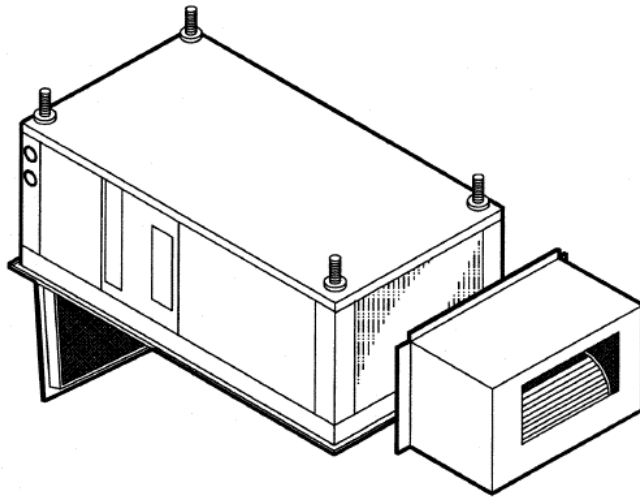




Ceiling Mount  
Mini-Temp  
**Installation and Operation Manual**

**1.5 & 2 Ton**  
Air | Glycol | Chilled Water | Water  
*For models MTA, MTG, MTC & MTW*



8167 Byron Road Whittier, CA 90606  
Phone: (562) 945-8971 Fax: (562) 696-0724



## Index

General Description	2
Transportation Mode	3
Configurations	5
Tech Data	7
Installation	16
Wiring	19
Steam Generating Humidifier	24
Water Connection	26
Cylinder Replacement	29
T-stat	34
Field Test Plans	39
Reference Documents	46
Trouble Shooting	48

### General Description

Mini-temp systems are provided for either air-cooled (MTA) or water cooled (MTW) installations. In addition, the water-cooled model may be operated as a closed-circuit system. The MTG with the addition of a dry-cooler.

Optional accessories include a humidifier, electric re-heat assembly, condensate pump, remote control panel, rigging device, and remote condenser. In addition; a condenser fan assembly is supplied with all air-cooled MTA equipment.

All glycol-cooled MTG models include a dry-cooler and pump.

<b>MTA- 2 1 2</b>	
Mini-Temp	<b>Voltage</b>
<b>Type</b>	2 - 208
Air Cooled - <b>A</b>	3 - 380
Water Cooled - <b>W</b>	4 - 460
Chilled Water Cooled - <b>C</b>	7 - 277
Glycol Cooled - <b>G</b>	
<b>Nominal Tonnage</b>	<b>Phase</b>
1.5-2 Ton	1- 1 phase
	3 - 3 phase

## Transportation Mode

Visual inspection of the outer casing provides a simple indication of possible internal damage to the equipment. Move the unit to the installation site in the upright position. **File a claim with the shipping company if the shipment is damaged or incomplete. Freight damage claims are the responsibility of the receiver.**

Optional articles such as parts, condensate pump, and remote control.

## Important – Read Before Installing

Check the power supply. Voltage, frequency and phase must correspond to that specified on the unit nameplate. The power supply must be able to handle the additional load imposed by this equipment.

## Locating the Unit

Consult local building codes and National Code for special installation requirements. When installing the unit, allow sufficient space for air flow clearance, wiring and servicing the unit. ***Front and rear of the unit should have a minimum clearance of 36 inches for servicing.***



The unit you have received is very special. It is specifically designed for Computer Room applications. Please read the following INSTRUCTIONS prior to working on the equipment.

### Electrical Data:

208V, 1 phase, 60 Hz.

### Nameplate Data

Refer to the unit name plate. It indicates all the electrical data for the unit. LOCAL ELECTRICAL CODES OR ANY OTHER APPLICABLE CODES MUST BE COMPLIED WITH PRIOR TO WORKING IN THE UNIT.

Check you unit for the kind of reheat it has. For type C and D piping connections are required. Make sure shut off valves are provided external to the unit.

### Condensate Drains

A drain is provided in the unit and it should carry the water from condensation to the drain.

### Condensate Pump

(Optional): When provided it is mounted on the unit or shipped separately. To avoid any flooding problems, provide a separate power source. **Wire the pump to shut the system off in case of overflow or pump failure.**

Configurations

**Air Cooled**

Bottom Supply/ Return with Grille Frame Assembly (standard)

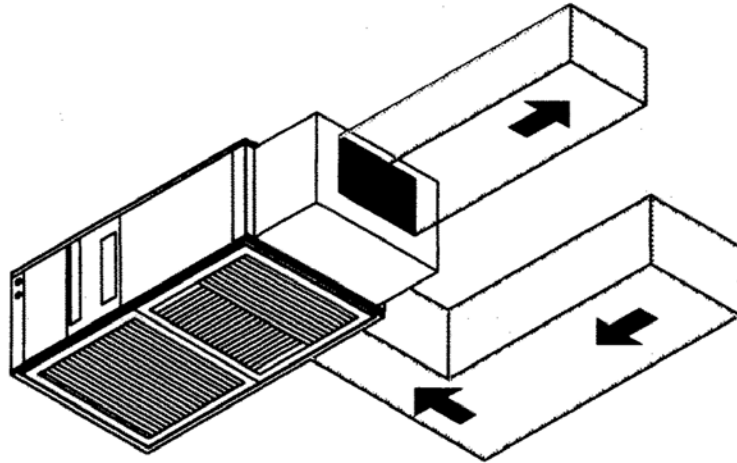


Figure 1

**Air Cooled**

Ducted System (*optional*) Rear Return/Side Discharge

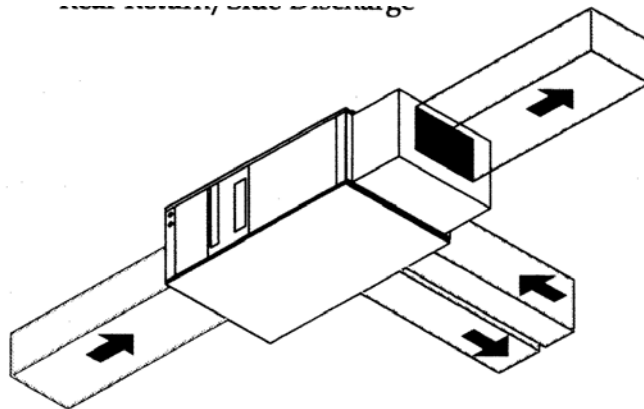


Figure 2

**Water / Glycol / Chilled Water**

Bottom Supply/ Return with Grille Frame Assembly (standard)

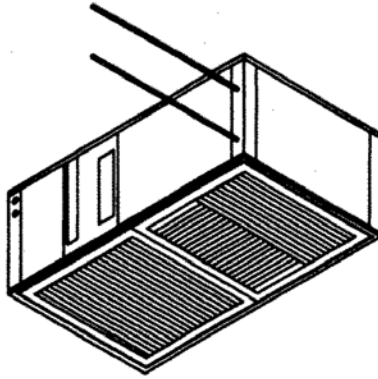


Figure 3

**Water / Glycol / Chilled Water**

Ducted System (*optional*) Rear Return/Side Discharge

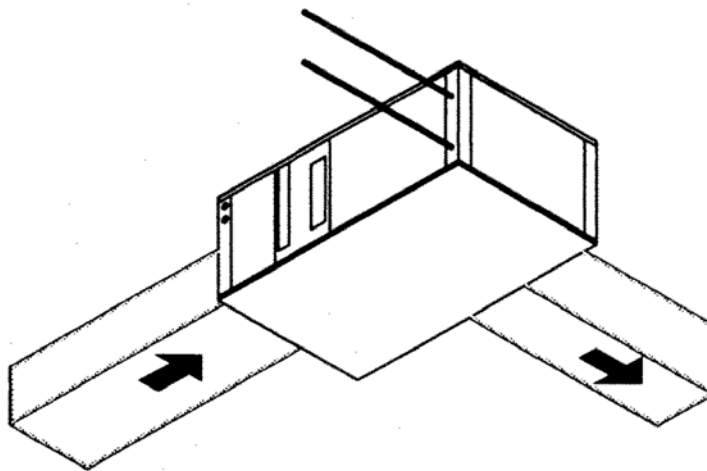


Figure 4

AIR COOLED	MTA-1.512	MTA-1.512
Tonnage	1.5	2
<b>80°F DB 67°F WB 50% HR Entering Air</b>		
Total BTU/HR	19,800 (5.8)	25,900 (7.8)
Sensible BTH/HR	16,500 (4.8)	23,300 (6.8)
<b>75°F DB 62.5°F WB 50% HR Entering Air</b>		
Total BTU/HR	17,800 (5.2)	22,200 (6.5)
Sensible BTH/HR	15,600 (4.5)	18,200 (5.3)
<b>72°F DB 60°F WB 50% HR Entering Air</b>		
<b>Evaporator Data</b>		
CFM	700 (330)	850 (401)
Fan Motor HP	0.25	0.25
Evaporator Coil Data		
Face Area Ft <sup>2</sup>	1.84 (0.17)	1.84 (0.17)
Rows	5	5
FPI	12	12
<b>Compressor Data</b>		
Refrigerant	R-407C	R-407C
Tonnage (qty)	1.5 (1)	2 (1)
ERR	9.8	9.8
<b>Electric Reheat</b>		
Kw	5.0	5.0
BTU/HR	17,060	17,060
<b>Steam Modulating Humidifier</b>		
GPM (water supply)	0.25	0.25
Lbs/HR	3.0	3.0
<b>Piping Data</b>		
Condensate Drains	1 1/8"	1 1/8"
Liquid Line	3/8"	3/8"
Hot Gas Line	1/2"	1/2"
Humidifier Water Supply	1/4"	1/4"
<b>Weight</b>	300	300



**Cooling Only**

	<i>208V/1Ph/60HZ</i>	<i>277/1Ph/60HZ</i>
	<b>FLA   MCA   MFS</b>	<b>FLA   MCA   MFS</b>
MTA-1.5	17.6 21.8 30A	36.8 44.1 60A
MTA-2	17.8 21.8 35A	37.2 44.1 60A

**With Reheat and Humidifier**

	<i>208V/1Ph/60HZ</i>	<i>277/1Ph/60HZ</i>
	<b>FLA   MCA   MFS</b>	<b>FLA   MCA   MFS</b>
MTA-1.5	21.2 26.5 30A	16.1 20.1 25A
MTA-2	21.2 26.5 30A	16.1 20.1 25A

**WATER COOLED** MTW-1.512 MTW -1.512

**Tonnage** 1.5 2

**80°F DB 67°F WB 50% HR Entering Air**

Total BTU/HR (Kw) 20,200 (5.9) 26,600 (7.8)

Sensible BTH/HR (Kw) 16,900 (4.9) 24,200 (6.8)

**75°F DB 62.5°F WB 50% HR Entering Air**

Total BTU/HR (Kw) 19,600 (5.7) 24,800 (7.2)

Sensible BTH/HR (Kw) 17,200 (5.0) 19,100 (5.6)

**72°F DB 60°F WB 50% HR Entering Air**

Total BTU/HR (Kw) 17,800 (5.2) 22,500 (5.4)

Sensible BTH/HR (Kw) 15,900 (4.6) 18,400 (5.4)

**72°F DB 58.6°F WB 50% HR Entering Air**

Total BTU/HR 16,900 (4.9) 21,200 (6.2)

Sensible BTH/HR 15,200 (4.4) 17,300 (5.0)

**Evaporator Data**

CFM 700 (330) 850 (401)

Fan Motor HP 0.25 0.25

**Evaporator Coil Data, Copper Tubing with Aluminum Fins**

Face Area Ft<sup>2</sup> 1.75 (0.16) 1.75 (0.16)

Rows 5 5

FPI 12 12

**Condenser Water Data, Coaxial Tube in Tube Condenser 85°F (29°C) Entering Water 150 PSIG**

GPM (L/s) 4.5 (0.19) 6.0 (0.38)

Pressure Drop Ft. of Water (kPA) 7.0 (48.2) 8.0 (55.0)

**Compressor Data**

Refrigerant R-407C R-407C

Tonnage (qty) 1.5 (1) 2 (1)

ERR 9.8 9.8

**Electric Reheat**

Kw 5.0 5.0

BTU/HR 17,060 17,060

**Steam Modulating Humidifier**

GPM (water supply)	0.25	0.25
Lbs/HR	3.0	3.0

**Piping Data**

Condensate Drain	1 1/8"	1 1/8"
Water Supply	1/2"	1/2"
Water Return	1/2"	1/2"
Humidifier Water Supply	1/4"	1/4"

<b>Weight</b>	275	275
---------------	-----	-----

**Cooling Only**

	<i>208V/1Ph/60HZ</i>	<i>277/1Ph/60HZ</i>
	<b>FLA   MCA   MFS</b>	<b>FLA   MCA   MFS</b>
MTW-1.5	12.0 15.0 25A	10.1 12.6 20A
MTW-2	12..2 15.3 25A	11.8 14.8 25A

**With Reheat and Humidifier**

	<i>208V/1Ph/60HZ</i>	<i>277/1Ph/60HZ</i>
	<b>FLA   MCA   MFS</b>	<b>FLA   MCA   MFS</b>
MTC-1.5	21.2 26.5 30A	16.1 20.1 25A
MTC-2	21.2 26.5 30A	16.1 20.1 25A

<b>CHILLED WATER</b>	MTC-1.512	MTC -1.512
<b>Tonnage</b>	1.5	2
<b>80°F DB 67°F WB 50% HR Entering Air</b>		
Total BTU/HR (Kw)	21,978 (6.4)	25,300 (7.4)
Sensible BTH/HR (Kw)	18,490 (5.4)	21,800 (6.4)
<b>75°F DB 62.5°F WB 50% HR Entering Air</b>		
Total BTU/HR (Kw)	18,300 (5.4)	24,800 (7.2)
Sensible BTH/HR (Kw)	18,490 (5.4)	21,800 (6.4)
<b>72°F DB 60°F WB 50% HR Entering Air</b>		
Total BTU/HR (Kw)	15,800 (4.6)	22,500 (5.4)
Sensible BTH/HR (Kw)	14,700 (4.6)	18,400 (5.4)
<b>Evaporator Data</b>		
CFM	700 (330)	850 (401)
Fan Motor HP	0.25	0.25
<b>Evaporator Coil Data, Copper Tubing with Aluminum Fins</b>		
Face Area Ft <sup>2</sup>	1.75 (0.16)	1.75 (0.16)
Rows	4	4
FPI	12	12
<b>Condenser Water Data, Coaxial Tube in Tube Condenser 85°F (29°C) Entering Water 150 PSIG</b>		
GPM (L/s)	4 (0.19)	6 (0.38)
Pressure Drop Ft. of Water (kPA)	7.0 (.44)	8.0 (.50)
<b>Compressor Data</b>		
Refrigerant	R-407C	R-407C
Tonnage (qty)	1.5 (1)	2 (1)
ERR	9.8	9.8
<b>Electric Reheat</b>		
Kw	5.0	5.0
BTU/HR	13,640	13,640
<b>Steam Modulating Humidifier</b>		
GPM (water supply)	0.25	0.25
Lbs/HR	3.0   1.3	3.0   1.3

**Piping Data**

Condensate Drain	1 1/8"	1 1/8"
Water Supply	5/8"	5/8"
Water Return	5/8"	5/8"
Humidifier Water Supply	1/4"	1/4"
<b>Weight</b>	220	250

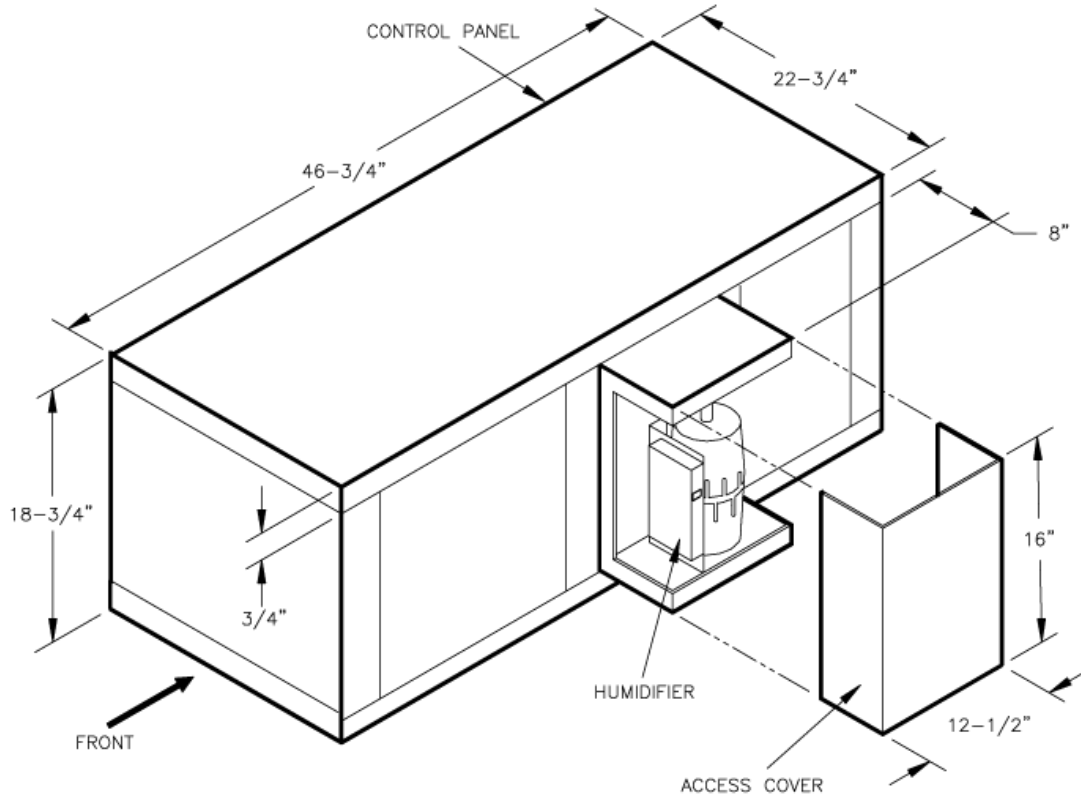
**Cooling Only**

	208V/1Ph/60HZ	277/1Ph/60HZ
	<b>FLA   MCA   MFS</b>	<b>FLA   MCA   MFS</b>
<b>MTW-1.5</b>	12.0 15.0 25A	10.1 12.6 20A
<b>MTW-2</b>	12.2 15.3 25A	11.8 14.8 25A

**With Reheat and Humidifier**

	208V/1Ph/60HZ	277/1Ph/60HZ
	<b>FLA   MCA   MFS</b>	<b>FLA   MCA   MFS</b>
<b>MTC-1.5</b>	21.2 26.5 30A	16.1 20.1 25A
<b>MTC-2</b>	21.2 26.5 30A	16.1 20.1 25A

Components Layout



DIMENSIONAL DATA: MINI-TEMP

**MTW/ MTG / MTC**

Bottom Supply/Return with Grille Frame Assembly

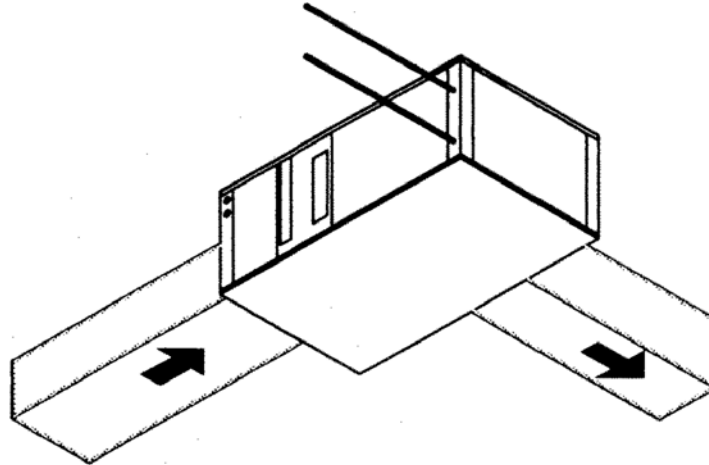


Figure 4

**Rear Return/Side Discharge with Duct Connections**

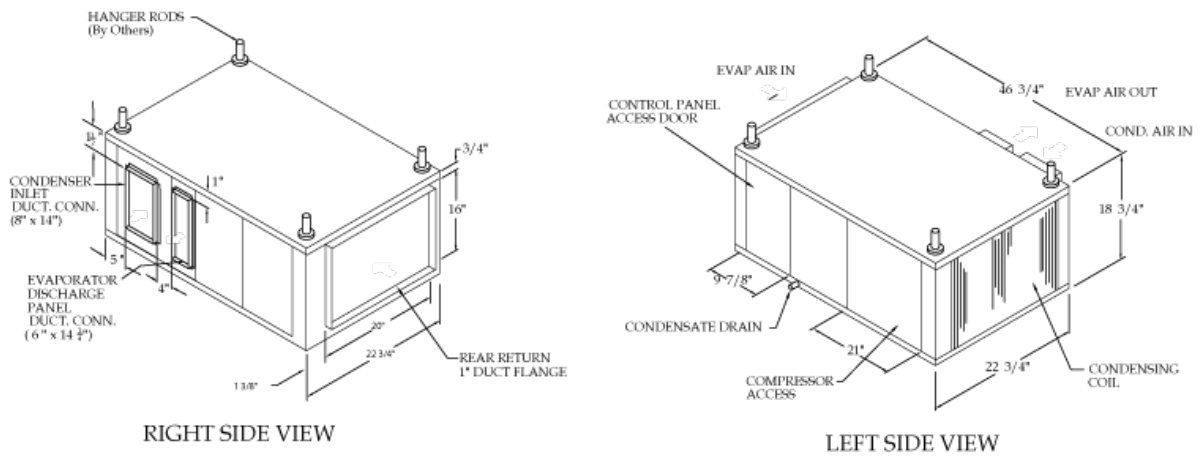


Figure 4

#### Receiving Inspection:

Each Mini-Temp system is operated and completely tested to assure that the equipment is fully operational and meets factory specifications before packaging for shipment. The carrier assumes responsibility for the equipment when he accepts the shipment and retains responsibility until the shipment is complete and accepted at the job site. Consequently, it is essential that a careful inspection be made on delivery. If there is visible damage or a shortage, this information should be noted on the delivery slip and an immediate claim should be made with the carrier.

Should additional damage become evident when the equipment is uncrated, this information should be reported immediately to the carrier, with a request for inspection of damage by carrier's insurance representative. Shipping damage is the sole responsibility of the carrier.

Compu-Aire, Inc. is not responsible for filing any claims. All needed inspection and claim filing is the responsibility of the receiver.

#### Location:

The Mini-Temp system is designed for installation in a standard 2 x 4 feet ceiling tile opening. All controls and normal service access are on one side of the unit together with electric and piping access.

It is desirable to allow at least 24 inches clearance on all sides although clearance on one side is sufficient for normal service. Certain locations may require the unit to be lowered for major service. Routine maintenance can be done through the filter grill.

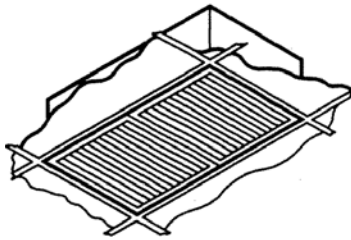
Avoid locating the system in confined areas that affect the air flow as down drafts, short cycles and air noise may result.

Reheat Assembly (*Optional*):

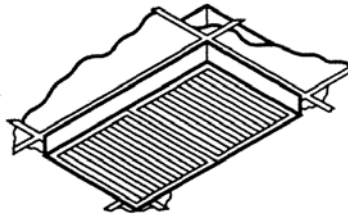


### Application

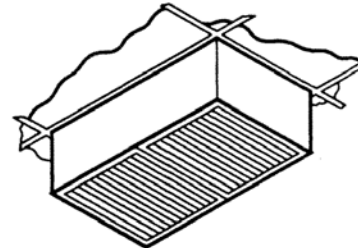
Normally mounted flush with the ceiling, Mini-Temp unit may be partially recessed or surface mounted if a 20-inch clearance area above the ceiling is not available.



**Flush**

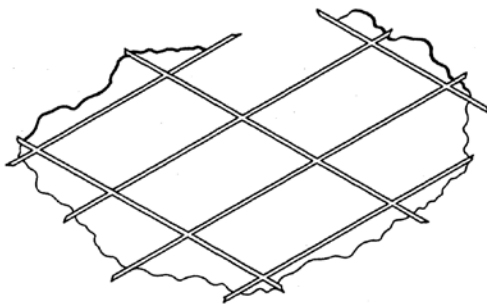


**Partially Recessed**

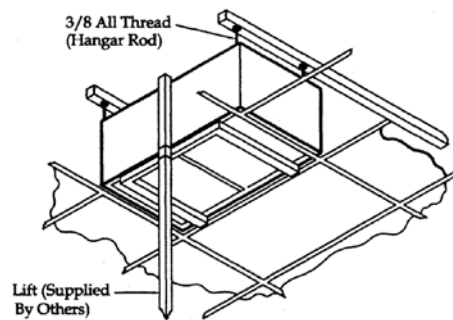


**Surface**

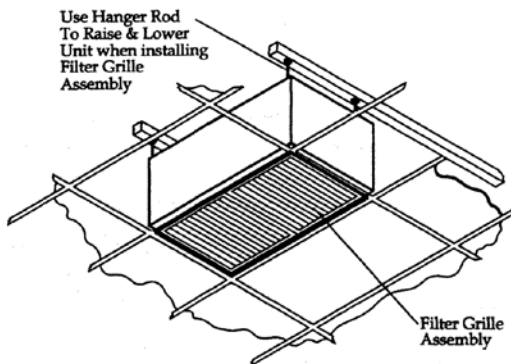
### Installation



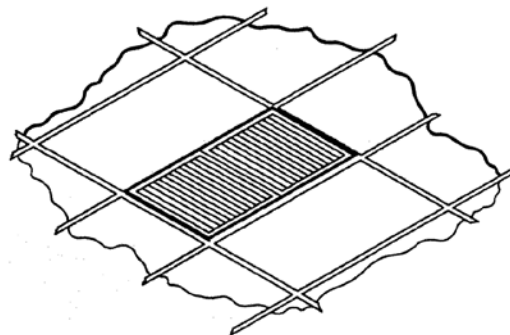
**1. Remove ceiling tile**



**2. Raise Unit**



**3. Install Filter Grille Assembly**

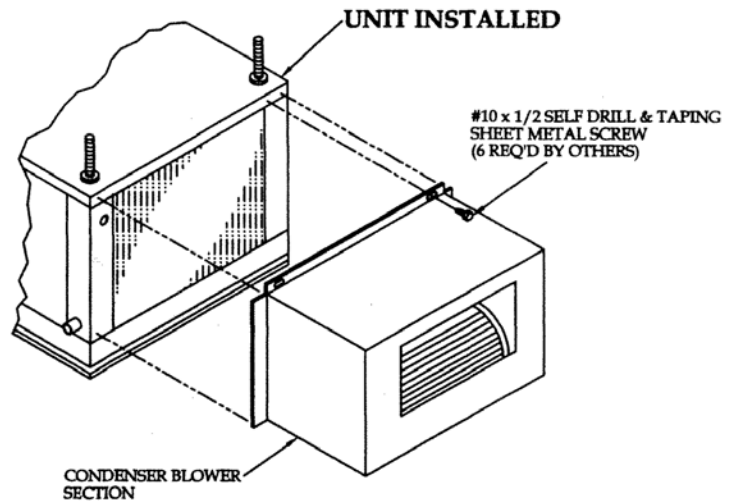


**4. Reinstall Ceiling Tile**

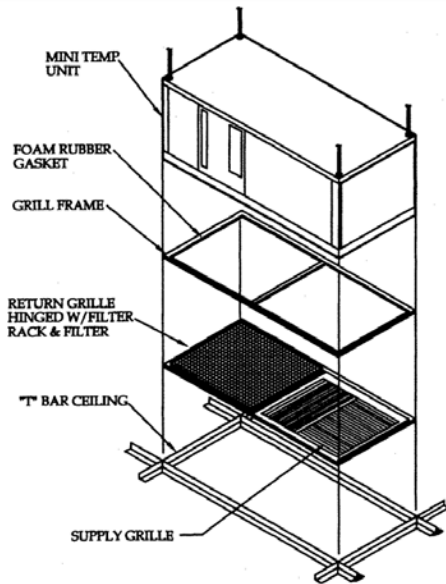
On flush installations, position filter grille above ceiling T-bars and lower Mini-Temp unit to compress gasket by 1/8 inch, assuring a tight seal. On partially recessed or surface installations, remove and discard filter grille frame. Fasten filter grille directly to unit frame with sheet metal screws (by others).

### Condenser Blower

If system is air cooled, install condenser blower using six (6) #10 x 1/2 inch self-tapping sheet metal screws. Connect wire ends with wire nuts.



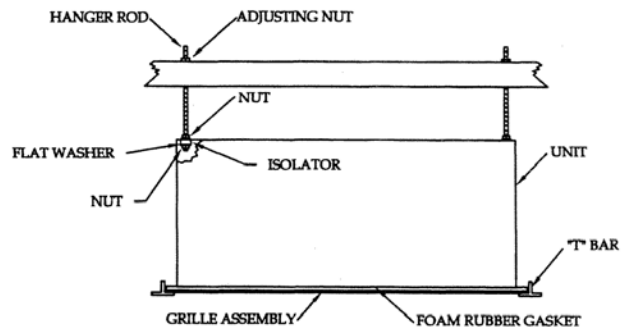
### Filter Grille Assembly



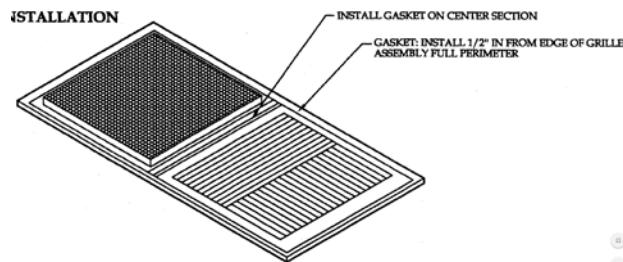
### Flush Mount Installation

As the system is designed for suspension mounting, structural members capable of supporting 400 pounds must be made available. Pre-drill holes in support members for four (4) 3/8 suspension rods. Bring piping and wiring service to ceiling opening. Use factory supplied isolators to install all thread rods. Raise unit above ceiling tiles and secure with locknuts.

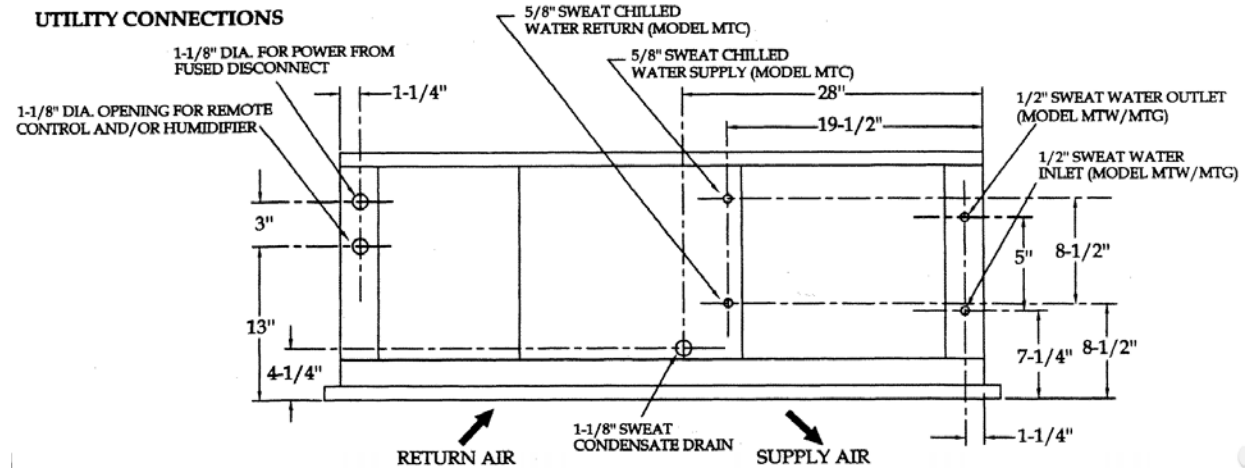
Make sure units level to prevent water damage.



### Filter Grille Gasket Installation



## Utility Connections



## Electrical

Provide external fused disconnect or circuit breaker for 208 / 230 / 277 / 1Ph / 60Hz service as required by local code. Refer to specification data sheet for rated current requirement. Connect power wiring in accordance per electrical diagram located in the control compartment door and local code.

24 volt control power is provided through unit transformer.

if system is to be equipped with an optional humidifier, install both manual and solenoid valve provided and wire in.

If optional remote control panel is supplied, follow instructions shipped with those components for proper connection.

## Piping

Condenser Water Cooled

Supply and return connections for water cooled MTW/MTG equipment are 1/2" sweat. The inlet is at the bottom with the outlet at the top. Do not transpose these connections at either end. Install water shut off valves and unions (by others) on both supply and return lines.

Do not exceed 125 PISG working pressure.

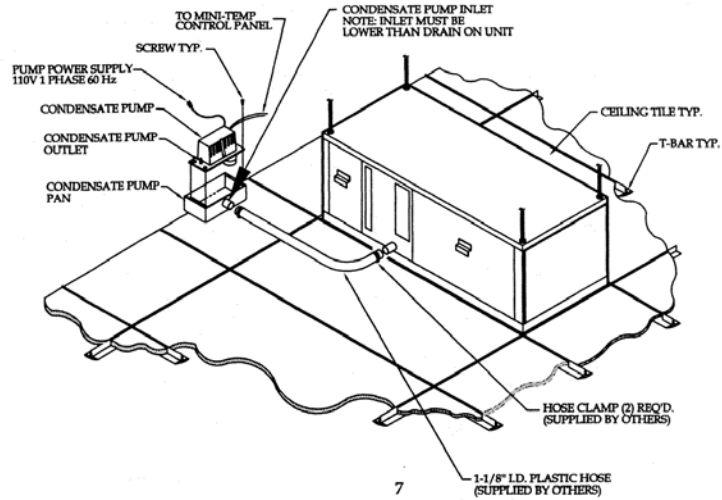
## Drain

Connect 1 1/8" line to condensate drain. If a condensate pump is used, all drains must terminate in the tank.

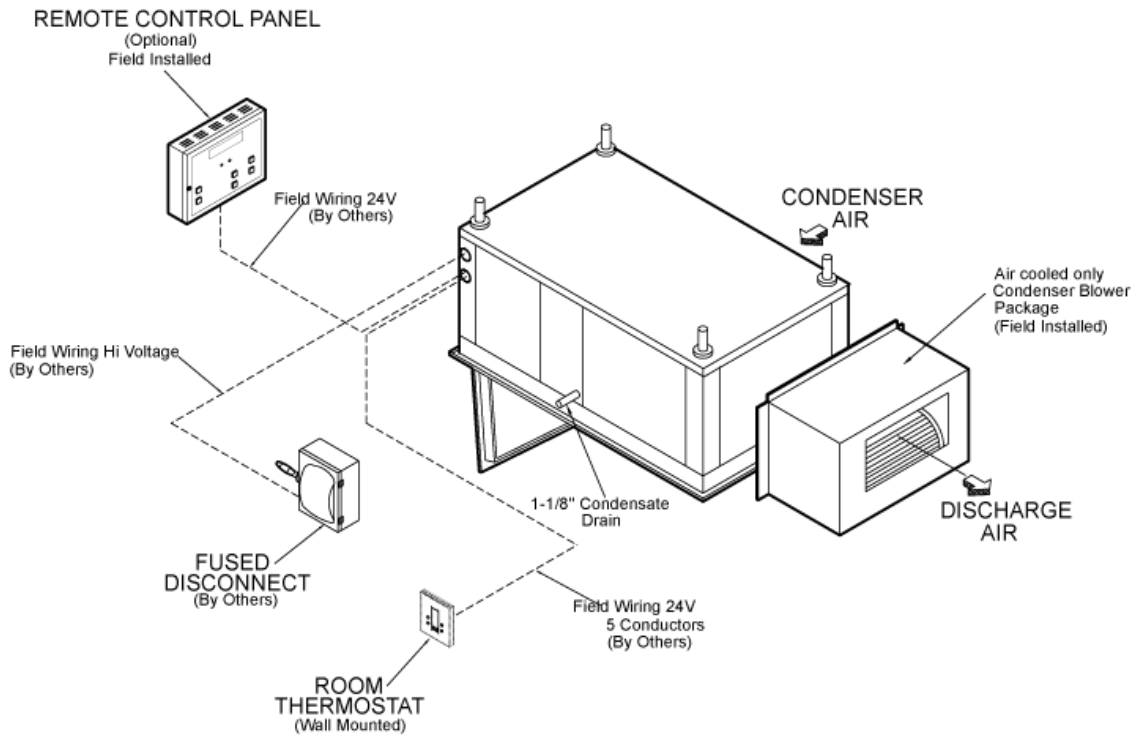
*Note: Drain line must run separately to the building drain or drain receptacle.*

## Condensate Pump

### CONDENSATE PUMP - Installation

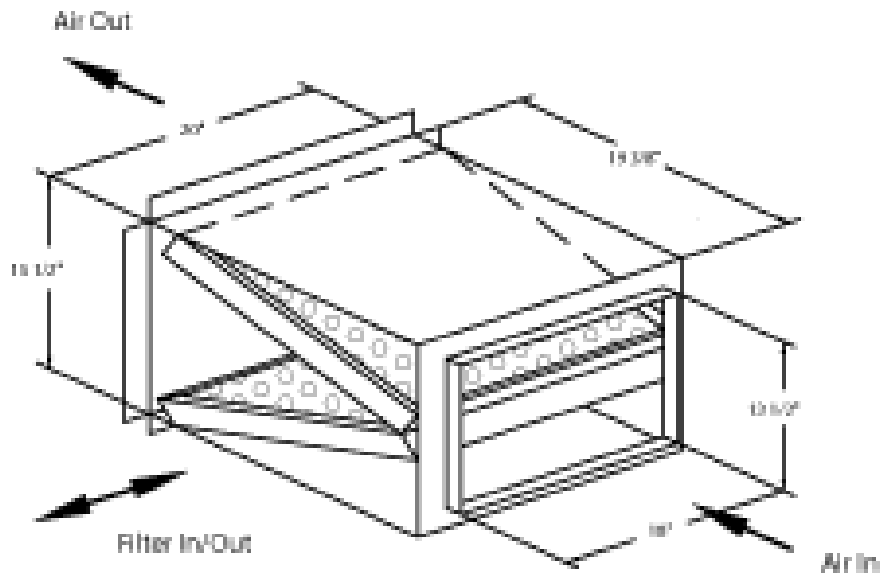


## Field Wiring: Mini-Temp Packaged



## MTA / MTW / MTG / MTC





"V" Bank Filter Box

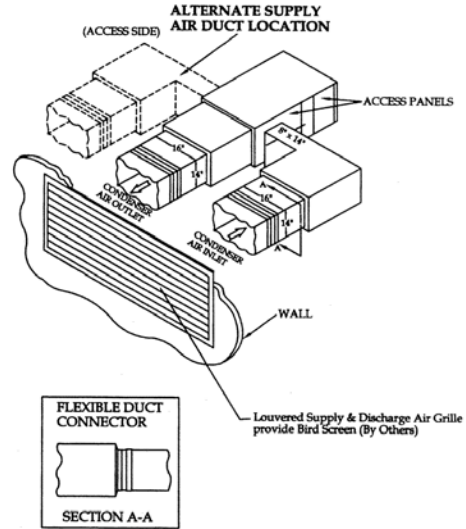
## Methods of Ducting Condenser Air

Air cooled Mini-Temp is designed for 1500 CFM at a maximum of 0.25" ESP, and a minimum temperature of 35° for entering condenser air. For year-round operation of the Mini-Temp unit, it is suggested that air direct from the space above the sub-ceiling be used.

The warm discharge air can then be ducted away from the unit to prevent it from being recirculated back to the condenser. Air can be ducted to an airshaft or outdoors through a grill depending on the building.

Air intake duct, if used, may be connected to either side of the unit by transferring the blocking plate. It is suggested that the access side of the unit be left clear.

Always use canvas connectors to isolate resonating noise from the system.



*Note: All ductwork, grills and canvas connectors by others.*

## Check-Test-Start

**Electrical:** Tighten all connections. Check and record amperage of all components.

**Piping:** Check all connections for leaks. Pour water through drain to assure free flow.

**Fan:** Assure that wheel turns freely and does not touch housing. Tighten motor mount. Check rotation direction.

**Compressor:** Tighten expansion bulb. Free vibration isolators. Check for signs of oil leaks. Make sure piping is not touching components. Reset high pressure switch at 400 pounds. Check and record suction and discharge pressure. Leak-test system.

## Operation

With voltage supplied to the unit, this energizes the evaporator fan motor.

If an increase in room temperature is sensed by the thermostat (in the room), it will start the compressor. As the room temperature drops, the temperature controller will shut the compressor off.

If the room temperature drops below the set point, the reheat (if so equipped) will be energized.

It is important to note that cooling and heating may be on at the same time when the unit is calling for dehumidification.

Room humidity is controlled by the humidistat (in the room). If the room humidity drops below the set point, the humidifier (if so equipped) is energized. If room humidity rises beyond the set point, the high humidistat will energize the compressor.



### Important

Unit is equipped with condensate (*water*) sensor placed in the condensate drain pan. The probe is extremely sensitive to moisture. If water is present the unit will not start.

## Maintenance-Monthly

- ✓ (Disconnect power before performing maintenance)
- ✓ Check filter and humidifier pad and replace as required. (Filter Size: 20" x 20" x 1")
- ✓ Check drain for unobstructed flow
- ✓ Tighten all electrical connections
- ✓ Clean both interior and exterior of system



## Steam Generating Humidifier

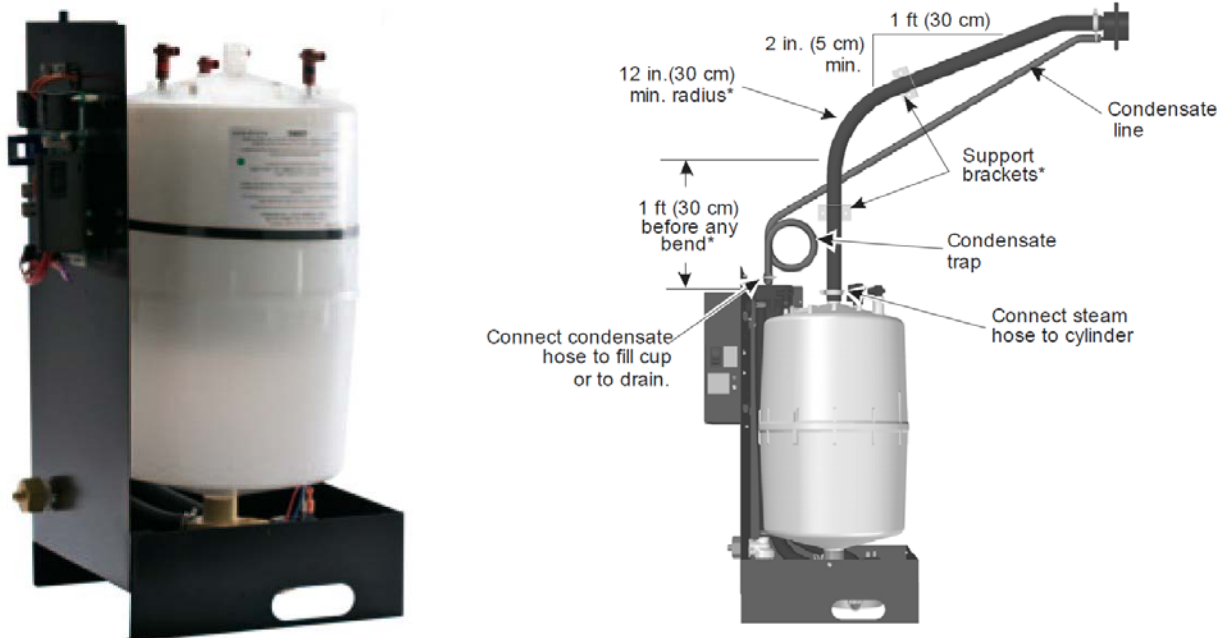
### Principle of Operation:

When the humidistat calls, the cylinder fills to 110% of the full amperage (F.L.A.) or to the top of the cylinder, whichever comes first.

If it reaches 110% F.L.A. the water heats and boils away to a level giving only 90% F.L.A.

An electronic timer uses the rate of fall to determine the water level. The objective is to concentrate current-carrying minerals in the cylinder so that a smaller volume of water is required to produce the rated steam output.

This achieves the longest life for the disposable cylinder because of minimum electrode coverage and uses less energy because the high concentration allows minimal drain rate.



When it reaches 90% F.L.A. the fill valve will open, refilling cylinder to 110% F.L.A. On occasion, the drain valve will also come on if water level is too high a concentration and the requirement for dilution of the water in the cylinder.

If the water reaches top of cylinder before 110% F.L.A. the fill valve shuts off via the sensor and fill boil-fill-boil cycle continues, cycling off the red full cylinder light until the concentration becomes high enough to reach 100% F.L.A. Then the following described control process takes over.

#### Water Supply and Plumbing:

The orifice in the fill valve(s) is sized for an extended water pressure range of 30 to 85 psi.

For water pressure between 15 and 30 psi, notify the factory and the next larger size of fill valve will be supplied.

For cases below 15 psi, notify the factory and fill valve with largely oversized orifice will be supplied.

For cases above 85 psi, install a pressure reducing valve in the water feed line to the unit. Otherwise insufficient cylinder water will drain when fill and drain mix during the automatic dilution cycle.

With extremely dirty or muddy water sources, e.g. some well sources, ensure proper filtration by adding an external filter to the water line entering the unit. (Consult factory for accessories such as filters).

DO NOT soften water with this humidifier unit because it is much too conductive.

DO NOT use completely demineralized water with this humidifier unit as it is the minerals that allow electrode principle to work.

DO NOT use a hot water source, as it will cause deposits to eventually block the fill valve orifice.

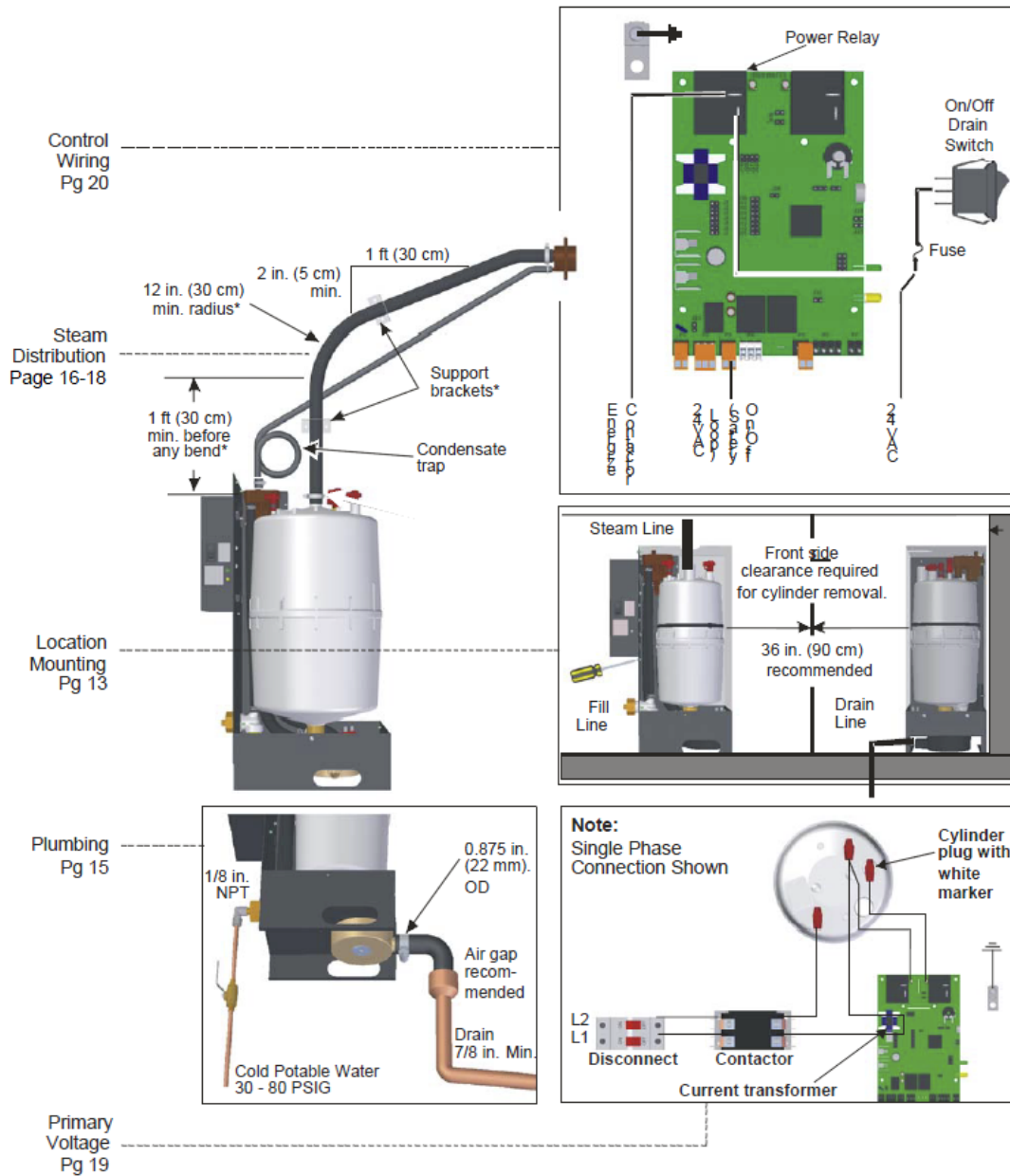
### Water Connection

A copper compression olive type coupling for 3/4" soft copper is provided with unit and requires no soldering for the water connection to the unit.

An isolating gate valve should ALWAYS be placed in feed water line allowing service of the fill valve.

Each unit is fitted with a fill solenoid valve located on the base drain pan. Flow orifices are designed for water pressures from 30-85 psi and protected by the built-in strainer.

For inlet water pressure outside this range, the factory should be contacted. (See also water supply section).



### Humidifier Start-Up:

Check to see that the unit is securely mounted on a level surface with the proper drain and water supply. Check for correct voltage with appropriately sized service. Check that the steam distributor, steam supply hose and condensate line are correctly

installed and routed back to the unit. Ensure that the external control humidistat is in an area to properly sense the relative humidity to be maintained by the humidifier, and that the inter-connecting low voltage wires between the humidistat and unit's control terminal strip are in accordance with the wiring diagram.

Check all electrical connections for wires, which may have become loose in shipping. Components burnt due to loose connection are not under warranty.

Check electrode plugs to ensure they are pressed firmly onto the electrode pins. Important: Loose connections will cause overheating of the cylinder plugs and probably melting of the plugs and/or cylinder.

Open the isolating gate valve in the feed water line to the unit.

Make sure the humidistat is set high enough to call for humidification.

Turn on the main disconnect in the primary service feeding the unit and check that unit has power at the primary terminal block. Push the auto on/off/drain switch to "on".

Water will start to enter the cylinder through its bottom port and rise in the cylinder to a point determined by the solid-state control circuitry.

It is not unusual upon initial start-up for the water to fill the cylinder and cycle on the red high water sensor light.

The red light simply acts as a safety to shut off the fill valve and prevent over fitting. With the red light on, the water in the cylinder will continue to heat and after a few minutes start to boil. After the boiling action of the water has lowered the water level below the sensor at the top of the cylinder, the red light will go out and the fill solenoid will again open until the cylinder is again full.

This cycling of the red light and fill valve will continue until the unit's full output capacity is reached after which the water level will automatically lower itself in the cylinder. (The increased concentration allows for lower electrode coverage while maintaining the same output). When a stabilized condition is reached, the water will be boiling close to the cylinder seam level. The solid-state circuitry will maintain the proper concentration in the cylinder by introducing short drains only when necessary.

If the cylinder is manually drained, the above process will repeat itself.

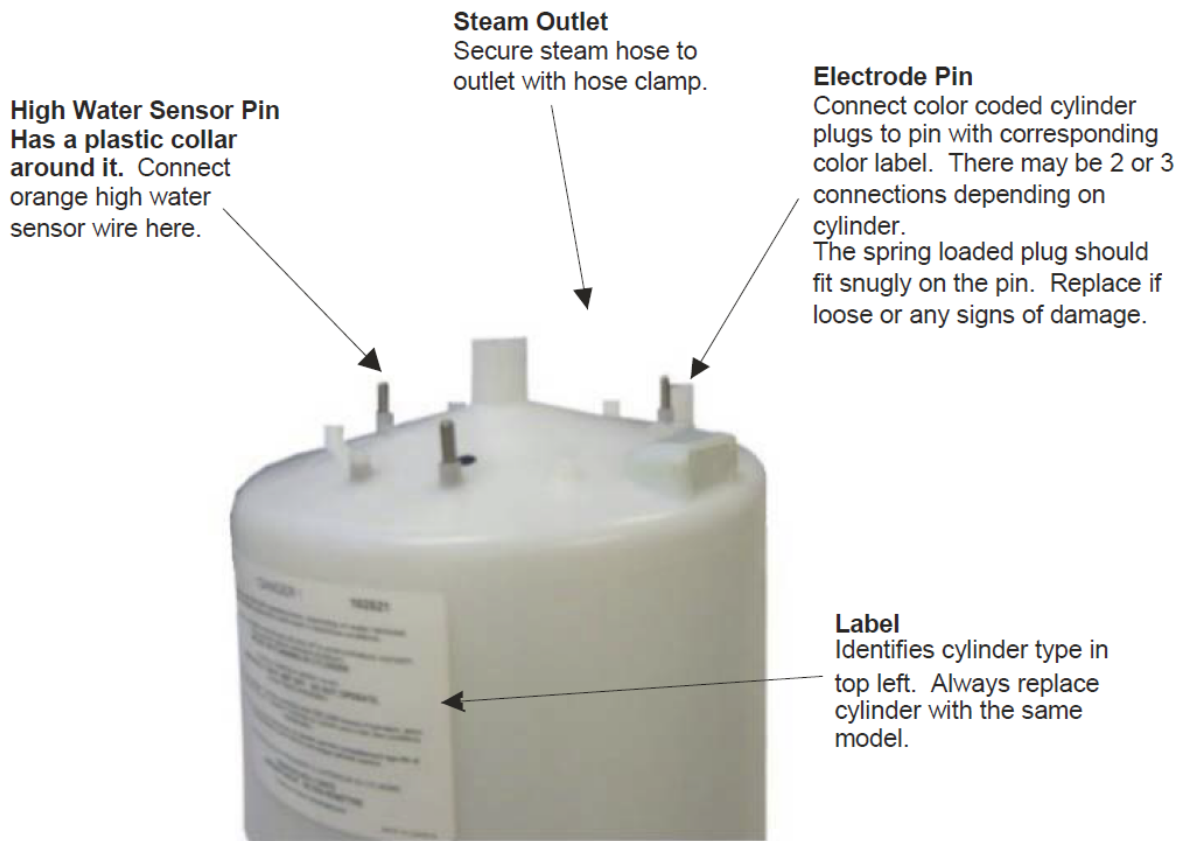
### Low Water Conductivity

Should normalization of the unit be required immediately after start-up, the installer may speed up the process by artificially increasing water conductivity. The installer should dissolve half a teaspoon of table salt (no more) in a cup of water and add it to the cylinder by means of the fill cup attached to the plumbing section.

Open the plumbing compartment and add salt solution through cylinder outlet. Excessive amounts of salt will result in erratic operation of the unit; however, normalization of the unit will occur automatically through the solid-state control sequence.

### Capacity Adjustment

The M.E.S. series of humidifiers are factory set to cover most normal conditions. If an extreme situation is encountered, notify the factory for instructions.



Removing Cylinder

## Cylinder Replacement

After an extended period of operation in accordance with life expectancy information, the cylinder is completely used as indicated by a red light illuminated on the face of the cabinet. When this condition is reached, a new replacement cylinder is to be installed.

**Note:** Red light may come on during initial start-up but does not mean cylinder replacement. See “Humidifier Start-up” Section.

Consult factory or agent for replacement. Quote the cylinder model from the white 3-digit label on the cylinder or quote model, voltage, and serial number from the unit specification label.

When to replace the steam cylinder: The steam cylinder is disposable and must be replaced at the end of cylinder life. Cylinder life is dependent on water supply conditions and humidifier usage. Failure to replace the cylinder at the end of cylinder life may result in unit damage.

Extended Shutdown: Any time that the unit is going to be shut down for an extended period, including summer shutdown, always drain down the cylinder before disconnecting power. Otherwise, the electrodes are subject to harmful corrosion, which drastically shortens the cylinder life. Do not leave the switch in the drain position indefinitely as the drain coil could burn out. Leave the switch in the off position.

## Removing the Cylinder

Turn off the water supply to the unit.

The old cylinder must be drained completely before removing. This is done by pushing the auto on/off drain switch to the "drain" position.

When completely drained, push the auto/of/off drain switch to the "off" position.

Open the main disconnect during the entire cylinder change operation.

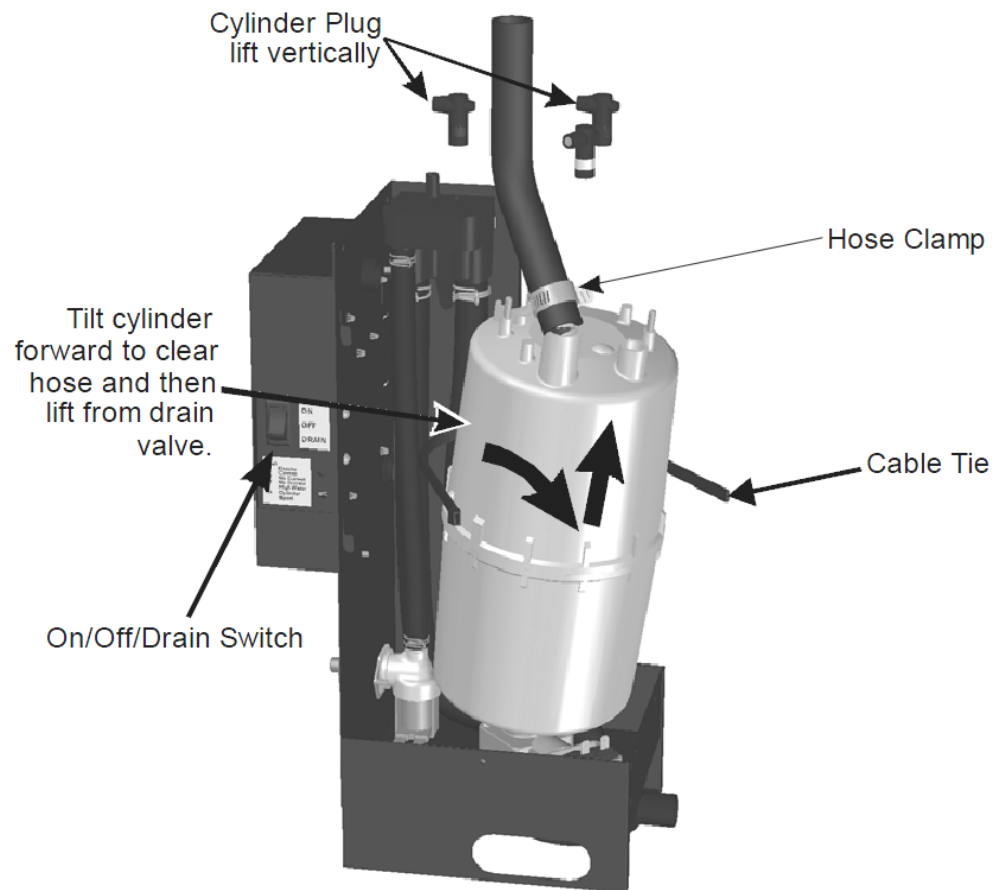
The power wires to the cylinder are attached by the cylinder plugs to the electrode pins on top of the cylinder. Pull these plugs vertically off the pins.

Using slot screwdriver, loosen the steam hose clamp(s) and pull steam hose off vertically.

The cylinder is now ready to be lifted out of the unit.

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Use a slot screwdriver to loosen the steam hose clamp(s) and pull the steam hose off vertically.



Removing Cylinder

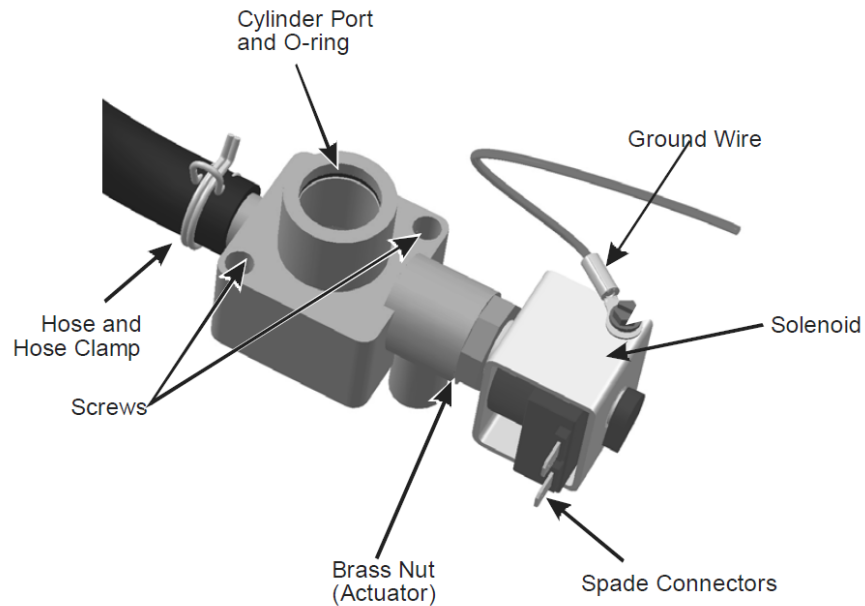
### Installing the New Cylinder

The reverse procedure should be followed to install a new cylinder. The main disconnect is to be left open until the cylinder is completely installed and reconnected.

Ensure that the cylinder mounting stubs are seated properly in the allotted side mounting slots within the unit.

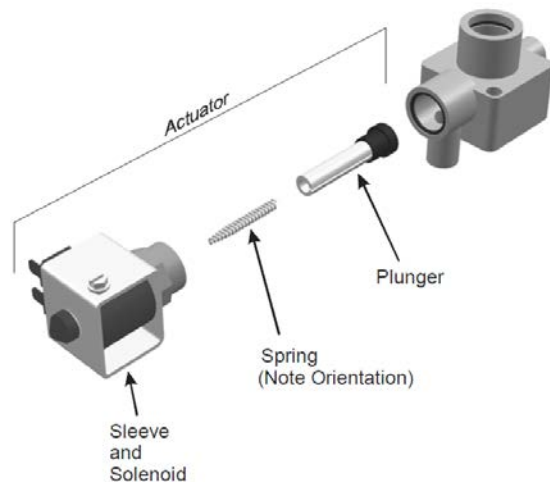
The white cylinder plug on all units is for the sensor electrode, which always goes on the single pin offset from the others.

Ensure that cylinder plugs are very snug on the pins.



**Figure 25: Drain Valve**

For loose fitting plugs, a temporary solution is to squeeze plugs with a pair of pliers before installing. Since loose plugs may generate enough heat to melt and destroy the plug and cylinder, new plugs must be ordered.



### Trouble-Shooting Humidifier

Auto on/off/drain switch in “on” position-unit will not fill: When the on/off control circuit is made and the “auto on/off drain” switch is pushed to “on”, the 24 volt holding coil of the primary contactor should energize. The resulting magnetic pull closes the high voltage contacts with a distinct and audible “clunk”. If the contactor will not make, then inspect the following while referring to the wiring diagram.



Check for 24VAC across pins 18 and 26.

Jumper the humidistat on external control terminal strip. If contactor operates then control system is at fault.

The low voltage 3 amp fuse located in the control box could be blown.

The contactor holding coil could be open or shorted.

The switch could be defective.

Recheck that the "auto/on/off drain" switch is still at "on". If it is, then shut off the main disconnect and check fuses or breaker of the main disconnect. If they are serviceable, turn power back on.

To test for defective "auto/on/off drain" switch, connect a wire from the fuse directly to terminal 6 on the external control strip. If the contactor activates, the "on" side of the switch is defective. If the contactor does not activate, then the basic unit PC board could be defective.

If the 3 amp control fuse blows when the wire from the fuse touches terminal 6 on the external controls strip, contactor holding coil could be shorted. Replace the contactor if necessary.

Return wires to normal.

After the necessary components have been replaced and the contactors pull in, there is high voltage to the cylinder and the control sequence can begin.

Approximately 30 seconds after the contactor pulls in, the fill valve coil should energize. There is also a visible fill relay on the basic printed circuit board. It is the one located farthest from the C.T. core. The points on this relay must be touching for the fill valve to be energized.

If the points will not touch after the built-in time delay, then the sensor input may be interfering. To confirm, remove the red and black sensor wires from the terminal 6 and 10 on the PC board. Wait 30 seconds and if the fill relay point now touch, then the sensor should be replaced. If they do not touch, then the PC board could be faulty. To confirm, disconnect the red wire from terminal 18 and touch it to terminal 14. If the fill valve coil activates then the basic PC board should be replaced. If it still does not activate then the fill valve coil should be replaced.

Having changed the necessary components, water starts filling the cylinder and begins to submerge the electrodes. Because of the high voltage across the electrodes, the water can now conduct electricity.

Red "Change Cylinder" light on – Water at top of cylinder:

Common occurrence on startup – See "Humidifier start up and Operation" section.

If cylinder is old, it indicates replacement time (can be ordered from factory). See "When to replace steam cylinder" section.

Red "Change Cylinder" light on – water not at top of cylinder:

Water foaming to top of cylinder to activate red light, also may be accompanied by arcing (flashing) inside cylinder.

Water remains at high level and won't concentrate:

Normal on cold start-up, can be accelerated by adding maximum 1 tsp. of salt to the cylinder (through the plastic fill cup) on fill cycle. See "Low Water Conductivity" section.

If the unit has been operating extensively, observe for normal fill-boil-fill-boil cycle; no drain should be occurring. Check for leaking drain valve or backpressure.

Water beyond top of cylinder up into spout:

Red light not on and fill still activated; jumper across connection of sensor on basic unit PC board, if fill remains on when connection is jumped, then basic PC board is faulty.

If fill shuts off, then verify primary voltage to cylinder (contactor energized). If primary voltage is present, the high water sensor PCB is defective.

Unit drains continually:

May be caused by foaming and/or backpressure, or leaking drain valve.

Cylinder is almost empty, check for magnetic pull on drain solenoid indicating miswiring. If no pull, drain actuator is blocked open, remove, disassemble and clean.

If drain is occurring through activated drain valve, valve is incorrectly wired or electronics are faulty – consult factory.

If drain is occurring through the overflow in the fill cup, this is due to abnormal restriction on the steam line and back pressure forces water out of the cylinder, therefore, water cannot concentrate and level must stay high, review installation of steam line to ensure no blockages or excessive static pressure in air system.

## Controller

### T-Stat

#### Description

The TEC3000 Series Thermostat Controllers are stand-alone and field-selectable BACnet® Master-Slave/Token-Passing (MS/TP) or N2 networked devices that provide on/off, floating, and proportional control of:



- local hydronic reheat valves
- pressure-dependent VAV equipment with or without local reheat
- two- or four-pipe fan coils
- cabinet unit heaters
- other zoning equipment using an on/off, floating, or 0 to 10 VDC

proportional control input

Models also provide single- or two-stage control of unitary rooftop units (RTUs) with or without economizers and heat pumps.

The networked models feature a field-selectable Building Automation System (BAS) BACnet MS/TP or N2 communication capability that enables remote monitoring and programming for efficient space temperature control. All models include a USB port configuration that reduces installation time by allowing simple backup and restore features from a USB drive, which enables rapid cloning of configuration between like units.

Some models have occupancy sensing capability built into the device. These thermostat controllers maximize up to 30% energy savings in high-energy usage commercial buildings, such as schools and hotels, during occupied times by using additional standby setpoints.

All models feature an intuitive UI with backlit display that makes setup and operation quick and easy. Multiple fan configurations are supported for fan coil equipment types:

#### **single-speed**

multi-speed (two or three discrete speeds)

variable-speed/EC motors (0 to 10 VDC control)

Some models support dehumidification on two-pipe fan coil units with reheat, and four-pipe fan coil units with or without reheat. When no heating is required, the thermostat controller monitors space humidity and activates dehumidification control as necessary. Heat and/or reheat is used as required to maintain the space temperature. For optimal dehumidification performance, use a fan coil unit that has a multi-speed or variable-speed fan (VSF).

Refer to the TEC3000 Series Stand-Alone and Field Selectable BACnet MS/TP or N2 Networked Thermostat Controllers Product Bulletin (LIT-12011954) for important product application information.

### Features

- Two Configurable Binary Inputs—provide additional inputs for advanced functions such as remote night setback, service or filter alarms, motion detector, and window status, and configures the application to respond accordingly.
- Field-Selectable BACnet MS/TP or N2 Networked Communication (TEC36xx-00-000 Models)—simplifies the upgrade from N2 networked communication to BACnet MS/TP networked communication without changing hardware.
- USB Port Configuration—reduces installation time by allowing simple backup and restore features from a USB drive, which enables rapid cloning of configuration between like units.

Backlit Liquid Crystal Display (LCD)—offers real-time control status of the environment in easy-to-read, plain text messages with adjustable backlight that brightens during user interaction.

- Configurable Touch Screen UI—allows facility managers to limit the user interaction with the thermostat controller display based on specific energy policies.
- End-of-Line Switch—simplifies the layout and installation of communication buses.
- Mobile Access Portal (MAP) Gateway Compatibility (MAP Release 4.0 or Later)—allows the user to view equipment and control conditions using mobile devices.
- Stand-Alone and BACnet MS/TP or N2 Networked Models— offers application flexibility.
- Onboard Occupancy Sensor (TEC3xx1-00-000 and TEC3xx3-00-000 Models)—provides energy savings in high-energy usage commercial buildings without additional installation time or cost.
- On/Off, Floating, Proportional 0 to 10 VDC, and Single- or Two-Stage Control—offers additional application flexibility by providing more advanced control signals.
- Integral Humidity Sensor (TEC3xx2-00-000 and TEC3xx3-00-000 Models)—monitors space humidity and activates dehumidification control on two-pipe fan coil units with reheat and four-pipe fan coil units with or without reheat.
- Multiple Fan Configurations—provide single-speed, multi-speed, and variable-speed fan control.

- Full Line of Remote TE-6300 Series Temperature Sensors— supports a wide range of remote temperature sensing needs from a single supplier.

### **Repair Information**

If the TEC3000 Series Thermostat Controller fails to operate within its specifications, replace the unit. For a replacement thermostat controller, contact the nearest Johnson Controls® representative.

## Check that ALL WIRING IS CORRECT

To perform this, test the unit must be turn OFF. Check that properly sized fuses are installed in the disconnect switch. Correct fuse size and minimum circuit ampacity are listed on the unit nameplate. Now, check the wiring connections in the Main Control Panel to see if they are tight. It is best that this be checked prior to operating the machine. After checking, close the Main Control Panel cover and proceed as follows:

Microprocessor Control Panel – With the system switch in the “OFF” position, apply power to the unit. The “Power ON” light should illuminate.

## Blower Speed Adjustment

Adjustment of the air flow maybe desired. The air flow can be readily adjusted on the microprocessor controller (See microprocessor controller for instructions). After the unit has been started and the air flow properly adjusted, check the blower motor current to ensure is increased, the blower motor current should be checked. If a field adjustment is made, the motor should run for at least one hour at maximum design room temperature to see if motor trips on internal overload. For proper motors amps refer to the name plate.

## Check that ALL WIRING IS CORRECT

To perform this, test the unit must be turn OFF. Check that properly sized fuses are installed in the disconnect switch. Correct fuse size and minimum circuit ampacity are listed on the unit nameplate. Now, check the wiring connections in the Main Control Panel to see if they are tight. It is best that this be checked prior to operating the machine. After checking, close the Main Control Panel cover and proceed as follows:

Microprocessor Control Panel – With the system switch in the “OFF” position, apply power to the unit. The “Power ON” light should illuminate.

## Check for Correct Phasing

The equipment should now be checked for correct phasing required to make the blower motor turn in the correct directions. For this test, it is necessary to open the right-side doors of the unit to observe the blower and blower motor. Now, momentarily switch the system switch to the “ON” position and then back to “OFF”. The blower motor with have started and it is therefore possible to determine rotation. Heaters and humidifiers are not affected by phasing.

## Blower Speed Adjustment

Adjustment of the air flow maybe desired. The air flow can be readily adjusted on the microprocessor controller (See microprocessor controller for instructions). After the unit has been started and the air flow properly adjusted, check the blower motor current to ensure is increased, the blower motor current should be checked. If a field adjustment is made, the motor should run for at least one hour at maximum design room temperature to see if motor trips on internal overload. For proper motors amps refer to the name plate.

## Field Test Plans

THIS FORM MUST BE COMPLETED FOR EACH UNIT AND SENT BACK TO COMPU-AIRE.

TEST DATE START: \_\_\_\_\_ TEST DATE COMPLETE \_\_\_\_\_

COMPANY PERFORMING TESTING: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_ FAX NO: \_\_\_\_\_

EMAIL: \_\_\_\_\_

TECHNICIAN'S NAME: \_\_\_\_\_

TECHNICIAN PHONE NO: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

PROJECT ADDRESS: \_\_\_\_\_

CUSTOMER CONTACT: \_\_\_\_\_

UNIT MODEL: \_\_\_\_\_

UNIT SERIAL NO: \_\_\_\_\_

VOLTAGE: \_\_\_\_\_

**UNIT TYPE:**

AIR       CHILLED WATER       WATER

**UNIT EQUIPPED WITH:**

Type of Humidifier:					
Humidifier SN#		Cylinder#		kW	
Type of Heat				kW	
Chilled Control Valve					
Condensate Pump SN#					



## FIELD CHECK

- \_\_\_\_\_ UNIT ALIGNMENT AND SECURELY MOUNTED
- \_\_\_\_\_ DOOR ALIGNMENT
- \_\_\_\_\_ NUTS FOR TIGHTNESS
- \_\_\_\_\_ WIRES FOR CONNECTION TIGHTNESS
- \_\_\_\_\_ UNIT GROUND CONNECTED
- \_\_\_\_\_ HIGH AND LOW VOLTAGE WIRING CONDITION FOR ANY DAMAGE
- \_\_\_\_\_ SMOKE DETECTOR
- \_\_\_\_\_ REMOTE SENSORS
- \_\_\_\_\_ CONDENSATE PUMP MOUNT
- \_\_\_\_\_ PIPING AND VALVE SUPPORTS AND AVOID ANY RUBBING PIPES
- \_\_\_\_\_ INSULATION (CHECK ALL PIPING, C.W. VALVES)
- \_\_\_\_\_ CONDENSATE DRAIN TRAP
- \_\_\_\_\_ ISOLATION VALVES INSTALLED
- \_\_\_\_\_ STRAINER INSTALLED
- \_\_\_\_\_ SUPPLY AND RETURN AIR CLEARANCE AND AIR DISTRIBUTION
- \_\_\_\_\_ HUMIDIFIER WATER LINES FLUSHED
- \_\_\_\_\_ HUMIDIFIER CYLINDER IS SECURED
- \_\_\_\_\_ CHILLED WATER VALVES IS SECURED

### **Set Controls to Test Operation:**

- \_\_\_\_\_ TEMPERATURE SET POINT
- \_\_\_\_\_ HUMIDISTAT SETPOINT
- \_\_\_\_\_ HI LOW TEMPERATURE AND HUMIDITY SET POINTS

*(Note Any Changes Made to The Controller Settings)*

### Unit Power Supply: Test Voltage

Line Voltage	L1-L2		L2-L3		L1-L3	
Control Voltage at Controller						

<b>Evap Fan # 1</b>						
Motor HP/kW		FLA		Voltage		
Model #						
AMP Draw	L1		L2		L3	
Control Input Signal Min/Max						VDC

<b>Reheat</b>						
Electric		Stages				
<b>Heater</b>						
AMP Draw Stage 1	L1		L2		L3	
AMP Draw Stage 1	L1		L2		L3	

<b>Humidifier</b>						
AMP Draw	L1		L2		L3	
Fill Valve Operation			Drain Valve			

Condition in 100% Cooling Test Mode				
Supply Air Temperature			Return air Temperature	
Fill Valve Operation			Drain Valve	
Return Air Humidity				
C.W. Supply Temperature			C.W. Return Temperature	

Chilled Water				
Water <b>in</b> Temperature		Water <b>Out</b> Temperature		
Chilled Water Valve Part#				
Chilled Water Valve Operation		Min/Max		VDC Range

**Automatic Controls**

CONTROLLER MODEL: \_\_\_\_\_

SOFTWARE REVISION: \_\_\_\_\_ REVISION DATE: \_\_\_\_\_

\_\_\_\_\_ CHECK ALL ALARMS

\_\_\_\_\_ CALIBRATE SENSORS AS NEEDED

\_\_\_\_\_ VERIFY POINTS LIST WITH CONTROLS CONTRACTOR

\_\_\_\_\_ VERIFY OPERATION OF LONWORKS COMMUNICATION CARD WITH BMS

\_\_\_\_\_ CHECK ALL ANALOG OUT PUTS

\_\_\_\_\_ CHECK ALL DIGITAL OUT PUTS

**Alarm set points**

TEMPERATURE: HIGH: \_\_\_\_\_ LOW: \_\_\_\_\_

HUMIDITY: HIGH: \_\_\_\_\_ LOW: \_\_\_\_\_

(NOTE ANY CHANGES MADE TO THE CONTROLLER SETTINGS)

**Condensate Pump**

WET TEST: \_\_\_\_\_

**Technician Comments**

*Note all readings and any adjustment made at the job site:*

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**Any Visual Damage:**



**MAINTENANCE CHECKLIST**

Inspection Date \_\_\_\_\_  
Job Name \_\_\_\_\_  
Unit Model # \_\_\_\_\_  
Unit Serial Number # \_\_\_\_\_  
Room Temperature \_\_\_\_\_° Humidity \_\_\_\_\_%  
Ambient Temperature \_\_\_\_\_°

**Filters**

- \_\_\_ 1. Check/replace filters
- \_\_\_ 2. Grille area unrestricted
- \_\_\_ 3. Wipe section clean
- \_\_\_ 4. Coil clean

**Blower Section**

- \_\_\_ 1. Blower wheel(s) free of debris
- \_\_\_ 2. Check belt tension and condition (replace if needed)
- \_\_\_ 3. Check bearings
- \_\_\_ 4. Check sheave/pulley (replace if worn)
- \_\_\_ 5. Check motor mount
- \_\_\_ 6. Motor amp draw L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_
- \_\_\_ Compare measured amp draw to nameplate rating

**Reheat**

- \_\_\_ 1. Inspect elements
- \_\_\_ 2. Check wire connections (inside reheat box)
- \_\_\_ 3. Reheat amp draw \_\_\_\_\_ #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3

**Steam Generating Humidifier**

- \_\_\_ 1. Check drain valve/drain lines/trap for clogs
- \_\_\_ 2. Check water make-up valve and all hoses for leaks
- \_\_\_ 3. Clean strainer
- \_\_\_ 4. Replace humidifier bottle if necessary

- \_\_\_ 5. Check operation of humidifier
- \_\_\_ 6. Humidifier amp draw L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_

**Condensate Pump**

- \_\_\_ 1. Check for debris in sump
- \_\_\_ 2. Check operation of float(s) (free movement)

**Electrical Panel**

- \_\_\_ 1. Check fuses
- \_\_\_ 2. Check contactors for pitting
- \_\_\_ 3. Check all wire connections

**Controls**

- \_\_\_ 1. Check/Verify Control Operation (Sequence)
- \_\_\_ 2. Check operation of the airflow switch
- \_\_\_ 3. Check setting/operation of the clogged filter switch
- \_\_\_ 4. Check/test changeover device(s)
- \_\_\_ 5. Check/test water detection device(s)

Notes \_\_\_\_\_  
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Signature \_\_\_\_\_  
Company \_\_\_\_\_

**Trouble Shooting  
Symptom**

*High head pressure*

**Probable Cause**

Condenser fan not operating  
Dirty condenser coil  
Insufficient open area around condenser

**Check or Remedy**

Check power to motor.  
Clean coil.  
Clear area 3 feet all around condenser air inlet and discharge duct.

*Room Temperature too high*

Condenser discharge air recirculation  
Condenser water not circulating  
Thermostat set too high

Duct discharge air way from inlet to condenser.  
Check pump and water regulating valve.  
Reset thermostat to lower setting. Check for fan and compressor symptoms.  
Reset thermostat to higher setting.

*Room Temperature too low  
Low air flow*

Thermostat set too low  
Dirty air filter  
Thermal overloads in compressor open

Replace air filter  
Wait 5 minutes for automatic reset. Open disconnect. Remove cover from compressor.  
Check with ohm meter on the control circuit leads and isolate the defective overload.  
See symptom "high head pressure"

*Compressor not operating*

*Compressor will not operate when cooling is called for*

Compressor out on high head pressure  
  
Low head pressure, out of refrigerant, or dirty filter  
Low pressure switch defective

Change filter or recharge after fixing leak.

*Main fan not operating*

Water sensor in the condensate pan senses high condensate level. Entire system shuts down  
Power not on  
Overload tripped on motor

Check low pressure switch for continuity, by disconnecting one of the wires on the switch and using an ohm meter to read continuity.  
Check for restriction in condenser drain line.  
Adjust humidifier needle valve if water run-off too high.  
Check high voltage disconnect.  
Wait 5 min. for auto. Reset & determine the cause.

*Reheat not operating*

Water sensor in condensate pan senses water. Entire system shuts down

Check for restriction in condensate drain line.  
Adjust humidifier needle valve if water run off too high.

*High humidity*

Heater safety open  
Defective holding coil  
Thermostat not operating  
Compressor not operating on dehumidistat  
Humidistat set too high  
Poor vapor seal in room

Check continuity through safety.  
Check for 24V at holding coil  
Check thermostat on heating.  
Check compressor for operation as in previous steps. Check dehumidistat.  
Reset humidistat lower.

*Low humidity*

No water flowing  
  
Pad not clean  
Humidistat set too low  
Cold water

If the control is functioning properly by calling for dehumidification, check the room for proper vapor seal.  
Turn on water. Check strainer, valve & solenoid.  
Clean/replace pad.  
Reset humidistat higher.  
Heat water to 140°f.

**Technical Support/ Service/Parts**

**Website**

[www.compu-air.com](http://www.compu-air.com)

**Location**

Compu-Aire, Inc.  
8167 Byron Road  
Whittier, CA 90606  
United States of America  
Phone: +1 (562) 945-8971  
Fax: +1 (562) 696-0724

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