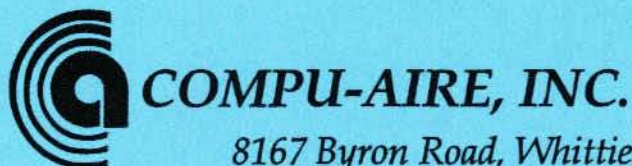
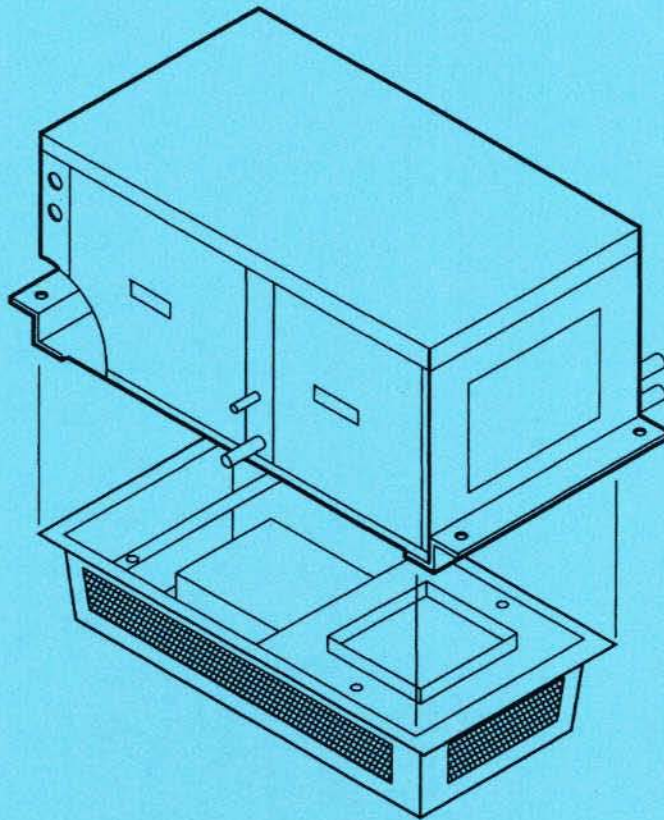


INSTALLATION/OPERATION & MAINTENANCE MANUAL

MINI-TEMP PLUS **AIR COOLED** **WATER COOLED**



8167 Byron Road, Whittier, Ca 90606
Phone: (562) 945-8971 Fax: (562) 696-0724
Website; www.compu-aire.com E-mail: cs@compu-aire.com

ISO 9002 Registered Company

ADDENDUM

CORRECT PHASING OF SCROLL COMPRESSORS:

The scroll compressor is an unidirectional compressor and will only compress refrigerant in one rotation direction. Therefore, the proper rotation of the scroll compressor must be checked. The scroll compressor will run in the reverse direction but it will not pump refrigerant and will draw substantially reduced current as compared to listed values, and will result in elevated sound levels. Scroll compressor will trip on internal protection after running for some time in the reverse direction.

Verification of the proper rotation of the scroll compressor is done by observing that suction pressure drops and discharge pressure rises when the compressor is energized.

WARNING:
EXTENDED IMPROPER ROTATION OPERATION MAY ALSO VOID COMPRESSOR WARRANTY.

INDEX

DESCRIPTION	PAGE
1. INSPECTION	1
2. GENERAL DESCRIPTION	2
3. SELECTION OF SITE AND PREPARATION	3 - 4
4. OPERATING INSTRUCTION	5
5. ELECTRICAL LAYOUT	6 - 7
6. CONDENSATE DRAINS AND LOW AMBIENT CONTROL	8
7. DIMENSIONAL DATA AND COMPONENT LAYOUT	9 - 13
8. TECHNICAL DATA	14 - 18
9. HUMIDIFIER OPERATION MANUAL	19 - 28
10. START-UP	29
11. MAINTENANCE	30
12. WARRANTY CERTIFICATE	31

INSPECTION

Upon receipt of equipment inspect any visible or concealed damage and promptly report the same to the carrier and file a damage claim. **IT IS THE RESPONSIBILITY OF THE RECEIVER, COMPU-AIRE IS NOT RESPONSIBLE.**

Then verify the exact voltage of the unit and compare with the voltage source. In case there is any disagreement, contact the factory.

GENERAL DESCRIPTION

COMPU-AIRE Model MINI-TEMP PLUS unit is a compressorized air cooled self contained split system. An external source of electrical power 208v/1 Ph/60Hz, 277v/1Ph/60Hz, 208v/3Ph/60Hz or 460v/3Ph/60Hz supply is the only electrical utility connection required. In addition, a condensate drain connection and supply and return air connections are required.

MAJOR COMPONENTS

Major components of the Air Conditioner are:

1. Evaporator section consisting of:
 - * Evaporator blower and motor
 - * Evaporator with externally equalized expansion valve water
2. Condensing section consisting of:
 - * Condenser coil
 - * Condenser blower and motor
 - * Compressor
 - * Receiver
 - * Head Pressure Control for low ambient

SELECTION OF INSTALLATION SITE

Prior to installing the unit check the structure thoroughly. Ascertain the location of wiring, condensate disposal, duct work location, ease of access to the unit for maintenance and service 32" minimum clearance must be provided on all sides.

Loading limitation of walls, ceilings, and floors must be paid particular attention to.

UNIT MOUNTING

Unit is shipped as a complete package with evaporator and condensing section. If the unit is to be ceiling hung use:

Minimum 3/8" diameter for 2 & 3 ton and 1/2" diameter for 5 ton hanging rods with washers, locknuts and vibration isolators. Hanger hardware is field supplied.

INSTALLATION AND PREPARATION

1. Position unit in desired location.
2. Check to see that nothing obstructs the flow of air to or from condenser fan and outside air inlet.
3. Open access panels and inspect air conditioner thoroughly for broken controls or other damage such as loose pipes etc.
4. Remove caps from receiver, and compressor discharge and suction valves. Using wrenches, check to see that these valve stems are backseated as far as they will go. Replace valve caps.
5. Electrically ground unit.
6. Turn disconnect switches to OFF position. Connect unit to source of electric power. Power tolerances are at $\pm 10\%$.
7. Tighten access panels fully to prevent leakage of conditioned air from the cabinet.
8. Prime condensate drain.

OPERATION INSTRUCTIONS

Before starting the MINI-TEMP, check to see that nothing is obstructing the flow of air to the compressor section and that no obstruction is in the way of the air being exhausted by the condenser fans.

MINI-TEMP PLUS are designed to meet various air conditioning and heating requirements. MINI-TEMP PLUS unit lends itself to be mounted on the floor or suspended from the ceilings.

For ease of passage through tight spaces unit can be turned on its sides (extreme care should be exercised while turning the unit on its side). **ANY DAMAGE CAUSED DUE TO THE UNIT BEING TURNED ON THE SIDE IS THE RESPONSIBILITY OF THE CONTACTOR.**

ELECTRICAL

Units are completely wired at the factory. Prior to any electrical hook up check the following.

1. Verify the unit voltage.
2. Check all connections for tightness.
3. Consult and comply with all applicable local and national codes.
4. Provide fused disconnects for the unit.
5. Low voltage wiring must be 18 gauge minimum up to 50 feet run. Factory wiring terminates in the control box.
6. Locate the remote control panel in a location where there will not be any direct air flow, or the outside wall or near any other heat source which may improperly influence the sensing of the remote control panel. Run 18 gauge wire between the control box and remote control panel. Distance not to exceed 25 feet.

PFCU
CFCU OR
WCCU
CONDENSING
SECTION

MTE
EVAPORATOR SECTION

CONTROL
PANEL

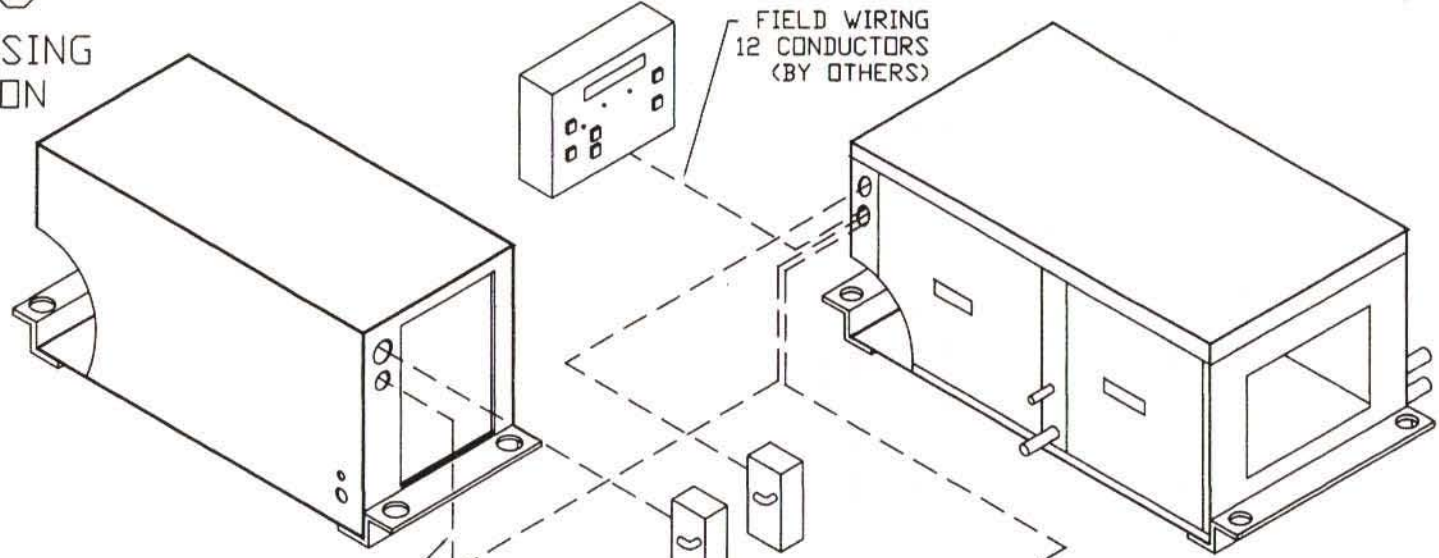
FIELD WIRING
12 CONDUCTORS
(BY OTHERS)

FIELD WIRING
4 CONDUCTORS
(BY OTHERS)

FUSED
DISCONNECT
(BY OTHERS)

FIELD WIRING
5 CONDUCTORS
(BY OTHERS)

ROOM
THERMOSTAT



7

CONDENSATE DRAINS

1 1/8" Condensate drain is provided. THIS DRAIN SHOULD BE CONNECTED TO A FIELD DRAIN WITH A MINIMUM SLOPE OF 1/4" PER 10 FEET OF RUN.

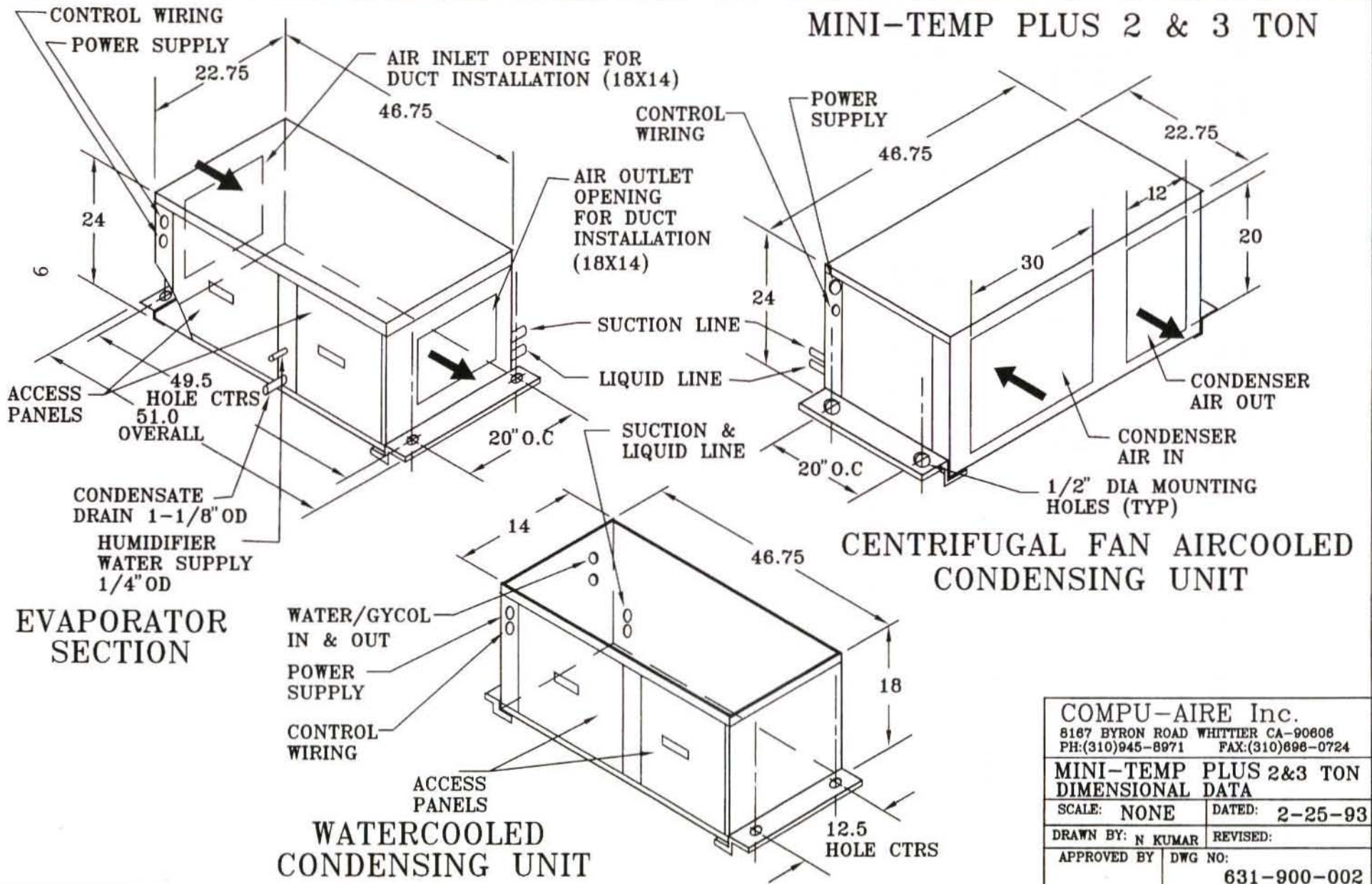
AIR FLOW

The evaporator is provided with direct drive motor for 2 & 3 ton units and belt drive with variable pitch motor pulleys which are field adjustable for 5 ton units. Refer to the specification data for the air flow data. In case field adjustments are made, check to verify the motor full load amps.

LOW AMBIENT CONTROL

A low ambient head pressure control valve is provided in case the system pressure drops below 180 psig. The head pressure control valve will bypass the refrigerant across the condenser coil. The head pressure control valve is located in the condensing section.

MINI-TEMP PLUS 2 & 3 TON



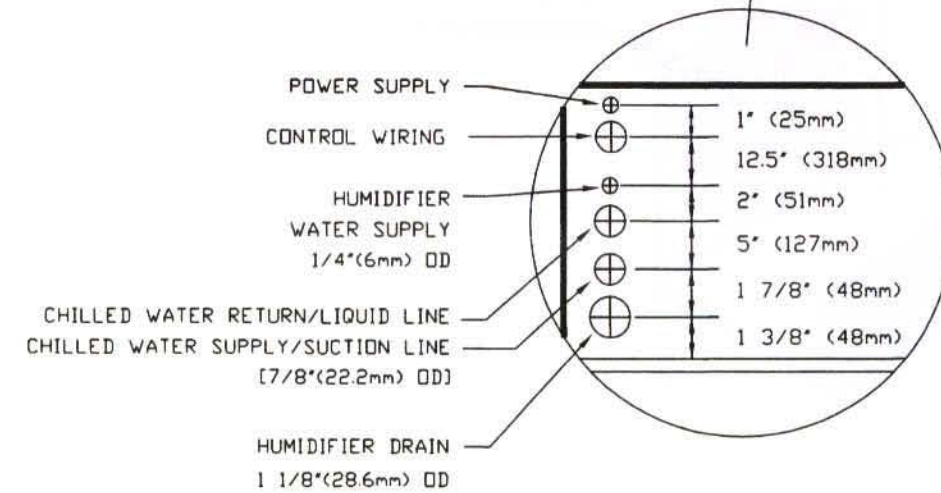
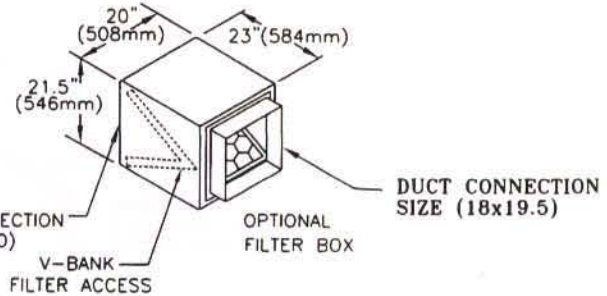
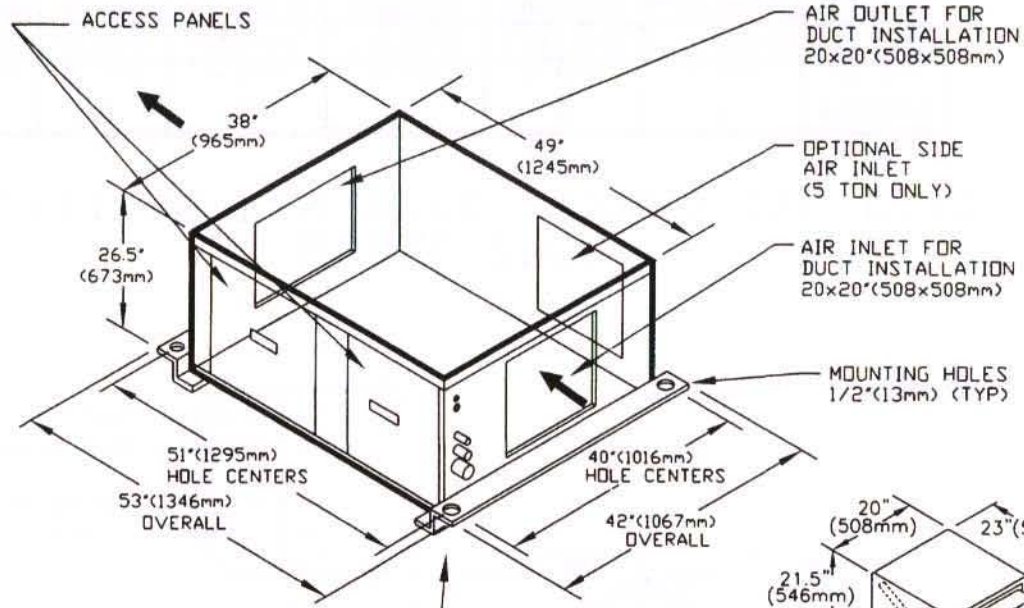
EVAPORATOR SECTION

WATERCOOLED CONDENSING UNIT

CENTRIFUGAL FAN AIRCOOLED CONDENSING UNIT

COMPU-AIRE Inc. 8187 BYRON ROAD WHITTIER CA-90808 PH:(310)945-8971 FAX:(310)698-0724	
MINI-TEMP PLUS 2&3 TON DIMENSIONAL DATA	
SCALE: NONE	DATED: 2-25-93
DRAWN BY: N KUMAR	REVISED:
APPROVED BY	DWG NO: 631-900-002

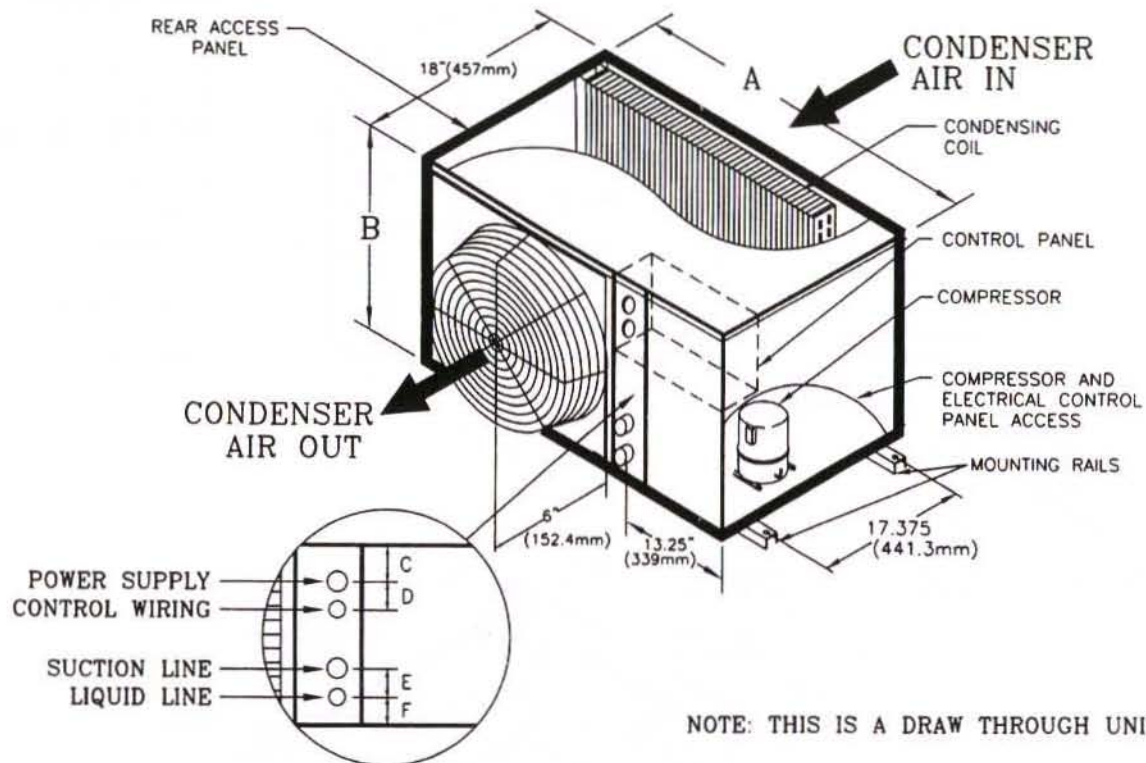
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	NEW RELEASE	1/26/01	BF
B	MINI TEMP PLUS 5 TON ONLY	09/24/03	AP



MINI-TEMP PLUS 5 TON

COMPU-AIRE, inc.
MINI-TEMP PLUS
 DRAWN BY A. POGHOSYAN DATE 1/26/01
 APPROVED BY: REVISION 09/24/03
 JOB NO. DWG NO. **631-901-008**

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
B	NEW RELEASE	09/13/02	AP



NOTE: THIS IS A DRAW THROUGH UNIT

MODEL PFCU PROPELLER FAN TYPE CONDENSING UNIT

PFCU MODEL	NOMINAL TONNAGE	A In. (mm)	B In. (mm)	C In. (mm)	D In. (mm)	E In. (mm)	F In. (mm)	WEIGHT LBS. (Kg.)
01.5	1.5	38"(965)	24"(610)	1.75"(44.4)	2.00"(50.8)	3.00"(76.2)	13.00"(330.2)	240 (108)
02	2	43"(1092)	24"(610)	1.75"(44.4)	2.00"(50.8)	3.00"(76.2)	13.00"(330.2)	300 (135)
03	3	50"(1270)	31"(787)	2.00"(50.8)	2.00"(50.8)	3.00"(76.2)	21"(533.4)	325 (146)
05	5	54"(1372)	37"(940)	3.00"(76.2)	2.00"(50.8)	3.00"(76.2)	21"(533.4)	340 (153)

COMPU-AIRE, inc.

PFCU DIMENSIONAL DATA

DRAWN BY: A. POGHOSYAN	DATE: 05/12/02
APPROVED BY:	REVISED: 09/13/02
JOB NO:	DWG NO. 605-900-006

REMOVE BLOWER CUT
WIRES REMOVE (2) 1/4 NUTS
ONE SIDE OF BLOWER

HANGER
ROD
(BY OTHERS)

ISOLATER
(FURNISHED)

FLAT
WASHER
(BY OTHERS)

NUT
(BY OTHERS)

BLOWER AND
BLOWER MOTOR

CONTROL
BOX

HUMIDIFIER
CONTROL

DRAIN

HUMIDIFIER SUPPLY
& NEEDLE VALVE

HEATER ASSY
DISCONNECT WIRES
BEFORE REMOVING

SHEET METAL SCREW (4 TYP)

HEATER COVER

12

SEE
DETAIL
'A'

MOUNTING
CLIP

UNIT
CHANNEL
FRAME

FOAM
TAPE

BOLT
TYP. (4)

T-BAR

DETAIL
'A'

COMPU-AIRE, inc.
8167 BYRON ROAD WHITTIER, CA 90606
TEL (310) 945-8971 FAX (310) 696-0724

MINI-TEMP PLUS

SCALE NONE

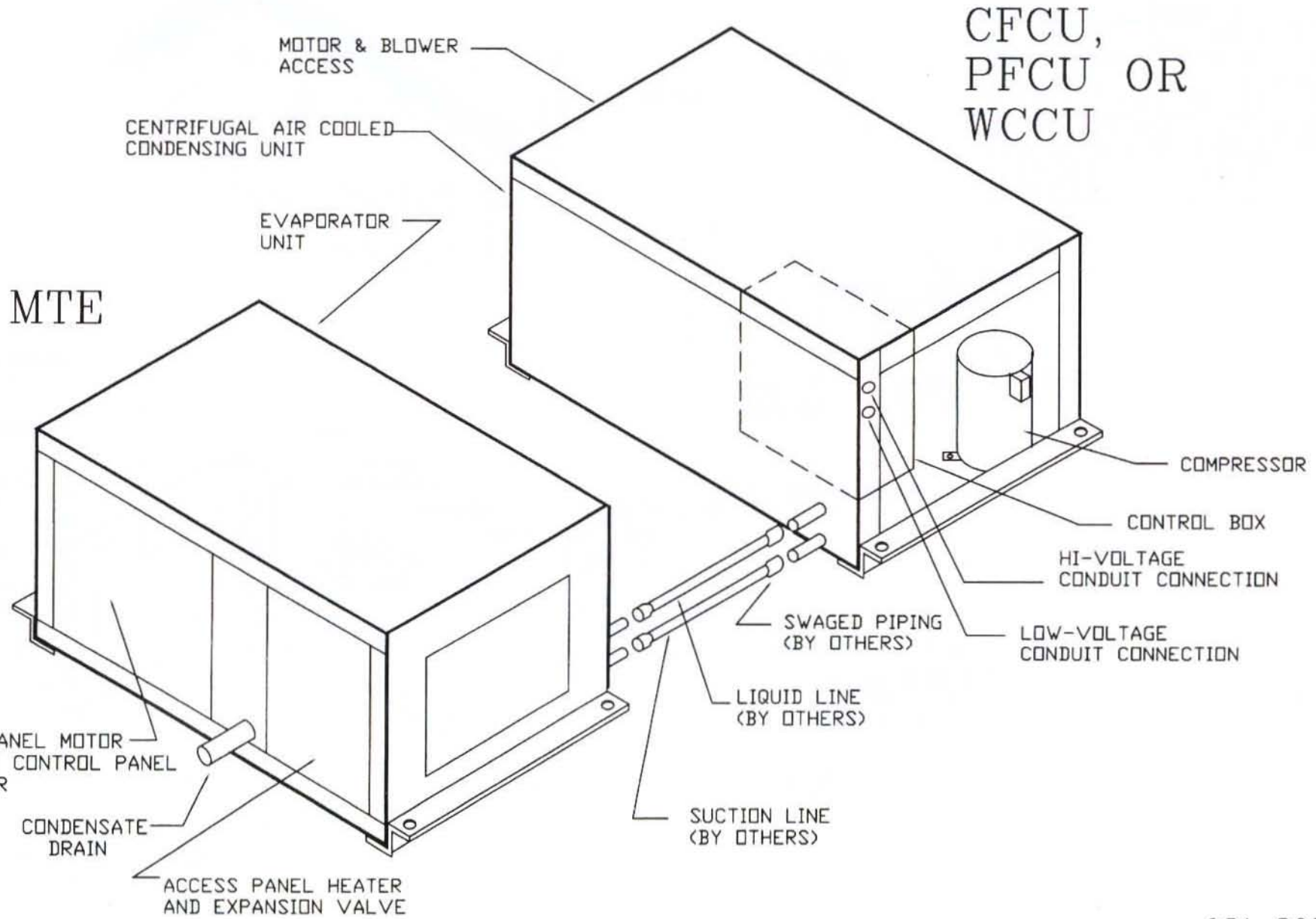
DATE 10-14-92

DRAWN BY
D. WINSLOW

DRAWING No.

CHECKED BY

631-900-001



TECHNICAL DATA

MINI-TEMP PLUS

EVAPORATOR SECTION

MODEL	MTE-P-1.5	MTE-P-2	MTE-P-3	MTE-P-5
NOMINAL TONNAGE	1.5	2	3	5
EER	9.0	9.2	9.1	9.0
CAPACITY DATA-				
80°F(27°C)DB/50% RH Entering Air				
TOTAL-BTU/HR	18200(5.3)	24900(7.3)	36800(10.7)	65800(19.2)
SENSIBLE-BTU/HR	13975(4.1)	20420(5.9)	29350(8.6)	50500(14.8)
75°F(24°C)DB/50% RH Entering Air				
TOTAL-BTU/HR	16720(4.9)	23300(6.7)	33850(9.9)	61100(17.9)
SENSIBLE-BTU/HR	13420(3.9)	19650(5.7)	28200(8.2)	48920(14.3)
72°F(21°C)DB/50% RH Entering Air				
TOTAL-BTU/HR	15850(4.6)	22100(6.4)	32320(9.4)	58250(17.1)
SENSIBLE-BTU/HR	12950(3.8)	19200(5.6)	27420(8.0)	47920(14.0)
FAN DATA-DIRECT DRIVE				
FAN MOTOR HP	1/4	1/2	1/2	1
HIGH SPEED CFM (L/S)	685(318)	895(417)	1260(590)	2360(1109)
COIL DATA- COPPER TUBING- ALUMINUM FINS				
FACE AREA FT ² (M ²)	1.8(.17)	2.6(0.25)	2.6(0.25)	5.5(0.53)
ROWS/FPI	4/12	4/12	4/12	4/12
REHEAT DATA- ELECTRIC (OPTIONAL)				
K.W	5.0	5.0	5.0	12
CAPACITY-BTU/HR	17050	17050	17050	40920
HUMIDIFIER DATA-DISPOSABLE CYLINDER TYPE (OPTIONAL)				
KW	1.7	1.7	1.7	3.4
LB/HR (KG/HR)	4.5(2.0)	4.5(2.0)	4.5(2.0)	10(4.5)
PIPING CONNECTION DATA- IN INCHES				
LIQUID LINE	3/8	3/8	3/8	1/2
SUCTION LINE	5/8	7/8	7/8	1-1/8
HUMIDIFIER SUPPLY	1/4	1/4	1/4	1/4
CONDENSATE DRAIN	3/4	3/4	3/4	3/4
WEIGHT	195(88.6)	195(88.6)	210(95.4)	275(125)

**ELECTRICAL DATA
EVAPORATOR SECTION
SPLIT SYSTEM
COOL ONLY**

208V/230V/1PH/60HZ

FLA	2.0	3.4	3.4	5.6
MCA	2.25	4.3	4.3	7.0
MFS	15A	15A	15A	15A

277V/1PH/60HZ

FLA	1.6	3.2	3.2	4.8
MCA	2.0	4.0	4.0	6.0
MFS	15A	15A	15A	15A

WITH REHEAT AND HUMIDIFIER

208V/230V/1PH/60HZ

FLA	25.1	26.4	34.7	60.4
MCA	31.3	33.0	43.4	75.5
MFS	35A	40A	50A	90A

277V/1PH/60HZ

FLA	18.9	20.5	26.7	46.0
MCS	23.6	25.6	33.4	57.5
MFS	30A	30A	40A	70A

SELF CONTAINED

EVAPORATOR SECTION ATTACHED TO CONDENSING SECTION
CONDENSING SECTION CENTRIFUGAL FAN TYPE

MODEL	MTA-P-1.5SC	MTA-P-2SC	MTA-P-3SC	MTA-P-5SC
NOMINAL TONNAGE	1.5	2	3	5
EER	9.0	9.2	9.1	9.0

COOL ONLY

208V/230V/1PH/60HZ

FLA	14.6	20.2	25.6	49.3
MCA	17.8	24.2	31.0	59.9
MFS	30A	35A	45A	80A

277V/1PH/60HZ

FLA	13.2	18.2	21.4	N/A
MCA	16.1	21.9	26.0	N/A
MFS	25A	30A	40A	N/A

WITH REHEAT AND HUMIDIFIER

208V/230V/1PH/60HZ

FLA	36.1	40.3	45.7	91.6
MCA	48.1	55.4	62.2	109.2
MFS	60A	70A	70A	150A

277V/1PH/60HZ

FLA	28.9	34.1	37.5	N/A
MCA	38.6	47.4	52.0	N/A
MFS	50A	60A	70A	N/A

208V/3PH/60HZ

FLA	10.0	27.1	34.2	60.5
MCA	15.5	38.9	47.5	85.5
MFS	30A	50A	60A	100A

460V/3PH/60HZ

FLA	7.0	15.9	19.3	28.1
MCA	11.8	25.5	29.0	47.5
MFS	20A	30A	40A	50A

FLA= FULL LOAD AMPERES

MCA= MINIMUM CIRCUIT AMPACITY (WIRE SIZING AMPERES)

MFS= MAXIMUM FUSE SIZE

ELECTRICAL DATA-CONDENSING UNIT COMPLETE WITH COMPRESSOR AND
CONDENSER FAN AND MOTOR

AIR-COOLED PROPELLER FAN TYPE PFCU

MODEL	PFCU-1.5	PFCU-2	PFCU-3	PFCU-5
NOMINAL TONNAGE	1.5	2	3	5
EER	9.2	9.4	9.5	9.3
COMPRESSOR DATA- Heat Pump Duty High Efficiency Hermetic R-22				
Size	1.5	2	3	5
EER	10.0	10.2	10.4	10.1
FAN DATA- PROPELLER FAN TYPE DIRECT DRIVE				
CFM (L/S)	1420(670)	1420(670)	1980(934)	2340(1104)
Fan Size	16"	16"	20"	24"
Fan Quantity	1	1	1	1
Motor Hp	1/5	1/5	1/5	1/2
Quantity Of Motors	1	1	1	1
CONDENSER COIL DATA				
Face Area FT ² (M ²)	3.8(.35)	5.0(.46)	7.7(.72)	10.5(.98)
Rows	2	2	2	3
PIPING DATA all sizes are in inches				
Liquid Line	3/8	3/8	3/8	1/2
Suction Line	5/8	7/8	7/8	1 1/8
WEIGHT lbs(kg)	275(123)	310(140)	325(148)	340(155)

AIR COOLED CENTRIFUGAL FAN TYPE CFCU

MODEL	CFCU-1.5	CFCU-2	CFCU-3	CFCU-5
NOMINAL TONNAGE	1.5	2	3	5
EER	9.0	9.2	9.3	9.1
COMPRESSOR DATA- Heat Pump Duty High Efficiency Hermetic R-22				
Size	1.5	2	3	5
EER	10.0	10.2	10.4	10.1
FAN DATA- CENTRIFUGAL FAN TYPE DIRECT DRIVE				
Air Volume CFM(l/s)	1020(482)	1020(482)	1670(788)	3580(1690)
Motor (HP)	1/2	3/4	3/4	2.0
ESP "wc(Pa)	0.50(125)	0.50(125)	0.50(125)	0.50(125)
CONDENSER COIL DATA				
Face Area FT ² (M ²)	1.75(.17)	1.75(.17)	4.6(.43)	7.6(.71)
Rows	4	4	3	4
Fpi	12	12	12	12
PIPING DATA- All sizes are in inches				
Liquid Line	3/8	3/8	3/8	1/2
Suction Line	5/8	7/8	7/8	1 1/8
WEIGHT lbs(kg)	285(130)	310(140)	340(154)	395(180)

WATER COOLED CONDENSING UNIT WCCU

MODEL	WCCU-1.5	WCCU-2	WCCU-3	WCCU-5
NOMINAL TONNAGE	1.5	2	3	5
EER	9.9	10.2	10.3	10.0
COMPRESSOR DATA- Heat Pump Duty High Efficiency Hermetic R-22				
Size	1.5	2	3	5
EER	10.0	10.2	10.4	10.1
WATER COOLED CONDENSER DATA				
Condenser Type	Co-Axial	Co-Axial	Co-Axial	Co-Axial
GPM 75°F EWT	2.25(0.14)	3.0(0.19)	4.5(0.28)	7.5(0.47)
Pressure Drop	10.1(30.1)	10.1(30.1)	10.1(30.1)	10.1(30.1)
GPM 85°F EWT	4.5(0.28)	6.0(0.39)	4.5(0.47)	15.0(0.95)
Pressure Drop Ft.of H ₂ O(kPA)	17.1(50.9)	17.1(50.9)	17.1(50.9)	17.1(50.9)
GPM 105°F EWT	6.0(0.38)	8.0(0.5)	12.0(0.76)	20.0(1.26)
Pressure Drop Ft.of H ₂ O(kPA)	37.1(110.9)	37.1(110.9)	37.1(110.9)	37.1(110.9)
PIPING DATA all sizes are in inches				
Liquid Line	3/8	3/8	3/8	1/2
Suction Line	5/8	7/8	7/8	1 1/8
Water Supply	7/8	7/8	1 1/8	1 1/8
Water Return	7/8	7/8	1 1/8	1 1/8
Weight LBS. (KG)	275(125)	275(125)	290(132)	345(159)

4. Steam Generator Type Humidifier

PRINCIPLE OF OPERATION

(See also Initial Start-Up)

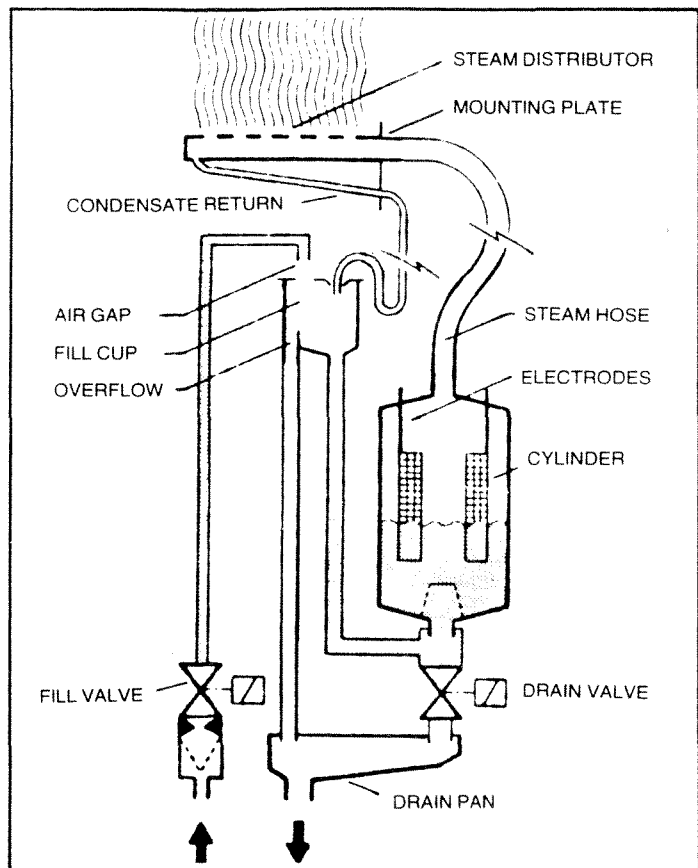


Figure 26¹ OPERATION SCHEMATIC

When the humidistat calls, the cylinder fills to 110% of the Full Load 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 achieve 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 comes on. The drain valve should only come on in addition if the water level is too low and a dilution is required. Otherwise this fill boil cycle continues until the water reaches an optimum low water level, always maintaining an average of 100% F.L.A.

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

1. The orifice in the fill valve(s) is sized for an extended water pressure range of 30 to 85 psi.
2. For water pressure between 15 and 30 psi, notify the factory and the next larger size of fill valve will be supplied.
3. For cases below 15 psi, notify the factory and fill valve with largely oversized orifice will be supplied.
4. 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.
5. 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).
6. DO NOT soften water with Condair unit because it is much too conductive.
7. DO NOT use completely demineralized water with the Condair unit as it is the minerals that allow the electrode principle to work.
8. DO NOT use a hot water source as it will cause deposits to eventually block the fill valve orifice.

Water Connection

1. A copper compression olive type coupling for 1/4" soft copper tubing is provided with unit and requires no soldering for the water connection to the unit.

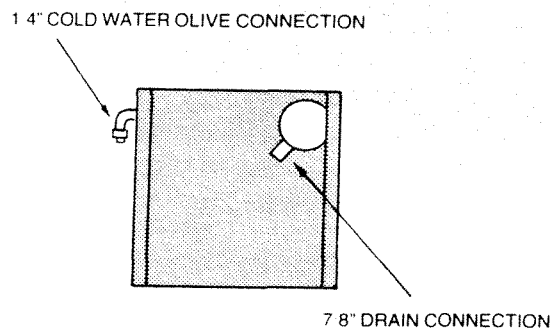


Figure 27

2. An isolating gate valve should ALWAYS be placed in feed water line allowing service of the fill valve.
3. 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 are protected by the built-in strainer.
4. For inlet water pressure outside this range, the factory should be contacted. (See also water supply section)

The Inlet Water Strainer

The fill solenoid is equipped with a built-in serviceable strainer to prevent foreign particles, such as sand or solder from blocking the fill orifice.

1. To clean the strainer, first turn off the unit, close the gate valve on the water supply line, remove the locking bar located in the fill solenoid and slide out the strainer.
2. Rinse the strainer and back flush it thoroughly with tap water to ensure the removal of all debris.
3. To re-install strainer, reverse procedure.

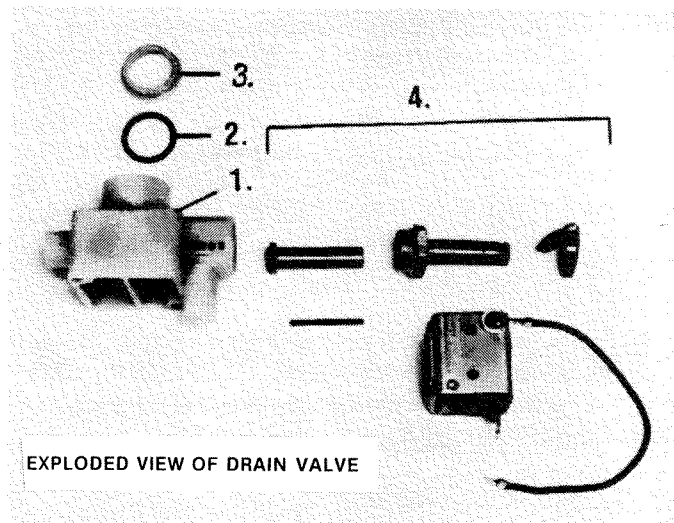


STRAINER

Figure 28

Drain Connection

1. Unit is equipped with a 7/8" O.D. unthreaded drain outlet on the underside of the base drain pan. Cut a few inches of steam supply hose, available from the factory, and connect from drain outlet to 3/4" nominal diameter copper pipe and route to closest (floor) drain.
2. Where municipalities, counties or cities require an air gap to isolate unit from sanitary drainage system, a funnel drain under the unit should be incorporated.
3. Drain canal on bottom of unit must be removed and cleaned at least once a year. Ensure that rubber gasket is re-installed properly.
4. Drain valve must be disassembled and cleaned each time a cylinder is replaced. (These three components, i.e. drain canal, drain valve and cylinder are continually exposed to concentrated mineral water.



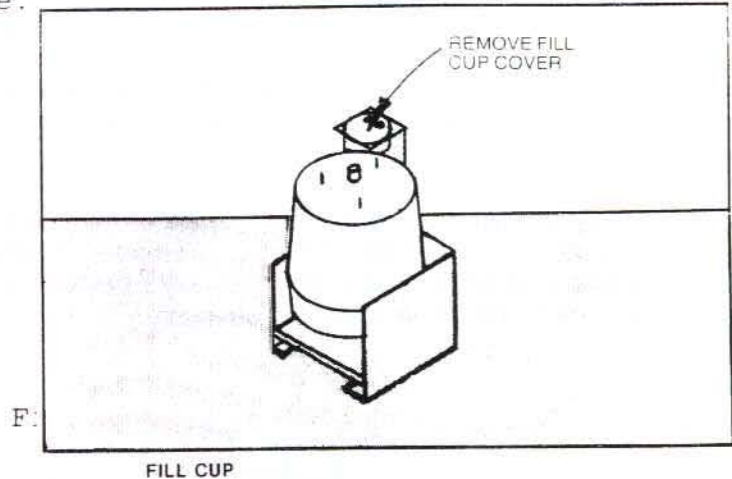
ITEM NO.	DESCRIPTION	NORTEC P/N
1	VALVE BODY (Small)	132-4042
1	VALVE BODY (Large)	132-4041
2	O-RING	132-5014
3	STUFFING BLOCK	132-1042
4	COIL ASSEMBLY COMPLETE	132-6002

EXPLODED VIEW OF DRAIN VALVE

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, during a fill cycle.



To obtain access to this fill cup simply pry open the fill cup cover plate. (Do not displace the splash diverter underneath). Excessive amounts of salt will result in erratic operation of the unit; however, normalization of the unit will be corrected 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.

REPLACEMENT IF THE STEAM CYLINDER

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

REPLACEMENT OF THE STEAM CYLINDER

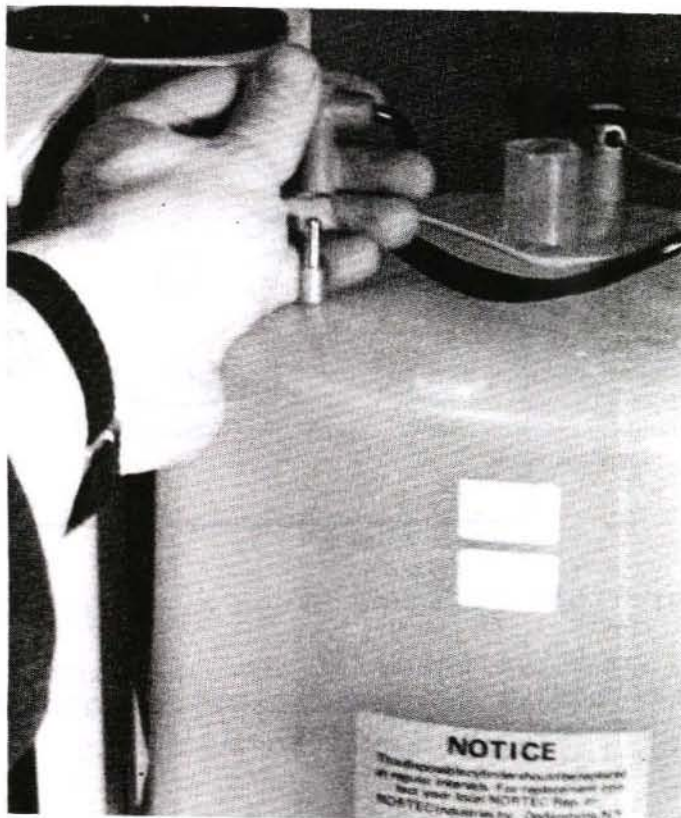
After an extended period of operation in accordance with life expectancy information, see Figure 24, the cylinder is completely used as indicated by a red light illuminated on the face of the cabinet. When this condition is reached, a new replacement cylinder is to be installed.

NOTE: Red light may come on during initial start-up but does not mean cylinder replacement.

Any time that the unit is going to be shut down for an extended period of time, including summer shutdown, ALWAYS drain down the cylinder before disconnecting power. Otherwise, the electrodes are subject to harmful corrosion.

REMOVING THE CYLINDER

1. Turn off the water supply to the unit.
2. The old cylinder must be drained completely before removing. This is done by pushing the auto on/off drain switch to the "drain" position.
3. When completely drained, push the auto/on/off drain switch to the "off" position.
4. Open the main disconnect during the entire cylinder change operation.
5. The power wires to the cylinder are attached by cylinder plugs to the electrode pins on top of the cylinder. Pull these plugs vertically off the pins. (See Figure 20).
6. Using slot screw driver, loosen the steam hose clamp(s) and pull steam hose off vertically.
7. The cylinder is now ready to be lifted out of the unit. (See Figure 21).



CYLINDER REMOVAL

INSTALLING THE NEW CYLINDER

1. 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.
2. Ensure that the cylinder mounting stubs are seated properly in the allotted side mounting slots within the unit.
3. The white cylinder plug on all units is for the sensor electrode which always goes on the single pin offset from the others.

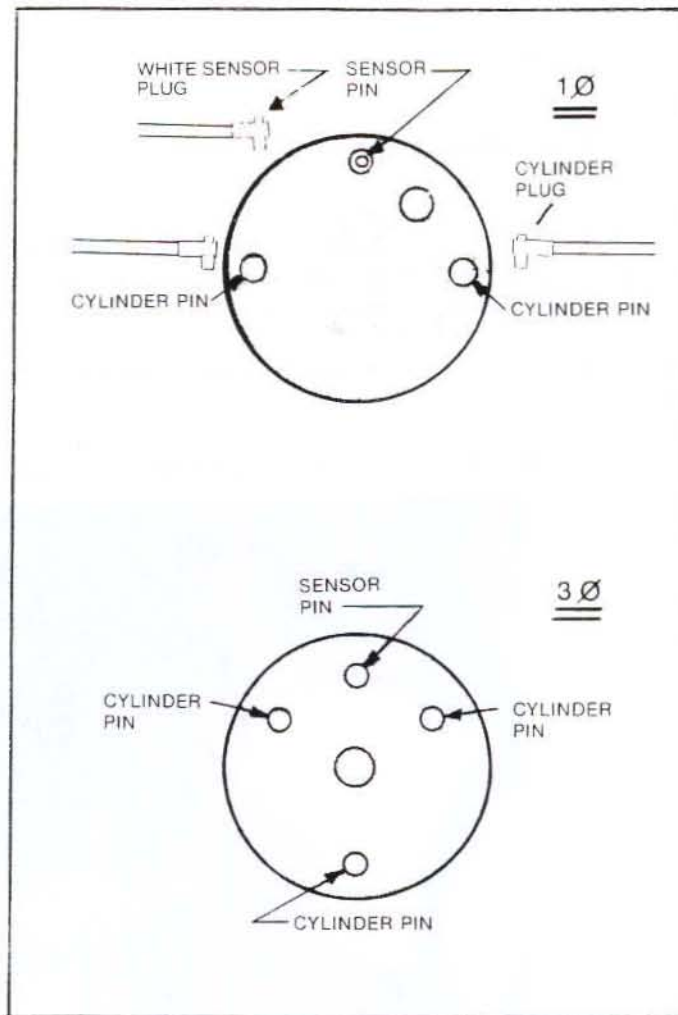


FIGURE 12. PLUGS

4. Ensure that cylinder plugs are very snug on the pins.
5. For loose fitting plugs, squeeze with a pliers before installing, since loose plugs may generate enough heat to melt and destroy the plug and cylinder.

TROUBLE-SHOOTING

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.

1. Check for 24vac across pins 33 and 39.
2. Jumper contacts 1 & 2 on external control terminal strip. If contactor operates then control system is at fault.
3. The low voltage 3 amp fuse located on front of the unit.
4. The "On/off" jumper plug connection on the basic unit.
5. The wire ribbon connecting the basic unit to the current transformer board.
6. The contactor holding coil could be open or shorted.

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 a defective "auto on/off/drain" switch, disconnect the red wire from pin 38 on the main p.c. board (basic unit) and touch it to pin 39. If the contactor activates, the "on" side of the switch is defective. If the contactor does not activate, then the basic unit p.c. board could be defective.

If the 3 amp control fuse blows when the red wire from pin 38 is touched to pin 39, contactor holding coil could be shorted. After contactor has been replaced and contactor still will not activate then the basic unit "on/off" jumper circuit could be burnt. This can be temporarily by-passed by placing a jumper between terminals 35 and 39 unit replacement of the basic unit. Return the red wire to pin 38.

After the necessary components have been replaced and the contactors pull in, there is high voltage to the cylinder(s) 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 physically located in line with pin 36. The points on this relay must be touching in order for the fill valve coil 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 wire sensor input from the male connector on the basic p.c. board. (It is located 1/2" from the right hand side of the board.) Wait 30 seconds and if the fill relay points now touch, then sensor should be replaced. If they do not touch, then the basic p.c. board could be faulty. To confirm, disconnect

the red wire from pin 38 and touch it to pin 36. If the fill valve coil activates then the basic p.c. board 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 LIGHT ON WATER AT TOP OF CYLINDER

- common occurrence on start-up - See previous pages
- water level should be at top of the cylinder - if cylinder is new this is normal
- if cylinder is old, it indicates replacement time (can be ordered from factory)

RED 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
- indicates abnormal water condition (softened) or over concentration of contained water in the cylinder caused by:

1. Blocked water filter (clean)
2. Inoperative fill valve (check)
3. Inoperative drain valve (check)
4. Blocked drain valve (disassemble and clean)
5. Blocked screen at bottom of cylinder (remove and back flush)
6. Faulty sensor relay (remove sensor connection from p.c. board and wait 60 seconds)
7. White sensor plug interchanged with power plug at top of cylinder (white plug should be on terminal offset from the others)

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 page 9
- if unit has been operating extensively, observe for normal fill, boil, fill, boil, cycle; no drain should be occurring.

WATER BEYOND TOP OF CYLINDER UP INTO SPOUT:

- red light not on and fill still activated; jump across connection of sensor on basic unit p.c. board, if fill shuts off, then sensor was faulty.
- if fill remains on when connection is jumped, then basic unit is faulty
- consult factory for new part and replacement instructions.

UNIT DRAINS CONTINUALLY:

- if cylinder 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 miswired or electronics is faulty-consult factory.
- if drain is occurring through the overflow on the fill cup, this is due to an abnormal restriction on the steam line and backpressure 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.

To make service simpler and to check on its normal electronic functions, an optional solid state plug-in check adapter is available from the factory at cost by ordering BMF-9513.

START-UP

1. Check all electrical connections for tightness.
2. Check belt tension on 5 ton units.
3. Check motor screws for tightness.
4. Check supply voltage on all three phases. A variance of more than 10% from nameplate rating may cause component failure and will void system warranty.
5. Check to see that the air filter is installed.
6. Turn unit on and check for proper blower rotation both for the evaporator and the condenser section.
7. Make sure the unit is level.
8. Set thermostat so it is calling for blower on only.
9. Turn unit on. The evaporator blower should be running. Check and record these amperages. Make sure they do not exceed the nameplate ratings.
10. Turn the thermostat at low. The compressor will come on.
11. Check and record the compressor amperage. Make sure it does not exceed the nameplate readings.
12. Check and record the suction and discharge refrigerant pressures.
13. Turn the thermostat to high to energize the heat cycle. check and record the amperage. Compare to the nameplate rating.
14. Check and record the suction and discharge refrigerant pressures.
15. Before completing the start-up procedure, check to make sure the air leaks are plugged.
16. Set room thermostat to the desired setting.

MAINTENANCE

The items listed below should be maintained on a regular basis. The frequency of the maintenance depends upon the usage of the unit.

FOLLOWING ITEMS SHOULD BE THOROUGHLY CHECKED MINIMUM EVERY 90 DAYS

1. Filter--should be checked regularly on monthly basis and changed when necessary.
2. Belts--tension and wear on 5 ton units.
3. Blower bearing collar--checked and tightened.
4. Electrical connections--should be checked for tightness especially in the power circuit.
5. Outdoor heat exchange coil--should be checked for dirt accumulation and cleaned.
7. Condensate drain for access dirt or debris collection. Clean if necessary.

***It is recommended that these items be checked weekly until a proper maintenance routine can be established.**



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