

**INSTALLATION
OPERATION
MAINTENANCE
AND PARTS
MANUAL**

SYSTEM 2100

***WATER / GLYCOL COOLED
(CAW / CAG)***

COMPU-AIRE, INC.

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ISO 9002 REGISTERED COMPANY

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DESCRIPTION

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GENERAL

The Compu-Aire Water/Glycol Cooled series is a complete environmental control system, factory wired, tested and specifically designed to provide temperature, humidity and dust control for computer room installations.

The unit as shipped from the factory includes a blower/motor package, evaporator with expansion valves, co-axial condensers, water control valve, humidifier, reheat elements, electrical control package, control monitor, and other specified special options.

TRANSPORTATION DAMAGE

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 jackstand parts, condensate pump, and remote control panel are packed inside the unit.

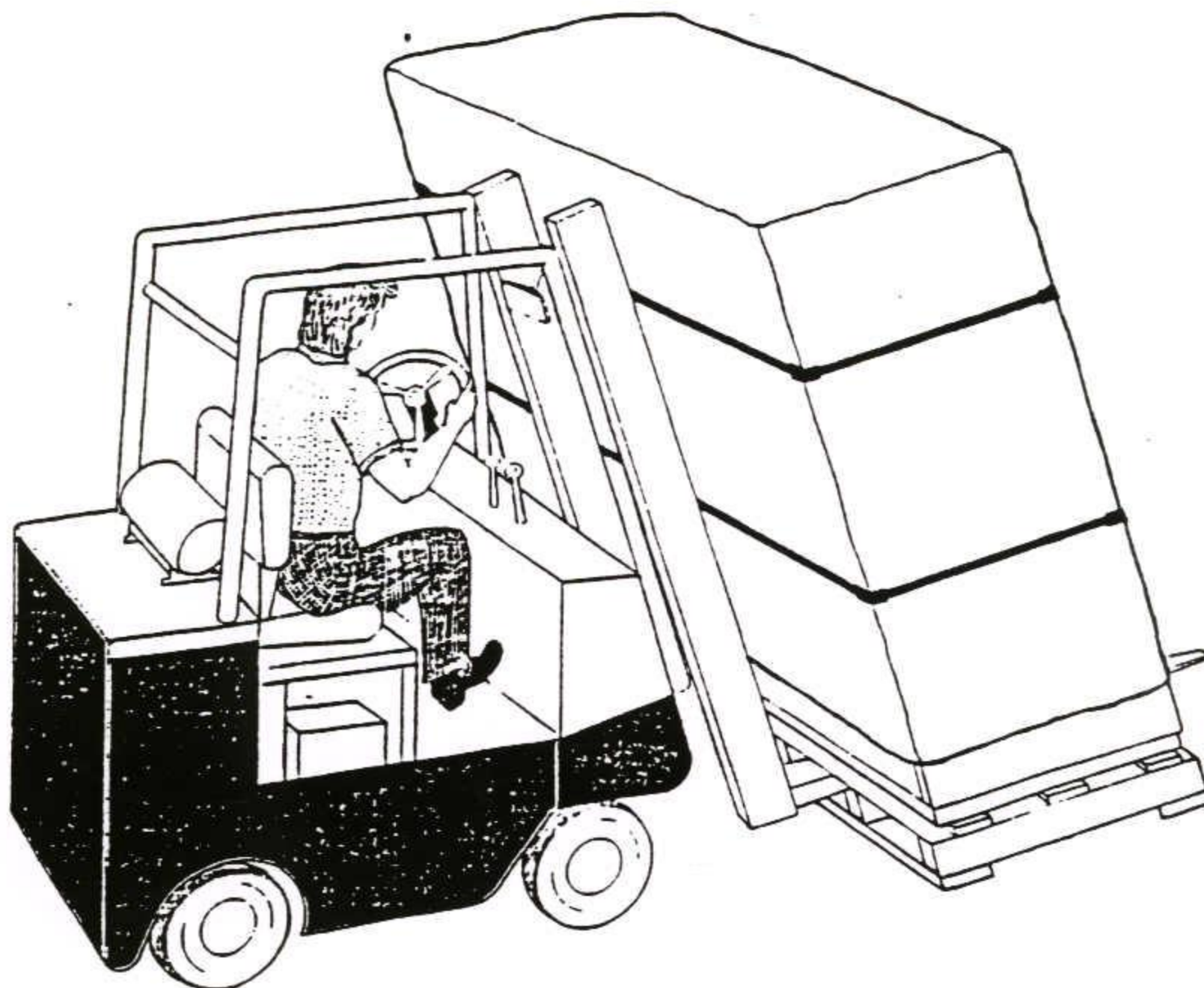
IMPORTANT - READ BEFORE INSTALLING

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 Electrical Code for special installation requirement. When installing the unit, allow sufficient space for air flow clearance, wiring, and servicing the unit. Left side and front should have a minimum clearance of 36 inches for servicing. Right side should have 36 inches of clearance if available. Top clearance must be a minimum of 12 inches. No rear clearance is required, but it is suggested that 1 or 2 inches be provided to allow for out-of-square walls. The unit may be set directly on top of the raised floor or on adjustable jackstands.

The unit should not be placed near any corner of the room. For best air distribution, the unit should be placed in mid-point against the longest wall, and as close to the load(s) as possible. For multiple units, place them as far apart from each other as possible for optimum air distribution. before placing a unit directly on the raised floor, it is important that the proper openings have already been cut.



PRE-INSPECTION

Upon receipt of the units, inspect the items for either visible or concealed damage.

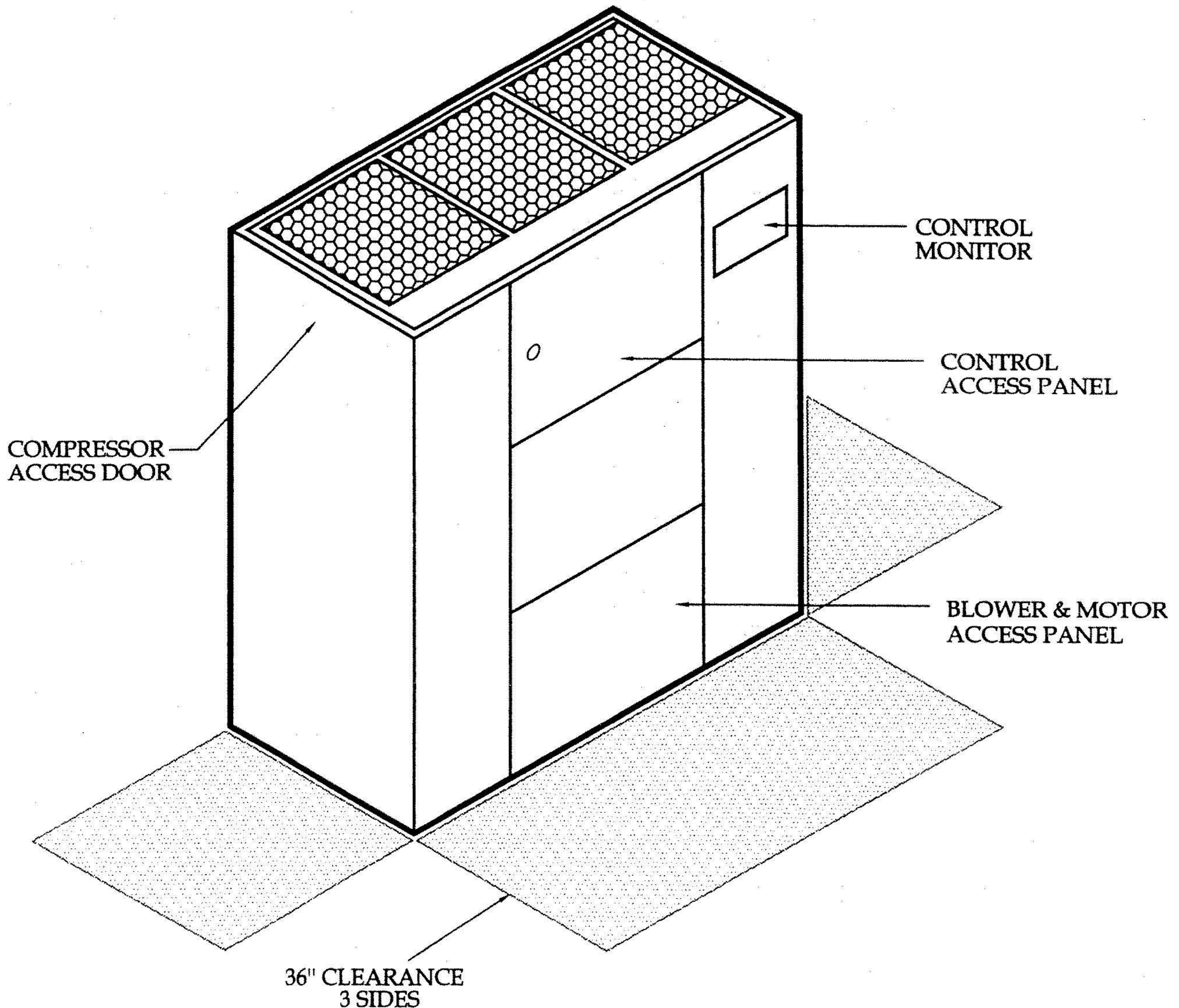
REPORT ANY DAMAGE TO THE CARRIER. COMPU-AIRE IS NOT RESPONSIBLE FOR FILING OF ANY CLAIMS. ALL NEEDED INSPECTION AND CLAIM FILING IS THE RESPONSIBILITY OF THE RECEIVER.

LOCATING THE AIR CONDITIONER

Proper clearance is important for the unit function and access to various components for adjustment and repair or replacement.

Front*	36"
Left Side	36"
Right Side	36"

*Consult Electrical Codes and provide clearance



TECHNICAL DATA WATER COOLED SYSTEMS

Table 2

MODEL	CAW-632	CAW-832	CAW-1032	CAW-1532	CAW-2032	CAW-2532	CAW-3032
	CAW-634	CAW-834	CAW-1034	CAW-1534	CAW-2034	CAW-2534	CAW-3034
	CAW-635	CAW-835	CAW-1035	CAW-1535	CAW-2035	CAW-2535	CAW-3035
NOMINAL TONNAGE	6	8	10	15	20	25	30
EER	9.6	10.3	9.9	9.5	9.6	9.3	9.4
CAPACITY DATA 80°F DB, 67°F WB (26.7°C DB, 19.4°C WB), 50% RH Entering Air							
Total BTU/HR (kW)	87,300(25.6)	133,900(39.2)	148,100(43.4)	216,600(63.4)	269,900(79.0)	312,600(91.5)	416,900(122.0)
Sensible BTU/HR(kW)	68,200(20.0)	97,300(28.4)	120,900(35.4)	177,900(52.1)	218,400(63.9)	250,200(73.3)	326,800(95.7)
75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH Entering Air							
Total BTU/HR (kW)	81,200(23.7)	122,900(40.0)	139,100(40.7)	198,700(58.2)	248,300(72.7)	288,200(84.4)	385,900(113.0)
Sensible BTU/HR	60,600(19.5)	94,600(27.7)	110,900(32.5)	172,000(50.4)	210,200(61.6)	241,600(70.7)	316,800(92.8)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH Entering Air							
Total BTU/HR (kW)	78,100(22.9)	117,500(34.4)	131,100(38.4)	189,600(55.5)	236,100(69.1)	274,200(80.3)	367,900(107.7)
Sensible BTU/HR	64,400(18.8)	92,300(27.0)	114,100(33.4)	168,100(49.2)	205,100(60.0)	236,100(69.1)	309,100(90.5)
72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH Entering Air							
Total BTU/HR (kW)	76,900(22.5)	114,400(33.5)	127,200(37.2)	184,400(54.0)	231,000(67.6)	266,400(78.0)	358,100(104.9)
Sensible BTU/HR	68,400(20.0)	97,400(28.5)	121,200(35.5)	179,100(52.4)	218,300(63.9)	250,600(73.4)	328,200(96.1)
AIR DATA - Based on 0.5 inches external static pressure-variable pitch pulley							
CFM (L/s)	3400(1604)	4700(2218)	5750(2714)	8500(4012)	10500(4956)	12000(5664)	15000(7080)
Fan Motor HP	2.0	3.0	3.0	5.0	5.0	7.5	10.0
Number of Fans	1	2	2	3	3	2	3
OPTIONAL AIR -for increased capacities or available static pressures; consult factory							
CFM (L/s)	4650(2197)	5650(2667)	6500(3068)	9450(4460)	12000(5664)	14500(6844)	N/A
Fan Motor HP	3.0	3.0	5.0	7.5	7.5	10.0	N/A
COMPRESSOR DATA - High Efficiency R-22							
Type	Hermetic	Hermetic	Hermetic	Hermetic	Hermetic	Hermetic	Hermetic
Quantity	2	2	2	2	2	2	2
EVAPORATOR COIL DATA - High Efficiency "A" configuration, Copper tube, Aluminum fins							
Face Area-FT ² (m ²)	15.3(1.42)	15.3(1.42)	15.3(1.42)	21.5(2)	24.0(2.23)	24.0(2.23)	29.5(2.74)
Rows	3	3	4	4	4	4	4
REHEAT - Electric							
kW	12	15	15	22.5	30	30	37.5
BTU/HR - includes fan motor	43,300	56,300	56,300	84,500	115,100	121,387	148,400
Stages	2	2	2	3	4	4	4
HUMIDIFIER - Electronic self generating steam type with disposable cylinder							
kW	6.8	6.8	6.8	10.2	10.2	10.2	10.2
Capacity - LB/HR(kg/hr)	17.5(7.9)	17.5(7.9)	17.5(7.9)	30(13.6)	30(13.6)	30(13.6)	30(13.6)
FILTERS (Downflow Units) - 30% Efficient ASHRAE standard 52-76							
16"x25"x2"	2	2	2	2	1	1	-
25"x20"x2"	2	2	2	3	4	4	6
Effective Area -2" FT ² (m ²)	56.0(5.2)	56.0(5.2)	56.0(5.2)	68.7(6.3)	73.9(6.8)	73.9(6.8)	91.8(8.5)
Effective Area -4" FT ² (m ²)	84.2(7.8)	84.2(7.8)	84.2(7.8)	107.7(10.0)	112.6(10.5)	112.6(10.5)	141(13.1)
FILTERS (Upflow Units) - 30% Efficient ASHRAE standard 52-76							
16"x20"x2"	2	2	2	2	1	1	-
20"x20"x2"	2	2	2	3	4	4	6
Effective Area - FT ² (m ²)	44.6(4.1)	44.6(4.1)	44.6(4.1)	56.8(5.3)	58.9(5.5)	58.9(5.5)	73.2(6.8)
WATER DATA							
85°F(29.4°C) Entering Water							
GPM(L/s)	18(1.13)	24(1.5)	30(1.9)	45(2.8)	60(3.8)	75(4.7)	90(5.7)
Pressure Drop PSI(kPa)	6.9(21.9)	8.2(60.3)	5.2(49.4)	7.4(50.7)	7.6(52.1)	12.3(84.3)	16.5(113.1)
70°F(21.1°C)							
GPM(L/s)	13.0(0.8)	20.0(1.2)	24.0(1.5)	40.0(2.5)	48.0(3.0)	64.0(3.7)	72.0(4.5)
Pressure Drop PSI(kPa)	2.8(19.2)	8.5(58.3)	6.9(47.3)	7.1(48.8)	7.5(51.5)	9.8(67.2)	10.4(71.2)
PIPING DATA - All connections are Copper O.D.							
Condensate Drains	(2)3/4"	(2)3/4"	(2)3/4"	(2)3/4"	(2)3/4"	(2)3/4"	(2)3/4"
Condenser Water Return	1 5/8"	1 5/8"	1 5/8"	2 1/8"	2 1/8"	2 1/8"	2 5/8"
Condenser Water Supply	1 5/8"	1 5/8"	1 5/8"	2 1/8"	2 1/8"	2 1/8"	2 5/8"
Humidifier Water Supply	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"
WEIGHT LB(kg)	1580(718)	1750(795)	1850(840)	2200(1000)	2350(1068)	2450(1114)	2950(1340)

Bold face data is in metric units.

TECHNICAL DATA GLYCOL COOLED SYSTEMS

Table 3

MODEL	CAG-632	CAG-832	CAG-1032	CAG-1532	CAG-2032	CAG-2532	CAG-3032
	CAG-634	CAG-834	CAG-1034	CAG-1534	CAG-2034	CAG-2534	CAG-3034
	CAG-635	CAG-835	CAG-1035	CAG-1535	CAG-2035	CAG-2535	CAG-3035
NOMINAL TONNAGE	6	8	10	15	20	25	30
EER	8.9	9.4	9.3	9.1	9.2	8.9	9.0
CAPACITY DATA 80°F DB, 67°F WB (26.7°C DB, 19.4°C WB), 50% RH Entering Air							
Total BTU/HR (kW)	77,100(22.6)	112,100(32.0)	123,600(36.2)	185,100(54.2)	232,400(68.1)	268,600(78.6)	365,000(106.9)
Sensible BTU/HR(kW)	64,500(18.9)	89,200(26.1)	112,600(32.9)	167,900(49.1)	204,200(68.6)	308,200(73.3)	326,800(90.2)
75°F DB, 62.5°F WB (23.9°C DB, 16.9°C WB) 50% RH Entering Air							
Total BTU/HR (kW)	72,000(21.1)	104,600(30.6)	114,900(33.6)	173,100(50.7)	216,900(63.5)	251,000(73.5)	341,600(100.0)
Sensible BTU/HR(kW)	61,900(18.1)	86,900(25.4)	107,800(31.6)	162,000(47.4)	197,300(57.8)	226,900(66.4)	298,400(87.4)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50% RH Entering Air							
Total BTU/HR (kW)	69,100(20.2)	100,500(29.4)	111,000(32.5)	166,100(48.6)	207,900(60.9)	240,200(70.3)	327,900(96.0)
Sensible BTU/HR(kW)	60,800(17.8)	85,100(24.9)	106,400(31.2)	158,600(46.4)	192,900(56.5)	222,000(65.0)	292,000(85.5)
72°F DB, 58.6°F WB (22.2°C DB, 14.8°C WB) 45% RH Entering Air							
Total BTU/HR (kW)	67,500(19.7)	97,800(28.6)	112,900(33.1)	169,200(49.5)	211,200(61.8)	244,000(71.5)	321,000(94.0)
Sensible BTU/HR(kW)	64,900(19.0)	90,100(26.4)	112,900(33.1)	169,200(49.5)	211,200(61.8)	244,000(71.5)	321,000(94.0)
AIR DATA - Based on 0.5 inches external static pressure-variable pitch pulley							
CFM (L/s)	3400(1604)	4700(2218)	5750(2714)	8500(4012)	10500(4956)	12000(5664)	15000(7080)
Fan Motor HP	2.0	3.0	3.0	5.0	5.0	7.5	10.0
Number of Fans	2	2	2	3	2	2	3
OPTIONAL AIR -for increased capacities or available static pressures; consult factory							
CFM (L/s)	4650(2197)	5650(2667)	6500(3068)	9450(4469)	12000(5664)	14000(6608)	N/A
Fan Motor HP	3.0	5.0	5.0	7.5	7.5	10.0	N/A
COMPRESSOR DATA - High Efficiency R-22							
Type	Hermetic	Hermetic	Hermetic	Hermetic	Hermetic	Hermetic	Hermetic
Quantity	2	2	2	2	2	2	2
EVAPORATOR COIL DATA - High Efficiency "A" configuration, Copper tube, Aluminum fins							
Face Area-FT ² (m ²)	15.3(1.42)	15.3(1.42)	15.3(1.42)	21.5(2)	24.0(2.23)	24.0(2.23)	29.5(2.74)
Rows	3	3	4	4	4	4	4
REHEAT - Electric							
kW	12	15	15	22.5	30	30	37 1/2
BTU/HR-includes fan motor	43,300	56,300	55,000	84,500	115,200	121,387	130,075
Stages	2	2	2	3	4	4	4
HUMIDIFIER - Electronic self generating steam type with disposable cylinder							
kW	6.8	6.8	6.8	10.2	10.2	10.2	10.2
Capacity-LB/HR(kg/hr)	17.5(7.9)	17.5(7.9)	17.5(7.9)	30(13.6)	30(13.6)	30(13.6)	30(13.6)
FILTERS (Downflow Units) - 30% Efficient ASHRAE standard 52-76							
16"x25"x2"	2	2	2	2	1	1	-
25"x20"x2"	2	2	2	3	4	4	6
Effective Area - 2' FT ² (m ²)	56.0(5.2)	56.0(5.2)	56.0(5.2)	68.7(6.3)	73.9(6.8)	73.9(6.8)	91.8(8.5)
Effective Area - 4' FT ² (m ²)	84.2(7.8)	84.2(7.8)	84.2(7.8)	107.7(10.0)	112(10.5)	112.6(10.5)	141(13.1)
FILTERS (Upflow Units) - 30% Efficient ASHRAE standard 52-76							
16"x20"x2"	2	2	2	2	1	1	-
20"x20"x2"	2	2	2	3	4	4	6
Effective Area-FT ² (m ²)	44.6(4.1)	44.6(4.1)	44.6(4.1)	56.8(5.3)	58.9(5.5)	58.9(5.5)	73.2(6.8)
GLYCOL WATER FLOW DATA - Based on 40% glycol water solution							
Condenser Type	Co-axial	Co-axial	Co-axial	Co-axial	Co-axial	Co-axial	Shell and Tube
GPM(L/s)	30(1.9)	32(2.0)	40(2.5)	55(3.5)	70(4.9)	70(4.4)	100(6.3)
PIPING DATA - All connections are Copper O.D.							
Condensate Drains	(2)3/4"	(2)3/4"	(2)3/4"	(2)3/4"	(2)3/4"	(2)3/4"	(2)3/4"
Glycol/Water Supply	1 5/8"	1 5/8"	1 5/8"	2 1/8"	2 1/8"	2 1/8"	2 5/8"
Glycol/Water Return	1 5/8"	1 5/8"	1 5/8"	2 1/8"	2 1/8"	2 1/8"	2 5/8"
Humidifier water supply	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"
WEIGHT LB(kg)	1580(718)	1750(795)	1850(840)	2200(1000)	2350(1068)	2450(1114)	2950(1340)

GLYCOL/WATER PUMP - Selection based on pressure drop through the System 2100 unit+dry fluid cooler+allowance for field piping							
HorsePower	1	1.5	2	3	3	5	5
Flow Rate GPM(L/s)	30(1.9)	32(2.0)	40(2.5)	55(3.4)	70(4.4)	70(4.4)	100(6.3)
Total Head Pressure Ft. of Water(kPa)	85(254.1)	80(239)	75(223.3)	75(223.5)	75(223.5)	95(284.0)	85(254.1)

DRY FLUID COOLER - Propeller fan type selection based on 95°F(35°C) ambient.							
Model(KDFC)	11	13	17	22	31	35	48
INTERNAL GLYCOL VOLUME							
Gallon(Liters)	3.6(13.5)	4.8(18.0)	6.7(25.1)	7.7(28.9)	10(37.5)	12.4(46.5)	14.6(54.8)
CFM (L/s)	10400(4908)	10200(4814)	9600(4531)	22000(10384)	20500(9676)	20000(9440)	31500(14868)
Motor HP/Qty	3/4(2)	3/4(2)	3/4(2)	1 1/2(2)	1 1/2(2)	1 1/2(2)	1 1/2(3)
Weight LB(kg)	340(154)	355(161)	400(181)	465(211)	550(250)	600(272)	900(409)
PRESSURE DROP							
Unit Pressure Drop - Ft. of Water (kPa)	16.2(48.4)	15.5(46.4)	16.2(48.4)	16.8(50.2)	16.8(50.2)	18.9(56.5)	18.9(56.5)
Dry Fluid Cooler Pressure Drop - Ft. of Water (kPa)	3.7(11.0)	7.0(20.9)	5.7(17.0)	8.1(24.2)	8.4(25.1)	8.3(24.8)	5.2(15.5)

Bold face data is in metric units.

ELECTRICAL DATA

System 2100 Air Conditioners with scroll compressors, electric reheat and electric humidifier

For electrical data using alternate compressors, alternate reheat, no reheat, alternate humidifier, no humidifier consult factory

Table 8

AIR COOLED - CAA WATER COOLED - CAW GLYCOL COOLED - CAG (DOWN FLOW)							
VOLTAGE@ 3 PH, 60 HZ	CAA-63*	CAA-83*	CAA-103*	CAA-153*	CAA-203*	CAA-253*	CAA-303*
	CAW-63*	CAW-83*	CAW-103*	CAW-153*	CAW-203*	CAW-253*	CAW-303*
	CAG-63*	CAG-83*	CAG-103*	CAG-153*	CAG-203*	CAG-253*	CAG-303*
<u>208</u>							
FLA	52.2	67.2	71.5	111.3	142.5	154.7	195.3
MCA	63.4	81.4	86.8	135.0	173.6	187.3	236.4
MFS	70A	100A	110A	175A	225A	250A	300A
<u>460</u>							
FLA	24.2	31.8	33.6	52.3	64.5	73.7	88.3
MCA	29.4	38.6	40.8	63.5	78.7	89.4	106.9
MFS	35A	45A	50A	80A	100A	110A	150A
<u>575</u>							
FLA	19.5	25.3	26.9	40.6	49.9	58.9	72.2
MCA	23.8	30.7	32.6	49.2	60.9	71.4	87.5
MFS	30A	40A	40A	60A	80A	90A	110A
CAA, CAW, CAG (UP FLOW) & ENERGY MISER SYSTEMS - CAG/EM							
VOLTAGE@ 3 PH, 60 HZ	CAG-63*	CAG-83*	CAG-103*	CAG-153*	CAG-203*	CAG-253*	CAG-253*
<u>208</u>							
FLA	55.2	73.4	77.7	118.8	149.6	161.3	197.9
MCA	66.4	87.6	93.0	142.5	181.1	193.9	239.0
MFS	80A	100A	110A	175A	225A	250A	300A
<u>460</u>							
FLA	25.6	34.6	36.4	55.7	67.9	76.3	89.1
MCA	30.8	41.4	43.6	66.9	82.1	92.6	108.1
MFS	40A	50A	60A	80A	100A	125A	150A
<u>575</u>							
FLA	20.7	27.5	29.1	43.5	52.8	60.9	73.4
MCA	24.9	32.9	34.8	52.1	64.0	73.4	88.7
MFS	30A	40A	45A	70A	80A	100A	110A

* Denotes Voltage 2 = 208/230, 3 = 380/415, 4 = 460, 5 = 575

ELECTRICAL DATA

DRY FLUID COOLER (DFC)

Table 10

VOLTAGE @ 3 PHASE, 60 HZ													
UNIT MODEL CAG & CAG-EM	DRY FLUID COOLER	MOTOR		PUMP	208/230V			460V			575V		
		QTY	HP	HP	FLA	MCA	MFS	FLA	MCA	MFS	FLA	MCA	MFS
6	DFC-11-15	2	0.75	1.5	13.6	15.9	20	6.8	8.0	15	6.1	7.1	15
8	DFC-13-15	2	0.75	1.5	13.6	15.9	20	6.8	8.0	15	6.1	7.1	15
10	DFC-17-20	2	0.75	2.0	15.2	19.0	25	7.6	9.5	15	6.7	7.9	15
15	DFC-22-22	2	1.5	3.0	17.6	21.0	35	11.2	13.2	20	10.3	12.1	20
20	DFC-31-30	2	1.5	3.0	17.6	21.0	35	11.2	13.2	20	10.3	12.1	20
25	DFC-35-37	2	1.5	5.0	23.2	28.0	45	14.0	16.7	25	12.5	14.8	20
30	DFC-42-45	3	1.5	5.0	27.2	32.0	50	17.2	19.9	30	15.7	18.0	25

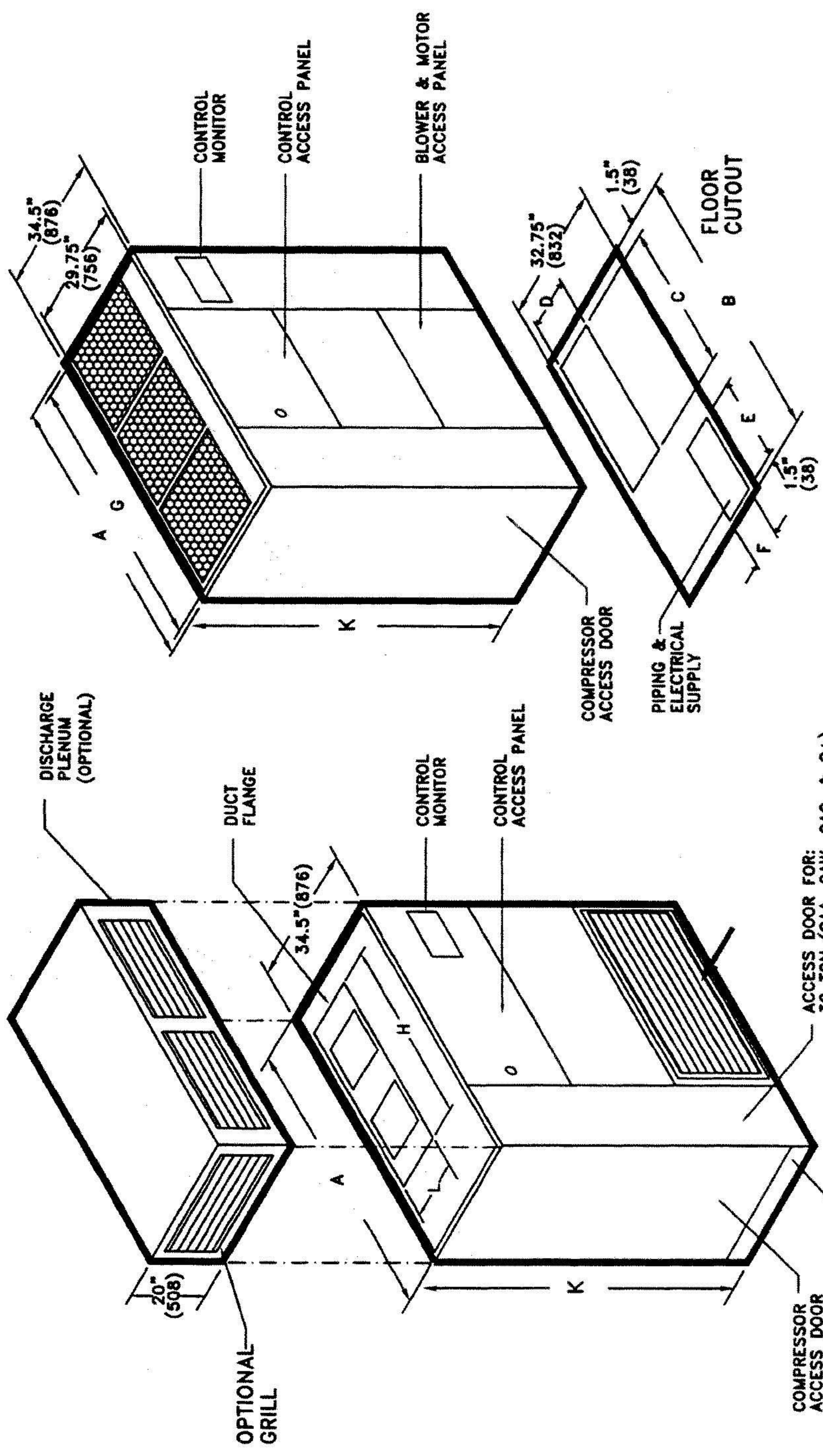
ELECTRICAL DATA INDICATED INCLUDES POWER REQUIRED BY THE PUMP

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
B	SEE ECD	12/20/00	BF

DIMENSIONAL DATA

AIR COOLED & WATER/GLYCOL COOLED	ENERGY/MISER & DX/CHILLED WATER/GLYCOL COMBINATION	A	B	C	D	E	F	G	H	K	L
		6.8, 10 TON		74.5 (1892)	72.0 (1829)	51.0 (1295)	14.0 (356)	16.5 (419)	10.0 (254)	70.0 (1778)	48.0 (1219)
15 TON	6.8, 10 TON	92.5 (2349)	90.0 (2286)	69.0 (1752)	14.0 (356)	16.5 (419)	10.0 (254)	88.0 (2235)	66.0 (1676)	74.0 (1880)	20.0 (508)
20.25 TON	15 TON	99.5 (2527)	97.0 (2464)	76.0 (1930)	14.0 (356)	16.5 (419)	10.0 (254)	95.0 (2413)	90.0 (2286)	74.0 (1880)	20.0 (508)
30 TON DOWN FLOW	20.25 TON	122.5 (3111)	120.0 (3048)	92.0 (2337)	14.0 (356)	16.5 (419)	10.0 (254)	118.0 (2997)	90.0 (2286)	74.0 (1880)	20.0 (508)
30 TON UP FLOW	30 TON	132.5 (3366)	130.0 (3302)	92.0 (2337)	14.0 (356)	16.5 (419)	10.0 (254)	127.0 (3226)	100.0 (2540)	74.0 (1880)	25 (635)



COMPU-AIRE, inc.

SYSTEM 2100

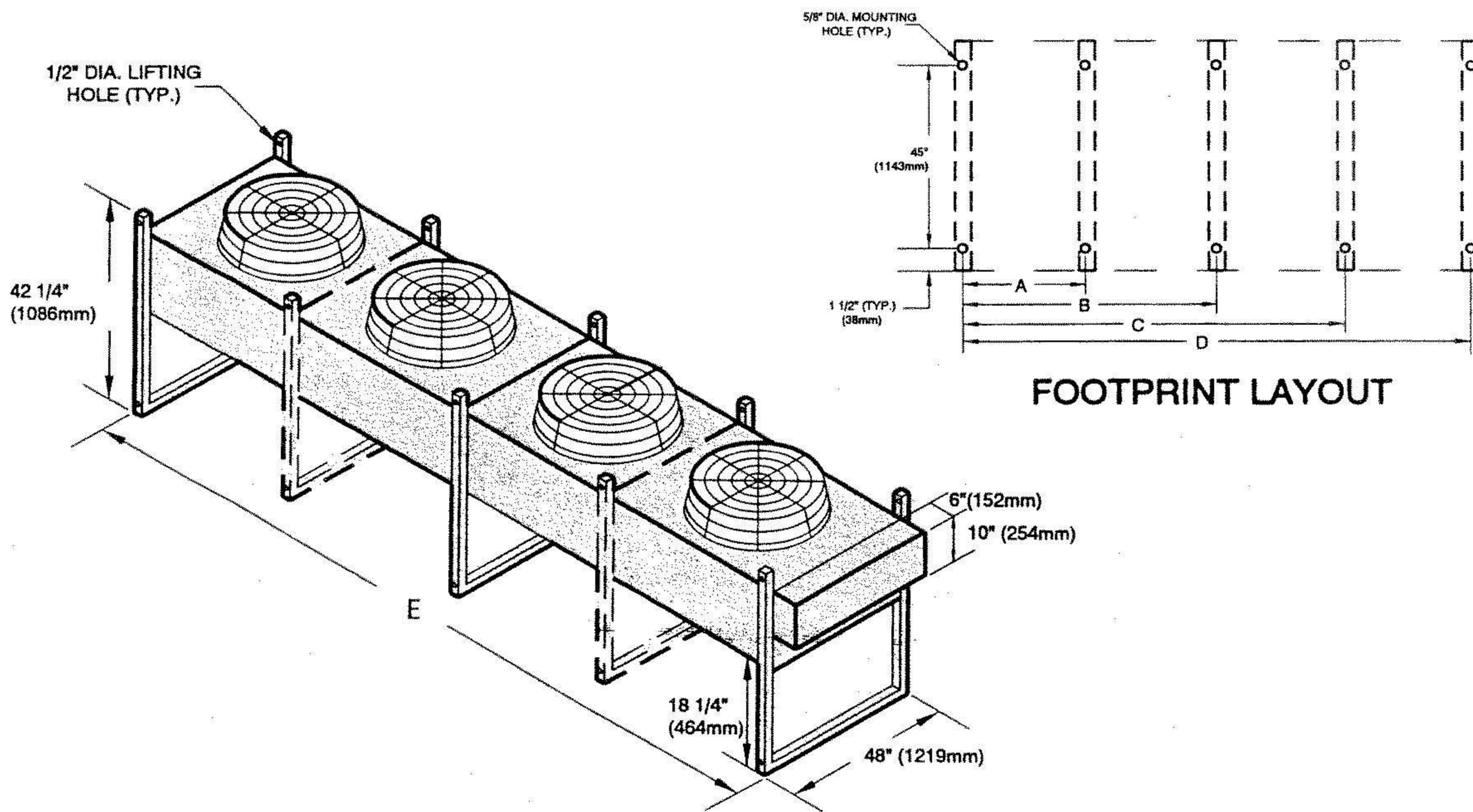
DRAWN BY: B.FUNDERWHITE DATE: 6/28/00

APPROVED BY: [Signature] REVISED: 12/20/00(B)

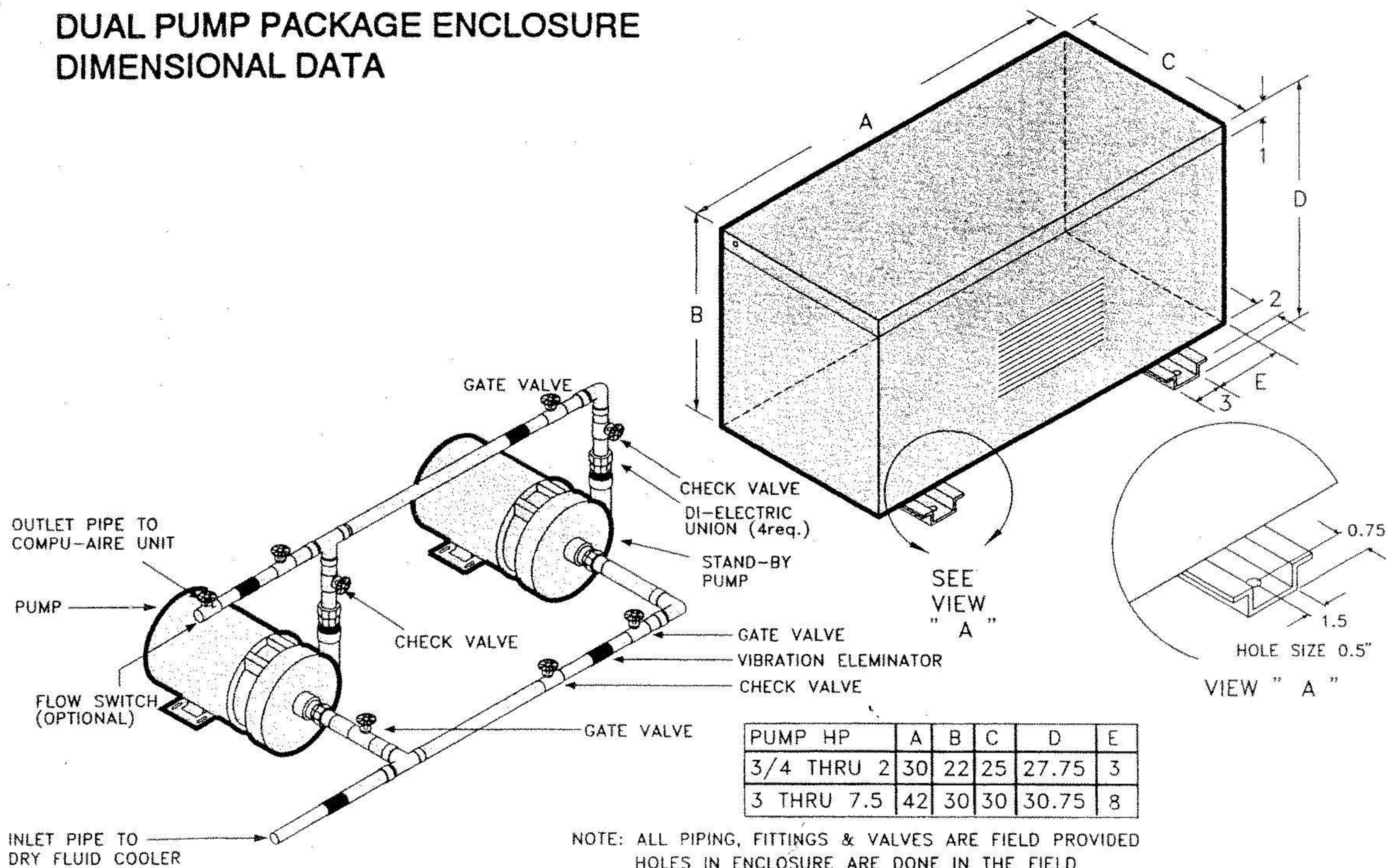
JOB NO. [Blank] DWG NO. **682-904-012**

DRY FLUID COOLER — DIMENSIONAL DATA

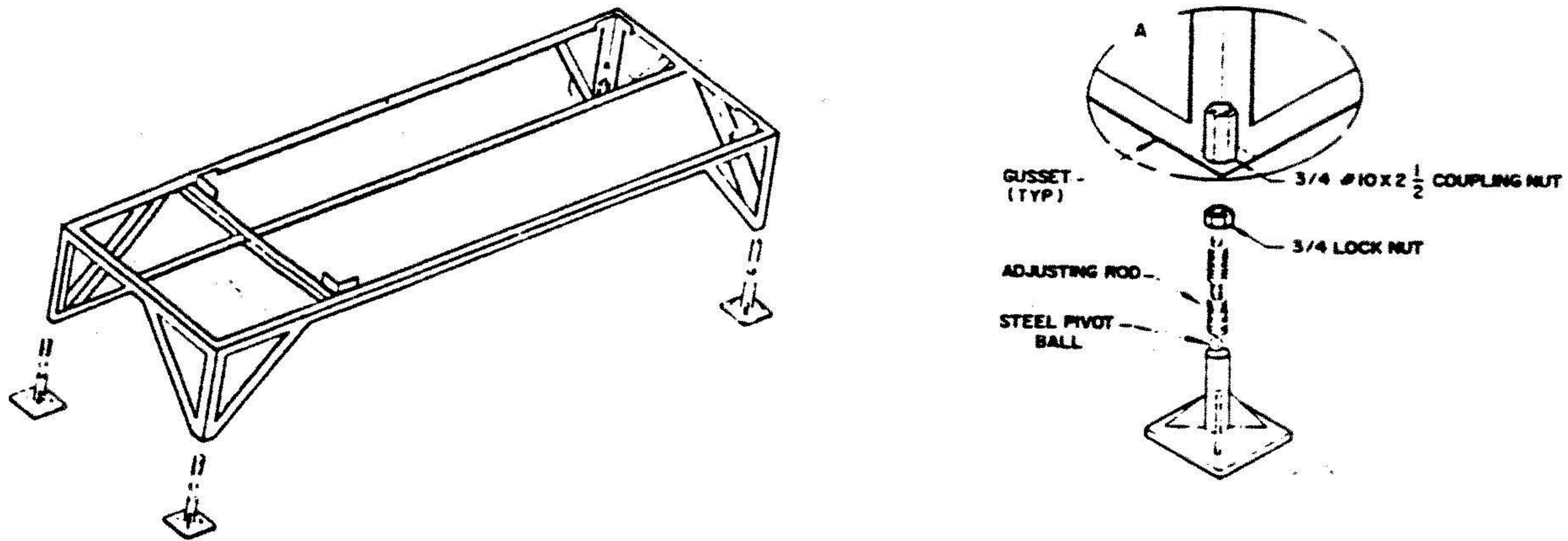
SYSTEM 2100	CONDENSER MODEL	A	B	C	D	E	FAN	OP WT.
CAG-6	DFC-11-15	30" (762mm)	60" (1524mm)	-	-	62.25" (1581mm)	2	340
CAG-8	DFC-13-15	30" (762mm)	60" (1524mm)	-	-	62.25" (1581mm)	2	355
CAG-10	DFC-17-20	30" (762mm)	60" (1524mm)	-	-	62.25" (1581mm)	2	400
CAG-15	DFC-22-22	48" (1219mm)	96" (2438mm)	-	-	96.25" (2445mm)	2	485
CAG-20	DFC31-30	48" (1219mm)	96" (2438mm)	-	-	96.25" (2445mm)	2	550
CAG-25	DFC-35-37	48" (1219mm)	96" (2438mm)	-	-	96.25" (2445mm)	2	600
CAG-30	DFC-42-45	-	96" (2438mm)	144" (3715mm)	-	146.25" (3715mm)	3	600



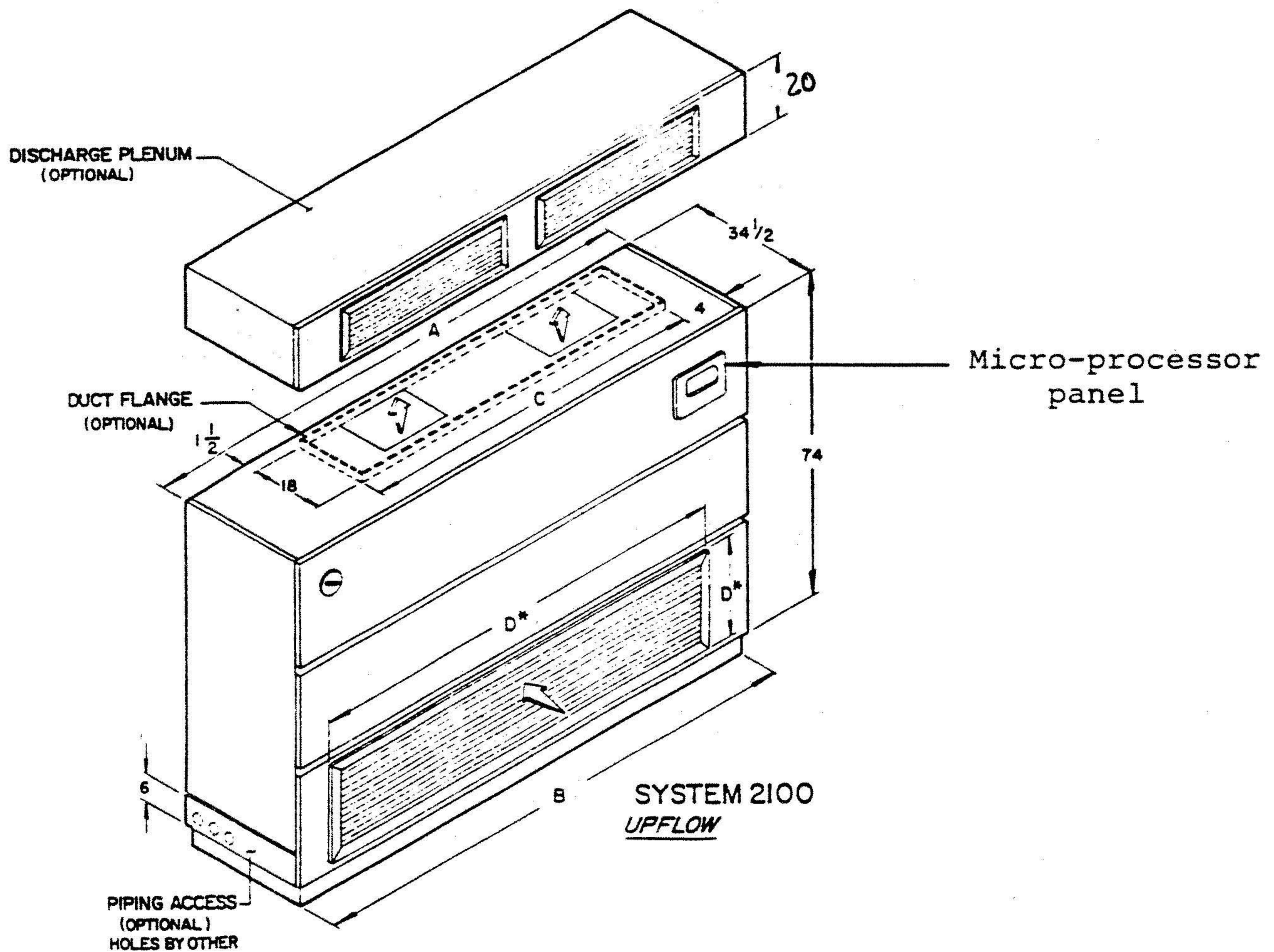
DUAL PUMP PACKAGE ENCLOSURE DIMENSIONAL DATA



An alternate method of setting the unit is with the use of leveling jackstands. The height of the unit can be raised or lowered through the use of the adjusting rods. The locknuts must be tightened to assure rigidity, as shown below.



UPFLOW UNITS - The unit may be placed directly on the sub floor. Use 2" wide 3/4" close cell gasket around the parameter of the unit. The upflow unit has an optional 20" high supply plenum. Field piping can be brought from the bottom left hand corner or from the access panel on the bottom of the left hand door. After ALL connections are made to the unit, seal off air opening around the pipes.



PIPING CONNECTIONS

Note: Water side operating pressure not to exceed 125 psig. Special higher pressure valves are available from the factory. Check nameplate.

Water/Glycol supply and return piping connections at the unit are not necessarily the size of the pipes to be run between the unit and the Dry Fluid Cooler on the cooling tower. Pipe connections at the unit are:

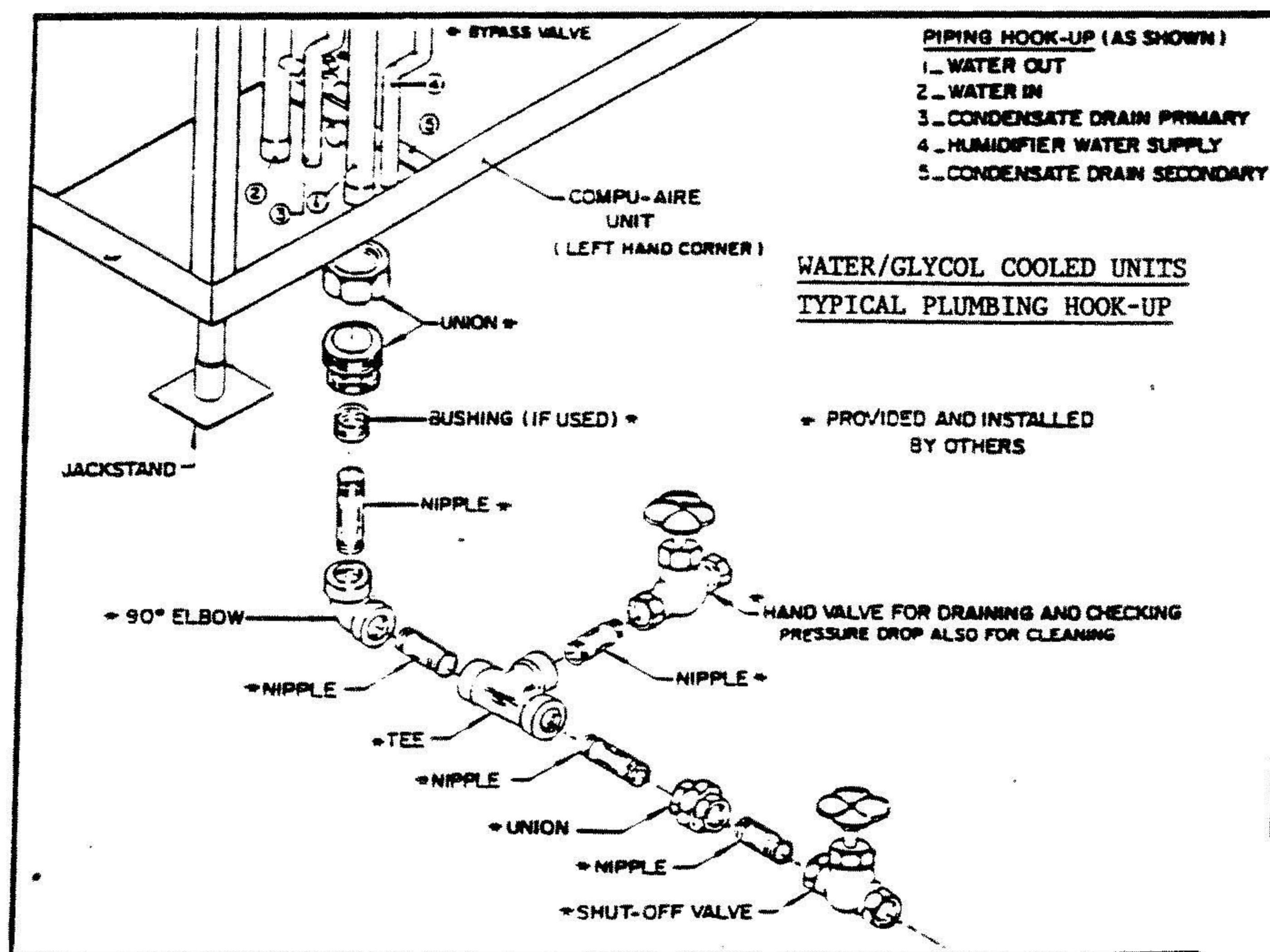
Unit Model	Water Supply and Return	Condensate Drains	Humidifier Water Supply
6 Ton	1-1/8"	(2) 3/4"	3/8"
8 Ton	1-1/8"	(2) 3/4"	3/8"
10 Ton	2-1/8"	(2) 3/4"	3/8"
15 Ton	2-1/8"	(2) 3/4"	3/8"
20 Ton	2-1/8"	(2) 3/4"	3/8"
25 Ton	2-1/8"	(2) 3/4"	3/8"

All piping connections are made from below the unit See sketch below.

It is highly recommended that shut off valves be provided under the floor for the water supply and return lines.

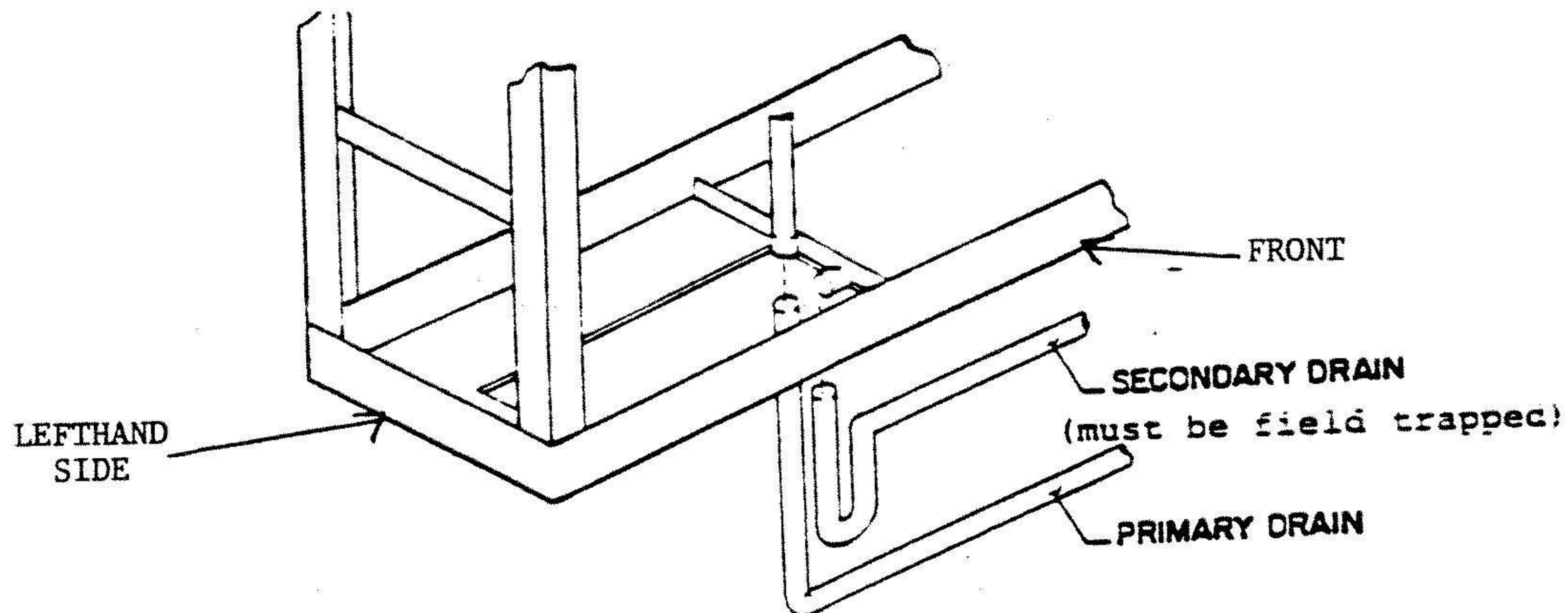
Water supply line for the humidifier should also have a shut off valve under the floor.

DOWN FLOW UNIT - All plumbing field piping is brought to the unit through the bottom, near the left hand corner as shown below:



CONDENSATE DRAIN CONNECTION

Two 3/4" copper stub are provided on each unit for condensate removal. A trap is already provided. It is recommended that unions be installed in each line to permit ready disconnection from the unit for easy cleaning. Where local codes permit, PVC pipe may be used for drain lines. It is important that the drain line be installed with sufficient slope to permit easy draining. Drain lines should have a pitch away from the unit not less than 1/4" for each 10 feet of run. DO NOT REDUCE THE SIZE OF THE DRAIN LINE.



A secondary drain connection must be made to the bottom of the blower pan. The connection is 3/4" stub trap thin drain.

On some applications where a floor sink or other means of condensate disposal is not available, a condensate pump of adequate size should be used. There are several small pumps available, complete with built-in floats for automatic condensate removal. The correct choice of pump depends greatly on the pressure head (vertical riser) that must be overcome. In some instances, where the head is higher than pump head capacity, two pumps piped in series may be necessary. A check valve must be installed at the discharge side of all condensate pumps to reduce short cycling.

NOTE: For units having an automatic flush cycle on the humidifier, a condensate pump with high temp plastic sump tank should be used, due to the high temperature of the water being flushed. **POWER SUPPLY FOR CONDENSATE PUMP SHOULD BE FROM A SEPARATE SOURCE, USUALLY 115 VOLT OUTLET, AND MUST NOT IN ANY WAY BE CONNECTED WITH THE AIR CONDITIONING UNIT.**

REFRIGERANT PIPING

Refrigerant piping for Water Glycol units are factory piped, evacuated and charged with R-22. **THERE IS ABSOLUTELY NO NEED TO BREAK INTO THE REFRIGERATION SYSTEMS. UNAUTHORIZED OPENING OF THE SYSTEM WILL NULLIFY THE WARRANTY.**

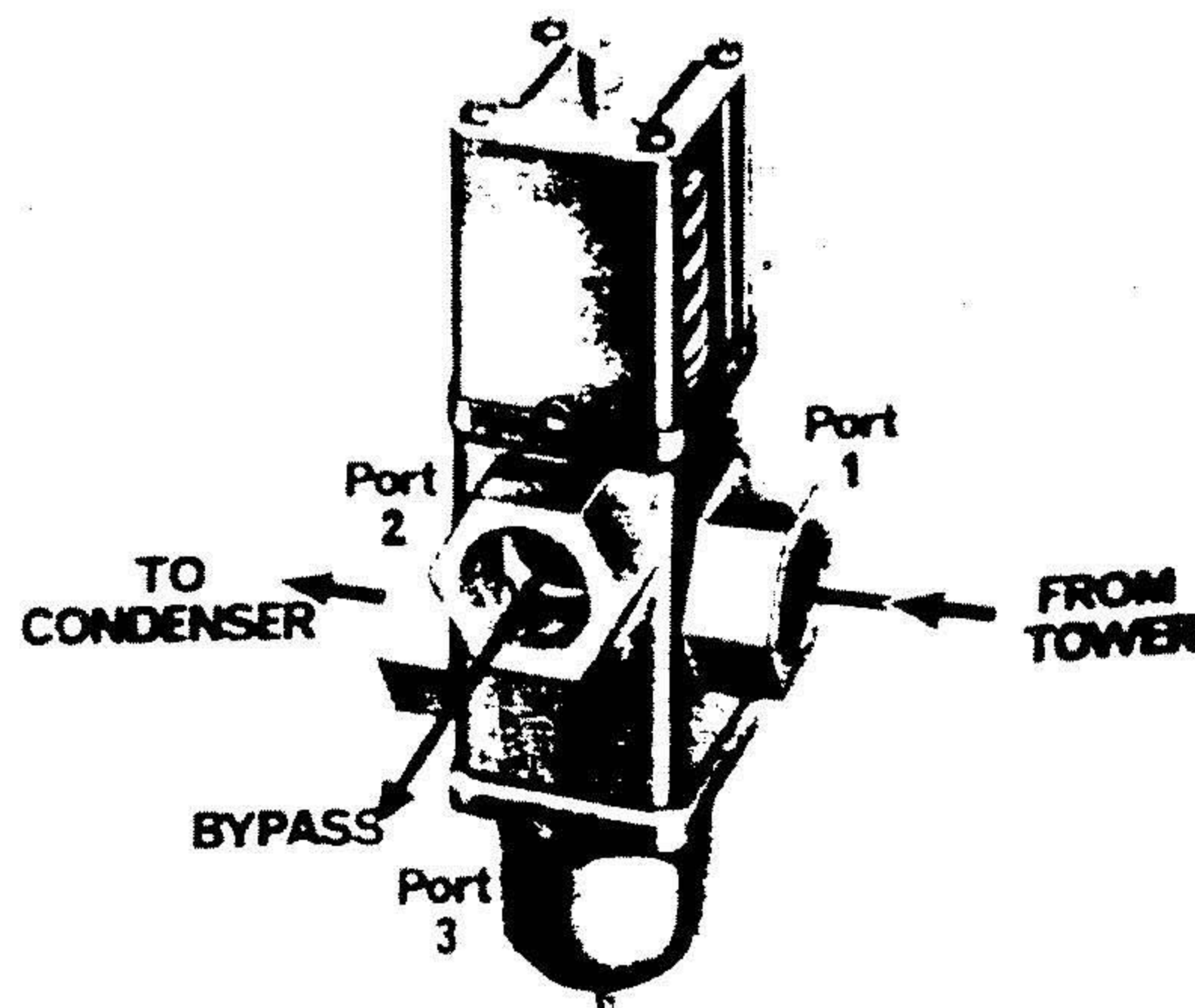
Each COMPU-AIRE Refrigeration System is provided with:

1. Externally equalized expansion valve(s).
2. Filter Dryer(s).
3. High Pressure switch manually resettable factory set to open at 400 psig and reset at 330 psig.
4. Low Pressure switch Auto reset. Set to open at 28 psig and close at 56 psig. This switch is also SPST.
5. Co-axial Tube-in-Tube Condenser. Condenser is factory piped with a water regulating valve in each circuit for head pressure control.
6. Bypass valve.

Water Regulating Valve

ADJUSTMENT: To raise valve opening point, turn adjusting screw, on end of valve opposite bellows, counter clockwise. To lower opening point, turn clockwise. Differential of valve is non-adjustable. When changing settings from R-12 to R-22 or vice versa, turn adjusting screw until spring cap is in the desired range area as indicated on spring housing, see Figure 10. Exact settings can be made by using a pressure gauge. **NOTE** - If compressor operates in high ambient temperatures, gas pressure, at times may remain high enough to prevent valve from closing. In such instances, opening point of valve should be raised just enough to cause valve to close during compressor standby periods.

MANUAL FLUSHING Valve may be flushed by inserting screwdriver or similar under two sides of main spring and lifting upwards.



HUMIDIFIER PIPING CONNECTION

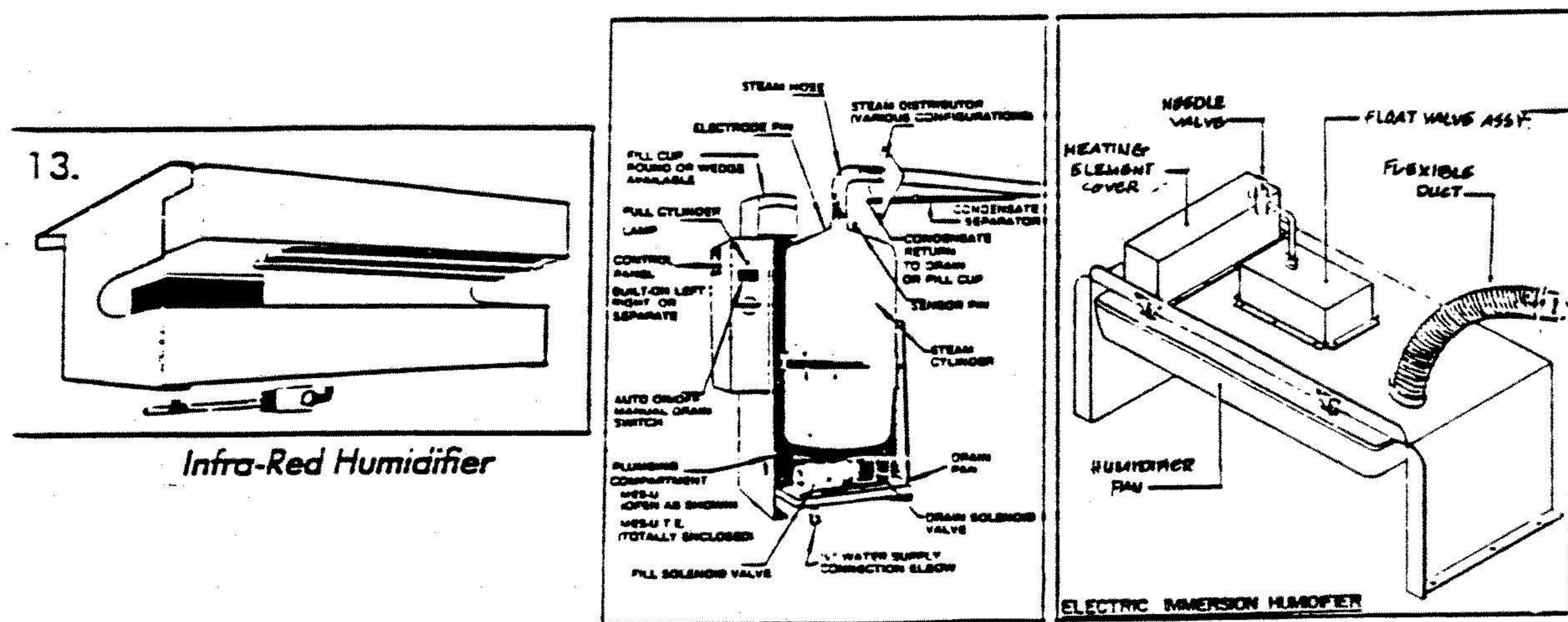
The standard humidifier supplied with Compu-Aire units is a disposable generator type humidifier. A 1/4" compression fitting is provided for the water supply, a 1/4" O.D. copper tubing should be used for make-up water.

For the optional infra-red humidifier or the electric immersion, piping connections are identical to the standard humidifier. All require a 1/4" O.D. tubing.

A water line shut off valve **MUST** be provided outside the air conditioner for future disconnection and service. In addition, an in line water pressure regulator and a strainer should be installed in the make-up water line. Water pressure should be set between 30 and 50 psig.

For infra-red and electric immersion the float is factory adjusted to maintain minimum water in the humidifier where the elements are just submersed in water. For field adjustment, loosen the float arm, or slightly bend the arm as shown below.

Some localities require backflow prevention device. Verify and provide if needed.

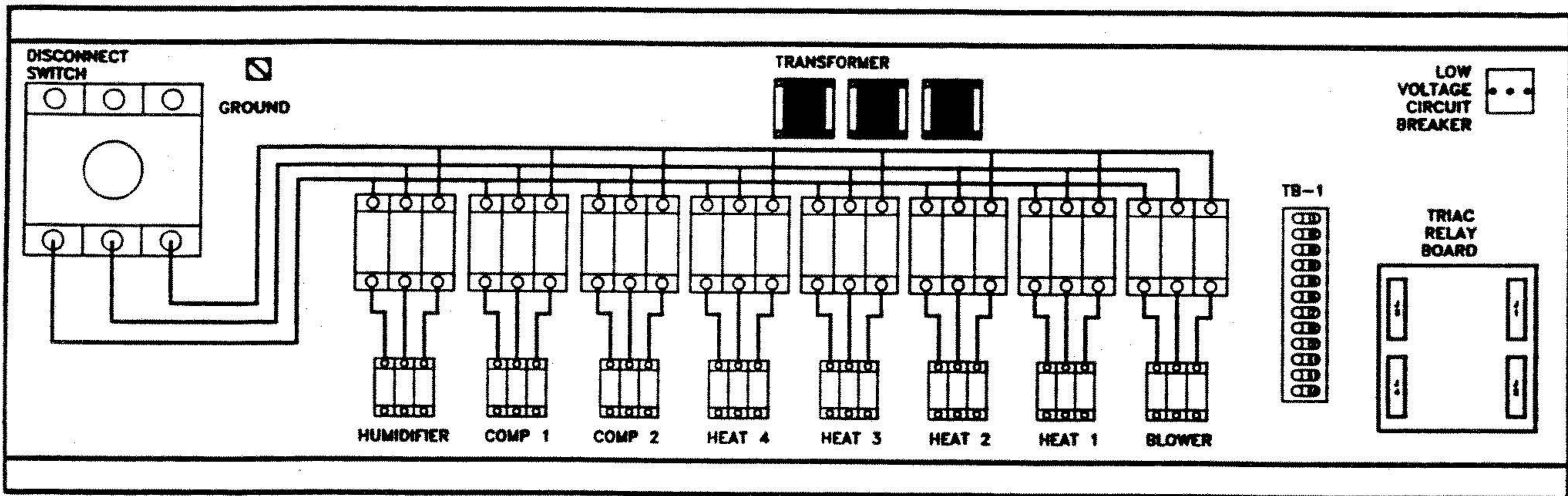


LEAK TESTING

No installation is complete until the entire system has been thoroughly checked for leaks. This includes water tubing, humidifier make-up water, and condensate lines.

ELECTRICAL CONNECTION

IMPORTANT - Before proceeding with the electrical connections, make certain that the volts, hertz and phase correspond to that specified on the unit rating plate. Also, check to be sure that the service provided by the utility is sufficient to handle the additional load imposed by this equipment. Refer to the unit rating plate for equipment electrical requirements. The attached wiring diagram shows the proper high and low voltage field wiring.

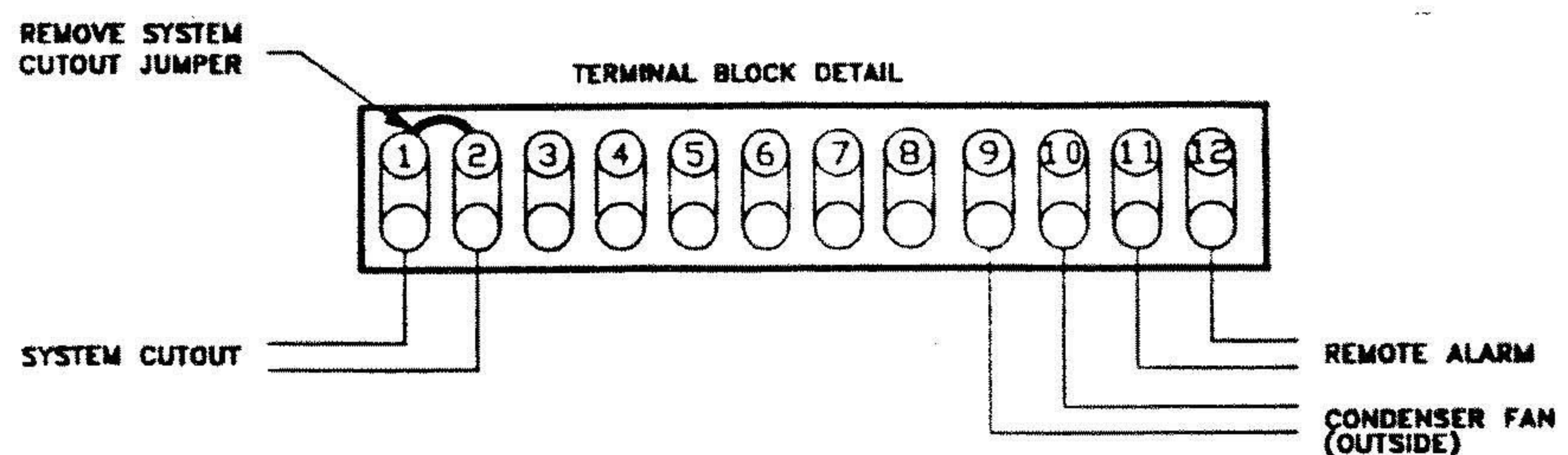


Make all electrical connections in accordance with National Electrical Code and any local code ordinances that may apply. USE COPPER CONDUCTORS ONLY.

WARNING- The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. It is important that an electrical ground wire of adequate size be connected to the ground lug provided inside the control box.

Supply voltage at the unit must be within $\pm 10\%$ of the voltage indicated on the nameplate. For a dual voltage rating, supply voltage must be within 5% from the lower nameplate rating and within 10% from the higher rating. Phase to phase imbalance must not exceed 3%. Contact your local utility company for correction of improper line voltage. Improper electrical power supply may cause premature failures and void unit warranties.

The unit is completely factory wired with self-contained controls.



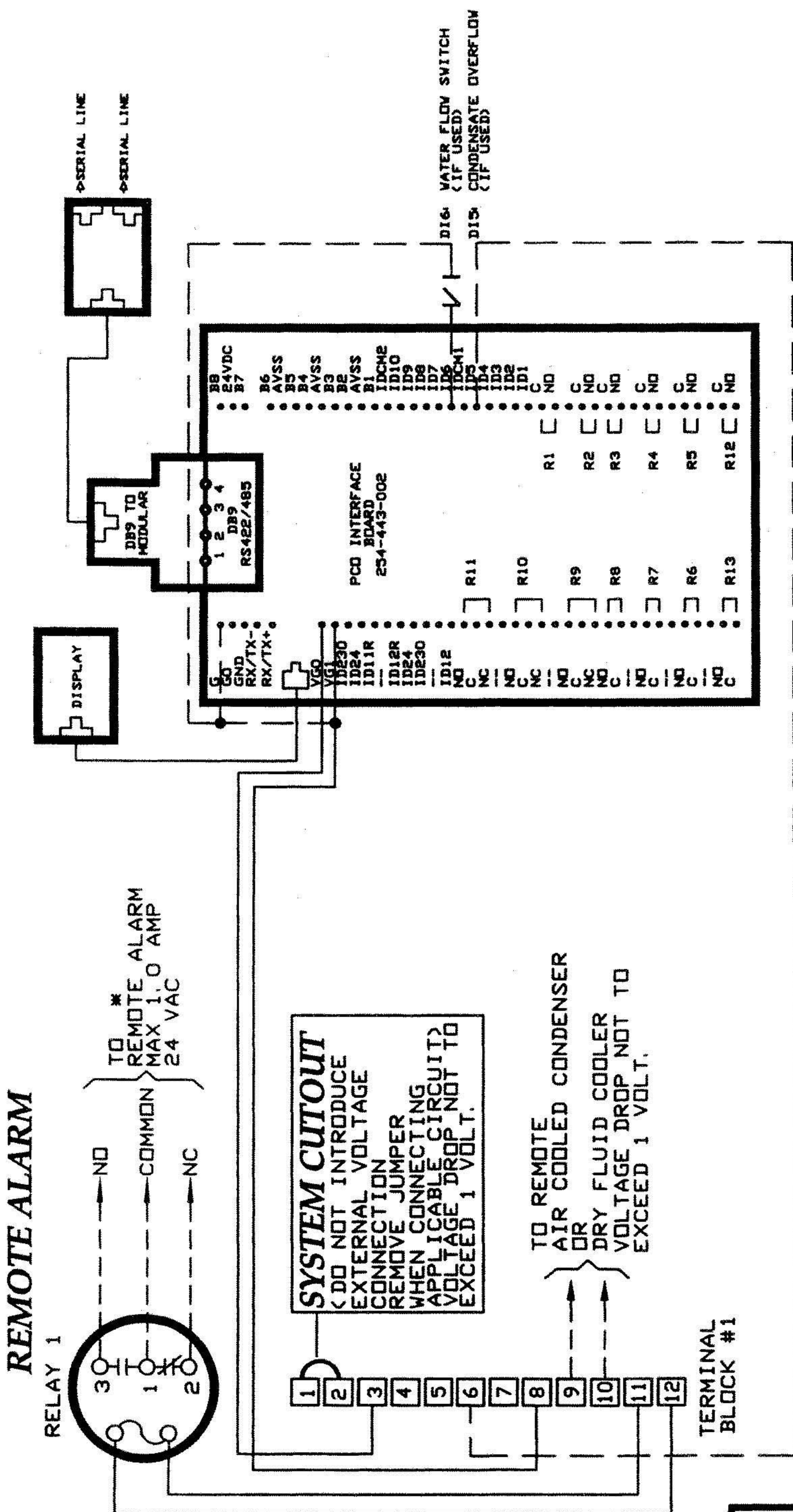
Note: Aux Term's 11 & 12 go to Dry Fluid Cooler. See wiring diagram on page _____.

The system cutout terminals on the terminal strip are for connection to a "panic button" or remote shut-off if required. This should only be connected to a switch and NO EXTERNAL SOURCE OF POWER SHOULD BE INTRODUCED AT THIS POINT. The conductors should be sized depending on the length of run and the number of control transformers used in the unit. Maximum voltage drop must not exceed 1 volt. Each control transformer draws approximately 3 amps @ 24V. For long runs where the conductor size becomes too large, an interlocking relay (field provided) should be used.

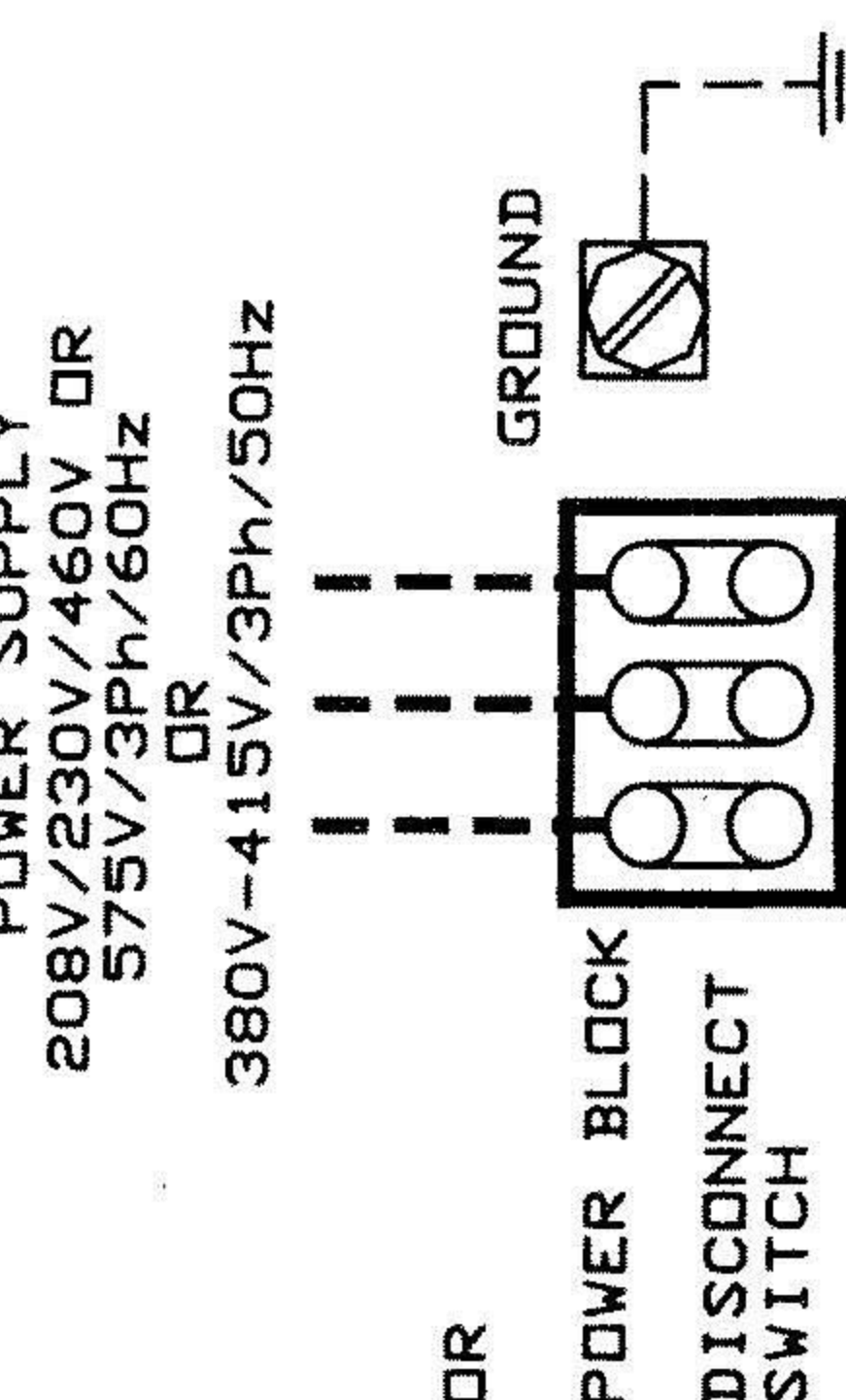
A dry contact (24 volts rating) is provided for terminals for a remote alarm connection. Whenever the unit alarm is energized, terminals will make.

If the control panel includes a condensate probe, make sure it is mounted below the unit against the floor area where water may collect. To check the operation of the probe, submerge it in a cup of water. The condensate alarm should energize.

REV.	DESCRIPTION	DATE	APPROVED
1	REV. 001	4/24/01	



REMOTE ALARM



SYSTEM CUTOFF
 < DO NOT INTRODUCE EXTERNAL VOLTAGE CONNECTION WHEN CONNECTING APPLICABLE CIRCUIT >
 VOLTAGE DROP NOT TO EXCEED 1 VOLT.

TO REMOTE AIR COOLED CONDENSER OR DRY FLUID COOLER VOLTAGE DROP NOT TO EXCEED 1 VOLT.

NOTES:
 1. DO NOT INTRODUCE EXTERNAL VOLTAGE TO ANY TERMINAL ON TB #1 < THIS WILL VOID THE UNIT WARRANTY >.

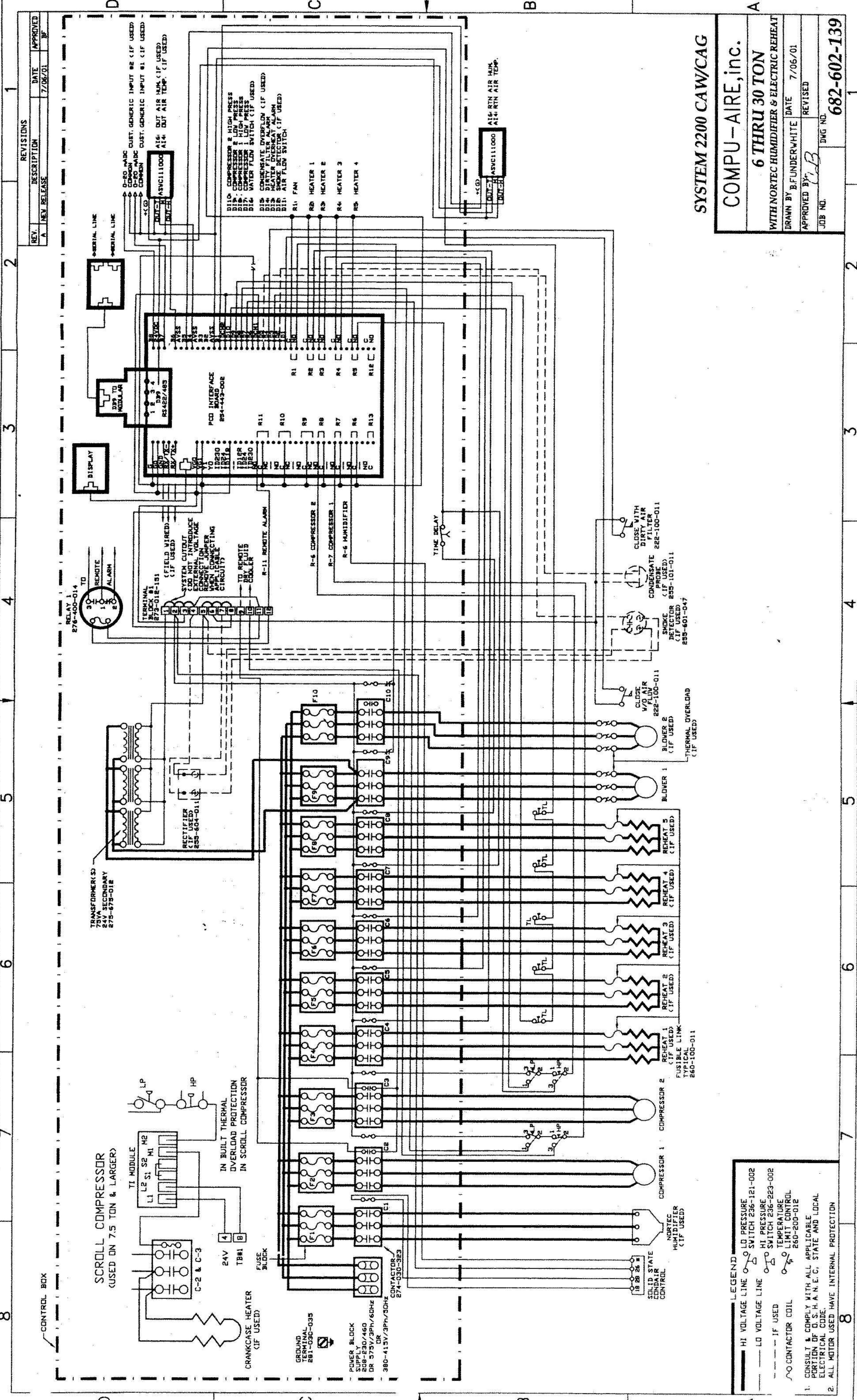
LEGEND
 — HI VOLTAGE LINE
 - - - HI VOLTAGE FIELD WIRING
 - - - LO VOLTAGE LINE
 - - - LO VOLTAGE FIELD WIRING

1. CONSULT & COMPLY WITH ALL APPLICABLE PORTION OF O. S. H. A. N. E. C., STATE AND LOCAL ELECTRICAL CODE.

**MCP-SYSTEM 2200
 FIELD WIRING
 CONNECTIONS**

COMPU-AIRE, inc.	
AIR/WATER COOLED	
DRAWN BY: JFUNDERWHITE	DATE: 08/24/99
APPROVED BY:	REVISED: 4/24/01CB
JOB NO.	DWG NO. 682-605-501

CONDENSATE PROBE < IF USED > 255-101-011

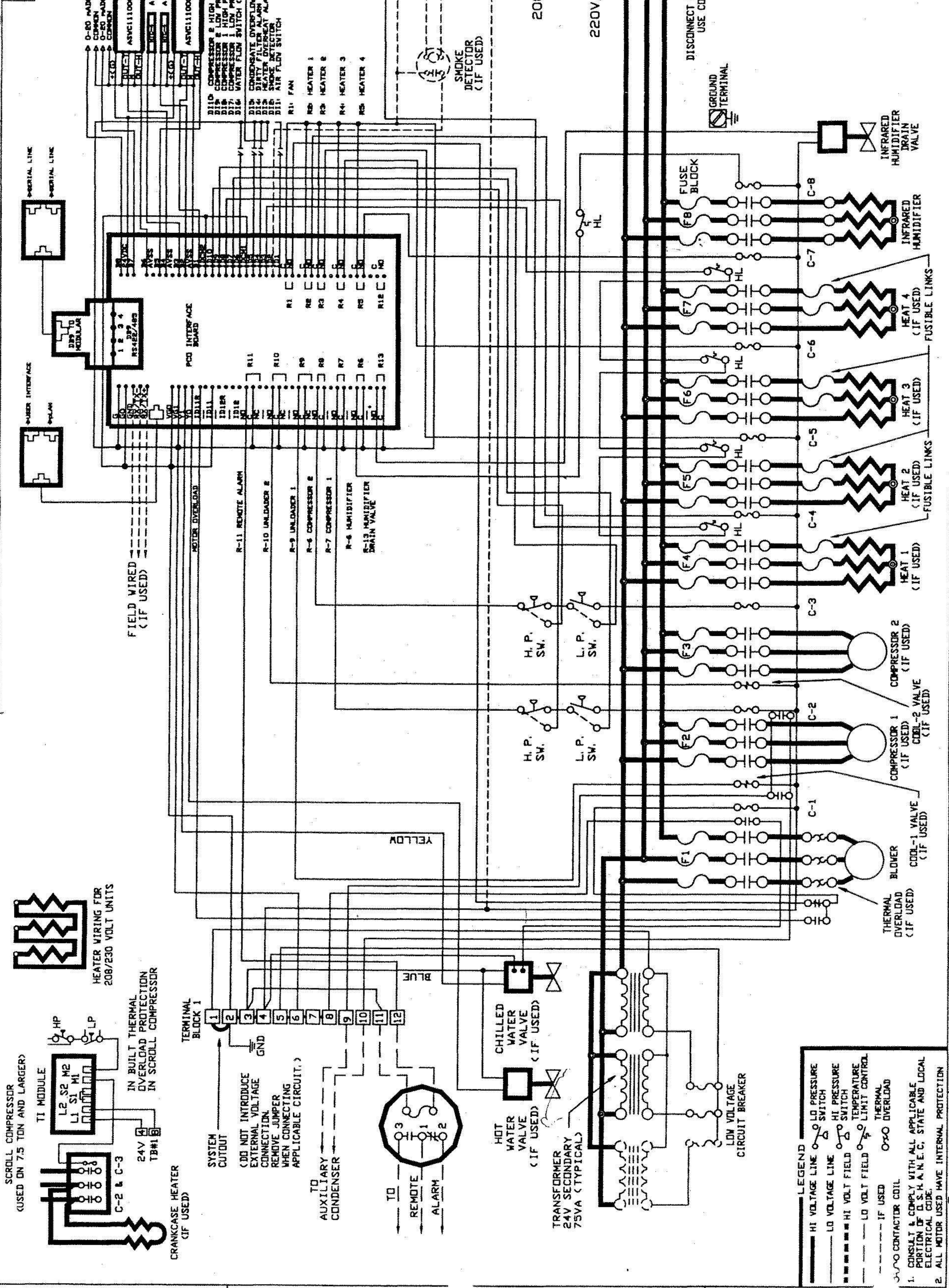


REV.	DESCRIPTION	DATE	APPROVED
A	NEW RELEASE	7/06/01	BF

SYSTEM 2200 CAW/CAG
COMPU-AIRE, inc.
6 THRU 30 TON
 WITH NORTEC HUMIDIFIER & ELECTRIC REHEAT
 DRAWN BY: BFUNDERWHITE
 DATE: 7/06/01
 APPROVED BY: *BF*
 REVISED
 JOB NO. **682-602-139**

- LEGEND**
- HI VOLTAGE LINE
 - LO VOLTAGE LINE
 - IF USED
 - CONTACTOR COIL
 - LO PRESSURE SWITCH 236-121-002
 - HI PRESSURE SWITCH 236-223-002
 - TEMPERATURE LIMIT CONTROL 260-200-012
1. CONSULT & COMPLY WITH ALL APPLICABLE PORTION OF C.S.A. N.E.C., STATE AND LOCAL ELECTRICAL CODE.
 2. ALL MOTORS USED HAVE INTERNAL PROTECTION

REV.	DESCRIPTION	DATE	APPROVED
1	SEE ECG	01/06/00	BY



COMPU-AIRE, inc.
SYSTEM 2200
WITH INFRARED HUMIDIFIER
 DRAWN BY: V.D. SALINAS DATE: 06-02-97
 APPROVED BY: [Signature] REVISED: 01/06/00(CB)
 JOB NO. DWG NO. **682-605-012**

LEGEND

- HI VOLTAGE LINE
- LO VOLTAGE LINE
- HI VOLT FIELD SWITCH
- LO VOLT FIELD SWITCH
- TEMPERATURE LIMIT CONTROL
- IF USED
- CONTRACTOR COIL
- OVERLOAD

1. CONSULT & COMPLY WITH ALL APPLICABLE PORTION OF U.S. N.E.C., STATE AND LOCAL ELECTRICAL CODE.
 2. ALL MOTOR USED HAVE INTERNAL PROTECTION

START-UP AND TEST PROCEDURE

CAUTION : POWER MUST BE SUPPLIED TO THE UNIT FOR 24 HOURS BEFORE STARTING THE COMPRESSOR TO AVOID SEVERE COMPRESSOR VALVE DAMAGE.

A. With All Power to Unit OFF - Check that All Wiring is Correct

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:

Solid-State Control Panel - With the system switch in the "OFF" position, apply power to the unit. The "Power On" light should illuminate.

B. 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 front access panel or 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 will have started and it is therefore possible to determine rotation. On Compu-Aire units, the blower should be rotating in a CLOCKWISE direction, looking in the right side of the unit. Heaters and humidifiers are not affected by phasing.

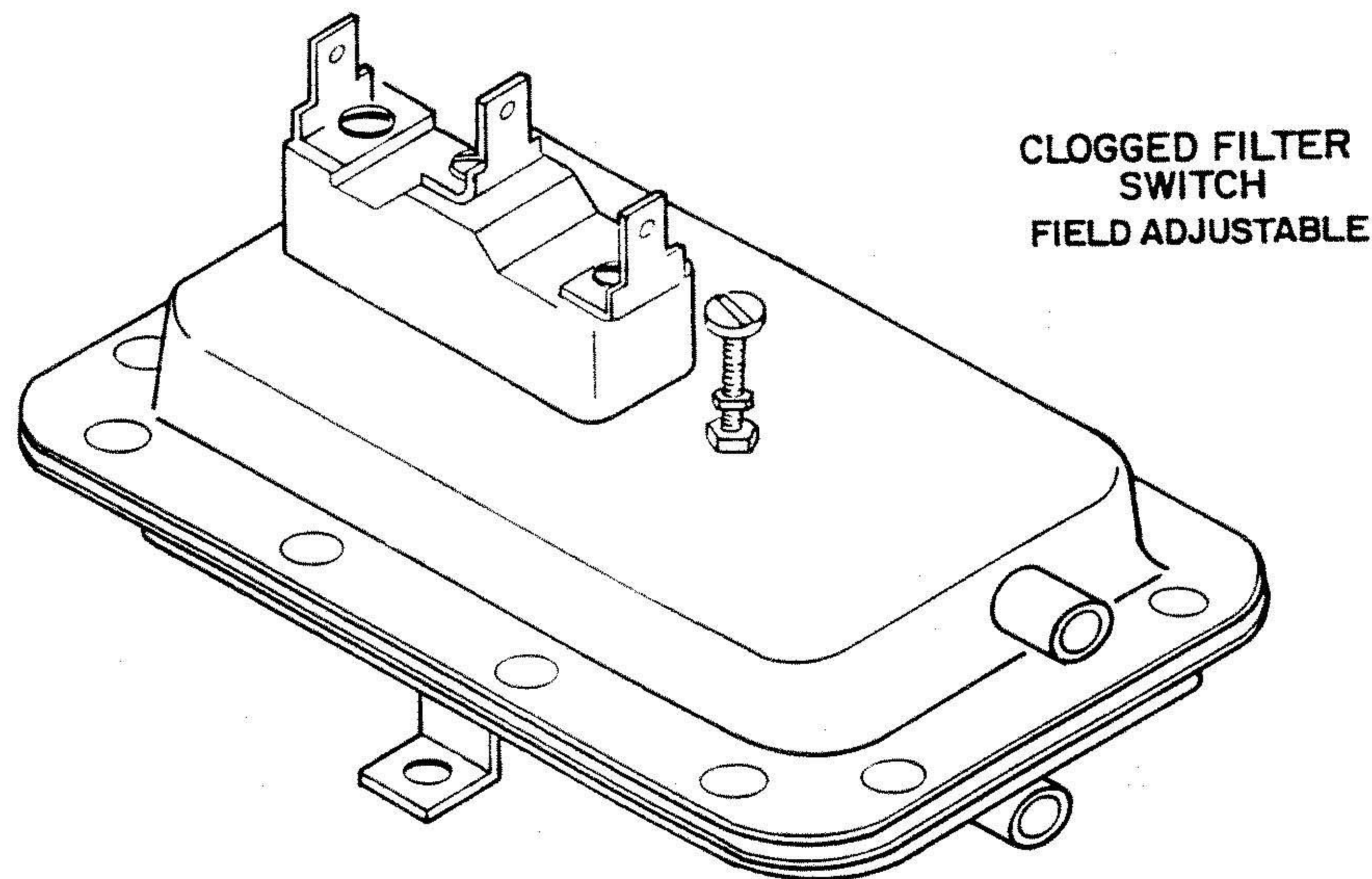
C. Blower Speed Adjustment

Adjustment of the air flow may be desired. The air flow can be readily adjusted with the variable pitch pulley provided on the blower motor. After the unit has been started and the air flow properly adjusted, check the blower motor current to ensure that the motor is not overloaded. Any time the blower speed 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.

D. No Air Flow & Clogged Filter Adjustment

The "No Air Flow" light and alarm should be checked prior to the completion of the installation. Although the control is adjusted at the factory, varying local conditions make it impossible to provide accurate pressure adjustments.

To check the filter pressure switch, let the unit operate on cooling for about 30 minutes. This will allow the evaporator coil surface to become wet. With the unit cooling and with the filters in place, block off approximately 75% of the air intake. If the sensing device is correctly adjusted, the "Clogged Filter" alarm should energize; the sensing device should have JUST turned on the alarm at the 75% blocked inlet condition. An Air Flow switch is also provided at the discharge side of the blower and will activate the No Air Flow malfunction light and alarm.



E. Humidifier Operation

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.

Check all electrical connections for wires which may have been 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.

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 an cycle on the red high water level indicator light.

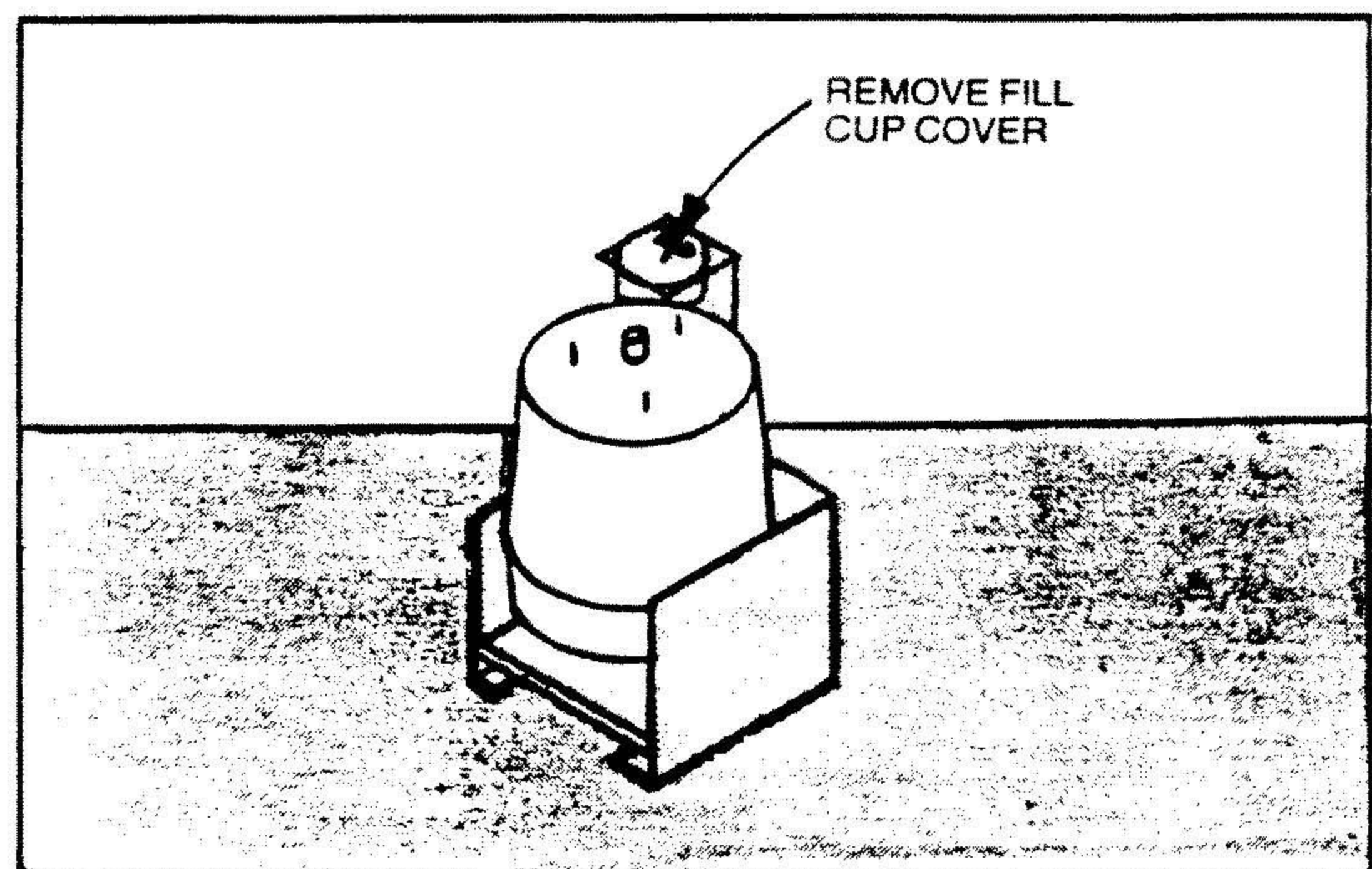
The red light simply acts as a safety to shut off the fill valve and prevent over fitting. With the red light on, the water in the cylinder will continue to heat and after a few minutes start to boil. After the boiling action of the water has lowered the water level go out and fill solenoid will again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

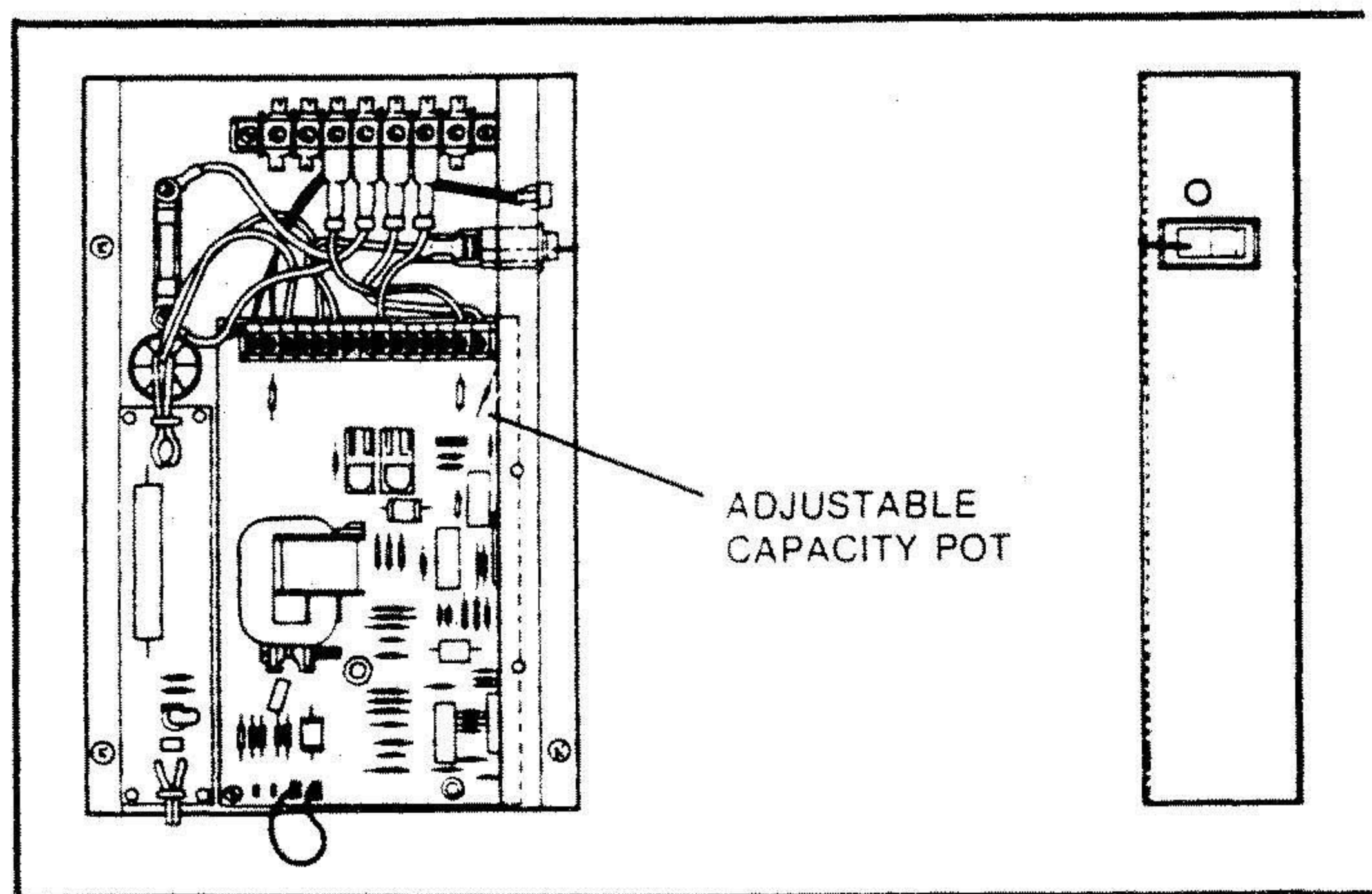


FILL CUP

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.



SYSTEM 2200 PROGRAMMABLE CONTROLLER:

The System 2200 is a programmable solid state control with 4 Row, 40 Character, back lit, super-twist Liquid Crystal Display (LCD). Information is displayed and presented in a format that is viewed and understood.

For detail operational instructions see:

**Compu-Aire
System 2200
Programmable Controller
User Guide**

SERVICE AND MAINTENANCE INSTRUCTIONS

A. Filters

- 1) The filters should be checked and changed periodically. When they become dirty, an alarm is activated by the filter pressure switch. If the filters are dirty, they must be changed for efficient operation of your system. To check the alarm indicator, cover approximately 75% of the return air opening; the alarm should energize.

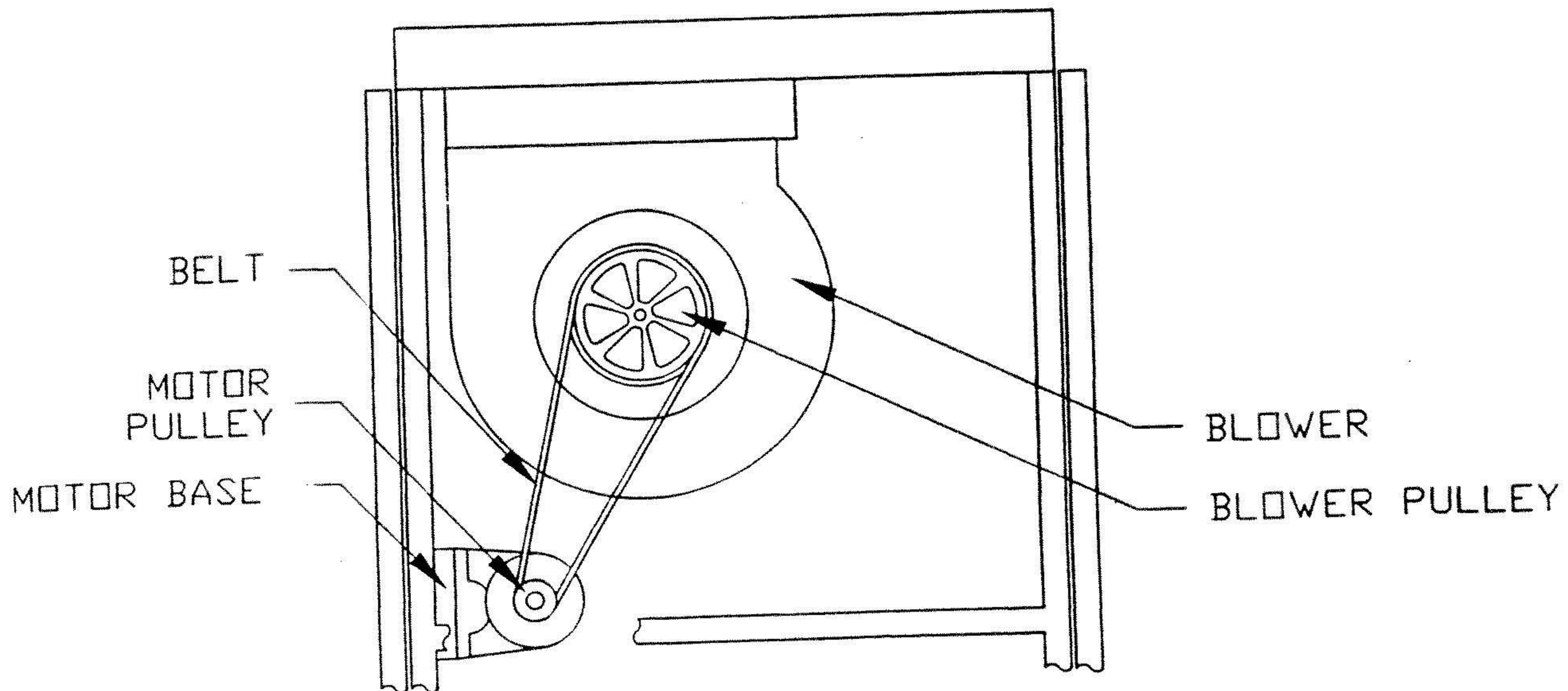
If the alarm energizes prematurely or does not energize when it should, adjust the filter switch. All doors to machine should remain closed before determining whether an adjustment is necessary.

- 2) Spare filters should be kept in stock. Filters should be checked monthly and replaced if necessary.

B. BLOWER DRIVE

Easy access can be made to the drive set by opening the front right door. This gives a full view of the motor and the drive set.

Belt tension should be checked every month to assure proper, efficient operation. If tightening is needed, slightly loosen the four motor mounting bolts. Then turn the adjusting screw (located in the front of the motor mounting channel), until the belt is properly adjusted. RE-TIGHTEN THE FOUR MOUNTING BOLTS.



C. BLOWER BEARINGS

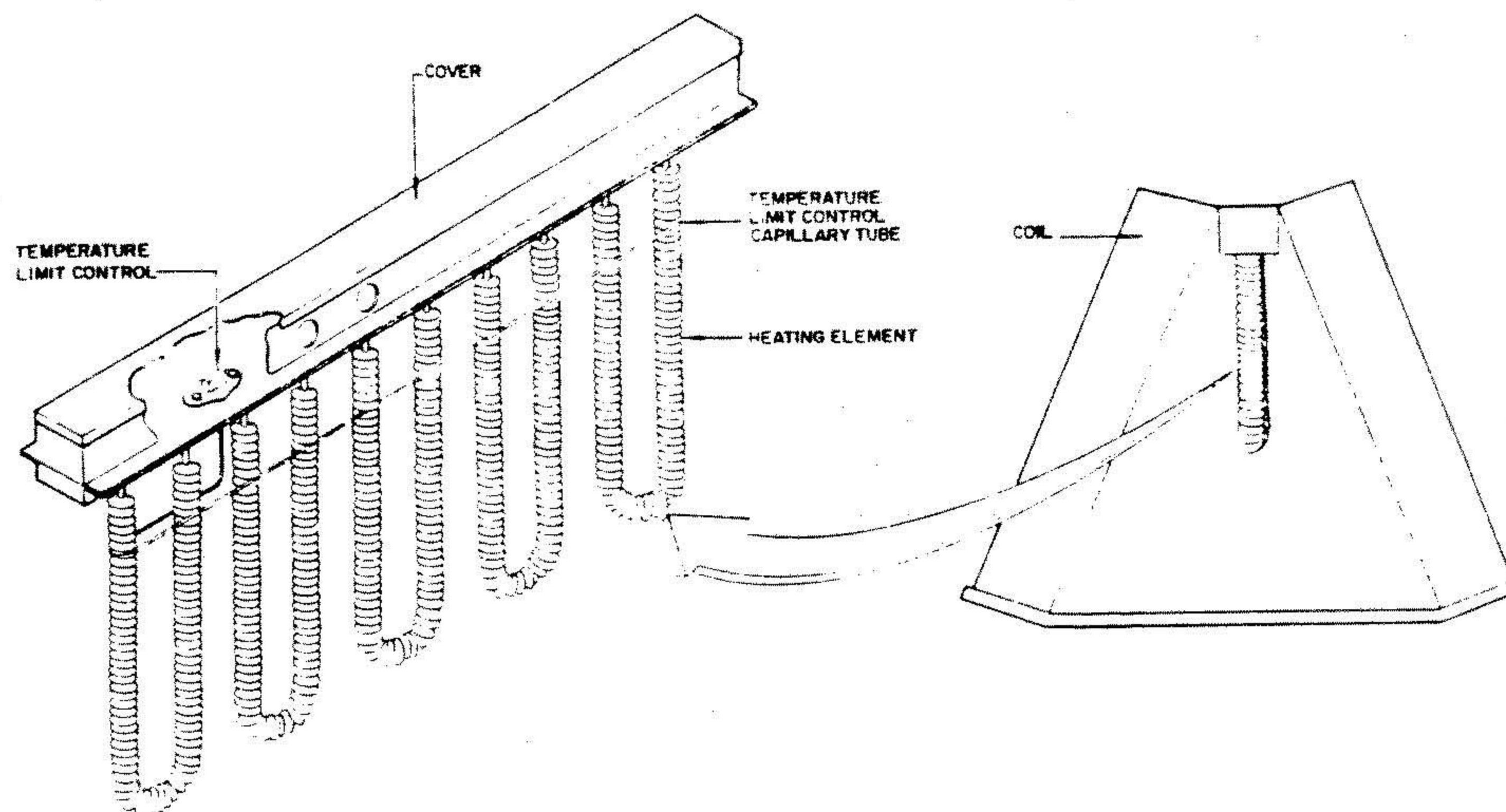
Blower bearings are permanently lubricated and do not require any maintenance. However, in special cases, some units have bearings that require lubrication at least every six months.

D. WATER REGULATING VALVE

Valve seat and rubber disc, after long periods of operation, may become worn, pitted or "wire drawn". To inspect valve seat and rubber disc, relieve tension on main spring by turning adjusting screw clockwise, remove the four round head screws extending through the main spring housing from end of valve opposite bellows (remove side screws on 1" or larger valves). Complete housing assembly is removed as one unit. Next, remove center assembly screw or seat guide post which allows access to all internal parts.

E. HEATING ELEMENTS

The heating elements are finned type, and there is no maintenance required. Access to the heater box can be obtained from the right hand side of the unit.



F. HUMIDIFIER

Four kinds of humidifiers are used in Compu-Aire Units: Electric Immersion, Infra-Red, Dry Steam, and Replaceable Generator.

1. ELECTRIC IMMERSION

This type humidifier will probably require the most maintenance. If is necessary to thoroughly clean out the humidifier pan at regular intervals. The frequency for this depends entirely on the nature of the water used, and the

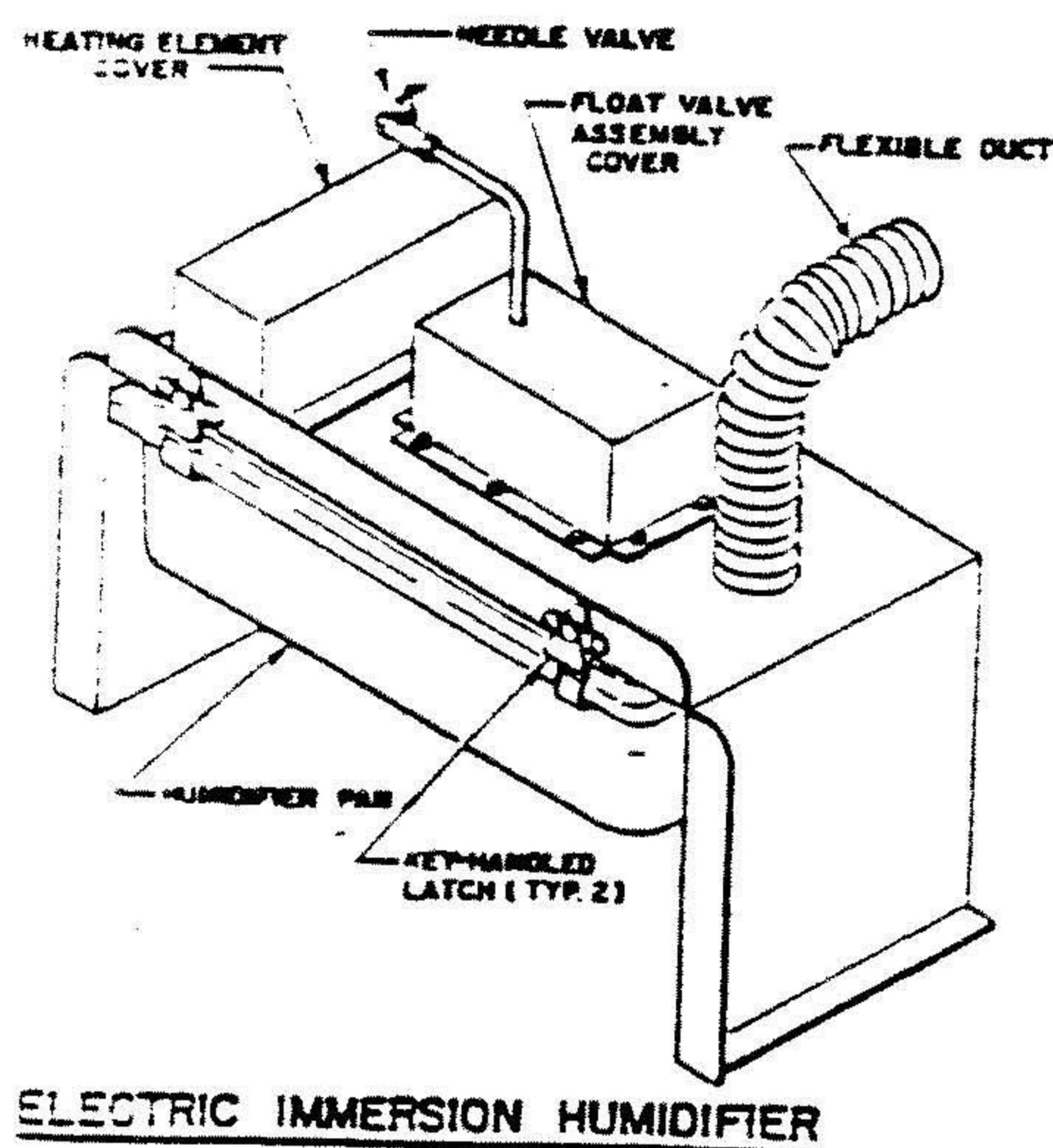
frequency at which the humidifier is called into operation. To begin with, it is recommended that the humidifier be checked every two weeks. When excessive scale has formed in the lower pan and on the heating elements, it will be necessary to thoroughly clean this pan.

To inspect the humidifier, de-energizes the power to the unit at the disconnect switch. Open the left front access door. The humidifier is now fully exposed. Visually inspect the pan and the heating elements.

If cleaning of the humidifier is required, shut off the water supply at the valve located on the side of humidifier assembly. Disconnect the humidifier electrical plug, release the front pan latch, disconnect the auto flush hose(if used) and overflow drain connections. Remove the whole humidifier assembly to a nearby sink for thorough cleaning.

To remove the scale, sulfamic acid scale remover is recommended (check with your local supply house). Flush out all free scale, then add scale remover as noted by the manufacturer of the scale remover to the humidifier pan filled with water. Empty the pan and rinse. If necessary, repeat the de-scaling procedure until the pan is clean. NOTE: DO NOT EMPTY THE RESIDUE FROM EITHER OF THESE OPERATIONS INTO THE UNIT DRAIN SYSTEM. After cleaning, re-install the humidifier. Check to ensure that the drain valve is shut, push the humidifier assembly back into place firmly, engage the latch, re-connect the electrical plug and piping hoses, then open the water supply valve.

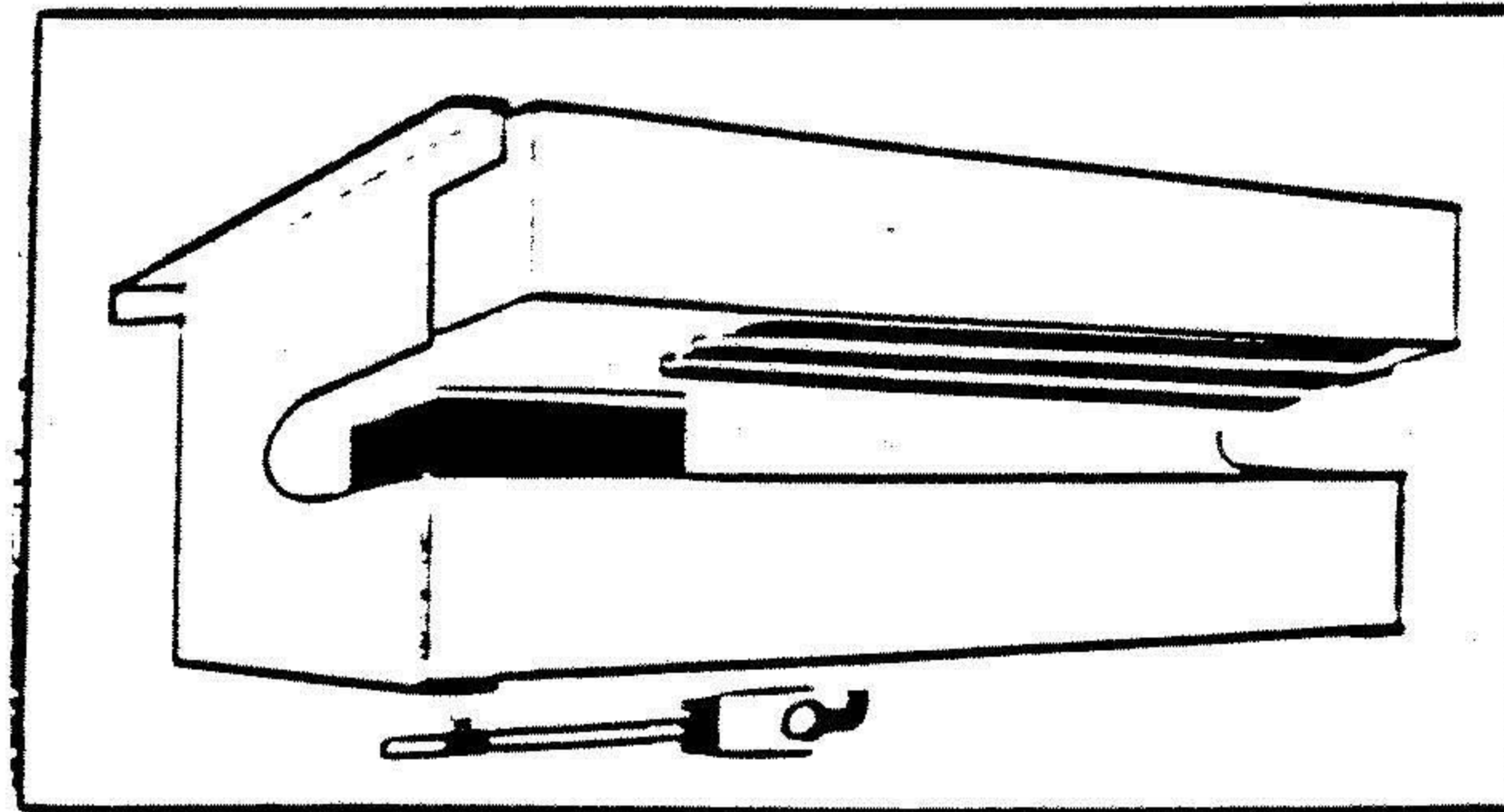
If the humidifier is equipped with automatic flush cycle, draining the humidifier can be accomplished by moving the lever on the flush valve to the manual position. Make sure that the lever is returned to the auto position when the cleaning operation is completed.



2. INFRA-RED HUMIDIFIER

The inspection procedure for the infra-red humidifier is the same as for the Electric Immersion type described below. If cleaning is required, remove the humidifier assembly to a nearby sink for cleaning.

Clean the pan using the method described in 1 below, again, using care not to allow scale to clog the drain in the pan or the unit. Carefully clean the reflector and lamps of any scale or deposits. BEFORE REPLACING THE LAMPS, WIPE OFF ALL GREASE, OIL, ETC. WITH A CLEAN DRY CLOTH. ANY GREASE OR OIL MAY CAUSE A HOT SPOT AND LAMP FAILURE. REMEMBER LAMPS ARE NOT COVERED IN THE UNIT WARRANTY.



Infra-Red Humidifier

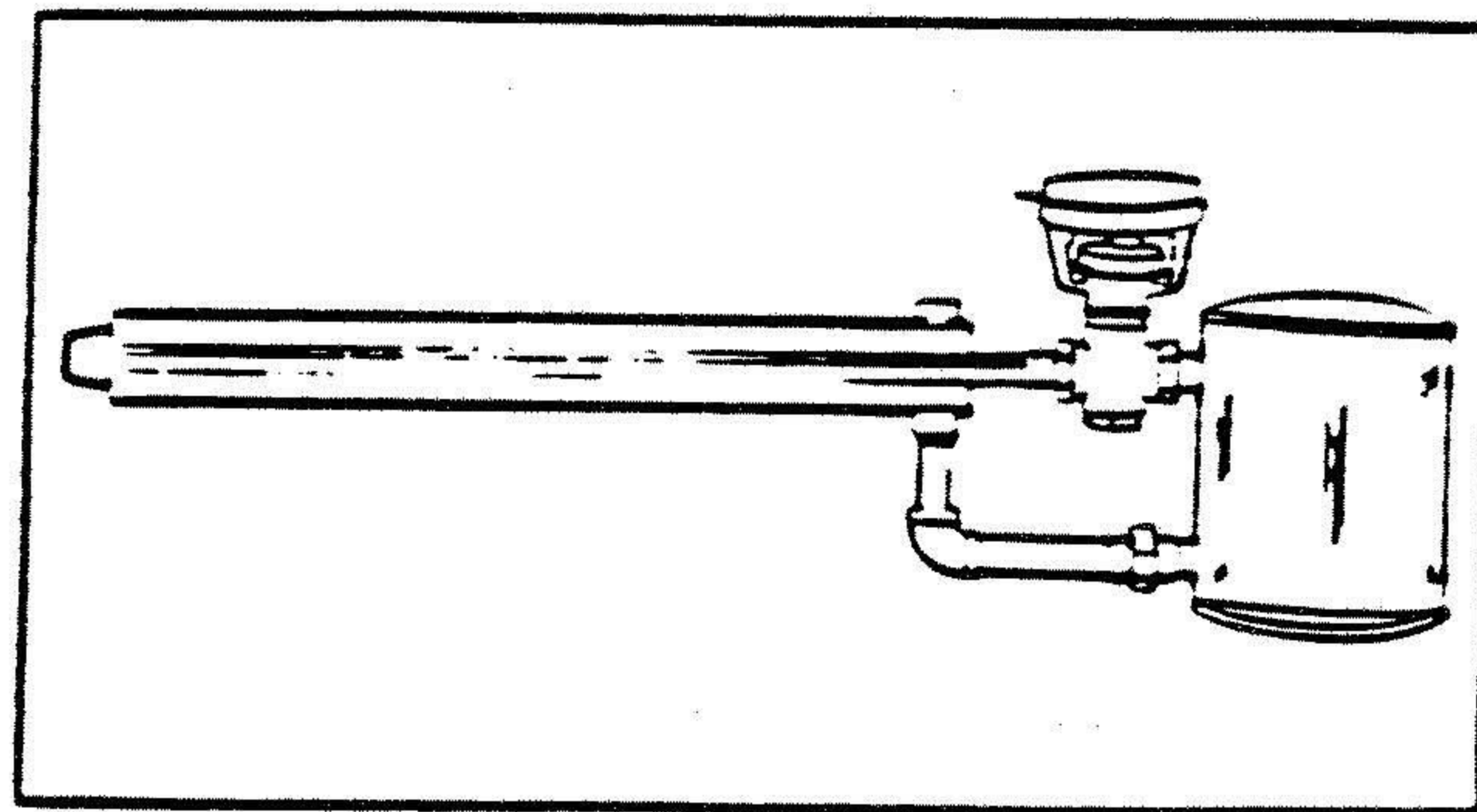
3. DRY STEAM

When units are equipped with dry steam type humidifiers, the necessary steam connections are made through additional connections.

- a) The operation of a steam humidifier is explained below:
 - 1) The steam supply is taken from the top of the steam main.
 - 2) Steam passes through a strainer to prevent dirt or scale from reaching the humidifier.
 - 3) Incoming steam strikes a baffle to divert any condensate to the drain.
 - 4) Steam fills the body and cap castings. Casting temperature will approximate the steam temperature

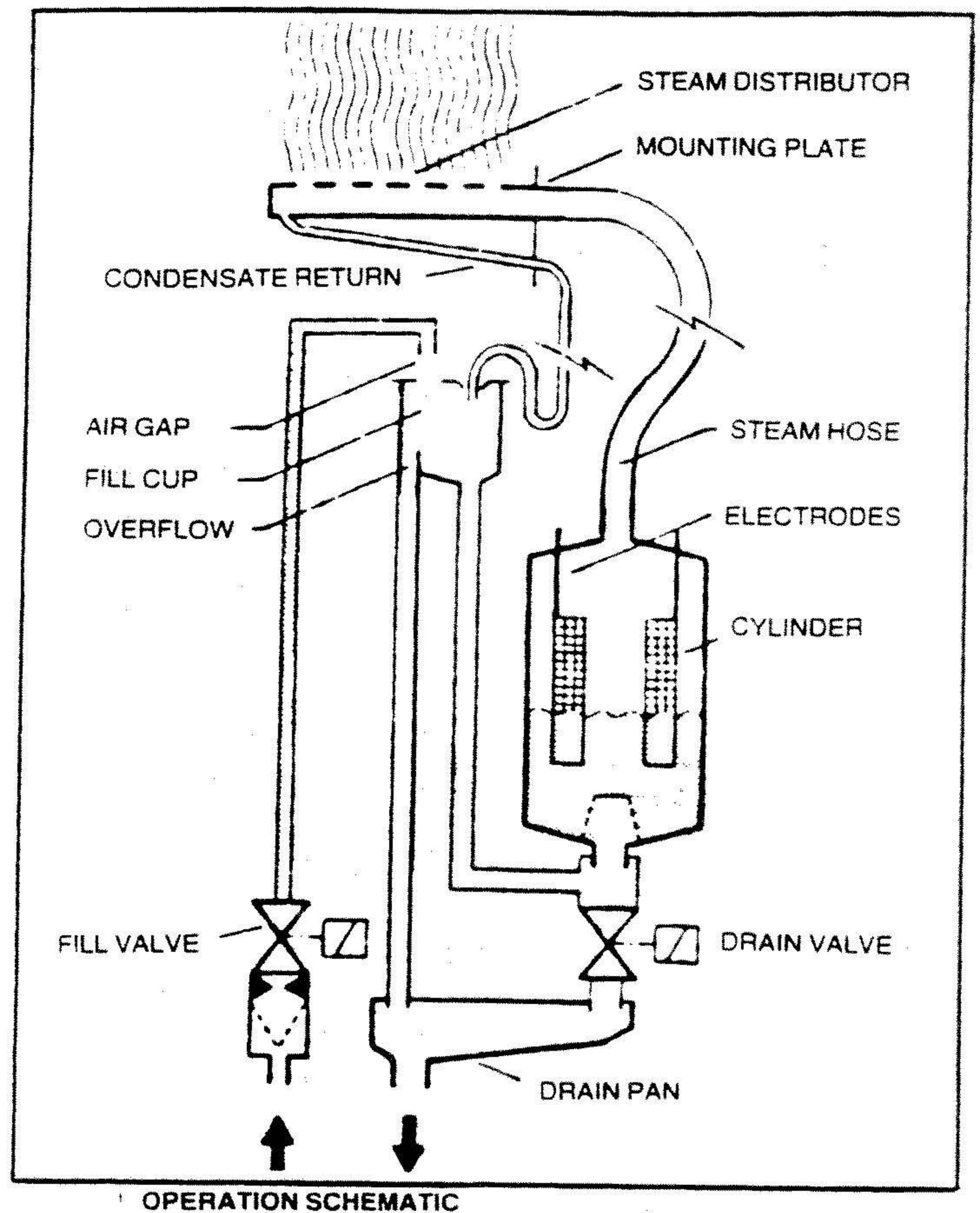
(approximately 240°F at 10 psig), preventing condensation and dripping at the outlet when the steam passes through at atmospheric pressure.

- 5) The humidistat actuates the operator to open the valve for humidity.
 - 6) Steam enters the re-evaporating chamber through a tube. Any condensate droplets will fall and evaporate on contact with hot metal.
 - 7) Dry steam passes up and out through muffling asbestos wicking on stainless steel.
 - 8) The steam is discharged directly in the unit.
- b. Maintenance of a dry steam humidifier is as follows:
- 1) Clean the strainer in the supply a few days after operation, and thereafter at least twice a year or as required.
 - 2) If the solenoid valve should stick, touch up the plunger with fine emery cloth and wipe out the plunger tube.



Steam Humidifier

4. Steam Generator Type Humidifier PRINCIPLE OF OPERATION



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 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 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.

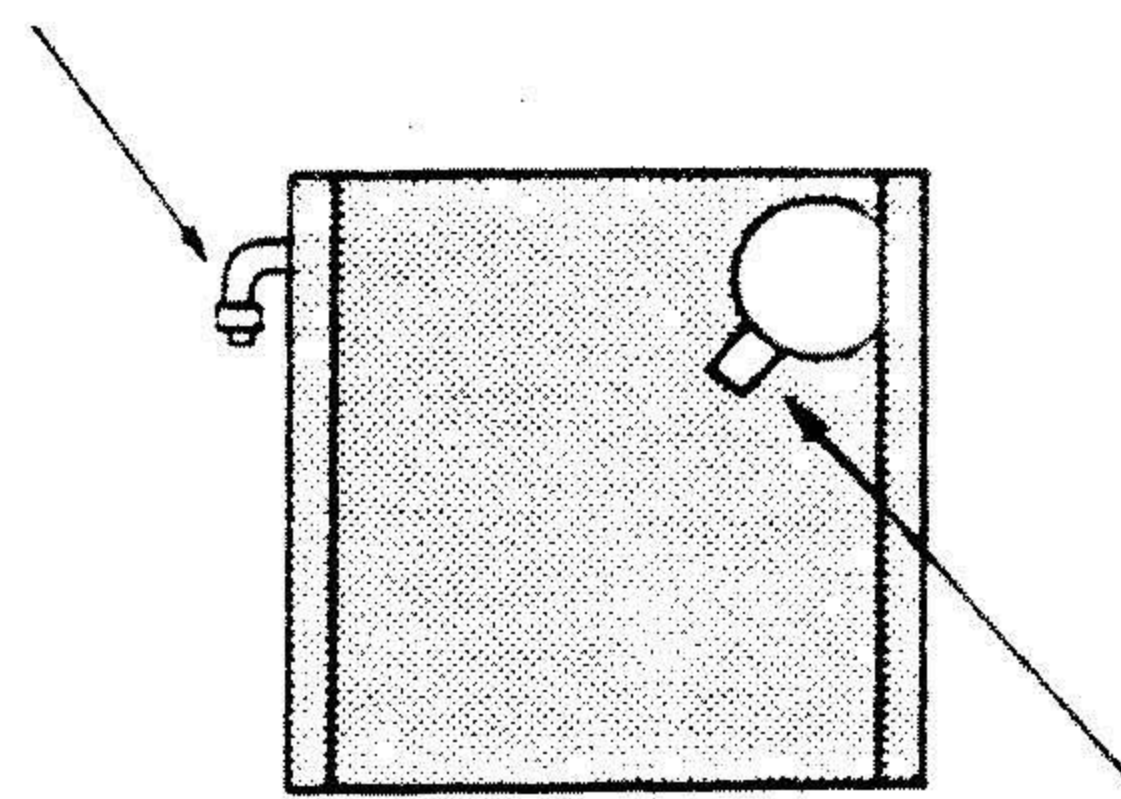
WATER SUPPLY AND PLUMBING

- 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.

1/4" COLD WATER OLIVE CONNECTION



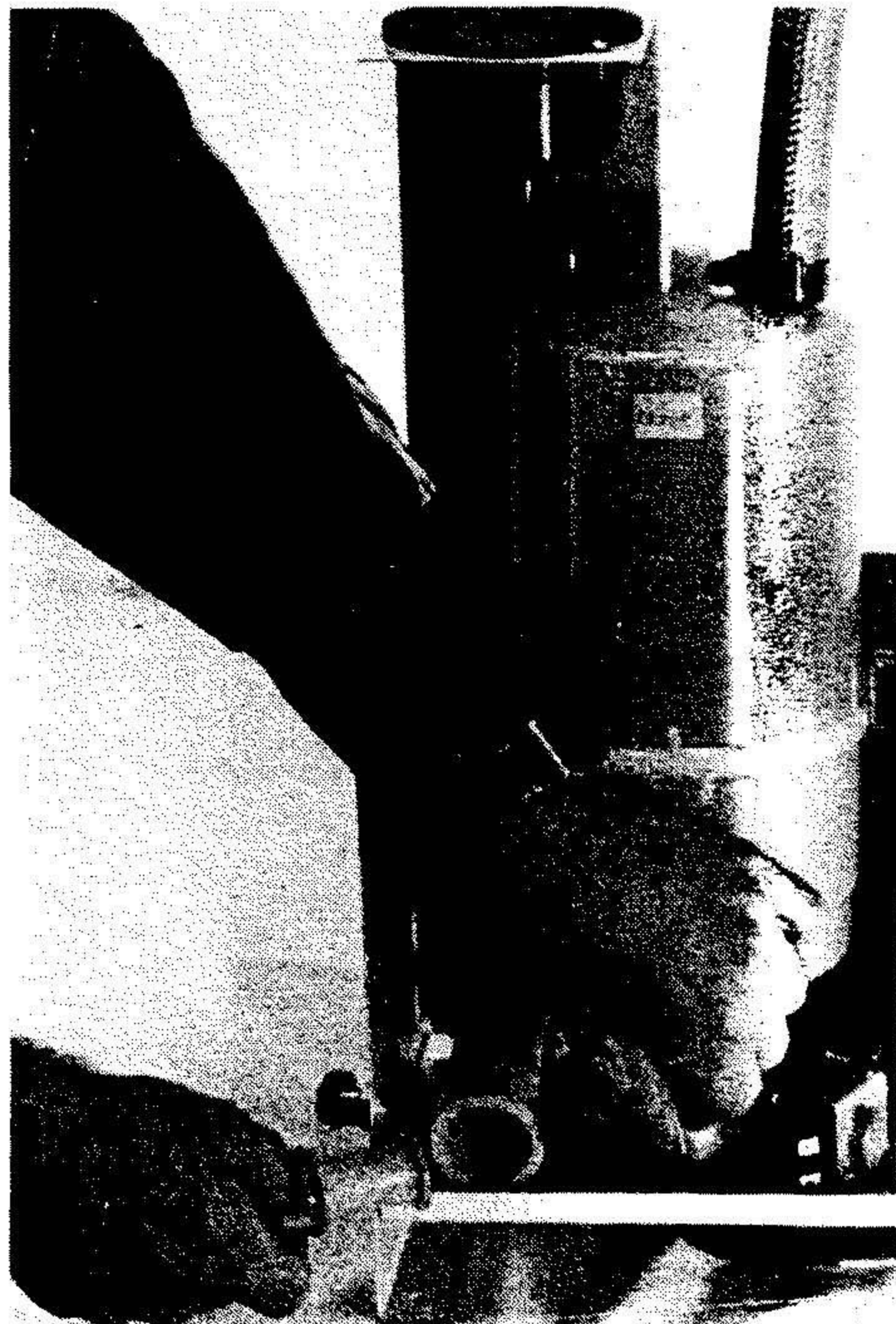
7/8" DRAIN CONNECTION

- 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.

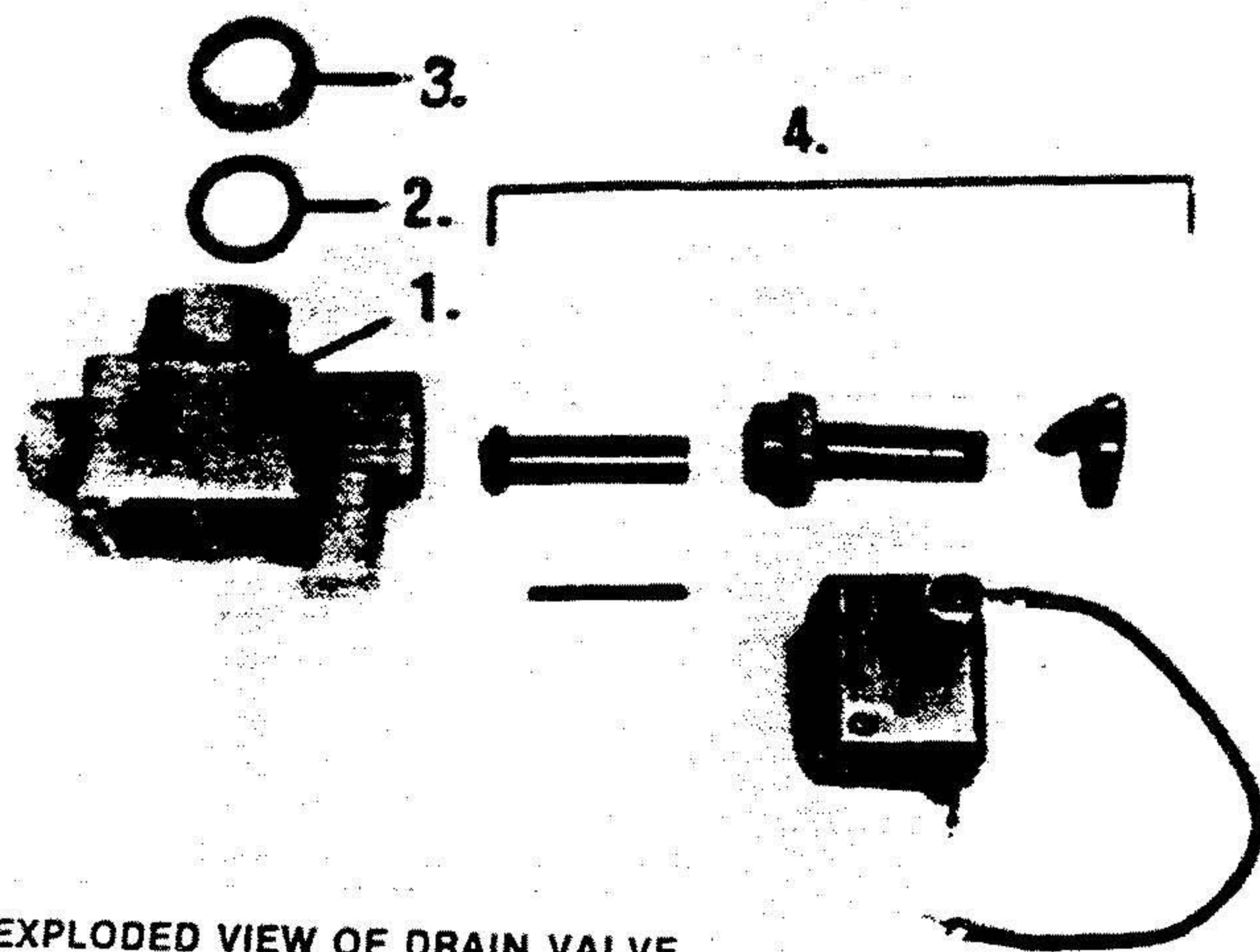
- 1) To clean the strainer, first turn off the unit, close the gate valve on the water supply line, remove the locking bar located in the fill solenoid and slide out the strainer.
- 2) Rinse the strainer and back flush it thoroughly with tap water to ensure the removal of all debris.
- 3) To re-install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



STRAINER

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.



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

- 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.

REPLACEMENT OF 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.

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

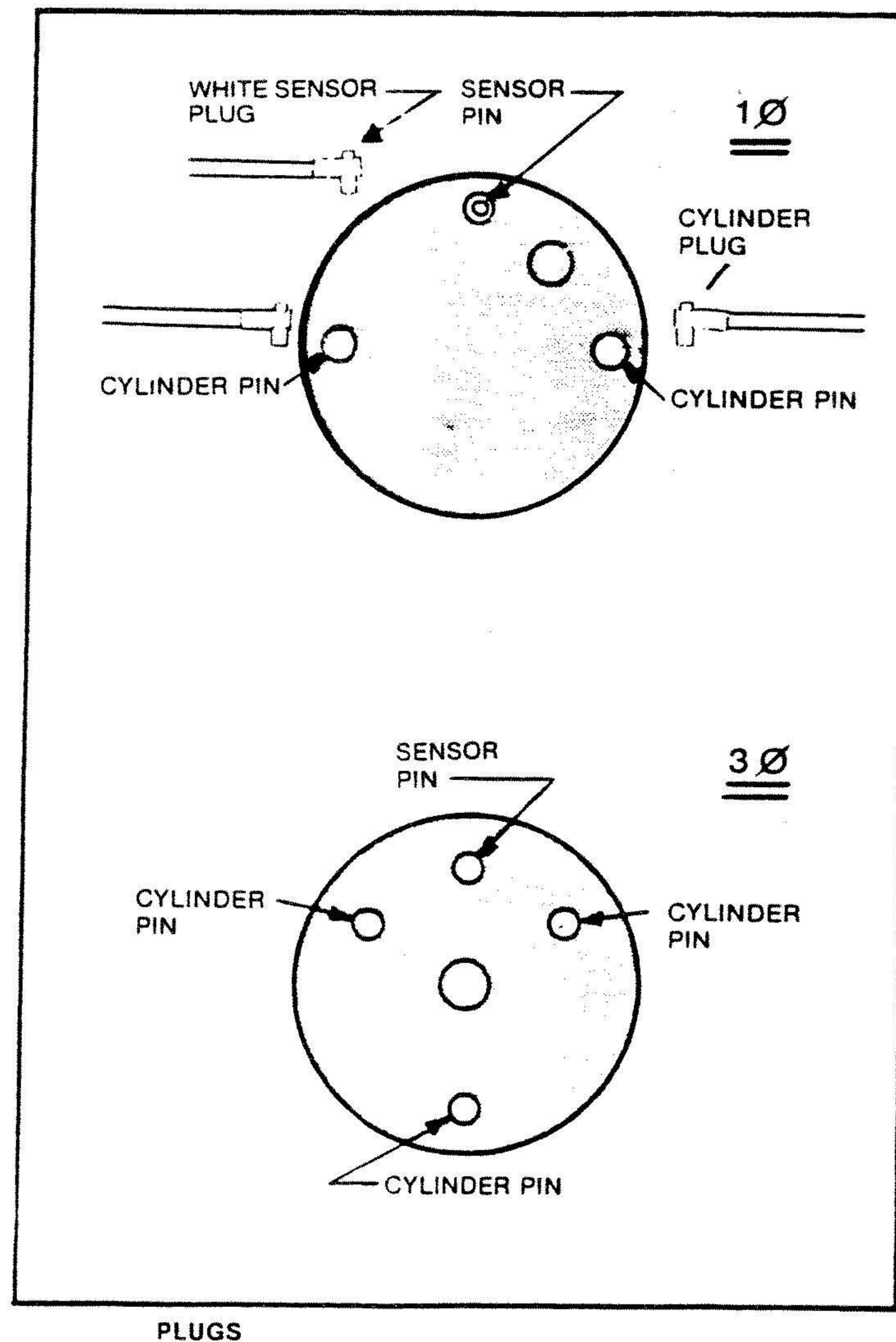
- 1) Turn off the water supply to the unit.
- 2) The old cylinder must be drained completely before removing. This is done by pushing the auto on/off drain switch to the "drain" position.
- 3) When completely drained, push the auto/on/off drain switch to the "off" position.
- 4) Open the main disconnect 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.
- 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.



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.



- 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 bypassed by placing a jumper between terminals 35 and 39 until 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 could 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 point 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. 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 Light on- Water at top of cylinder:

- Common occurrence on start-up - See previous pages
- water level should be at the 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 really (remove sensor concentration 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 (thorough the plastic fill cup on fill cycle. See page 9).
- if the 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 thorough activated drain valve, valve id 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 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.

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.

G. REFRIGERATION COMPONENTS

The unit is provided with two systems and both are factory piped and charged. For trouble free operation following items must be periodically checked.

- (a) Compressor mounts for proper tightness.
- (b) All refrigeration joints for any oil leaks or refrigerant leaks.
- (c) Pressure switches for calibration. High pressure switch is manually resettable opens at 400 psig and resets at 330 psig.
Low pressure switch is auto reset opens at 28 psig resets at 56 psig.
- (d) Every 90 days check unit operation completely in every mode. Make a test sheet. If any problem found repair prior to failure.

H. ELECTRICAL COMPONENTS

PERIODICALLY CHECK THE FOLLOWING:

- (a) Contactors for any sign of arching or damage.
- (b) Loose wires.

- (c) Blown fuses.
- (d) Transformers output.
- (e) Humidifier and reheat connections for tightness.

If any problems are found make necessary repairs.

I. CONDENSER CIRCUIT

SYSTEM 2100 unit is equipped with shell and tube condenser and water regulating valve from each circuit. Water regulating valve is used to control the head pressure. It is necessary to check that these valves are operating satisfactorily.

- (a) Bellows must be checked.
- (b) Cap tube assembly from any cracks or undue touching with moving parts.
- (c) Bypass gate valve for any leaks.

Adjusting of the water regulating valve.
Turn the adjusting screw clockwise to raise the opening point. The valve can be manually opened by inserting a screw driver under two sides of the main spring and lifting it upwards.



COMPU-AIRE INC.

8167 Byron Rd., Whittier, CA 90606
PH (562) 945-8971 FAX (562) 696-0724

STANDARD ONE YEAR WARRANTY

Job Name _____ Job No. _____ Date _____

We warranty this Compu-Aire, Inc. computer room unit to be free from defects in material and workmanship; our obligation being limited to repairing or replacing at our factory any part (except as noted below) within one year from the date of start-up and not exceeding _____ months from the date of shipment to the original purchaser. Parts to be returned to us PREPAID. Proof of start-up date must be submitted to the factory.

This warranty is effective only if the unit has been installed in accordance with our instructions and connected to proper and adequate electric, water and drain services, correctly dehydrated and placed into operation by a competent service representative.

Fan motor compressor warranty is covered by original manufacturer's warranty and any repair or replacement should be made by the local authorized service facility as listed in the telephone book.

Maintenance and service such as replacing filters, humidifier cylinder, infra-red lamps, float valve assemblies, belts, cleaning, lubrication, calibration and adjusting are NOT INCLUDED in this warranty.

Replacement or repair parts shall be shipped from the factory pre-paid and invoiced for the full amount. Upon receipt of warranted parts within 30 days with prepayment of the component and which our inspection discloses the parts are defective, and show no signs of misuse, alterations, or abuse, full credit will be issued.

Compu-Aire, Inc. does not assume any responsibility for the labor expense for changing defective parts or replacement of any refrigerant or other cooling medium such as glycol etc.

All parts and goods are thoroughly inspected and packed to meet the requirements of railroad freight classifications bureaus, and under standard shippers risk, when they leave our factory. SHOULD GOODS ARRIVE DAMAGED, call the agents attention to damage, and have same noted on freight bill. For concealed damage, demand immediate inspection from agent of the shipping company and insist on a notation being made on freight bill.

Purchaser-User

Model Number

Serial Number

Serial Number

Serial Number

Serial Number

Serial Number

Company Seal
must be
affixed for
validation

Authorized by _____
QUALITY MANAGER