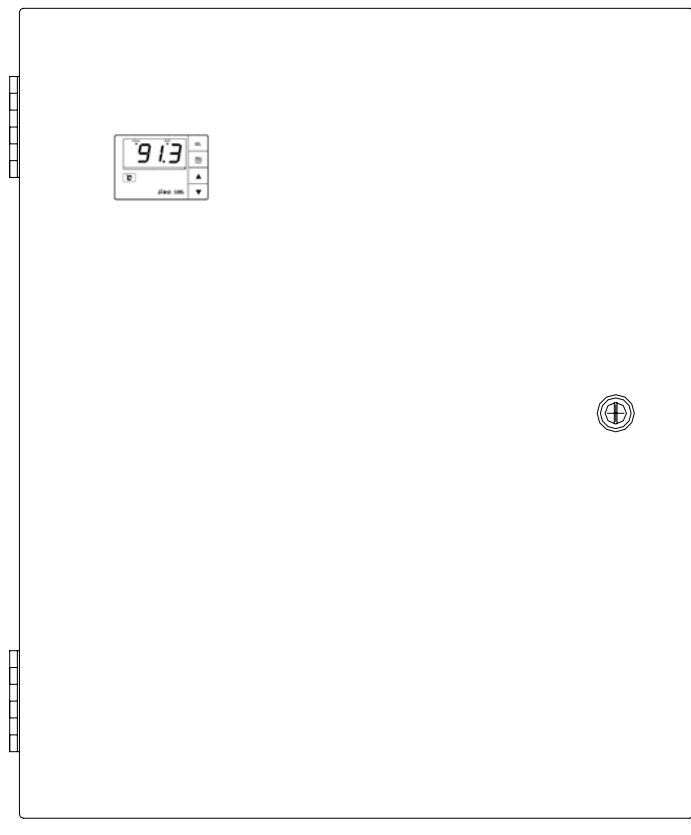
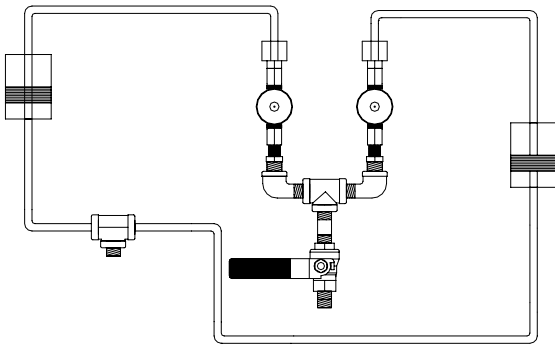


MC

Room Atomizing Humidification System (On/Off Operation)

**Installation
Operation
& Maintenance
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 earth connected, 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.

Table of Contents

Installation Instructions	5
Step 1 Installation Rules.....	5
Step 2 Assemble atomizing head assemblies	6
Step 3 Plan system layout (assistance is available from Carel USA)	7
Step 4 Mount the cabinet.....	9
Step 5 Connect air and water	10
Step 6 Connect electric power.....	10
Step 7 Mount and wire sensors & safeties	11
Step 8 Installation Checklist	12
Step 9 Startup Procedures	13
Operating the MC controls.....	15
Keyboard COMMANDS	15
Accessing parameters:.....	15
Changing the setpoint:.....	15
P and C Parameters:.....	15
Maintenance Instructions.....	18
Trouble Shooting Instructions	19
Alarms.....	19
Other Trouble Shooting.....	20
Parts of Atomizing Heads	22
Parts of Control Cabinet Control Sections	23
Wiring Diagrams	25
Technical Specifications	26

About Support Systems:

The MC system requires clean compressed air and water to operate efficiently and with minimal maintenance.

■ **Compressed Air Requirements:** 0.15 CFM per pound of water per hour is required. DO NOT UNDERSIZE AIR COMPRESSORS. The system cabinets should be fed with 100 psi of compressed air. Internal regulators are used to reduce it to the required discharge pressure to the atomizing heads (30 psi at manifold ends). Compressor after cooler, moisture separator and trap, and 0.1 micron coalescing filter are the minimum requirements. Oil from compressed air will cause excessive maintenance on the atomizing heads. Size air piping to avoid excessive pressure drops.

■ **Water Requirements:** The system requires 5 psi of clean water at the atomizing manifolds. 20 psi to the cabinet is the recommended minimum. If water lines are old, steel, or galvanized, then a water filter is required prior to the control cabinet. NEVER use steel or galvanized pipe within the system.

How The MC Works

The MC atomizing system is built around the exclusive atomizing nozzle design developed by Carel LLC over 10 years ago. This nozzle has many exclusive features:

- All stainless steel construction
- Special piston lubricant that avoids liberation of ions
- Most efficient design of air use versus droplet size
- Simple design with extremely low maintenance

The MC atomizing head uses what is called “Supersonic Vacuum Implosion” technology. This technology produces small droplets using minimal compressed air with relatively low pressures (30 psi air, 5 psi water). Air and water regulators and solenoid valves in the control cabinet control the pressures and flow to the nozzles.

On a call for humidity, the air valve is opened and air flows to the nozzles. When the air pressure rises high enough, it will push back the pistons in the atomizing nozzles, pulling back the cleaning needle and opening the water seat, allowing water to then flow out of the nozzles and be atomized. The nozzles are failsafe in that if the air pressure is too low, the pistons will remain closed and prevent water flow.

In operation, compressed air exits the front of the nozzle through a precision metered orifice which surrounds the water orifice. As the air exits at supersonic speed, it produces a high vacuum around the water orifice. Water is drawn into the vacuum and supercompressed. The water is then instantly accelerated to supersonic speed and decompressed, tearing it into tiny droplets and also distorting the droplets wildly. This distortion causes microingestion of the surrounding atmospheric air, enhancing the speed at which the droplets then evaporate.

LIMITED WARRANTY

All products manufactured by Carel USA, LLC 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 (The OEM controls warranty is 2 years from date of manufacture), 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 USA technician. Any product or part that is found to be defective will, at the option of Carel USA, LLC be replaced or repaired. Carel USA, LLC 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, LLC 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.

Installation Instructions

Step 1 Installation Rules

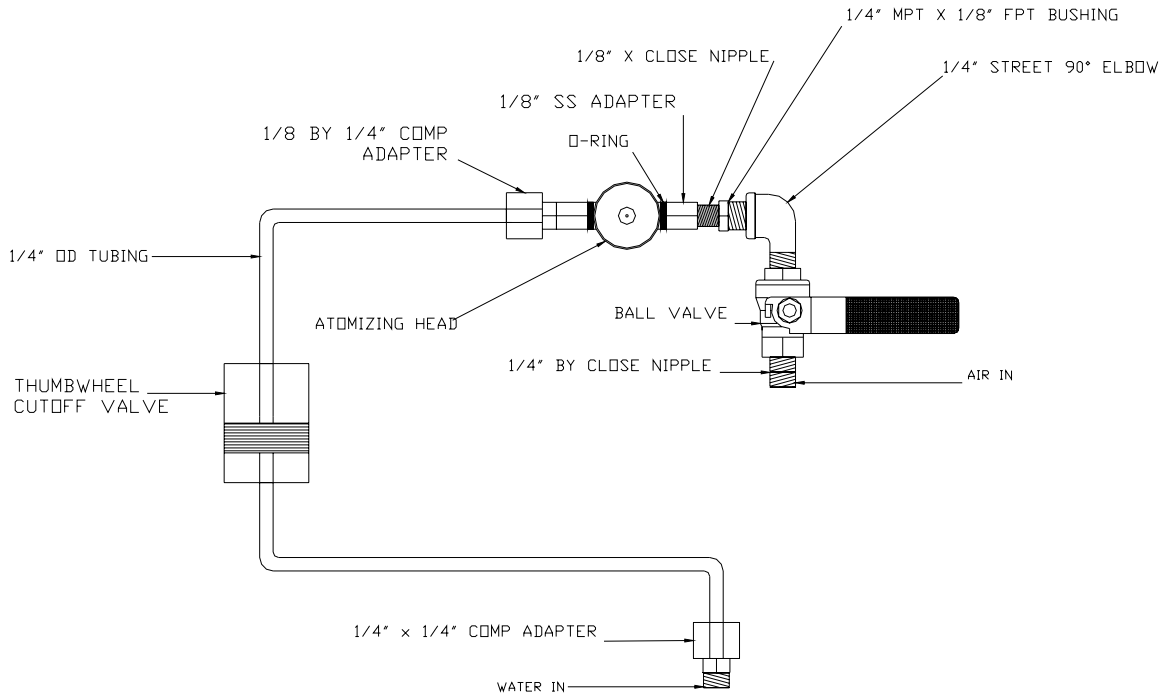
The following general rules need to be applied to any MC installation. Carel will not take responsibility for any system installed that does not follow these rules and warranty may be voided.

1. **All atomizing heads on a system must be at the same elevation.** Due to the low water pressure involved, a deviation in elevation of heads of more than 3 inches may be enough to cause the lower heads to spray heavy while the higher heads don't spray at all.
2. **Keep minimum pressure drops in the air and water piping.** Always use minimum 1/2" I.D. water lines. Use minimum 1/2" I.D. air lines up to 200 lbs/hr in capacity and/or when the total system layout is less than 100 feet. Use minimum 3/4" I.D. air lines when the system capacity is over 200 lbs/hr and/or the total system layout is more than 100 feet. Avoid excessive use of sharp 90° elbows (use sweep elbows or 2-45° elbows when possible) - neatness is secondary to function. **NOTE: It is the installer's responsibility to insure that the air and water lines are sized to provide proper pressure and volume to the cabinet and then to the atomizing heads.**
3. **Avoid vertical bends in air and water system piping.** These could trap dirt, water or air and prevent proper blowout of the lines during maintenance.
4. **Heads should be mounted above the air and water lines.** This insures that sediment and debris will not flow into the atomizing heads to cause maintenance.
5. **Position atomizing heads to avoid direct discharge onto obstructions.** As a rule of thumb, the atomizing heads discharge a plume of mist up to 15 feet long and to 4 feet in diameter. Anything in this plume has the potential to get wet.
6. **Position the heads to allow access for maintenance.** Position over aisles or along walls where access is easy, rather than over equipment and racks.
7. **The control cabinet should be located at least 3 feet below the elevation of the atomizing heads.** This is to allow a column of water pressure against the water regulator contained in the control cabinet to allow controllability.
8. **Size the compressor properly.** 0.15 CFM (0.12 SCFM) per pound of water per hour is required. **DO NOT UNDERSIZE AIR COMPRESSORS.** The system cabinets should be fed with 100 psi of compressed air. Internal regulators are used to reduce it to the required discharge pressure to the atomizing heads (30 psi at manifold ends).
9. **Compressed air must be clean and without oil.** Compressor after cooler, moisture separator and trap, and 0.1 micron coalescing filter are the minimum requirements. Oil from compressed air will cause excessive maintenance on the atomizing heads, causing a premature buildup of mineral around the water nozzle tip and in the front air orifice of the atomizing heads, blocking air flow and causing a heavy spray.
10. **Insure proper water supply.** 20 psi to the cabinet is the recommended minimum (100 psi maximum). If water lines are old, steel, or galvanized, then a water filter is required prior to the control cabinet. **NEVER** use steel or galvanized pipe within the system.

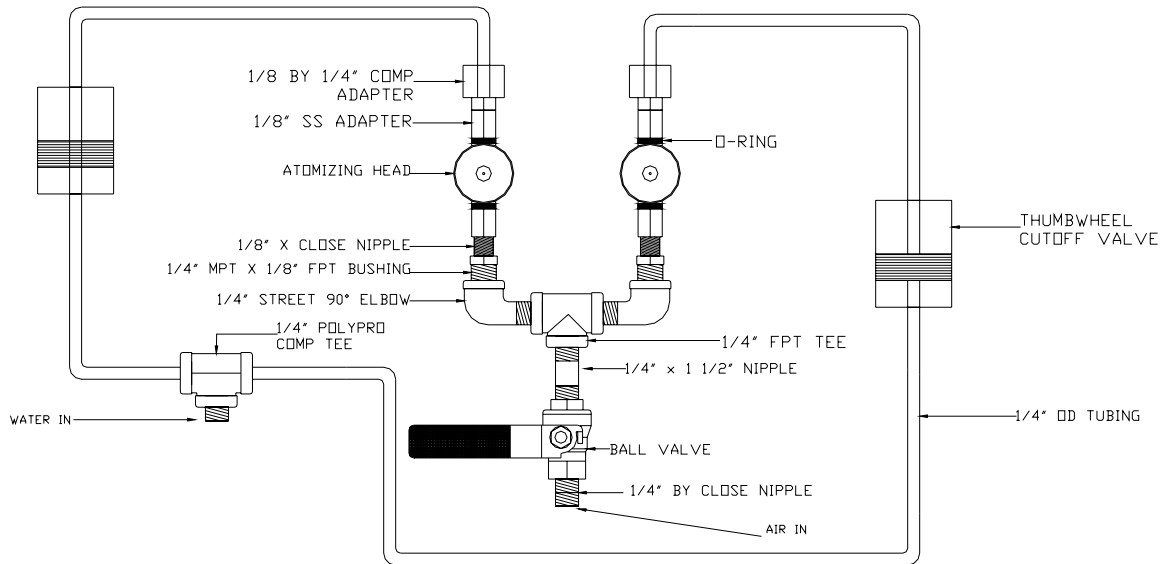
Step 2 Assemble atomizing head assemblies

Assemblies are shipped preassembled except for connection of the plastic water lines. The supporting air and water lines, and tees are supplied by the installer. All threaded fittings on the head assemblies for air and water are 1/4" MPT.

Single Head Assembly



Double Head Assembly



Installation, Operation, Maintenance Manual

Step 3 Plan system layout (assistance is available from Carel USA)

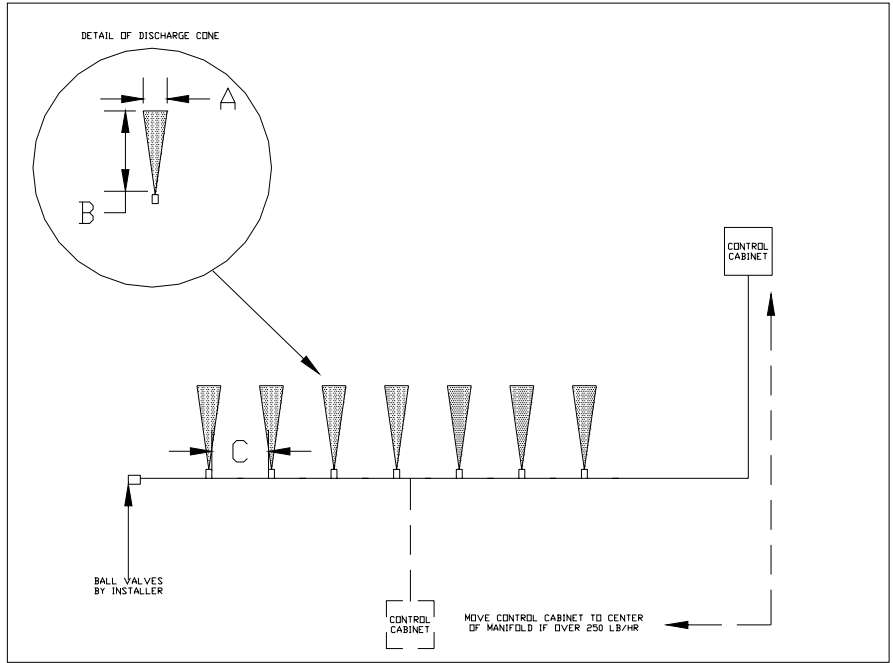
First, determine where the atomizing heads can be best located to maintain necessary clearances per the following diagrams. The atomizing heads may be located along a wall with all heads discharging in the same direction,

RECOMMENDED MINIMUM DISTANCES
(INCHES)

LBS/HR	A	B	C
6	30"	180"	30"
9	30"	192"	30"
12	36"	204"	36"
15	48"	240"	48"

RECOMMENDED
MINIMUM INSTALL
HEIGHT

LBS/HR	HEIGHT (FEET)
6	8'
9	8'
12	15'
15	20'



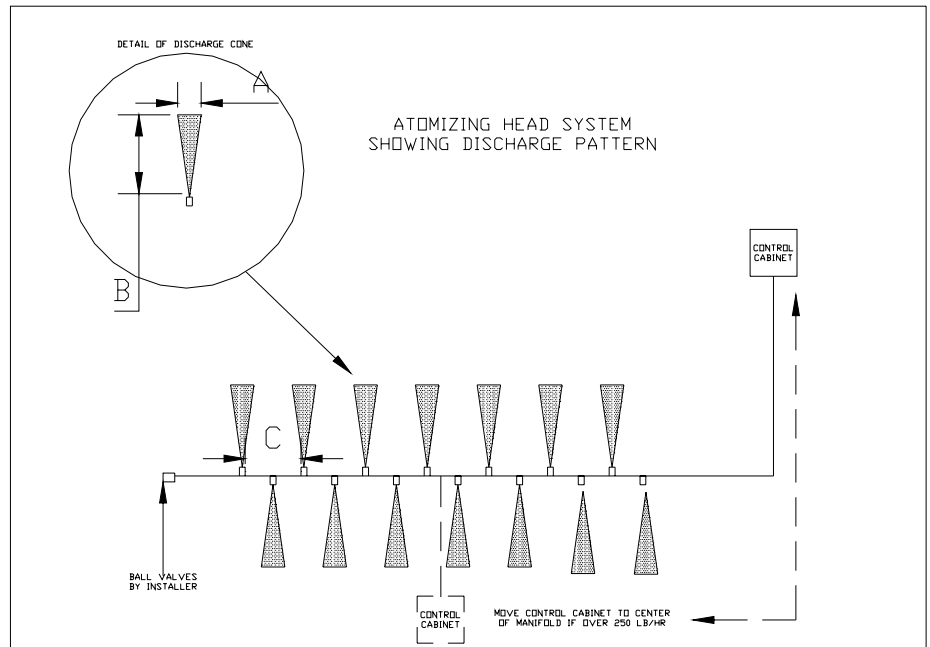
or down the center of the building with every other head discharging in opposite directions,

RECOMMENDED MINIMUM DISTANCES
(INCHES)

LBS/HR	A	B	C
6	30"	180"	30"
9	30"	192"	30"
12	36"	204"	36"
15	48"	240"	48"

RECOMMENDED
MINIMUM INSTALL
HEIGHT

LBS/HR	HEIGHT (FEET)
6	8'
9	8'
12	15'
15	20'



NOTE: The installer is responsible for the final position of the atomizing assemblies. Assemblies may have to be moved after startup if obstructions do not allow clear discharge.

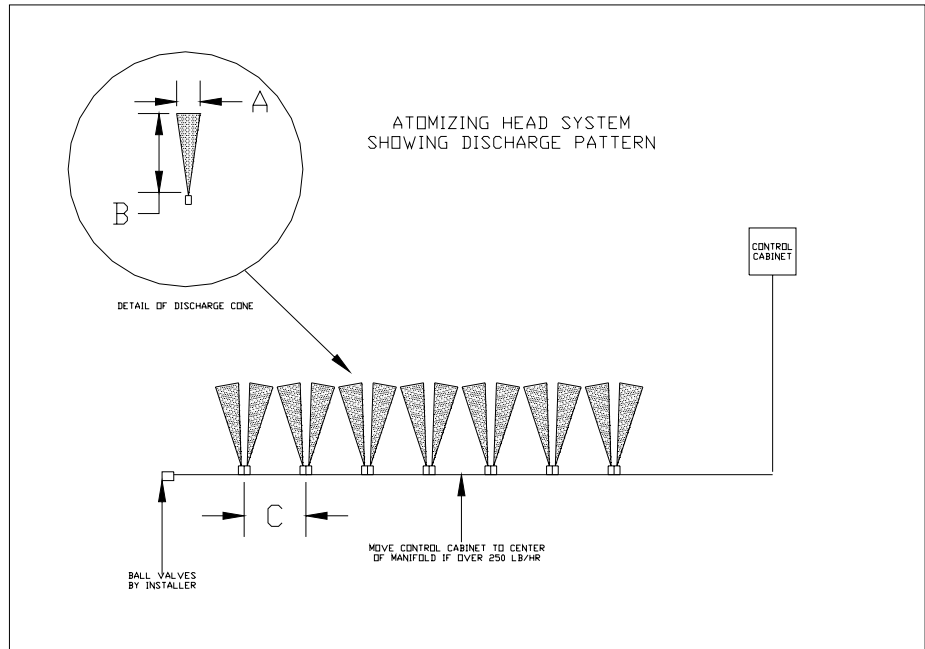
or double head assemblies discharging in the same direction (or with every other head opposite).

RECOMMENDED MINIMUM DISTANCES (INCHES)

LBS/HR	A	B	C
6	30"	180"	60"
9	30"	192"	60"
12	36"	204"	72"
15	48"	240"	96"

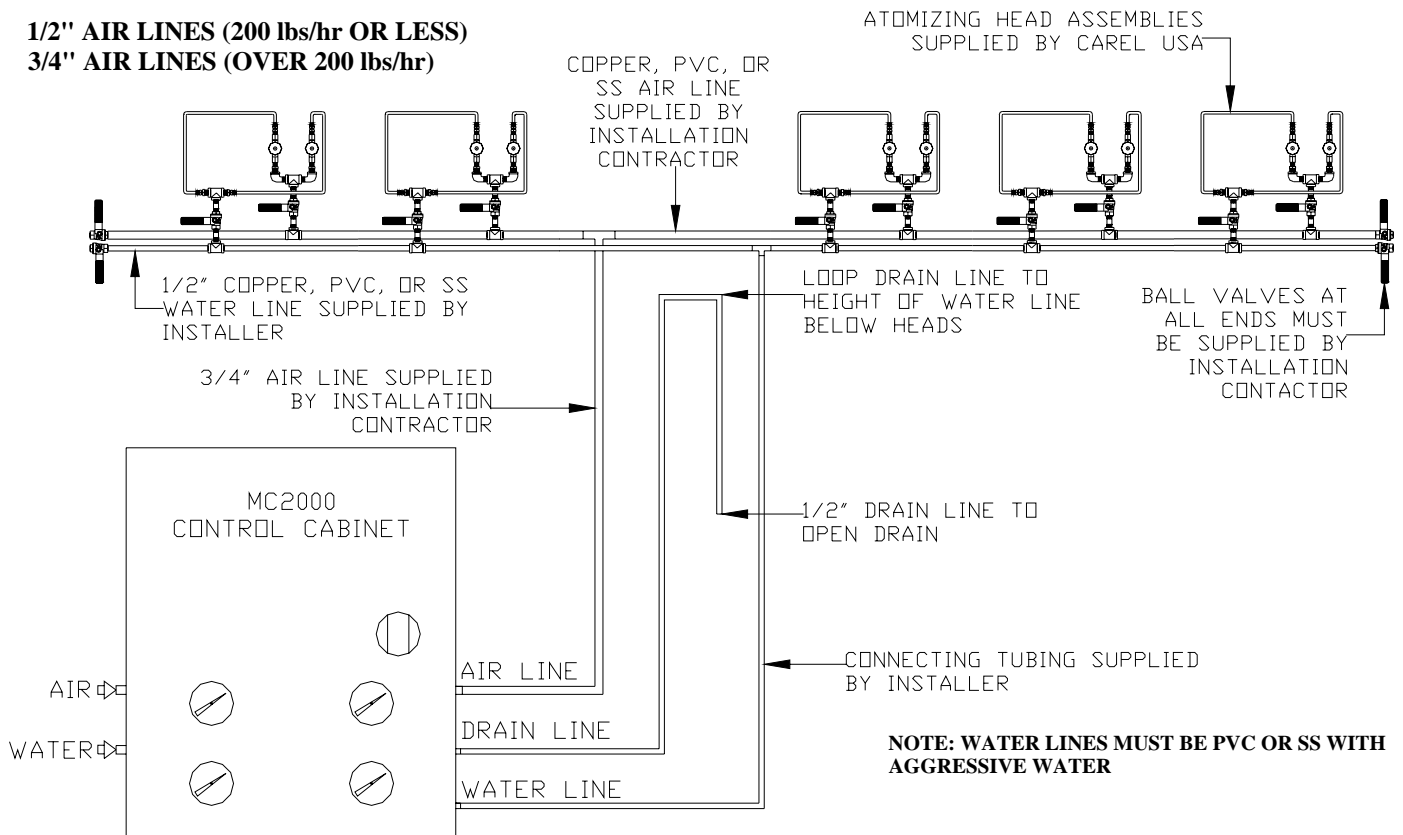
RECOMMENDED MINIMUM INSTALL HEIGHT

LBS/HR	HEIGHT (FEET)
6	8'
9	8'
12	15'
15	20'



The entire system layout then should resemble the following:

1/2" AIR LINES (200 lbs/hr OR LESS)
 3/4" AIR LINES (OVER 200 lbs/hr)



NOTE: You can feed the system from the end when the capacity is under 200 lbs/hr and shorter than 100 feet in length. Over 200 lbs/hr or longer than 100 feet, feed from the center as shown. Installer to provide ball valves on all ends, along with a 0-100 psi pressure gauge on the air line.

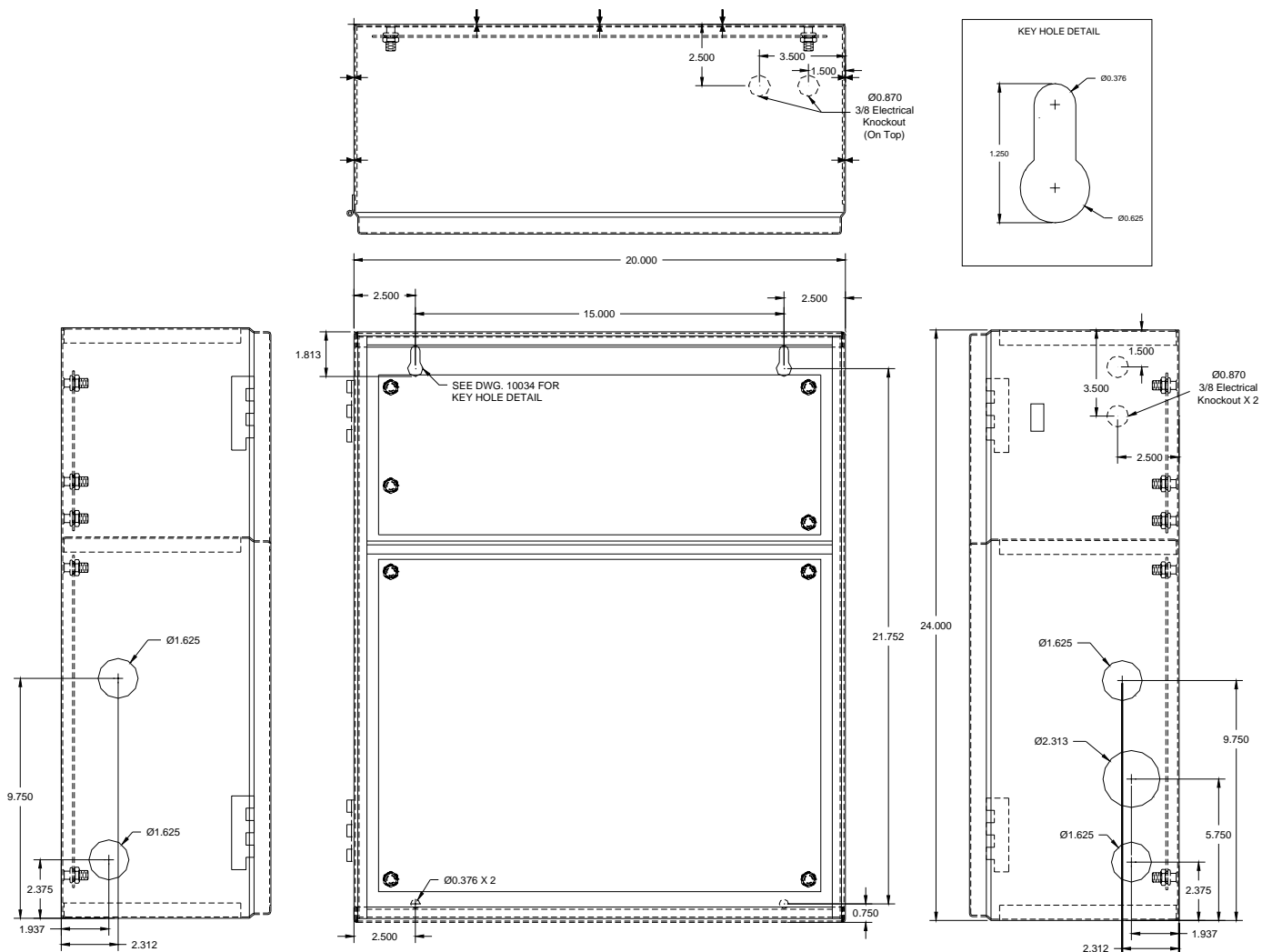
Step 4 Mount the cabinet

The control cabinet should be mounted to a solid surface at a convenient height. However, the cabinet should not be located above the atomizing heads. Optimum installation is with the control cabinet at least 3 feet or more below the atomizing heads.

Air and water inlet connections are on the left side of the cabinet, outlet connections on the right, so leave at least 2 feet clearance on both sides for these.

Cabinet must be mounted level and indoors. Minimum temperature = 40°F, maximum temperature and humidity = 120°F and 85%RH noncondensing.

Dimensions and mounting holes for the cabinets are as follows.



Step 5 Connect air and water

The air and water ball valves shown at right are supplied loose with the cabinet. Solder a piece of 1/2" copper tube (no longer than 2') to the 1/2" ball valve (supplied). Slip tube in top hole and 5/8" compression fitting then tighten. Cement a piece of 1/2' schedule 80 PVC pipe (no longer than 2') to the 1/2" union PVC ball valve (supplied). Slip pipe in bottom hole and cement to the union fitting in cabinet.



On the inlet side (left), the top connection is for air, bottom one is for water. On the outlet side (right) the middle connection is the drain.

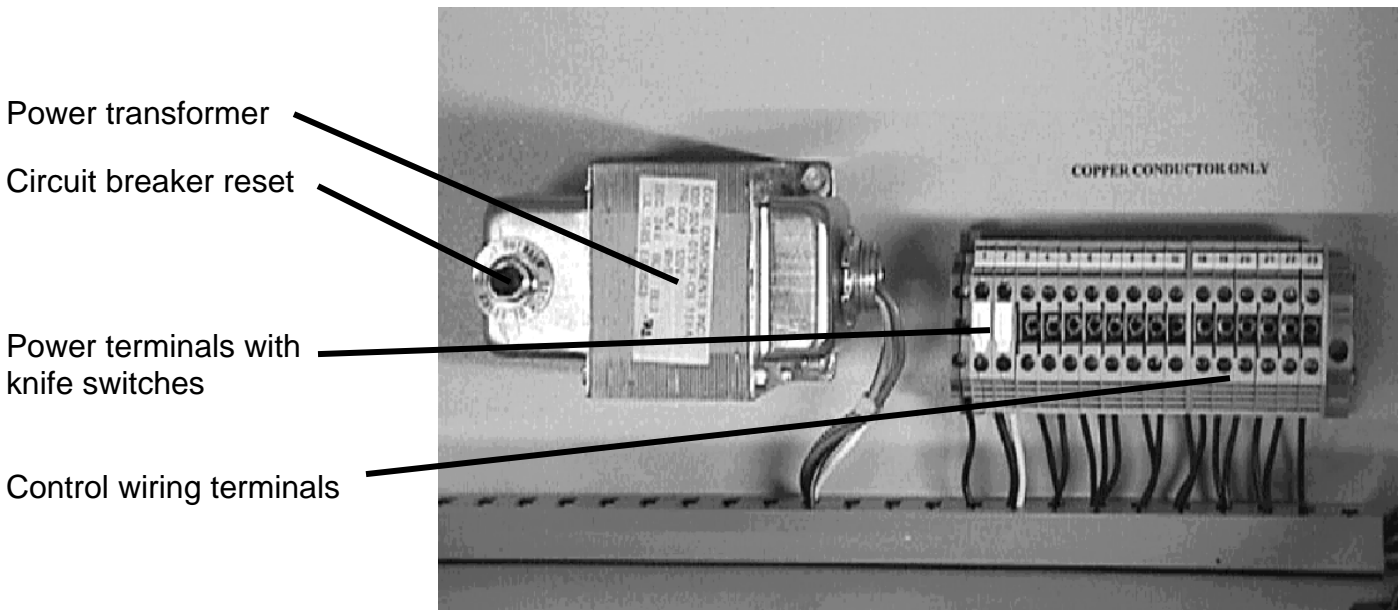
Use 1/2" water lines to feed the cabinet and from the cabinet to the atomizing manifold. Use 1/2" air lines when the system is under 200 lbs/hr and the piping distance is less than 100 feet. Use 3/4" air lines when the system is over 200 lbs/hr and/or the piping distance is longer than 100 feet. If the piping has excessive elbows and is more than 100 feet, then use 1" air lines.

NOTE: Use two (2) wrenches on all fittings to prevent twisting of the fittings inside the cabinet, which can cause them to leak.

NOTE: It is the installer's responsibility to size the air and water lines to minimize the pressure drop and provide 100 psi air and 20 psi water minimum to the cabinet in sufficient volume for system operation.

Step 6 Connect electric power

- In the top of the cabinet are the electrical connections. Connect 110 VAC to terminals 1 and 2 and the ground wire to the green and yellow ground terminal. Cabinet requires a 5 Amp service.
- The terminals have knife blade disconnects. The power transformer has an internal circuit breaker.



Installation, Operation, Maintenance Manual

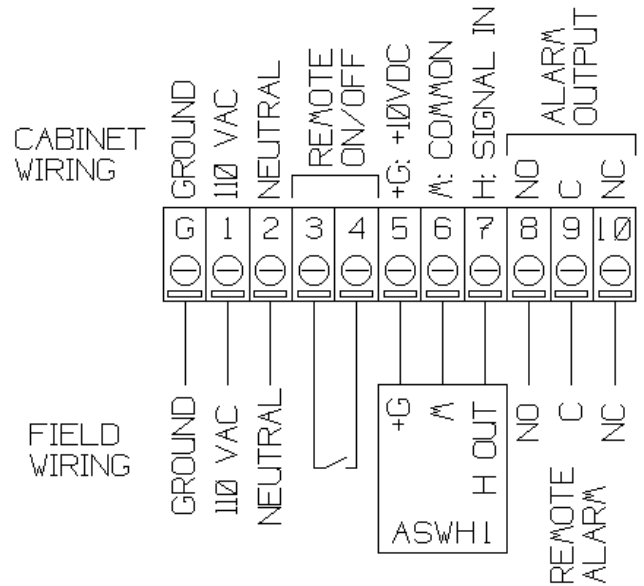
Step 7 Mount and wire sensors & safeties

The humidity sensor must be located on an inside wall or post, at a convenient height. Locate so that no air streams are blowing over it, and that direct sunlight does not hit it. The room sensor may also be mounted directly to the control cabinet (optional) if the cabinet is in the space being humidified.

Connect Control Wiring: Wire the control cabinets according to the wiring diagrams supplied with the cabinets themselves. Wiring diagrams in this manual are for reference only.

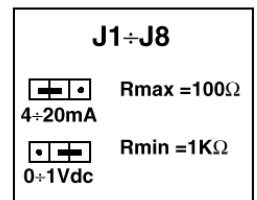
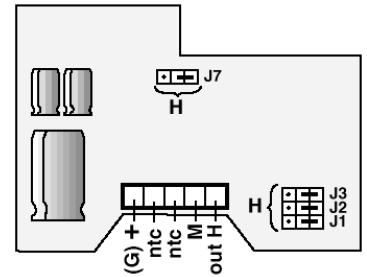
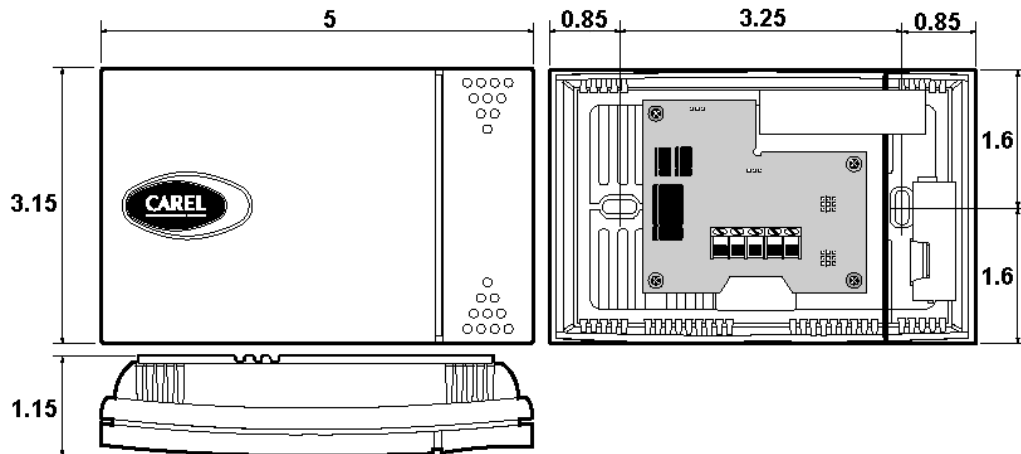
NOTES:

1. If the REMOTE ON/OFF is not used, then a jumper must be placed between terminals 3 & 4.
2. Sensor input is 0-1 Vdc.
3. The alarm relay is a dry contact SPDT 5 Amp relay, 250 Vac maximum.
4. All control wiring (terminals 3 through 10) are low voltage (less than 50 V).



DPWC Wall Humidity Sensors

Model	Description	Humidity:
<i>Humidity (0-1 VDC or 4-20 mADC)</i>		Thin film capacitor Linear 0-1 Vdc or 4-20 mAdc from 10 to 90%RH
DPWC111000	Wall Humidity sensor (replaces SHWOOP and ASWH100000)	Accuracy: +/- 3%RH from 20 to 90%RH calibrated at 55%RH and 25°C (77°F) +/- 5%RH above 90%RH and below 20%RH
		Response time: 60 seconds
		Power: 12 to 24 Vac/dc or +12 to -12 Vdc
		Housing: Wall: ABS with glass fiber fill
		Certifications: Calibrated to NIST traceable humidity/temperature standard, CE Approved



Step 8 Installation Checklist

The following checklist should be reviewed BEFORE contacting your CAREL representative for system start-up:

- _____ 1. Proper electric power is connected to the control cabinet. Controls light when power is turned on by the on/off switch.
- _____ 2. All plumbing connections are complete and tested for leaks. NOTE: Flush air & water lines before cabinet.
- _____ 3. All sensors are installed and connected. Wiring tested by turning on power by the on/off switch on the control cabinet and verifying proper humidity readouts.
- _____ 4. All computer and/or DDC wiring is completed to the control cabinet and the signal is verified.
- _____ 5. Air compressor is installed and has been started up. The compressor has a minimum of an aftercooler, moisture separator and trap, and a 0.1 micron coalescing filter. (Oil in the heads will degrade performance and drastically increase maintenance.) Check compressor size - should be sized to deliver 0.15 CFM per lbs/hr of capacity.
- _____ 6. Drain from cabinet is connected to an open drain and looped to height of nozzles or no more than 6" below supporting water line.
- _____ 7. All air and water lines and manifolds are terminated with removable plugs. Air gauge on end of air line.
- _____ 8. All atomizing heads are connected to the air and water manifolds properly. Verify air to air and water to water.
- _____ 9. Installation, plumbing and wiring matches layout drawings and specifications.
- _____ 10. Supply water is connected and available. Water treatment system has been started.

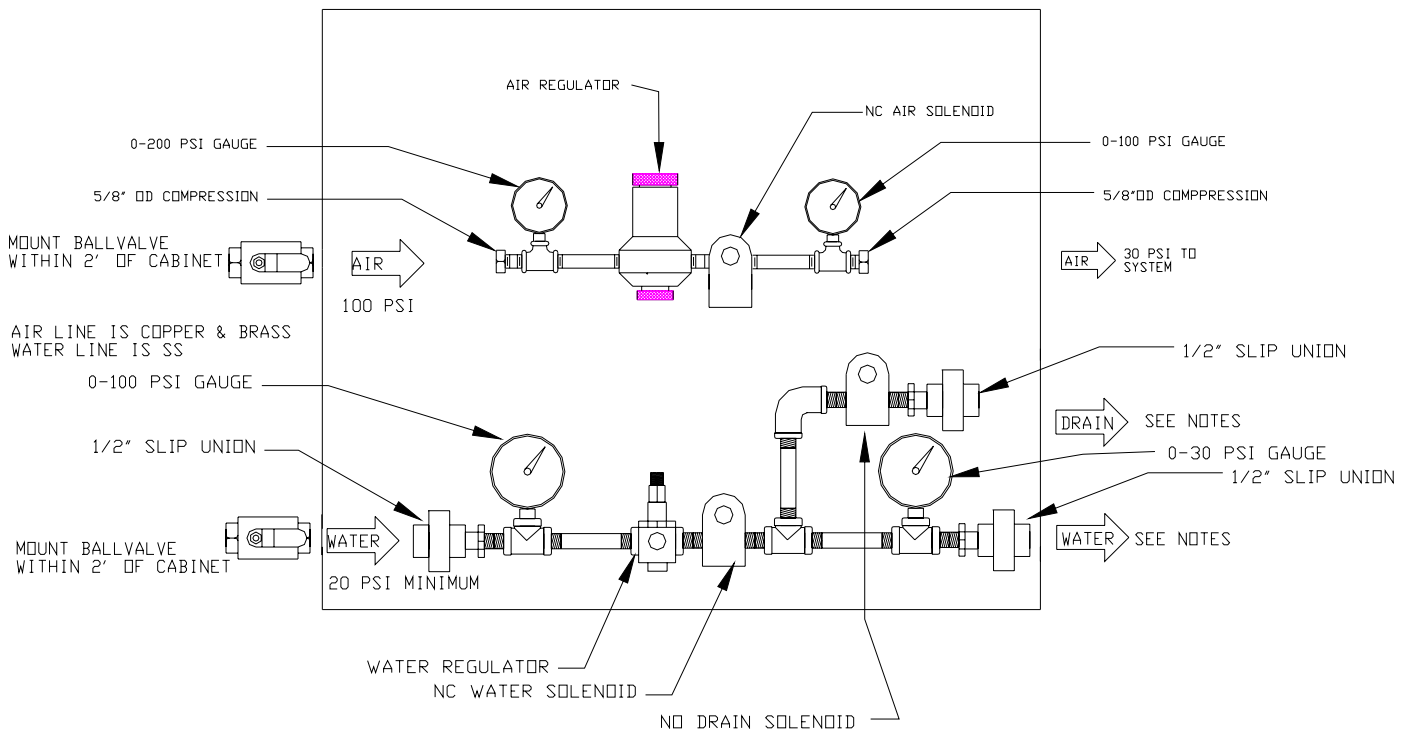
Checklist checked by: _____ **Date checked:** _____

NOTE: The above checklist MUST be returned before factory startup is begun. If any of the above items are found not to be ready at time of startup, a second startup charge may be assessed.

Step 9 Startup Procedures

You will need: A VAC/VDC multimeter, a set of wrenches, a flat blade screwdriver, and a rag and bucket.

- **Close all atomizing head air and water valves.** It is extremely important that no dirt gets into the atomizing heads during startup.
- **Clean main air and water supply lines to the control cabinet.** With the air and water shut off at their source, break the unions on the intake side of the control cabinet. Put on safety glasses. Place a cloth over the open ends of both the air and water lines to catch any flying debris. Slowly open the air and water valves respectively and bleed the lines until all dirt has been removed.
- **Clean all air and water manifolds.** Remove the line plugs from the ends of the air and water manifolds. Place a cloth and/or bucket over the open ends of both the air and water lines to catch any flying debris. Turn on the system power at the control cabinet and activate the system by adjusting the controller humidity setpoint to a high setting. Adjust air pressure to 30 psi, and water pressure to 5 psi to the manifold. Bleed the lines until all dirt has been removed from both lines and all air is out of the water lines. Shut off the system at the cabinet and reinstall the plugs at the ends of the lines.
- **Open all valves at the heads.** With the system OFF, open all air and water valves at the heads. Do not throttle the valves to any of the heads. **DO NOT** adjust the screw in the back of any of the heads without factory instruction.



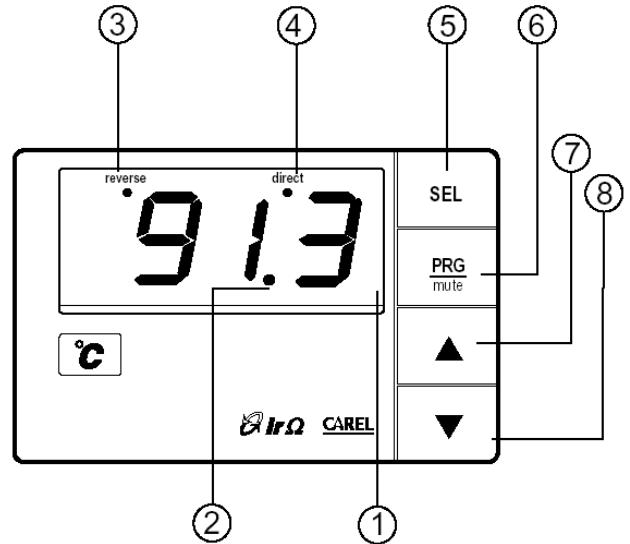
- **Start the system.** If there is no control device between terminals 3 & 4, install a jumper across these terminals. With power to the system, flip the on/off switch to ON. If the system does not turn on, note the %RH displayed, then press and hold the SEL button for at least 5 seconds until "St1" appears. Press ▲ to increase the setpoint above the displayed value and then press SEL to lock in the setting. The system should turn on. Adjust the air pressure to 30 psi at the end of the air manifold, note the cabinet pressure reading. Adjust the water pressure until you see visible spray out of each nozzle, note the cabinet pressure reading. Typically the water pressure at the heads is between 2 and 5 psi. The water pressure may be adjusted up or down slightly to achieve the heaviest spray possible without wetting items near the heads or producing any fallout of mist.

STARTUP IS COMPLETE - REFER TO OPERATING THE MC CONTROLS.

Operating the MC controls

The MC system uses the very latest Carel controls technology known as the IRDRW40000 parameter controller. There is a backlit, 3 character LED display and 4 user interface buttons.

- 1: Display
- 2: Decimal LED
- 3: Flashes when a relay is in reverse acting mode
- 4: Flashes when a relay is in direct acting mode



Keyboard COMMANDS

Button	Description
SEL	Displays and allows you to modify the set point.
PRG mute	If pressed for at least 5 seconds, allows you to enter the parameter setting mode. In the event of an alarm, silences the alarm and resets it. When programming, completes the programming mode and stores all values.
▲	Increases the value of a parameter or set point.
▼	Decreases the value of a parameter or set point.
SEL + PRG mute	If pressed for 5 seconds, allows you to enter the password and the configuration parameters (having a "Cxx" type code).

Accessing parameters:

Changing the setpoint:

Hold down the SEL button until "St1" appears. Release the SEL button and the setpoint 1 value will be displayed. Press ▲ or ▼ to modify the value, then press SEL again to confirm the value.

P and C Parameters:

P* parameters - press and hold the PRG button for at least 5 seconds to display 1st P parameter

C* parameters - press and hold SEL + PRG buttons for at least 5 seconds. Then enter "77"

NOTE: C parameters should not be changed without factory approval.

After entering P or C parameters, press ▲ or ▼ to sequence through the parameters. To change a parameter, press SEL to display the parameter value, then ▲ or ▼ to increase or decrease the value. Press SEL again to accept the new value and return to the parameter codes. When all changes are completed, press PRG to lock in the changes and return to operating mode.

NOTE: If you do not press any buttons for 10 seconds, the controller will revert to old settings and return automatically to operating mode.

Advanced set-up: list of the parameters

The table below lists all the standard parameters of the MC controller. To enter the parameter field, follow the instructions above. In the last column is a listing of each parameter's Default and Factory settings.

Parameter	Description	Min.	Max.	Def. / Fact.
Main Setpoints				
St1	Set Point 1	min.sensor	max.sensor	20 / 50
St2	Set Point 2 (Modes 6,7,8,9)	min.sensor	max.sensor	40
C0	Mode of operation	1	9	2 / 5
Setting Differentials				
P1	Diff. of Set Point 1 (absolute value)	0.1	99.9	2 / 5
P2	Diff. of Set Point 2	0.1	99.9	2 / 2
P3	Dead-zone Diff. (Modes 3,4,5) (absolute value)	0	99.9	2 / 0
C4	Authority. NTC models only with Mode 1 or 2 and C19=2, 3 or 4	-2	2	0.5
C5	Control action: 0=Proportional (P) 1=Prop+Integral (P+I)	0	1	0 / 0
Outputs				
C6	Delay between energizations of 2 different relays	0	999"	5" / 0
C7	Minimum time between energizations of the same relay	0	15'	0 / 0
C8	Minimum off time of the same relay	0	15'	0 / 0
C9	Minimum on time of the same relay	0	15'	0 / 0
C10	Status of the outputs in the event of sensor alarm: 0 = all relays 1 = all relays energised 2 = relays in Direct mode energised, disenergized the others 3 = relays in Reverse energised, disenergized the others	0	3	0 / 0
C11	Output rotation: (Modes 1,2,6,7,8 only) 0 = no rotation 1 = standard rotation 2 = rotation 2+2 (compr. on relays 1 & 3) 3 = rotation 2+2 ...output models only (A and Z) 4 = rotation of outputs 3 and 4 (no rotation for 1 and 2) 5 = rotation of outputs 1 and 2 (no rotation for 3 and 4) 6 = separate rotation of coupled outputs: 1-2 and 3-4 7 = rotation of outputs 2,3,4 (no rotation for out 1)	0	7	0 / 0
C12	time of PWM cycle (s)	0.2"	999"	20" / 20"
Sensor				
C13	Sensor type: 0=4-20, 1=0-20; 0=K T/c, 1= J T/c NTC: if C13=1 the instrument displays NTC2 but the control action depends on NTC1	0	1	0
P14	Sensor calibrat. or offset	-99	99.9	0 / 0
C15	Min.value for inputs I andV	-99	C16	0 / 0
C16	Max.value for inputs I andV	C15	999	100 / 100
C17	Sensor filter (noise filter)	1	14	5 / 5
C18	Temperature units: 0=°C, 1=°F	0	1	0 / 1
C19	2nd sensor: NTC only, Mode 1 or 2 0 = no modification of the Standard Mode 1 = differential mode (NTC1 - NTC2) 2 = summer offset 3 = winter offset 4 = active offset with Dead-zone P2	0	4	0 / 0

Installation, Operation, Maintenance Manual

Parameter	Description	Min.	Max.	Def. / Fact.
C21	Minim. Set-point 1 limit	-99	C22	0
C22	Maxim. Set-point 1 limit	C21	999	100
C23	Minim. Set-point 1 limit	-99	C24	0
C24	Maxim. Set-point 1 limit	C23	999	100
Alarms				
P25	Low temp. alarm set-point	-99	P26	35
P26	High temp. alarm set-point	P25	999	85
P27	Alarm differential (absolute value)	-99	99	2 / 0
P28	Alarm Delay (min.0)	120'	60'	0
C29	of dig. input 1 (C0 different from 6,7,8) In the event of alarm the status of relays depends on C31 0 = idle input 1 = immediate external alarm with automatic reset 2 = immediate external alarm with manual reset 3 = external delayed alarm (P28) with manual reset 4 = on/off depending on the status of the digital input	0	4	0 / 4
C30	Digital Input 2 (IRDR only) See C29	0	4	0 / 0
C31	Outputs status in the event of alarm condition detected via digital input 0 = all outputs OFF 1 = all outputs ON 2 = outputs in Reverse OFF, unchanged the others 3 = outputs in Direct OFF, unchanged the others	0	3	0 / 0
Others				
C32	Address of unit for serial connection	1	16	1 / 1
Special parameters				
C33	special Mode of Operation: 0=no, 1=yes Before modifying C33 be sure you have set and programmed the Starting Mode CO	0	1	0 / 0
C34	OUT1: DEPENDENCE	0	15	– (*)
C35	OUT1: TYPE OF OUTPUT	0	1	– (*)
C36	OUT1: ENERGIZATION	-100	100	– (*)
C37	OUT1: DIFFERENTIAL/LOGIC	-100	100	– (*)
C38	OUT2: DEPENDENCE	0	15	– (*)
C39	OUT2: TYPE OF OUTPUT	0	1	– (*)
C40	OUT2: ENERGIZATION	-100	100	– (*)
C41	OUT2: DIFFERENTIAL/LOGIC	-100	100	– (*)
C42	OUT3: DEPENDENCE	0	15	– (*)
C43	OUT3: TYPE OF OUTPUT	0	1	– (*)
C44	OUT3: ENERGIZATION	-100	100	– (*)
C45	OUT3: DIFFERENTIAL/LOGIC	-100	100	– (*)
C46	OUT4: DEPENDENCE	0	15	– (*)
C47	OUT4: TYPE OF OUTPUT	0	1	– (*)
C48	OUT4: ENERGIZATION	-100	100	– (*)
C49	OUT4: DIFFERENTIAL/LOGIC	-100	100	– (*)
(*)	(*) depends on the model and starting mode			

Parameter	Description	Min.	Max.	Def. / Fact.
Use via remote control/keypad				
C50	and Remote Control (TC) 0 = TS off, TC on (only type P parameters) 1 = TS on, TC on (only type P parameters) 2 = TS off, TC off 3 = TS off, TC off 4 = TS on, TC on (all param.s)	0	4	4 / 4
C51	Code to activate the remote control 0 = password entered	0	120	0 / 0

Maintenance Instructions

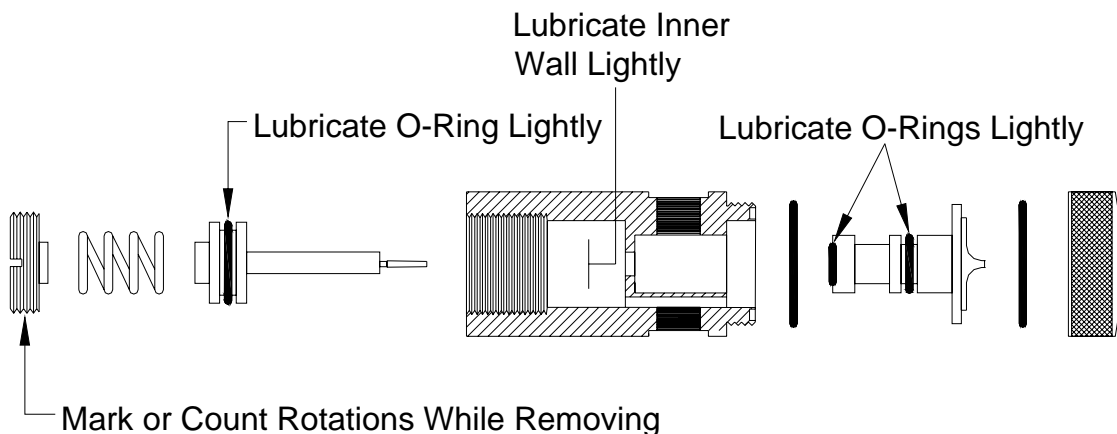
Although the MC system requires very little maintenance itself, some components such as the air compressor may require more. You should always follow the component manufacturer’s recommended maintenance schedules. The following maintenance is recommended:

- **Air compressor.** Follow the manufacturer's recommendations. An overloaded or improperly maintained compressor will throw more oil off into the air supply and will increase the maintenance of the atomizing heads.
- **Atomizing heads.** Once per year, the air cap at the front of each nozzle should be removed for inspection. The water nozzle located inside the air cap should be cleaned off with a soft cloth saturated with a 5% phosphoric or acetic acid solution. The air caps should be immersed in the same solution until clean. The air cap orifice should be checked for wear or occlusion. Place the air caps back on the heads tightly.

The piston should be removed, cleaned and regreased every 3-5 years. The O-rings are replaced every 8-10 years. Follow these steps when performing total cleaning and regreasing of the nozzles:

- Before disassembling the nozzles, mark the back adjustment screw or count the number of turns while removing it. This will insure proper calibration when reassembling the nozzles.
- After disassembling, clean nozzle parts using any standard humidifier cleaner or 5% phosphoric acid.
- Replace O-rings if they appear cracked or worn.
- Lubricate all parts indicated ONLY with CAREL approved lubricant (Dow Corning #4 Insulating Compound).
- Reassemble nozzle.

CAREL also offers a nozzle cleaning service at nominal charge. Contact your local CAREL representative for details.



- **Air and water lines.** Once per year, the air and water lines should be blown out to get rid of any debris, sediment or oil that may have collected.
- **Regulators, solenoids, valves.** Once per year, open these devices, inspect them for wear, and clean them. Replace any worn parts.
- **Controls and sensors.** Once per year, the sensors should be recalibrated against an accurate psychrometer. The sensors do not have a calibration potentiometer. Parameter P14 may be used to enter a sensor calibration offset.

Trouble Shooting Instructions

Hopefully, you will never have a problem with your MC system, but if you should, please refer to this section BEFORE calling your local CAREL representative.

Alarms

Code	Description	Cause	Action	Reset	Remedies
Er0	sensor error	faulty sensor	depends on C10	R: automatic V: manual	- check connections - check sensor signal (eg.: 0-1 Vdc = 0-100%)
Er2	memory error	voltage drop during programming stage memory damaged by electromagnetic interferences	stoppage	R: automatic V: manual	- reset factory-set values, turn off the controller, turn it on again holding down PRG;
Er3	alarm via external contact on digital input	the contact linked to the digital input is open	depending on C31	R: depends on C29 and C30 V: manual	- check C29, C30, C31 and P28; check the external contact
Er4	HIGH humidity alarm	P26 has been exceeded for a time-interval > P28 unchanged	control action goes on regularly	R: automatic V: manual	- check P26, P27, P28
Er5	LOW humidity alarm	P25 has been below P28 for a time-interval > P28 unchanged	control action goes on regularly	R: automatic V: automatic	- check P26, P27, P28

R = Control action

Resetting the instrument means to restore normal operating conditions after the cause that determined the alarm has disappeared.

V = Display

Display and buzzer. Display reset means that normal display of usual values is restored.

Other Trouble Shooting

■ ***Air bleeds from regulator.***

- Dirt has become lodged on the seat in the regulator. Unscrew the cap on the bottom of the regulator and remove the seat. Clear any dirt from the rubber seal and reinsert the seat and cap.

■ ***Heads spit or discharge a solid stream of water.***

- If the system is new and all of the heads are exhibiting a solid stream discharge, check the connections for air and water to insure that they are not reversed.
- If the heads have just been cleaned, check the orientation of the heads to insure that they have not been installed with the air and water reversed.
- With the system off, check that the modulating piston has not traveled beyond its normal operating range and become “stuck” in the back of the head (air pressures in excess of 40psi at the heads can cause this problem). When looking at the discharge end of the atomizing head, you should be able to see the tip of the piston extending through the water nozzle when it is off. If you cannot see the piston:
 - Mark the position of the rear adjusting screw, then remove the adjusting screw and remove the piston from the head (see page 16). If the piston or its o-ring is damaged replace any damaged parts, and reassemble the head. Return the adjusting screw to the marked position.
- Check for dirt or debris in the air orifice. Remove the air cap; inspect the underside of the cap for dirt or debris. Inspect the area around the tip of the water nozzle for dirt or debris.
 - If the dirt or debris is small in quantity and loose, wipe it away and reassemble the head. (most likely the debris is from constructing the air lines)
 - If the dirt or debris is large in quantity, and appears rusty, this is probably coming from iron air lines that are now rusting. This rust can cause severe problems in the operation of the atomizing heads. The heads will need to be cleaned, the air lines blown out and filters installed.
 - If the dirt or debris appears to be adhered to the tip of the water nozzle, this is an indication of oil in the air lines. Oil in the air will break the surface tension of the water and cause “wicking” of the minerals on the outside of the water nozzle. The MC system is self cleaning, for the inside of the water nozzle, but it cannot clear mineral that is on the outside of the nozzle. The heads must be cleaned of all oil, the air lines also must be cleaned, and proper filters installed.
- Check for dirt or debris on the shut-off seat of the modulating piston. If the problem is noticed only on shut down of the system, there is dirt on the seat of the piston. Remove the air cap and the water nozzle, and clean off any visible dirt or debris on the rubber seat on the piston. Use clean dry air to “blow out” the water nozzle. Reassemble the head.

■ ***Individual heads spray heavier than the rest.***

- Check that all valves on the heads are either full open or full closed.
- Check the air cap and water nozzle orifices for wear or occlusion. Clean or replace if necessary.
- Remove the atomizing heads in question and check the adjustment of the maximum capacity against a calibrated water flow meter, one head at a time. If the water flow is incorrect at the design pressures (30psi air / 5psi water), then turn the adjusting screw in the back of the head clockwise to reduce the flow and counter clockwise to increase it. This procedure can also be done by the Carel factory for a fee.

- **All heads spray too heavy or too light.**
 - Check the condition of the ambient air. If you are doing startup of the unit, and forcing the system to operate at 100% with little to no actual demand, then the observation of too much mist may be inaccurate.
 - With the system at 100% demand (output), adjust the air and water pressure regulators in the control cabinet to their proper settings of 30psi air and 5psi water at the end of the manifolds. Now adjust the water pressure regulator up/down until an acceptable output is observed. (**Warning:** Increasing the water pressure to gain more output may actually result in less evaporation due to the larger droplet sizes created. You must confirm the proper pressure settings before calling to discuss performance issues.)

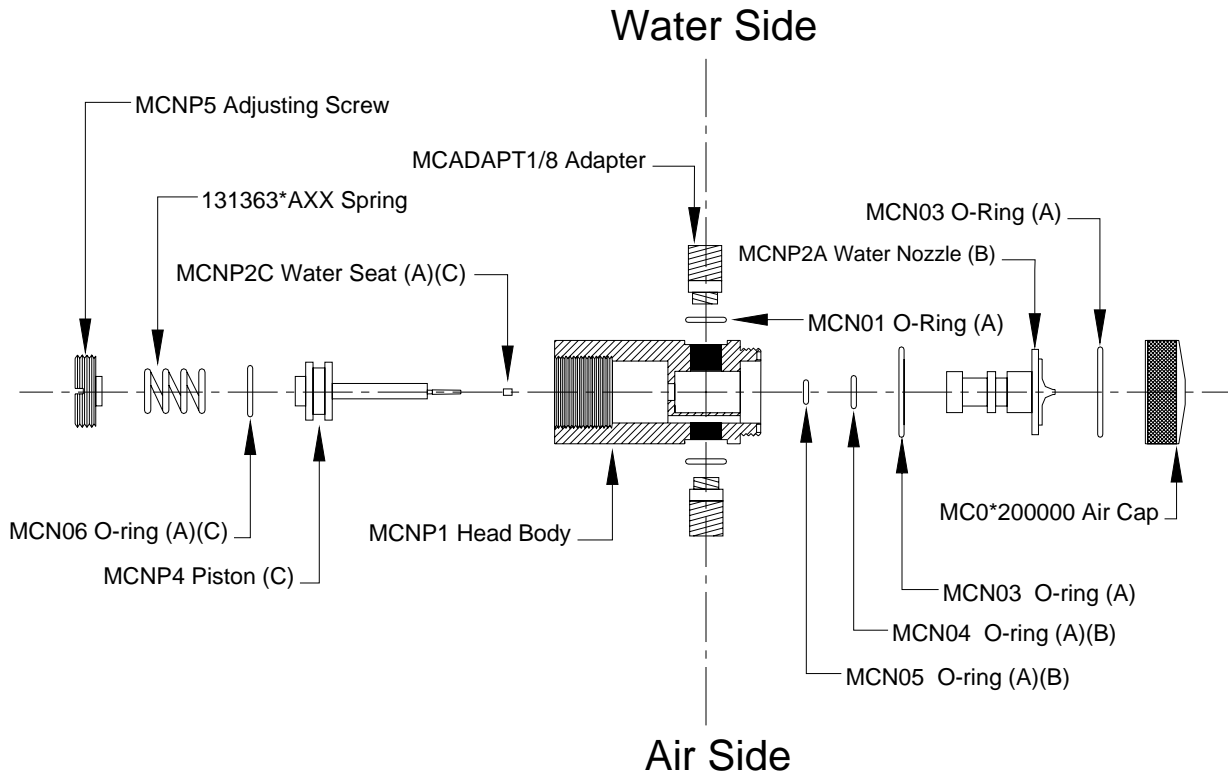
- **Sputtering heads.**
 - Check for air in the water lines. Bleed the water lines at the ends.
 - Check O-Rings and seals, for tears or breaks, replace any worn O-Rings or seals.
 - Check for loose air caps, a loose air cap can cause air to bleed back into the water.
 - Clogged drain line.

- **Individual heads drip after shutdown.**
 - Check the seat of the modulating piston for dirt, or wear. Clean or replace.
 - Check all O-Rings for wear, tears, or breaks. Replace as required (see page 21).
 - Check solenoid valves for proper operation.

- **Water pressure rises and/or is uncontrollable.**
 - Check the atomizing heads for loose air caps. A loose air cap can cause air to bleed into the water line and falsely pressurize it.
 - Check all O-Rings for wear, tears, or breaks. Replace as required.
 - Check the water regulator for dirt or debris on the seat. Clean or replace.
 - If incoming water pressure varies more then 20 PSI add a external regulator.

- **Controller does not function.**
 - No Display.
 - Check the primary voltage and confirm that you have 110 to 120VAC, at field wiring terminals 1 and 2. If not, check the breaker that is supplying the cabinet.
 - Check that the remote on/off between terminals 3 & 4 (if used) is closed. By placing a jumper between terminals 3 and 4 (this “jumps” out the airflow proving switch), if the controller then gets a display, you need to check the switch for proper functioning and wiring. It should be wired to close on for system operation.
 - Check the secondary voltage and confirm that you have 24VAC leaving the transformer. If not, check the integral breaker on the transformer.
 - Check that the on/off switch is in the on position.
 - Display, but no function.
 - Check that the on/off switch is in the on position.
 - Check the displayed value versus the set point. (Is there a demand for humidification?) The system will only come on if there is a demand.
 - Check the program parameters of the controller. Refer to the lower right hand corner of the wiring diagram supplied with the cabinet, for the factory recommended settings.

Parts of Atomizing Heads Room

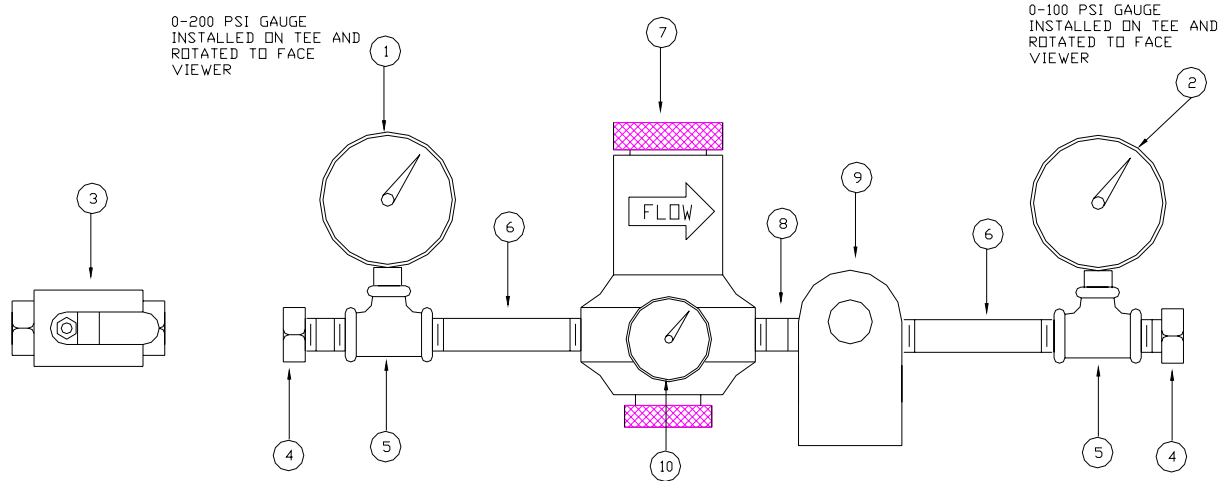


Parts for duct and room heads:

Parts for duct and room heads:	Description
Ordering Code	
MCHH***000	Atomizing head (***=lbs/hr, 006, 009, 012, 015, 020)
MCKSEA1000	"O" ring & seal rebuild kit for MC heads. Kit parts noted as (A). (1/head)
MCNP1	Head body
MCKNOZ1000	Water nozzle with "O" rings. Kit parts noted as (B). (1/head)
MC0*200000	Air cap (*specify head size; 6=A, 9=B, 12=C, or 15=D lbs/hr) (1/head)
MCKPIS1000	Piston w/ cleaning needle, "O" ring & seat. Kit parts noted as (C). (1/head)
MCNP5	Adjusting screw (1/head)
131363*AXX	Piston spring (*specify head size; 6=0, 9/12=1, 15=2) (1/head)
MCADAPT1/8	1/8" SS FPT thread adapter for body (2/head)

Parts of Control Cabinet Control Sections

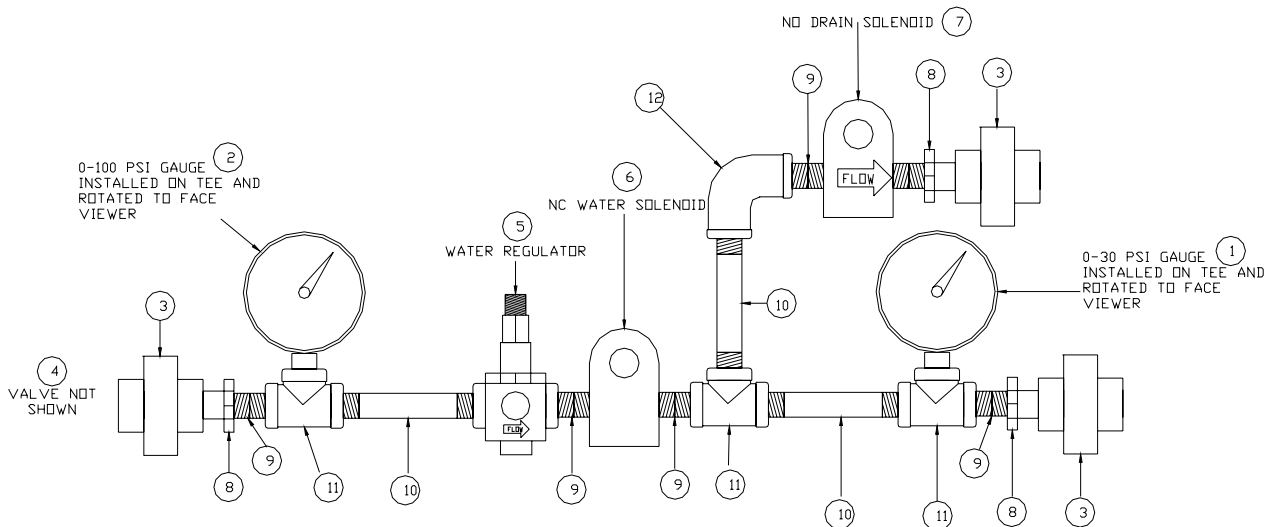
On/Off Air Control Section



PART NUMBER	QUAN.	
①	MCPG200	1
②	MCPG100	1
③	MCBALLVALVEB1/2S	1
④	MCCOMP1/2MPTX5/8	2
⑤	MCTEERB1/2X1/4FPT	2
⑥	MCNIPB1/2X21/2	2

PART NUMBER	QUAN.	
⑦	MCAIRREGB1/2	1
⑧	MCNIPB1/2XC	1
⑨	MCSOLB1/2NC	1
⑩	MCCSGAG100	1

Water Control Section



PART NUMBER	QUAN.	
①	MCPG30	1
②	MCPG100	1
③	MCUNIONPVC1/2S	3
④	MCBALLVALVEPVC1/2	1
⑤	MCWATEREG1/4	1
⑥	MCSOLSS1/4NC	1

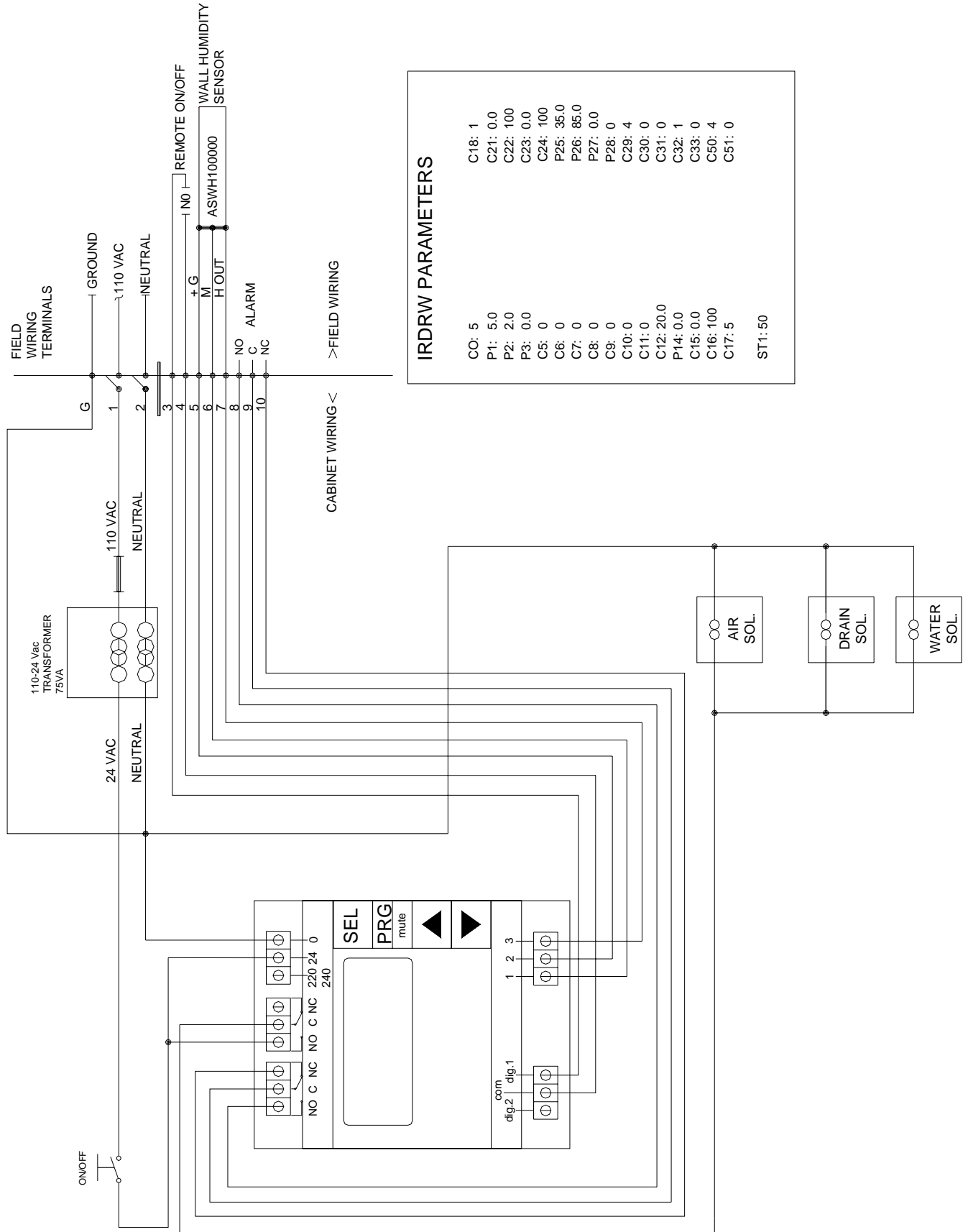
PART NUMBER	QUAN.	
⑦	MCSOLSS1/4ND	1
⑧	MCBUSHPVC1/2SX1/4FPT	3
⑨	ALNIPSS1/4XC	6
⑩	MCNIPSS1/4X21/2	3
⑪	MCTEESS1/4FPT	3
⑫	MCELBDWSS1/4FPT	1

Other Parts

Part No.	Description
Control Cabinet Parts:	
MCAIRREGB1/2	1/2" air regulator
MCWATREG1/4	1/4" water regulator
MCPG30	0-30 psi panel gauge
MCPG100	0-100 psi panel gauge
MCPG200	0-200 psi panel gauge
MCCSGAG100	0-100 psi air gauge for regulator
TRANS75	110VAC to 24VAC transformer, 75VA
MCSOLB1/4NC	1/4" NC brass solenoid valve, air or water, (Voltage)
MCSOLB1/4NO	1/4" NO brass solenoid valve, drain (Voltage)
MCSOLSS1/4NC	1/4" NC S/S solenoid valve, water, (Voltage)
MCSOLSS1/4NO	1/4" NO S/S solenoid valve, drain, (Voltage)
MCSOLB1/2NC	1/2" NC brass solenoid valve, air or water (Voltage)
SQS65.5U	Modulating air valve motor (2001)
599-02006C	Modulating air valve body, 0-100 lbs/hr
599-02010C	Modulating air valve body, 100-500 lbs/hr
MCAIRSEC	Complete 1/2" air control section, on/off
MCAIRMS	Complete 1/2" air control section with modulating valve, 0-100 lbs/hr Serial # > 2300
MCAIRML	Complete 1/2" air control section with modulating valve, 100-500 lbs/hr Serial # > 2300
MCWATERAGG	Complete 1/2" water control section, aggressive water
MCRSWITCH	SP/ST On/Off Rocker Switch
PCO2000BS0U00	PCO controller (specify room, supply, return, control) Serial # > 2300
PCO2CONOSO	PCO controller plug in wiring connectors
IRDRW4	IR controller for Room On/Off Cabinet Serial # > 2300

Wiring Diagrams

On/Off Room (for reference only - refer to wiring diagram in control cabinet)



Technical Specifications

Atomizing Heads

Capacities per head:	6, 9, 12, 15 lbs/hr water
Air consumption:	0.15 CFM/lbs/hr
Assemblies:	Single head, Double head
Materials:	303 stainless steel, Buna-N (Viton optional), silicone based lubricant (lithium based optional)

Control Cabinet

Power:	110/1/60 Vac, 75 VA,
Control circuit:	24 VAC from 75 VA transformer
Materials:	16 ga. Powder coated steel
Rating:	NEMA 1, NEMA 4 and NEMA 4X available
Min. inlet air pressure:	80 psi
Max. inlet air pressure:	100 psi
Min. inlet water pressure:	40 psi
Max. inlet water pressure:	100 psi
Air consumption:	100 lbs/hr cabinet=15 CFM, 500 lbs/hr cabinet=75 CFM
Water consumption:	100 lbs/hr cabinet=0.2 gpm, 500 lbs/hr cabinet=1 gpm
Humidity sensor:	see page 10
Operation:	On/Off by sensor



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