system. A flow restrictor (2) prevents the unit from filling too quickly or with too much pressure. The water flows up the fill tube (3) and into the fill cup (7), where it flows over the conductivity probes (6), which feed the water conductivity back to the controller for analysis. Water then flows over the dam in the fill cup (7), which creates a 1" air gap to prevent backflow of contaminated water into the feed lines, and through the fill tube (4) and into the bottom of the steam cylinder (11).

As the water fills the cylinder, it will reach the electrodes (10) and current will begin to flow. As the water continues to fill the cylinder, the current will increase, and this is monitored by an amperage transformer placed on one of the power wires (9). When the desired current is reached, the fill valve will close (1) and the water will then begin to warm and produce steam. If the water reaches the cylinder full probes (8) prior to reaching the desired current level, the fill valve (1) will be closed to prevent overflow. If the current rises too much as the water fills the cylinder, the drain valve or pump (13) will be activated to drain away some water and reduce the current flow.

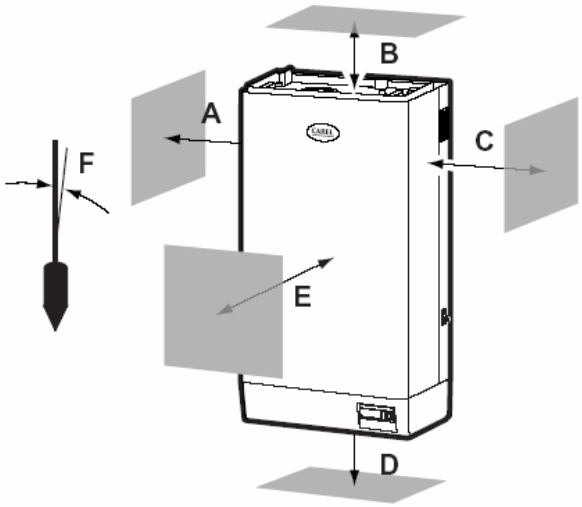
Periodically, based on the incoming water conductivity, the unit will drain some water to reduce the mineral concentration. A strainer (12) in the cylinder helps to prevent mineral debris from jamming the drain valve (13).

If there is no water in the cylinder, there will be no current flow and no steam production. The electrodes do not burn out, but they will eventually become completely coated with mineral and the cylinder will then need to be replaced or cleaned.

1 Installation

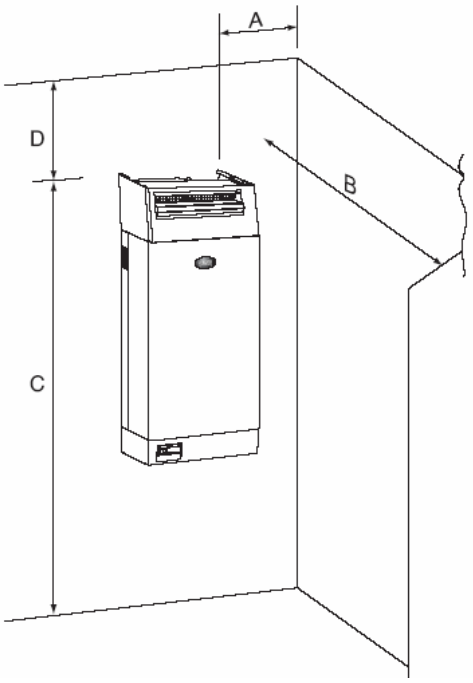
1.1 Positioning

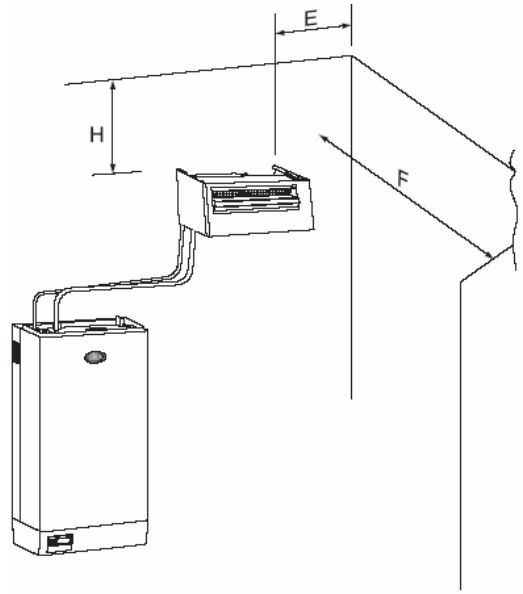
The HumiSteam has been designed for wall mounting (although it can be placed on a stand) and, since it is an atmospheric steam humidifier, should be placed close to the point where the steam will be used, to minimize the steam hose length (and condensate). **Certain clearances must be maintained around the unit:**



	A	B	C	D	E	F
Minimum Dimension (inches)	12	8	8	16	28	< 0.5°

With room blower units, other clearances are needed:

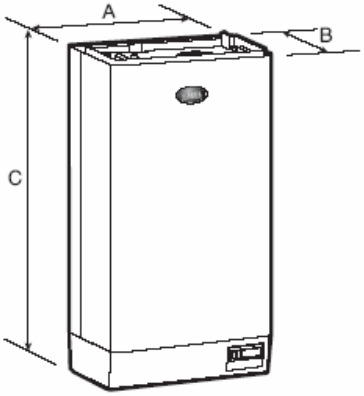




	A	B	C	D	E	F	H
Minimum dimension (inches)	20	72	72	24	20	72	24

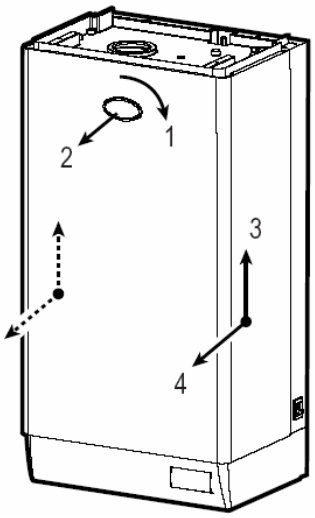
Unit Dimensions:

		UE003, UE005
Dimensions (inches)	**A**	14.4
	B	10.8
	C	24.4
Weight (lbs)	**packaged**	35.3
	empty	30
	installed	41.9



1.2 Mounting

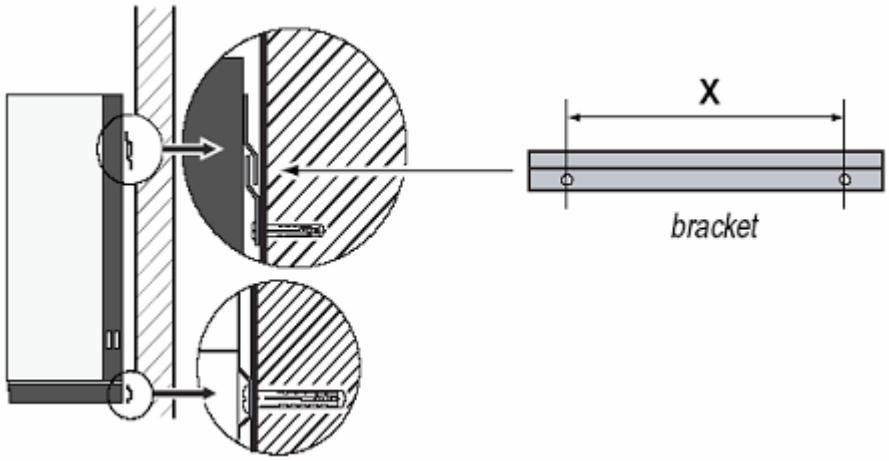
1.2.1 Removing the front cover



The front cover is secured by a capture screw located underneath the CAREL logo. Twist the CAREL logo to reveal the screw, and use a phillips head screwdriver to remove it. Then simply lift the front cover and pull out to remove it. Return it in reverse order.

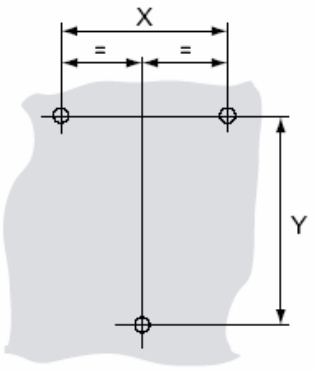
1.2.2 Fastening to the wall

Using the screws and anchors supplied, fasten the mounting bracket to the wall. Be sure that the screws anchor firmly into studs or supports. Note the unit installed weights from the Positioning section.



Once the mounting bracket is secured to the wall, hang the unit on the bracket. Fasten the remaining capture screws through the bottom holes in the unit to secure it to the wall.

Dimension	UE003, UE005
X	8.67
Y	19.69



1.3 Plumbing

1.3.1 Water supply

The HumiSteam must be supplied with water (not softened) having the following characteristics:

	UE003, UE005
Instant flow rate	0.2 gpm
Connection	1/4" O.D. Compression
Temperature limits	34 to 104°F
Pressure limits	15 to 116 psi
Hardness limits	<= 400 ppm CaCO3
Conductivity range	125 to 1250 µS/cm (micromhos)

The water feed line should be ½" copper, PVC or poly tubing run to within 3 feet of the humidifier, then bushed down to ¼" O.D. copper or poly to make the final connection to the ¼" O.D. compression fitting underneath the humidifier. With poly tubing an insert should be used to support the tubing and prevent leaks. This insert is not provided.

SUPPLY WATER LIMIT VALUES FOR THE IMMERSED ELECTRODE HUMIDIFIERS			MEDIUM-LOW CONDUCTIVITY		MEDIUM-HIGH CONDUCTIVITY	
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
Specific conductivity at 20°C	σ20	µS/cm	125	550	300	1250
Total dissolved solids	TDS	mg/l	116 (1)	512 (1)	279 (1)	1163 (1)
Dry residue at 180°C	$^{R}180$	mg/l	81 (1)	358 (1)	195 (1)	813 (1)
Hydrogen ion activity	pH		7	8.5	7	8.5
Total hardness	TH	mg/l $CaCO_3$	50 (2)	250	100 (2)	400
Temporary hardness		mg/l $CaCO_3$	30 (3)	150	60 (3)	300
Chlorides		ppm Cl	=	20	=	30
Iron + Manganese		mg/l Fe+Mn	=	0.2	=	0.2
Silica		mg/l SiO_2	=	20	=	20
Residual chlorine		mg/l Cl^-	=	0.2	=	0.2
Calcium sulphate		mg/l $CaSO_4$	=	60	=	100
Metal impurities		mg/l	0	0	0	0
Solvents, thinners, detergents, lubricants		mg/l	0	0	0	0

(1) Values depend on the specific conductivity; in general: TDS @0.93 * s20 ; R180 @0.65 * s20
(2) No less than 200% of the chloride content in mg/l Cl-
(3) No less than 300% of the chloride content in mg/l

NOTE: Softened water should NOT be used as it is generally corrossive to the electrode plating.

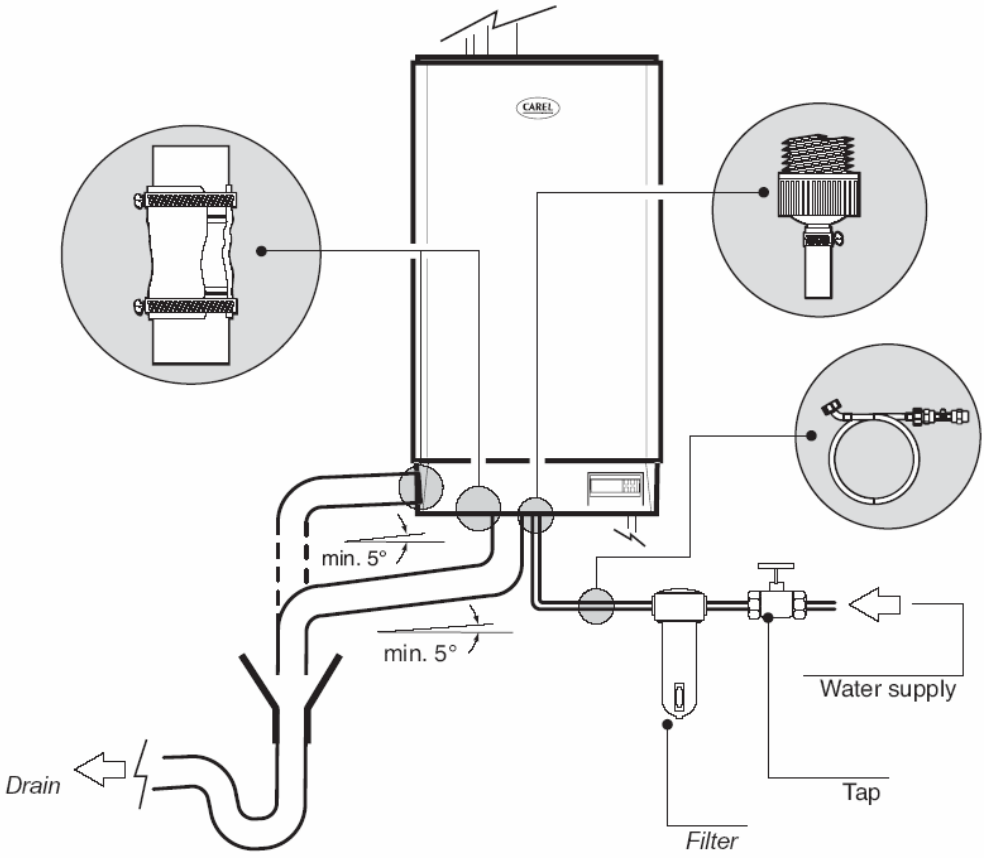
1.3.2 Water drain

The HumiSteam also requires connection to a drain. The drain water characteristics are:

	UE003	UE005
Drain rate per hour	2.2 gph	3.7 gph
Instant drain rate	1.3 gpm	
Connection	1-1/2" nominal diameter	
Typical temperature	212°F	

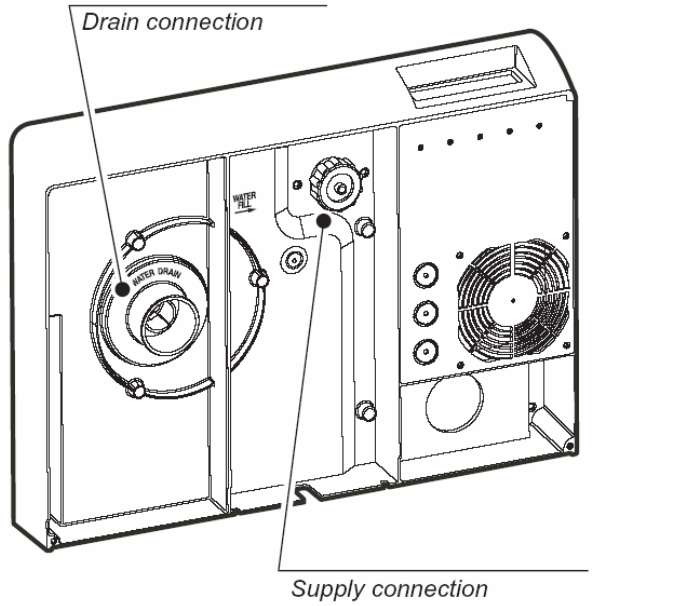
The drain line can be 1-1/2” schedule 40 CPVC, 1-1/2” copper, or 1-1/2” Polypropylene. In all cases, the drain tube is slipped over the drain outlet on the bottom of the humidifier. It is not glued or otherwise attached to the humidifier, so it must be supported by itself.

Drain line must be installed and plumbed to an open drain immediately after the unit. For proper operation of the unit, the open drain should be installed before the trap (if allowed by local code).



WARNING: Do NOT use PVC piping unless the unit has the optional drain tempering valve installed.

Physical location of the supply and drain connections are located as shown below.

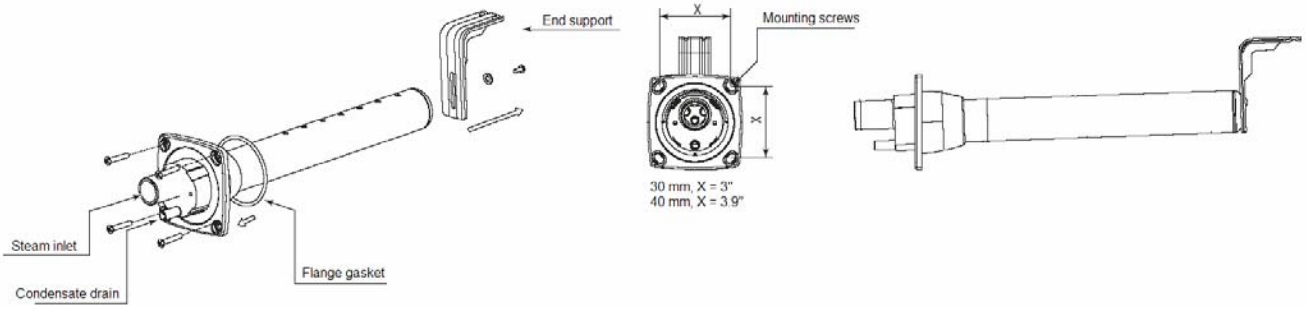


NOTE: Carel can provide a drain tempering system which limits the water drain to no more than 140°F.

1.4 Steam distribution

1.4.1 Duct injection

If you are using stainless steel duct steam distributor pipes:

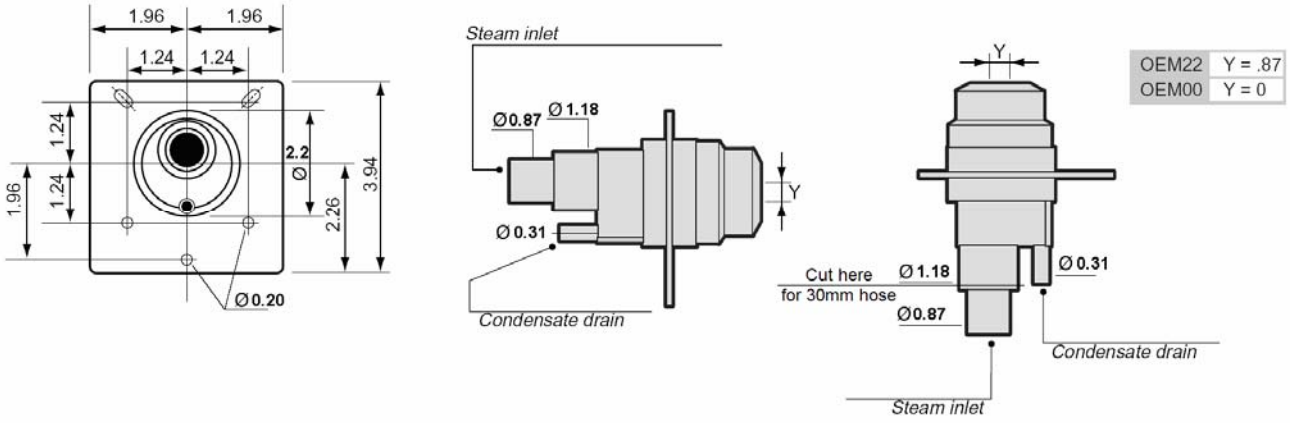


They must be mounted completely level in the duct with the steam outlet holes facing up as shown above. Support the end of longer distributor pipes if needed. Generally the distributor pipes should be mounted in the center of the air stream with a minimum of 6" from the center of the distributor pipe to the top of the duct and 3" minimum to the bottom. In vertical ducts, the distributor pipes are mounted in the center with the holes facing up. The airflow may be up or down, but when the airflow is down, maximum velocity is 1,500 fpm. Note: end support bracket is only supplied with distributors of 36" and larger length.

To install the stainless steel distributor pipes:

1. Cut a key shaped hole in the side of the duct to match the steam pipe and condensate return as shown at right.
2. Apply silicone sealant to the mounting plate and insert the pipe through the hole and secure it with 4 sheet metal screws.
3. Connect the steam and condensate hoses using the hose clamps supplied.

If you are using the duct kit, it includes the SDPOEM22 plastic steam distribution nozzle:



As with the stainless steel distributors, cut a hole in the duct to match the insertion part, apply silicon sealant to the duct mounting plate, fasten with 4 sheet metal screws and connect the steam hose and condensate lines using the hose clamps provided.

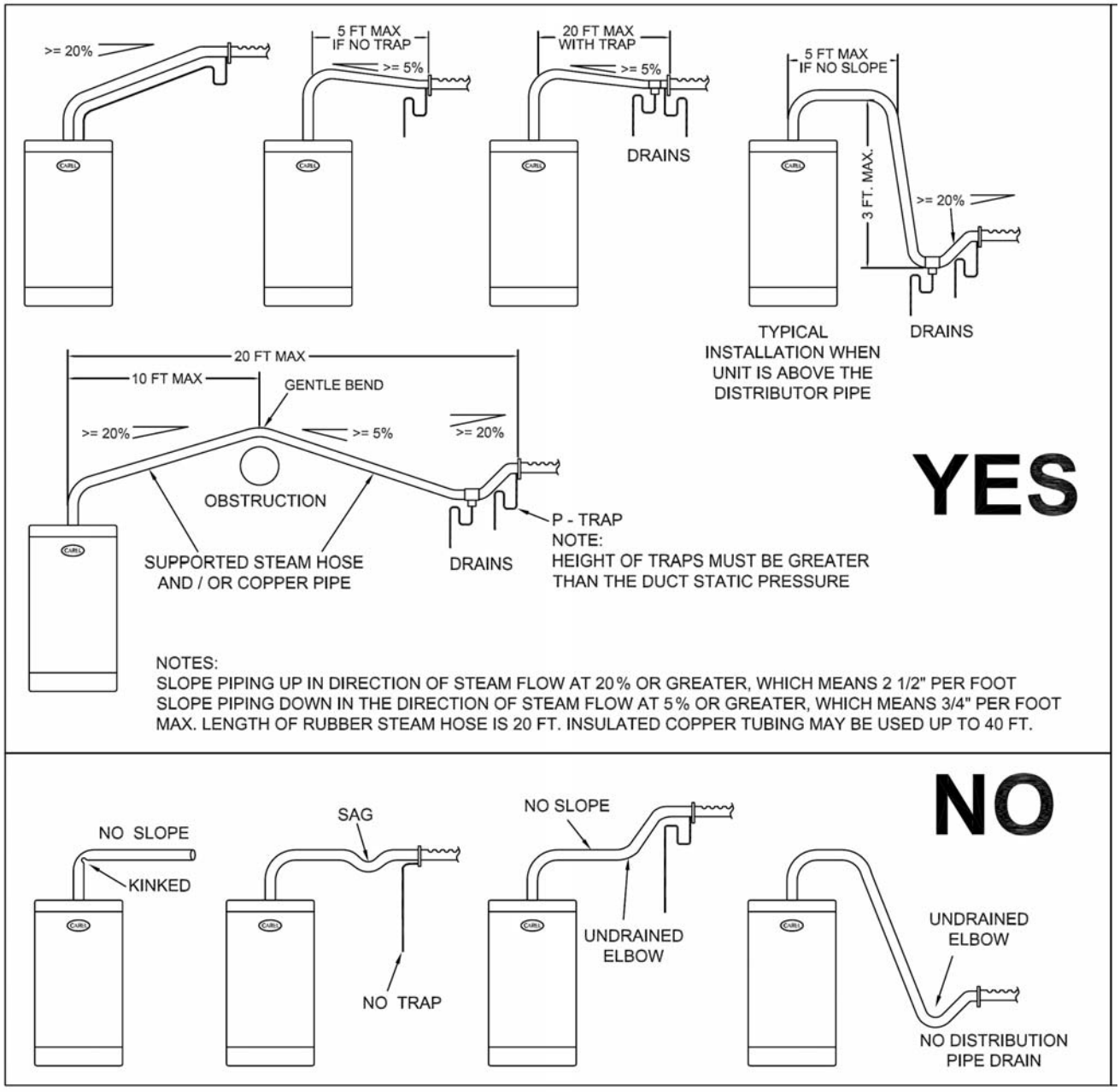
NOTE: The SDPOEM accommodates both the 22mm I.D. hose and the 30mm I.D. hose. If you are using the 30mm I.D. steam hose, you should cut off the smaller steam inlet at the cut line shown above.

IMPORTANT: Allow 2 feet of straight duct downstream of the distributor pipes when the air temperature will be >55^{O}F. Allow 3 feet of straight duct if the air temperature will be <50^{O}F. Always allow 2 feet upstream. Turbulent air flow may require longer lengths.

1.4.2 Steam Hoses

NINETY PERCENT (90%) OF ALL OPERATION PROBLEMS ARE CREATED BY IMPROPER STEAM PIPING FROM THE HUMIDIFIER UNIT TO THE DUCT DISTRIBUTOR PIPES. To avoid these problems, remember one simple fact when running the steam hose: steam naturally flows up hill, and condensate naturally flows down hill. Run the steam hose or piping to avoid any kinks, sharp elbows, or low spots that could collect or restrict the flow of steam to the distributor pipe, or the flow of condensate back to the humidifier. Support the hose adequately to avoid sags.

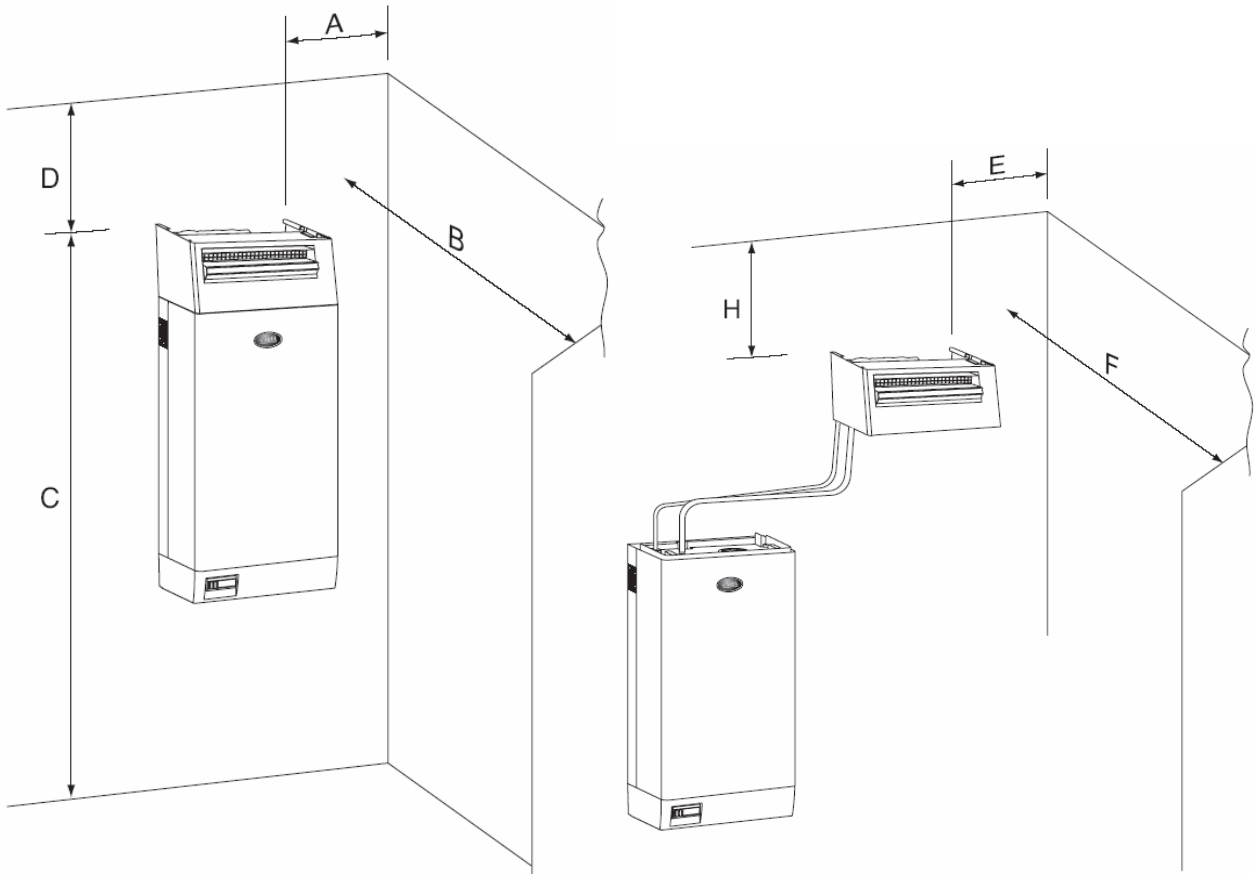
The following diagrams are to provide you with some guidelines. If you have a situation you are unsure of, *please* contact the factory for instructions.



IMPORTANT: Maximum length of rubber steam hose is 20 feet. Insulated copper tubing may be up to 40 feet. In all cases, minimize sharp bends and elbows – use 2-45° elbows instead of 90°s.
Hose size for UE 001, 003 = 22 mm.
Hose size for UE 005 = 30 mm.

1.4.3 Room distribution blower units

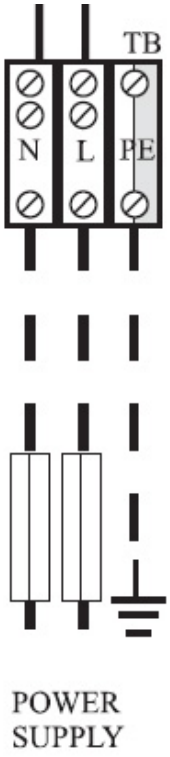
Refer to the manual supplied with the Room Distribution Units for specifics on the blower units themselves. Clearances required are shown below.



	A	B	C	D	E	F	H
Minimum dimension (inches)	20	72	72	24	20	72	24

	UE003, UE005
Room Blower Unit Model	VSDU0A
Rated Power Volts	24
Air Volume CFM	112
Noise Level dBA	30
Operating Temp/Humidity (°F / %RH)	14 to 104°F / 10 to 60%

1.5 Power wiring

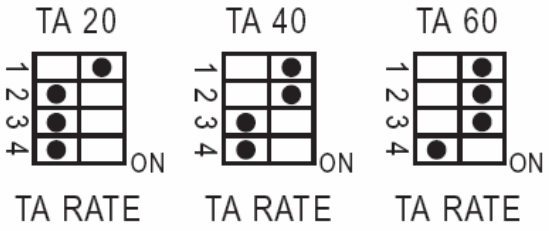


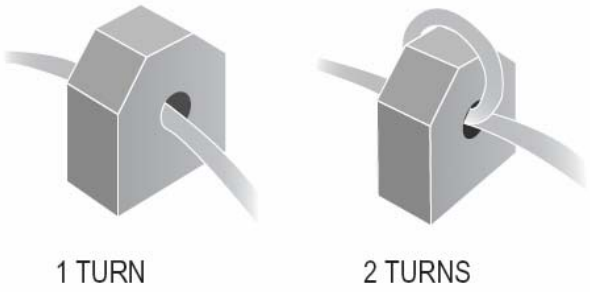
Check that the power supply voltage to be connected matches the value indicated on the rating plate inside the electrical panel. Insert the power and ground connection cables into the electrical panel compartment using the strain reliefs supplied, and connect to the terminals. An external fused disconnect must be installed.

All wiring must be in accordance with local, state and national electric codes.

NOTE: to avoid unwanted interference, the power cables should be kept separate from any control wiring.

Make sure that the TAM on the circuit board has the proper number of power wire turns through it, and that the TA Rate DIP switches on the control board are set per the table at the bottom of this page.





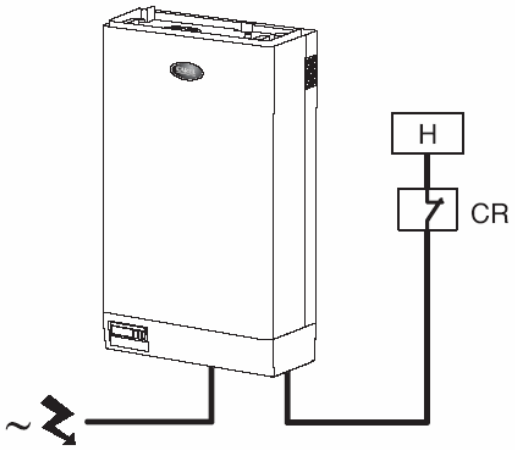
Model	Voltage Code	Voltage Phase	Nominal Current (Amps)	Power (kW)	Output (kg/hr)	Output (lbs/hr)	Turns Through TAM	TA Rate
UE003	U	208 - 1~N	10.8	2.25	3	6.6	2	60
	D	230 - 1~N	9.8				1	20
UE005	U	208 - 1~N	18	3.75	5	11	1	40
	D	230 - 1~N	16.3				1	40

NOTE: Tolerance allowed on main voltage = -15%, +10%

1.6 Control wiring

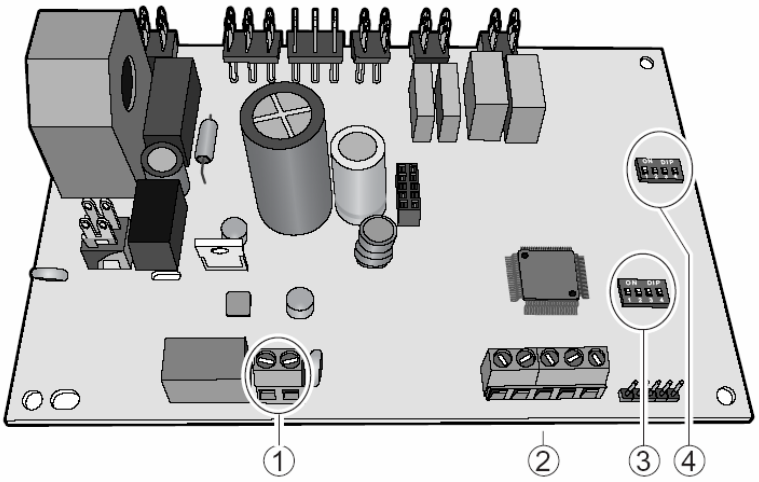
The HumiSteam *Lite* control system allows one humidistat to be connected, as well as various safety devices, remote on/off, alarm and serial communications.

Generally, the control humidistat (H) is located in the room or return air duct. In the case where the HumiSteam uses a direct discharge blower unit, this is the only control needed. In ducts or air handlers, a high limit humidistat is usually added to act as a safety (CR), as well as an air flow proving device.



Control wiring is made directly to the control board terminals:

1. alarm output terminal block;
2. control signal terminal block;
3. DIP switches for selecting drain mode;
4. DIP switches for selecting TA RATE.



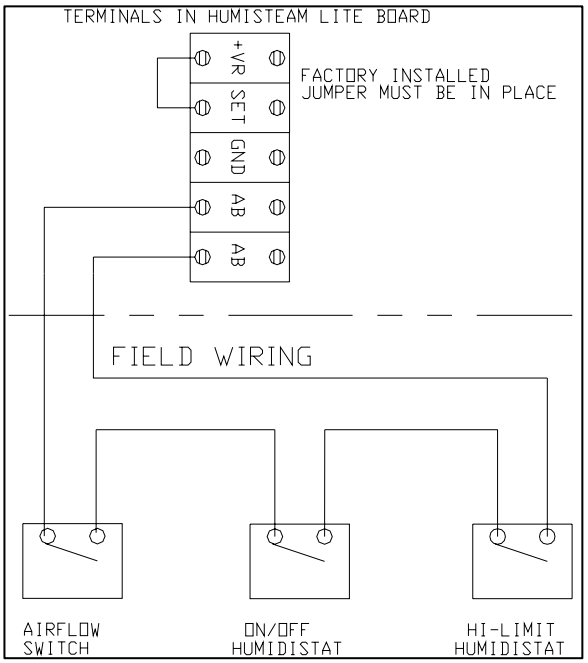
Control Signal Terminal Block (# 2 in diagram)

Terminal	Function	Electrical specifications
+VR	output voltage for sensors	10V; min. 5 k-ohm
SET	control signal input	range: 0 to 10 V; input impedance: 15 k-ohm
GND	common for +VR and SET	
AB AB	remote enabling input	Connects to external NO contact; Maximum resistance = 50 ohm; Maximum impedence = 10mAdc; humidifier enabled = contact closed

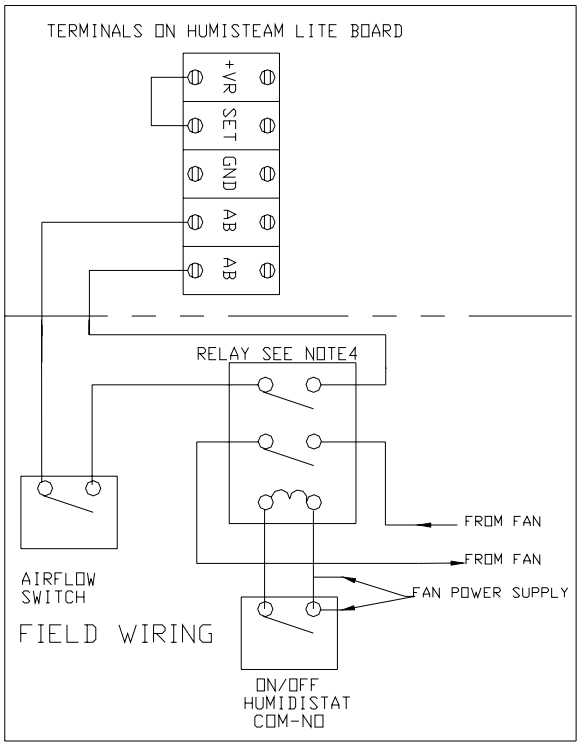
NOTE: DO NOT apply any voltage to terminals AB & AB. Connect external dry contact or jumper wire ONLY.

For On/Off Operation (diagram at right):
Connect any simple humidistat, high-limits, air flow switch, and remote contacts in series from terminals AB to AB.

Circuits must be completed from +VR to SET by a jumper and from AB to AB for the unit to operate. Use jumpers if devices are not connected.



In the case where it is necessary to have the furnace fan start when humidification is needed, a SPDT relay must be added to power both the fan and the humidifier, per the diagram at right.



Alarm Output:
The H terminals allows connection to an on-board SPDT alarm relay that provides No and NC contacts for remote indication of alarms. The relay is rated for up to 250V, 5A max. resistive and 2A max. inductive.

1.6.1 REHUMST Wall and Duct Humidistat

The REHUMST is designed to operate as a wall mount or duct mount humidistat. Figure 1 shows how to assemble the unit for wall mounting. Figure 2 shows how to assemble the unit for duct mounting.

FIGURE 1

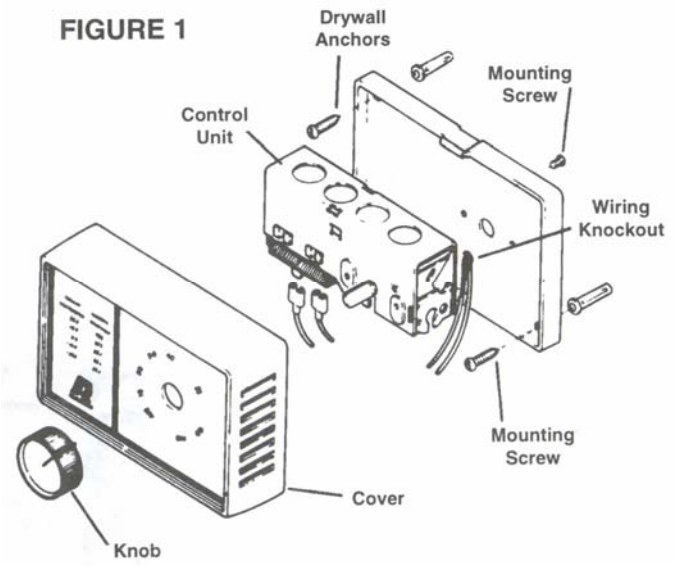
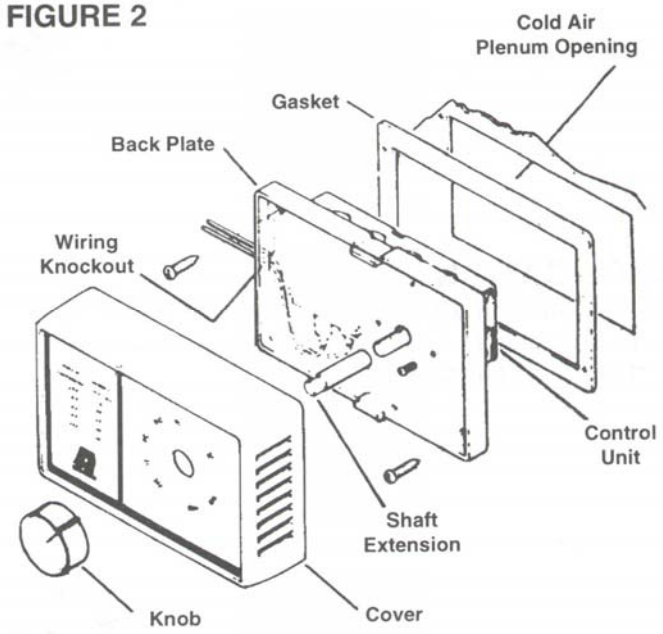


FIGURE 2

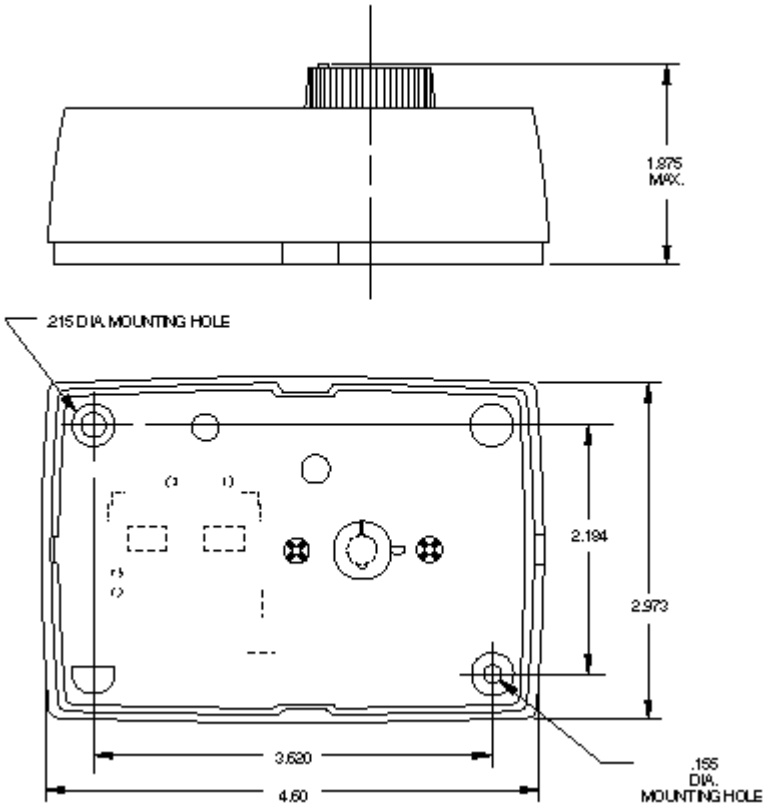


Function	RH Range	Switch	VAC	FLA
Humidistat	10 to 60%RH	SPST	<30 Vac	7.5 Amps

The REHUMST has only two wiring connection terminals, which eliminates any confusion.

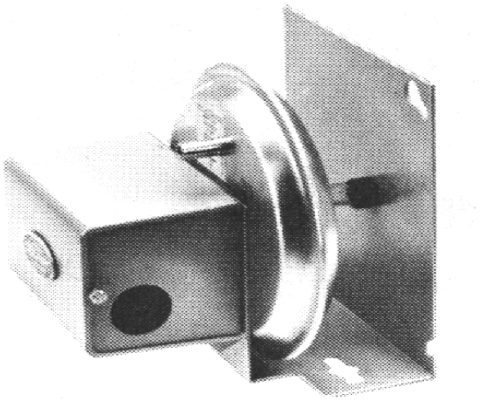
Mount the REHUMST either on the wall in the area to be humidified, or on the return air duct.

The range of the instrument does not permit its use as a high limit device.



1.6.2 PC-301 Air Proving Switch

Mounting the PC-301 air flow switch:
Mount the airflow switch in the supply or return duct using the screws supplied. Mount the device so that the diaphragm is in a vertical position as shown at right.



If the airflow switch is to be mounted on the return duct (vacuum), then mount it in a vertical position by the small plate. Drill a 7/16" hole in the side of the duct and connect the supplied tubing to the low pressure tap on the airflow switch and then run it through the drilled hole in the duct. Put no more than 2" of tubing into the duct. Caulk around the tubing where it enters the duct. The high pressure tap is left open to atmosphere.

If the airflow switch is to be mounted to the supply duct (pressure), then simply drill a 7/16 hole in the side of the duct, apply caulking to the large plate, and mount the device with the large plate to the duct and the high pressure tap/tubing mated the hole. The low pressure tap is left open to atmosphere.

MOUNTING DIAGRAMS

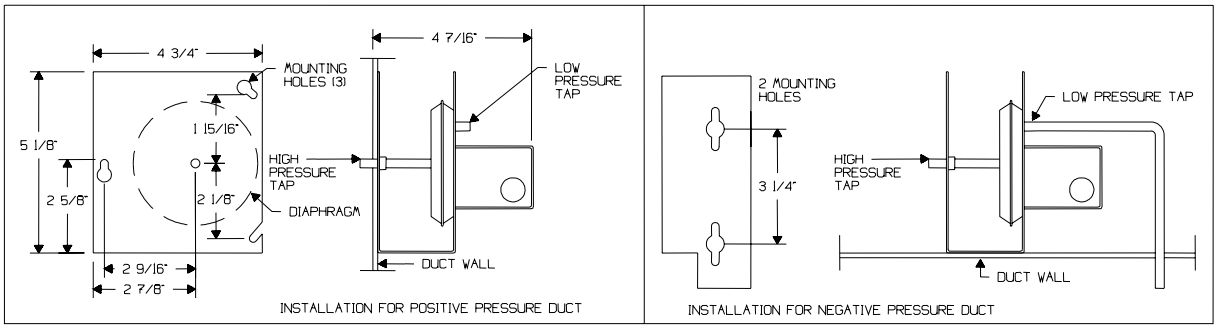
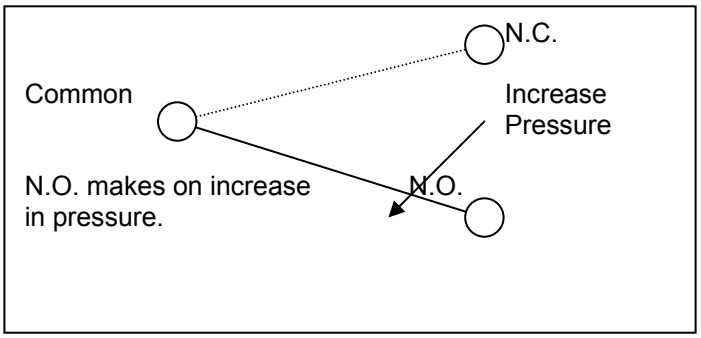


TABLE 1. MAXIMUM ELECTRICAL SWITCH RATINGS

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

WIRING DIAGRAM



2 Start-Up

IMPORTANT WARNINGS:

1. Before starting, check that the humidifier is in perfect condition, that there are no water leaks and that the electrical parts are dry;
2. Do not connect power if the humidifier is damaged or even partially wet!

When installation is completed, flush the supply pipe for around 30 minutes by piping water directly into the drain, without sending it into the humidifier; this will eliminate any scale or residues that may cause foam when boiling.

2.1 Startup Checklist

Before starting the humidifier, the following should be checked:

☐ Water is connected, the line has been flushed, and external valves are open.

☐ Drain is connected, run to an open drain, and has a trap under the unit.

☐ Electricity is connected in accordance with instructions, local codes and data labels in the unit.

☐ The power fuses are installed and intact.

☐ All control wiring is done and tested.

☐ Airflow switch is wired to open on air flow loss.

☐ If a hi-limit humidistat is used, wired to open on humidity rise above set point.

☐ Unit wires have been checked to make sure they and all connectors are tight from shipping.

☐ The steam hose(s) are run correctly with no sags or kinks and sloped properly according to the manual.

☐ Condensate hoses are run correctly with no sags or kinks and sloped properly according to the manual.

NOTE: If you ordered a factory startup, this checklist will be required. Failure to complete this checklist may result in additional charges.

2.2 The HumiControl Controller

The HumiSteam Lite uses an LED version of the HumiControl, which communicates all information through 3 LEDs on the front panel.

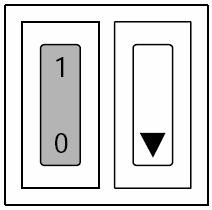
The **Green LED** to the left indicates the unit is powered.

The **Yellow LED** in the center indicates that the unit is producing steam. If it glows solid, the unit is at full capacity, otherwise it will flash, each flash indicating 1/10 of capacity, so that 8 flashes means 80% capacity.

The **Red LED** to the left indicates alarms. It indicates alarms by a series of long (1 per second) or short (2 per second) flashes. See the Alarms section for a table.

Each time the humidifier is started, the Yellow LED will blink to indicate the 1/10s of the version number. Then the Red LED will blink to indicate the version number. Version 2.1 = 1 flash of the Yellow LED, follwed by 2 flashes of the Red LED.

2.3 Start-up Procedure



After closing the external fused disconnect to put power to the humidifier, press the top (I) part of the I/O switch on the side of the unit. The unit will then respond to the On/Off humidistat.

After running the diagnostics, the unit will start operation, or flash an alarm, indicating the humidifier is disabled or in alarm. The alarm code will flash.

3 Operation

3.1 Manual Drain

Pressing the ▼ button on the side of the humidifier and holding it, will force a manual drain.

3.2 Seasonal Shut Down

During seasonal shut-down or alternatively shut-down for maintenance of the electrical parts and/or the plumbing, the humidifier should be placed out-of-service.

NOTE: the water cylinder should be emptied before shutting down the humidifier, to prevent corrosion of the electrodes.

Follow these instructions:

- Press and hold the manual drain switch until the steam cylinder is empty;
- Turn off the On/Off (I/O) rocker switch on the side of the humidifier, and disconnect power from the humidifier;
- Shut off the water to the humidifier.

In the event of malfunction of the drain valve, the cylinder can be emptied manually by lifting it out of the drain manifold and pouring the water into the bottom drain pan.

3.3 Alarms

In the event of an alarm, the alarm LED will flash, the alarm relay will close, and the alarm code will flash on the Red LED. Multiple alarms will flash in sequence. The unit must be turned off and on to reset the alarms.

Controller P	Causes	Solution	Action P	Alarm relay
2 fast flashes of Red LED	Over-current at the electrodes; probable electrode malfunction or water conductivity temporarily too high (especially when starting after a short stop)	1. Check the operation of the drain valve 2. Check for fill valve leakage 3. Drain part of the water and re-start	Shut-down	Active
3 fast flashes of Red LED	Power not available; no steam production when on	1. With the machine off and disconnected from the main power, check the internal electrical connections	Shut-down	Active
4 slow flashes of Red LED	Excessive reduction in output	1. Cylinder completely spent or water with excessive foam. Perform maintenance on the cylinder.	Shut-down	Active
3 slow flashes of Red LED	Lack of water	1. Check that the fill pipe from the main to the humidifier and the internal pipe are not blocked or bent and that there is sufficient pressure (0.1-0.8 mpa, 1-8 bar) 2. Check the operation of the fill valve 3. Check that the steam outlet is not working against excessive back-pressure, preventing the flow of water into the cylinder by gravity 4. Check that the steam outlet pipe is not is kinked and that there are no sags.	Shut-down	Active
5 slow flashes of Red LED	Drain malfunction	Check the drain circuits and the correct operation of the drain valve	Shut-down	Active
6 slow flashes CAREL or 4 fast flashes Red LED	Internal memory error	1. Reset the default parameters (see Chap. 7.5) 2. If the problem persists, contact the CARE service center	Shut-down	Active
2 slow flashes Red LED	Cylinder depleted signal cylinder	Perform maintenance and/or replace the only	Signal only	Not active
9 slow flashes Red LED	Cylinder full with machine off signal	With the machine off: 1. Check for any leaks from the fill valve or the condensate return pipe 2. Check that the level sensors are clean total shut-down	Shut-down	Active

3.4 Trouble-Shooting

problem	causes	solutions
the humidifier does not turn on	1. no electrical power 2. on/off switch of the humidifier in position 0 (open) 3. control connectors improperly connected 4. blown fuses 5. transformer failure	1. check the safety devices upstream from the humidifier and the presence of power 2. close the switch on the panel: position I 3. check that the connectors are properly inserted in the terminal block 4. check the condition of fuses F1/F2/F3 5. check that the voltage across the secondary winding of the transformer is 24Vac
the humidifier does not start operation	1. remote ON/OFF contact open (relay/terminals AB - AB) 2. the humidistat has not been connected correctly 3. humidistat failure 4. control signal not compatible with the type set 5. value measured out of range	1. close ON/OFF contacts (relay/terminals AB-AB) 2. check the external connection 3. replace the humidistat
the humidifier fills with water without producing steam	1. high steam back pressure 2. fill valve strainer clogged 3. mineral in the fill cup 4. drain solenoid valve leaking	1. check that the steam hose is not kinked or sagging, trapping condensate 2. clean the fill valve strainer 3. clean the fill cup 4. check for 24Vac at the drain solenoid valve and/or drain solenoid replacement
the thermal-magnetic overload switch is activated	1. thermal-magnetic overload switch is under-rated 2. over-current at the electrodes	1. check that the thermal-magnetic overload switch is rated for a current of at least 1.5 times the rated current of the humidifier
the humidifier wets the duct	1. the distributor is not installed correctly (too near the top of the duct or the condensate return is blocked) 2.system over-sized 3.humidifier active when the fan in the duct is off	1. check that the steam distributor is installed correctly 2. decrease the steam production set on the control 3. check the connection of the device (flow switch or differential pressure switch) slaving the humidifier to the ventilation in the duct (terminals AB-AB)
the humidifier wets the floor below	1. the humidifier drain is blocked 2. the supply water or overflow circuit has leaks 3. the condensate drain pipe does not bring the water back to the drain pan 4. the steam hose is not properly fastened to the cylinder	1. clean the drain assembly and pan 2. check the entire water circuit 3. check the correct position of the condensate drain hose in the drain pan 4. check the fastening of the hose clamps on the steam outlet

problem	causes	solutions
Water in the cylinder turns black	1. minerals in the cylinder have overconcentrated and are deteriorating the electrodes.	1. Check for sags & kinks that could trap condensate in the steam hoses that could cause a back pressure on the cylinder. 2. Check the duct static pressure. 3. Check the fill valve and inlet strainer. 4. Check the drain valve operation. 5. Correct installation problems and replace cylinder.
Heavy arcing occurs within hours of startup	1. The feed water contains large amounts of Iron, Copper or other conductive contaminants.	1. Contact the factory for an optional drain timer to force additional drains to control the minerals. 2. If you are using a softener, check the salt being used. If it contains any additives, discontinue use, flush all lines and convert to pure salt or unsoftened water. 3. Check the electrodes in the cylinder to be sure they were not damaged in shipping.
Humidifier continuously fills and drains without producing steam	1. Mineral has bridged between the electrodes. 2. There is back pressure from the steam hoses or duct. 3. The flow regulator in the fill valve is broken or out of place. 4. Water conductivity is very high. 5. Water is foaming excessively.	1. Clean or replace the cylinder. 2. Check the steam hoses for kinks or gullys that might be trapping condensate. 3. Replace the fill valve. 4. Consider using a mix of demineralized water with raw water. 5. Check cylinder - replace if exhausted. If feed water contains silica or nitrates, install a 1 micron water filter.

4 Maintenance

4.1 Periodic checks

- **After one hour of operation:** For both disposable and cleanable cylinders, check that there are no significant water leaks.
- **Every fifteen days or no more than 300 operating hours:** For both disposable and openable cylinders check operation, that there are no significant water leaks and the general condition of the cylinder. Check that during operation there is no arcing between the electrodes.
- **Every three months or no more than 1000 operating hours:** For disposable cylinders, check operation, that there are no significant water leaks and, if necessary, replace the cylinder; for cleanable cylinders, check that there are no blackened parts of the cylinder. If there are blackened parts of the cylinder, check the condition of the electrodes, and if necessary replace them together with the o-rings and the cover gasket.
- **Annually or no more than 2500 operating hours:** For disposable cylinders, replace the cylinder; for cleanable cylinders check operation, that there are no significant water leaks, the general conditions of the cylinder, check that there are no blackened parts of the cylinder: if this is the case, check the condition of the electrodes, and if necessary replace them together with the o-rings and the cover gasket.
- **After five years or no more than 10,000 operating hours:** For both disposable and openable cylinders, replace the cylinder. After extended use or alternatively when using water with a high salt content, the solid deposits that naturally form on the electrodes may reach the stage where they also stick to the inside wall of the cylinder; in the event of especially conductive deposits, the consequent heat produced may overheat the plastic and melt it, and, in more severe cases, puncture the cylinder, allowing water to leak out. As a precaution, check the deposits and the blackening of the wall of the cylinder, and replace the cylinder if necessary.

CAUTION: always disconnect the main power before touching the cylinder in the event of leaks, as current may flow through the water.

4.2 Cylinder maintenance

The life of the cylinder depends on a number of factors, including: the amount and type of mineral in the water, the correct use and sizing of the humidifier, and the output, as well as careful and regular maintenance. Due to the aging of the plastic and the consumption of the electrodes, even an openable steam cylinder has a limited life, and it is therefore recommended to replace it after 5 years or 10,000 operating hours.

Important warnings

The humidifier and its cylinder contain live electrical components and hot surfaces, and therefore all service and/or maintenance operations must be performed by expert and qualified personnel, who are aware of the necessary precautions. Before performing any operations on the cylinder, check that the humidifier is disconnected from the power supply. Remove the cylinder from the humidifier only after having drained it completely using the manual drain button or procedure. Check that the model and the power supply voltage of the new cylinder correspond to the data on the rating label.

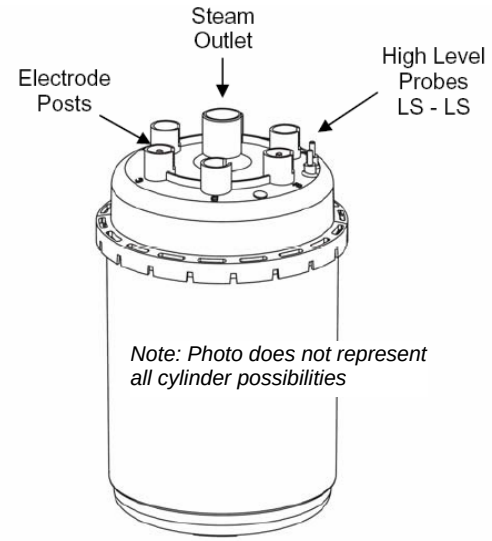
4.2.1 Replacing the cylinder

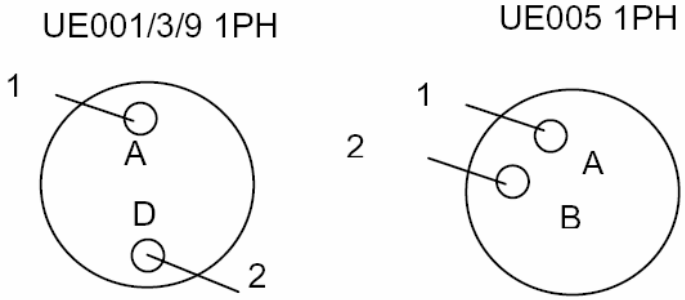
IMPORTANT WARNING: the cylinder may be hot. Allow it to cool before touching it or use protective gloves.
To replace the cylinder:

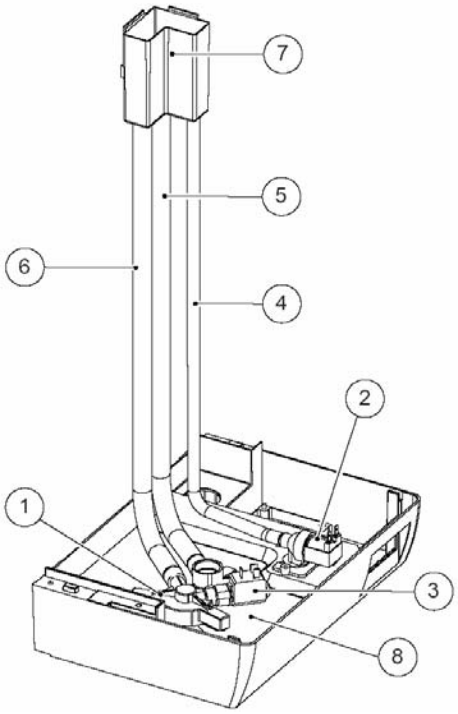
- completely drain the cylinder by pressing and holding the manual drain switch;
- turn the humidifier off and disconnect the main power;
- open and remove the cover;
- remove the steam hose from the cylinder;
- disconnect the electrical connections from the top of the cylinder;
- release the cylinder from its holding bracket and lift it up to remove it;
- install the new cylinder in the humidifier by performing the previous operations in reverse.

WARNING: Electrical connections to the cylinder must be tight or possible fire hazard may result. Threaded nuts on power wires must be connected with 22 to 29 inch-pounds of torque.

Connection of single or three phase UE 001 to 015 models







Maintenance of the other plumbing components

IMPORTANT WARNINGS:

- When cleaning the plastic components do not use detergents or solvents;
- Scale can removed using a solution of Lime-A-Way ®, CLR®, or 5% phosphoric acid, then rinse with water.
- External power must always be disconnected when performing any maintenance on the humidifier.

- **Fill valve:**

After having disconnected the cables and the hoses, remove the valve and check the condition of the inlet filter; clean if necessary using the same cleaning solution as for the steam cylinder and a soft brush.

- **Supply and drain manifold**:

Check that there are no mineral deposits in the cylinder attachment and clean if necessary. Check that the seal (o-ring) is not damaged or cracked; replace if necessary.

Item No.	Description
1	fill/drain manifold
2	fill valve
3	drain valve
4	fill cup fill pipe
5	cylinder supply pipe
6	overflow pipe
7	fill cup
8	drain pan
9	drain column
10	drain pipe
11	drain pump
12	conductivity meter

- **Drain valve**:

Remove the valve body, clean if necessary using the same cleaning solution as for the steam cylinder and a soft brush.

- **Drain pan**:

Clean the pan of any mineral deposits and check that the water flows freely from the pan to the drain at the drain valve.

- **Supply, fill, overflow pipes**:

Check that these are clear and clean or replace if necessary.

IMPORTANT WARNING: after having replaced or checked the plumbing, check that components have been reconnected correctly with the proper seals. Re-start the humidifier and perform a number of supply and drain cycles (from 2 to 4), then check for any water leaks.

4.3 Replacement Parts

4.3.1 Single Phase Humidifiers

Standard spare parts

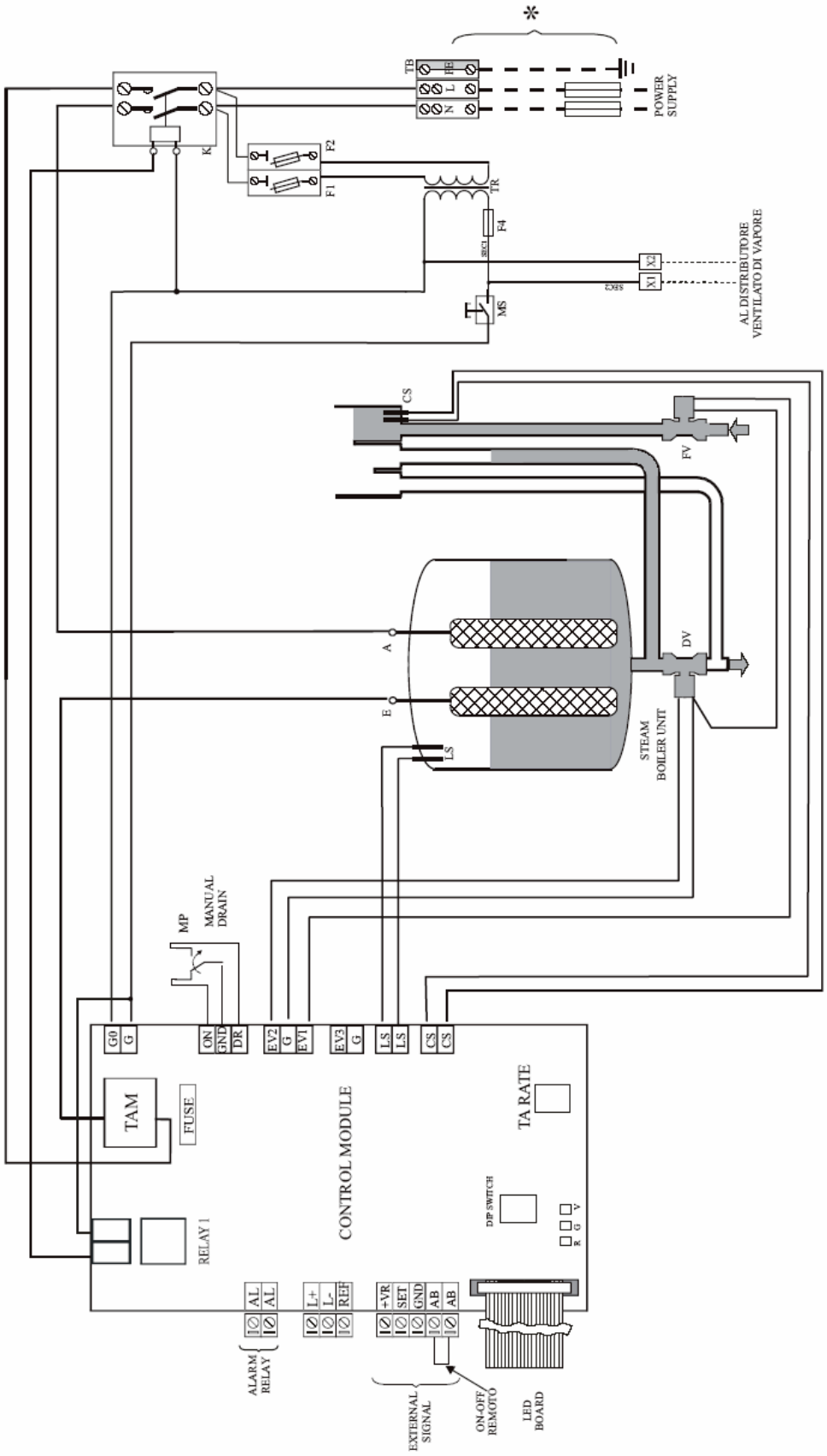
	Model	
	UE003	**UE005**
Water parts		
fill cup + conductivity meter	18C453A008	18C453A008
fill valve kit	1312085AXX	1312085AXX
drain valve kit	13C499A030	13C499A030
internal pipe kit	UEKT00000S	UEKT00000S
Non-openable cylinders		
208/230 VAC 1~, conductivity 350-1250 µS/cm	BL0S1F00H1	BL0S2F00H0
Electrical parts		
Contactor	0203000AXX	0203001AXX
power transformer: 208/230/460/575-24 Vac	09C565A002	09C565A002
fuse holder	0606192AXX	0606192AXX
fuse	0605319AXX	0605319AXX
Electronic parts		
LED display ver.C-P	UEKDP00000	UEKDP00000
control board ver.C-P **	UEP0000000U00	UEP0000000U00

Spare parts for special applications

	Model	
	UE003	**UE005**
Non-openable cylinders		
200/230 VAC 1~, conductivity 125/350 µS/cm	BL0S1E00H1	BL0S2E00H0
Openable cylinders		
200/230 VAC 1~, conductivity 125/350 µS/cm		BLCS2E00W0
200/230 VAC 1~, conductivity 350/1250 µS/cm		BLCS2F00W0
electrode kit (200/230 VAC 1~, 125/350 µS/cm)		KITBLCS2E0
electrode kit (200/230 VAC 1~, 350/1250 µS/cm)		KITBLCS2F0
electrode gasket kit		KITBLC2FG0

5 Wiring Diagrams

UE003, UE005 Single Phase



6 Technical Specifications

		UNIT MODEL NUMBER CAPACITY AMPERAGE WATTAGE	
VAC Phase	**Factor**	**UE003**	**UE005**
208 (U) 1	Lbs/hr kg/h Amps KW	6.6 3 10.8 2.25	11 5 18 3.75
230 (D) 1	Lbs/hr kg/h Amps KW	6.6 3 9.8 2.25	11 5 16.3 3.75
Height	In. (mm)	24.4 (620)	
Width		14.4 (365)	
Depth		10.8 (275)	
Dry weight	Lbs. (kg)	35.3 (16)	
Wet weight	Lbs. (kg)	41.9 (19)	
Water Feed	gpm (l/min)	0.16 (0.6)	
Water Inlet	In. (mm)	1/4" O.D. Comp.	
Max. Drain	gpm (l/min)	1.32 (5)	
Drain Size	In. (mm)	1-5/8" hose (40)	
Min. Drain	In. (mm)	3/4 (19)	
Cylinders		1	
Steam outlets	mm	22mm x 1	30mm x 1
Pressure	In. WC (Pa)	8" WC (2000)	6.4" WC (1600)
Control		24 VAC 50/60 Hz., 30 VA	
Operating	°F (°C)	34-140 °F (1-40°C) 10-60 %RH	
Water Type		15 - 116 psi (1-8 bar) 125-1250 MicroMhos conductivity	
Ventilated steam distributor		VSDU0A0001 24 Volt 112 CFM (192 m3/h) 30 dBA 10 to 104°F (-10 to 40°C) 10 to 60%RH	

Limited Warranty

All products manufactured by CAREL USA 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 and 1 month from the date of shipment (The OEM controls warranty is 2 years from date of manufacture), humidifier replacement parts warranty is 90 days from date of Invoice. Warranty replacement parts are warranted for remainder of original unit warranty or 90 days, whichever is longer, 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 USA technician. Any product or part that is found to be defective will, at the option of CAREL USA be replaced or repaired. CAREL USA 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. Products not included in this warranty are NTC and PTC probes, transformers (TRA series), and routinely replaceable parts such as steam cylinders and gaskets. CAREL USA 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. The Warranty will not be considered valid if a product is damaged due to negligence, mishandling or misapplication, or if the product label is missing. CAREL USA will attempt to repair or replace the products within two (2) months of the receipt of the returned goods.

CAREL

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