3.0 OPERATION

3.1 GENERAL

The unit should be started up only by a refrigeration technician who is familiar with the accepted operation practices for refrigeration systems.

Use the scroll unit start-up report, to record all temperature, pressure, electrical readings and control settings. A copy must be forwarded to American Pro service department, before warranty will be honored.

3.2 UNIT PIPING

See Figure 3.2.1 for typical unit piping schematics.

3-3 AIR COOLED PACKAGES START-UP

The unit is ready for start-up when the following procedures have been completed:

1. Water piping for the evaporator is installed and tested.
2. Electrical connections are made and properly fused.
3. Unit has been leak tested, leaks corrected and charge completed.
4. Compressor crankcase heater(s) has been energized for a minimum of 24 hours.
5. Calibrated refrigerant gauges have been connected to the suction and discharge ports.
6. Turn On the chilled water pump, check direction of rotation and adjust the water flow through the evaporator to the specified flow rate. Bleed off all entrained air.
7. Manually energize the fan starters and check the fan rotation. Fans should pull air through the condenser coil and discharge vertically upwards. Rotation can be changed on 3-phase motors by interchanging only two wires on the main terminal block.
8. Check all refrigerant valves to be sure they are open.
9. Proceed to section 3.4 System Start-Up.

3.4 SYSTEM START-UP

1. Before starting the compressor(s), check all three phases of supply voltage, of all legs of the motor. They must be within ±10% of the nameplate voltage.
2. Start compressor(s), check the gauges and note if the pressures are within the prescribed limits.
3. Check the refrigerant sight glass to be sure it is free of bubbles. If not, charge as specified per section 4.8 Charging.
4. Shut the compressor down and check the compressor crankcase sight glass for oil level. It should be between 1/2 to 3/4 of the complete sightglass. If not, see Section 3.5 Lubrication.
5. Restart the compressor. After an hour of operation the expansion valve superheat setting should be checked, it should be between 8°F [4.4°C] and 10°F [5.6°C] at full load design conditions. In some instances, it will be necessary to lower the superheat setting to ensure proper distribution. Turn the TX valve adjustment stem clockwise to increase the superheat setting and counterclockwise to decrease the setting. Be sure and allow ample time between each adjustment for the system to rebalance.
6. The temperature of the chilled water both in and out, should be checked to ensure the unit is operating within the desired temperatures.

3.5 LUBRICATION

3.5.1 OIL LEVEL

A properly operated unit should run with the compressor crankcase warm to touch. Check oil level frequently to see that a sufficient amount of oil remains in the crankcase. Compressor oil level can be checked by the sight glass. To make sure that proper oil level is observe, operate the compressor for 15 minutes, then stop the compressor. Oil should appear from 1/2 to 3/4 in the sight glass with the compressor stopped.

3.5.2 OIL TYPE

If the oil becomes discolored indicating contamination, the contamination can be take care of by installing a new filter-drier in the liquid line and changing the oil.

WARNING:
Use Only American Pro Approved Refrigeration Oil, Warranty Will Be Void If Other Than Approved Oil Is Used. It is recommended to change oil annually to prolong the compressor life-time.

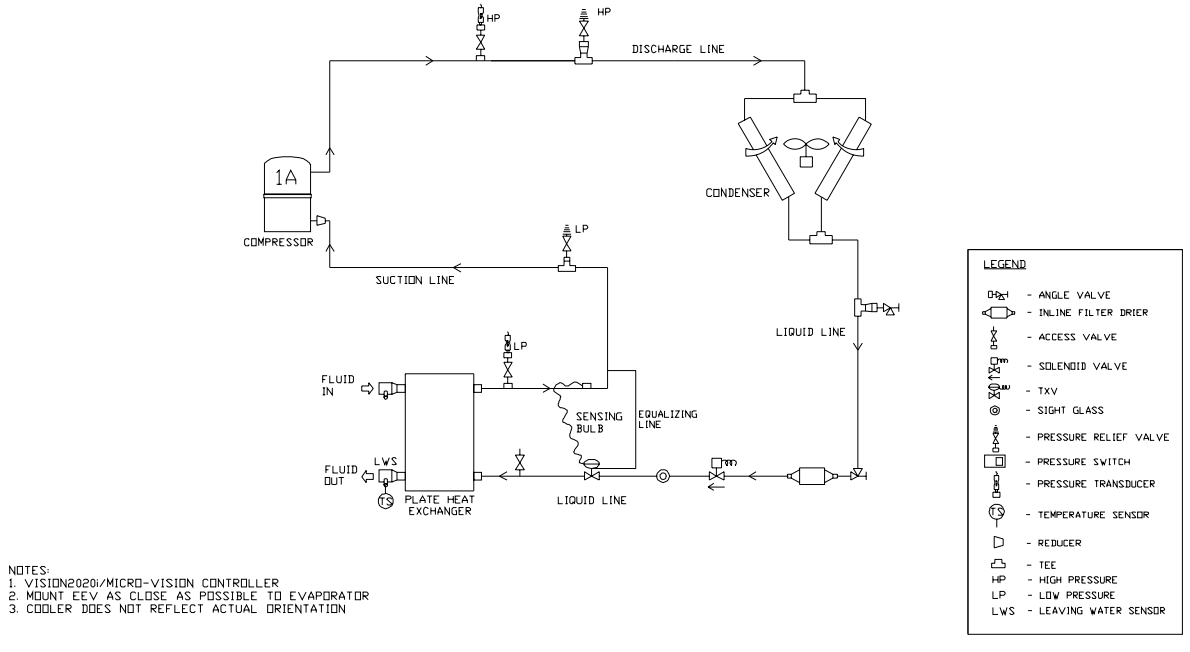
Oil charge for a complete recharge shown in the following table. Oil type and approved oils are also listed for each compressor. After recharge the oil level should be maintained per section 3.5.2.

COMPRESSOR MODEL	OIL CHARGE (L)	APPROVED OIL
SH 120	3.3	DHB-017
SH 140		
SH 161		
SH 180	6.7	
SH 240		
SH 295 / SH 300		
SH 380	7.2	

3.0 OPERATION

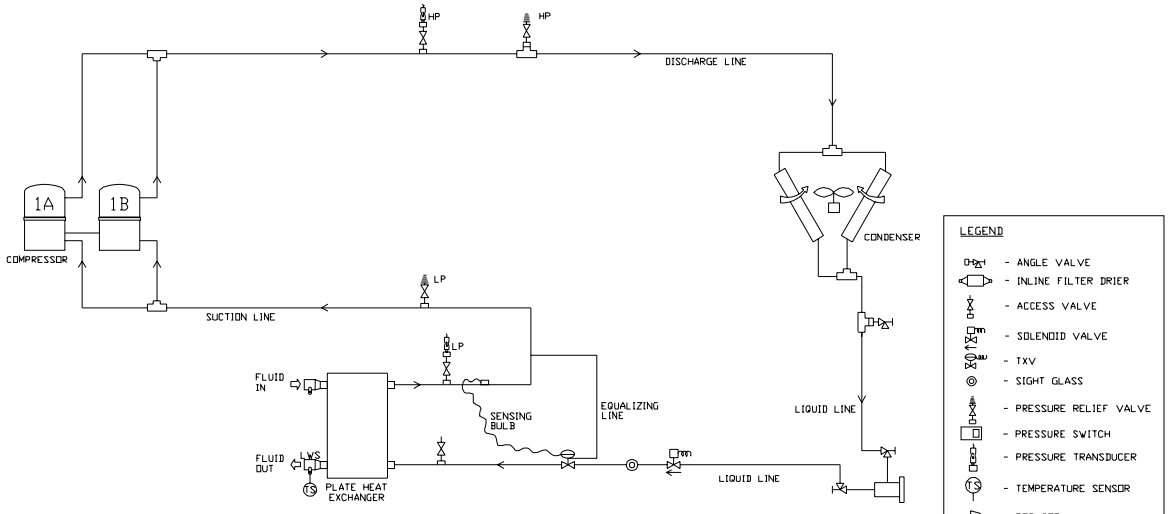
FIGURE 3.2.1 TYPICAL PIPING SCHEMATIC
50Hz

AP.BDET 010



NOTES:
1. VISION2020i/MICRO-VISION CONTROLLER
2. MOUNT EEV AS CLOSE AS POSSIBLE TO EVAPORATOR
3. COOLER DOES NOT REFLECT ACTUAL ORIENTATION

AP.BDET 020, 030



NOTES:
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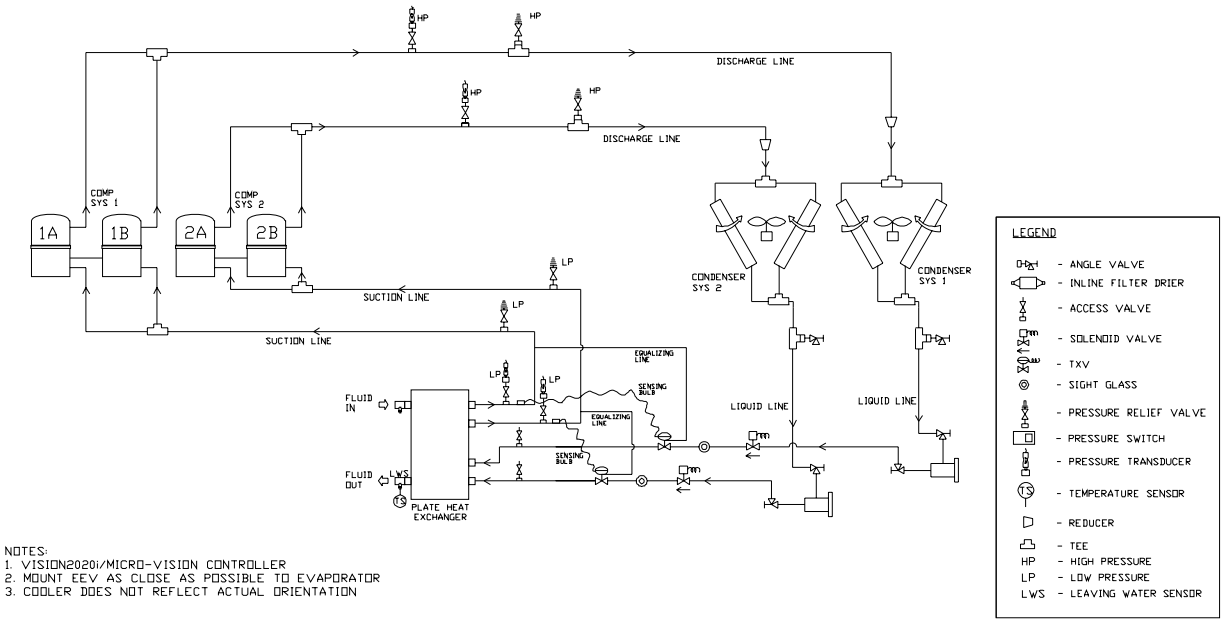
3. COOLER DOES NOT REFLECT ACTUAL ORIENTATION

3.0 OPERATION

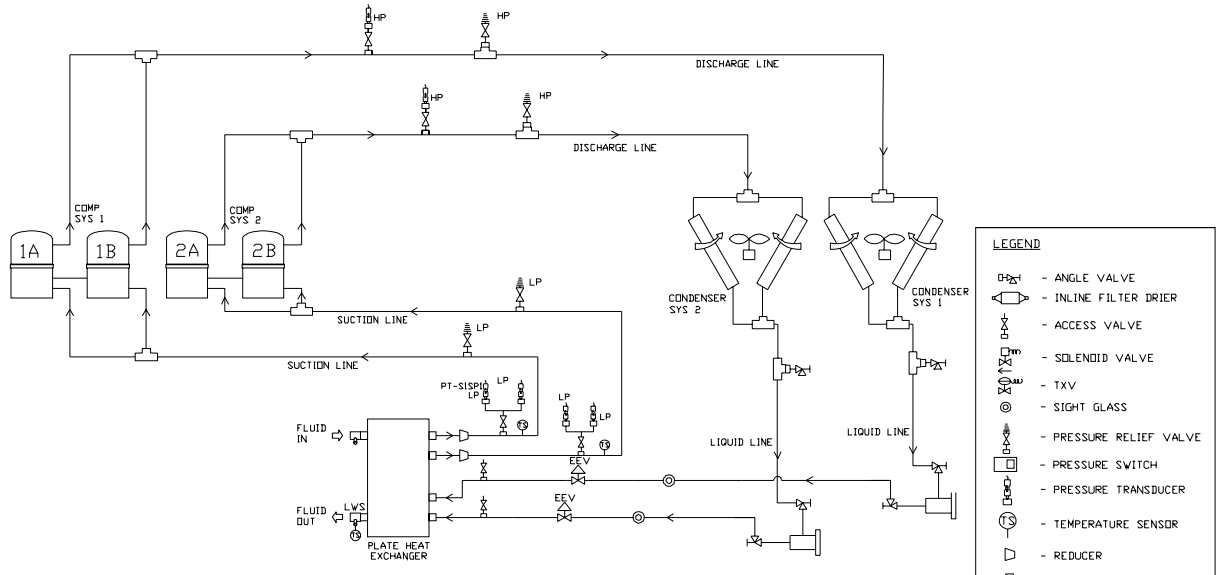
50Hz

AP.BDET 040, 050, 060, 065, 070, 080



NOTES:
1. VISION2020i/MICRO-VISION CONTROLLER
2. MOUNT EEV AS CLOSE AS POSSIBLE TO EVAPORATOR
3. COOLER DOES NOT REFLECT ACTUAL ORIENTATION

AP.BDET 095



NOTES:
1. VISION2020i/MICRO-VISION CONTROLLER
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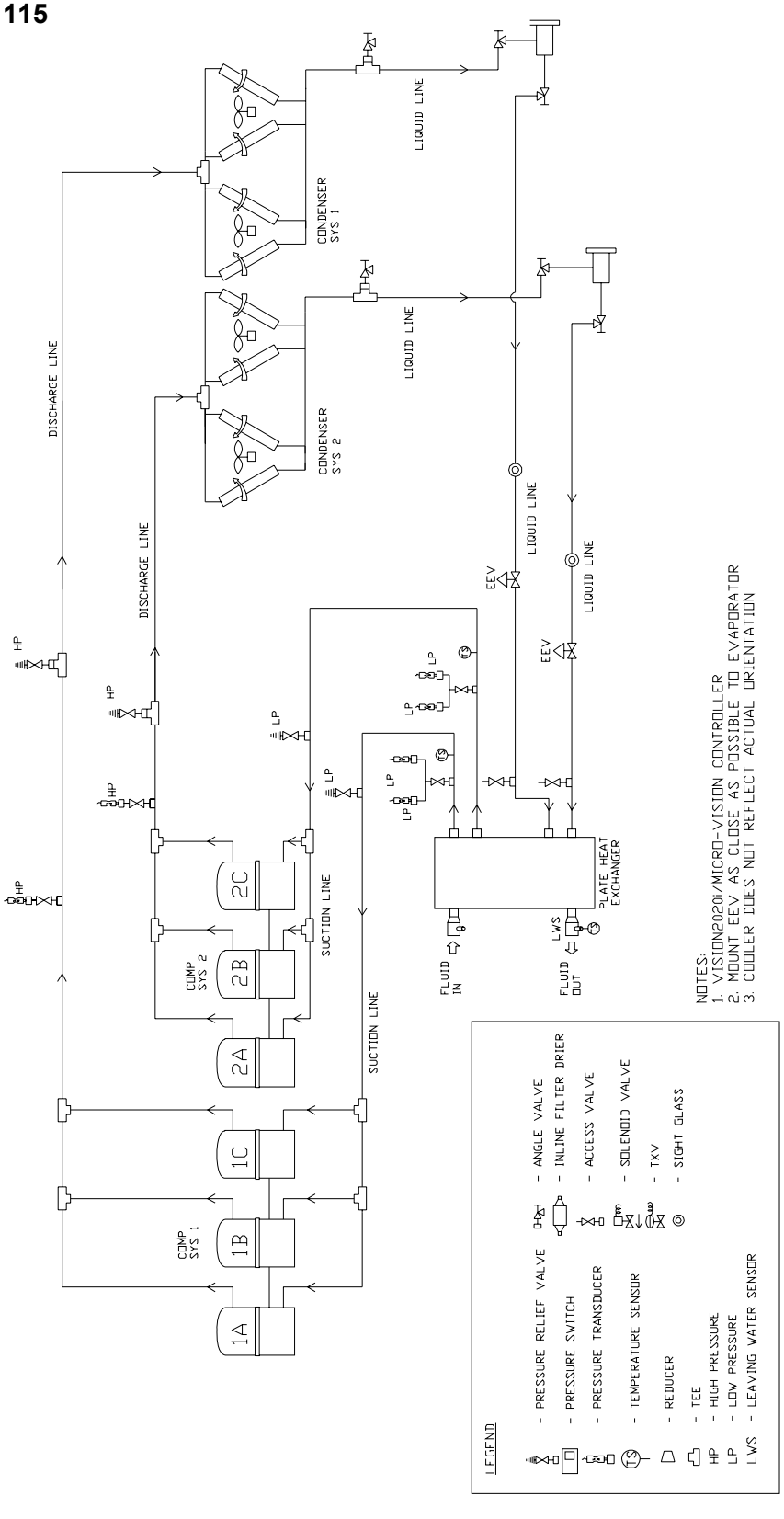
3. COOLER DOES NOT REFLECT ACTUAL ORIENTATION

3.0 OPERATION

50Hz

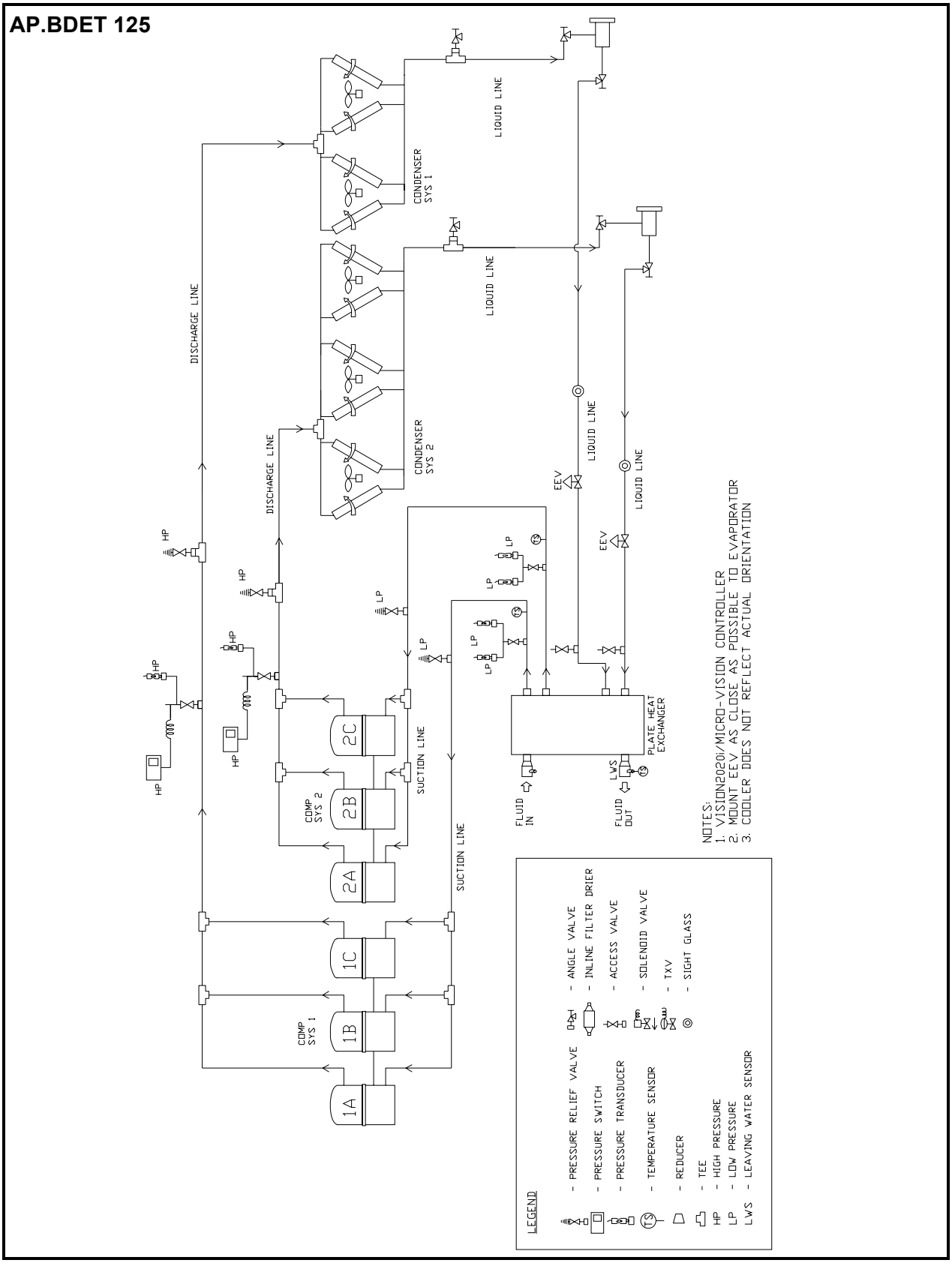
AP.BDET 105, 115



3.0 OPERATION

50Hz

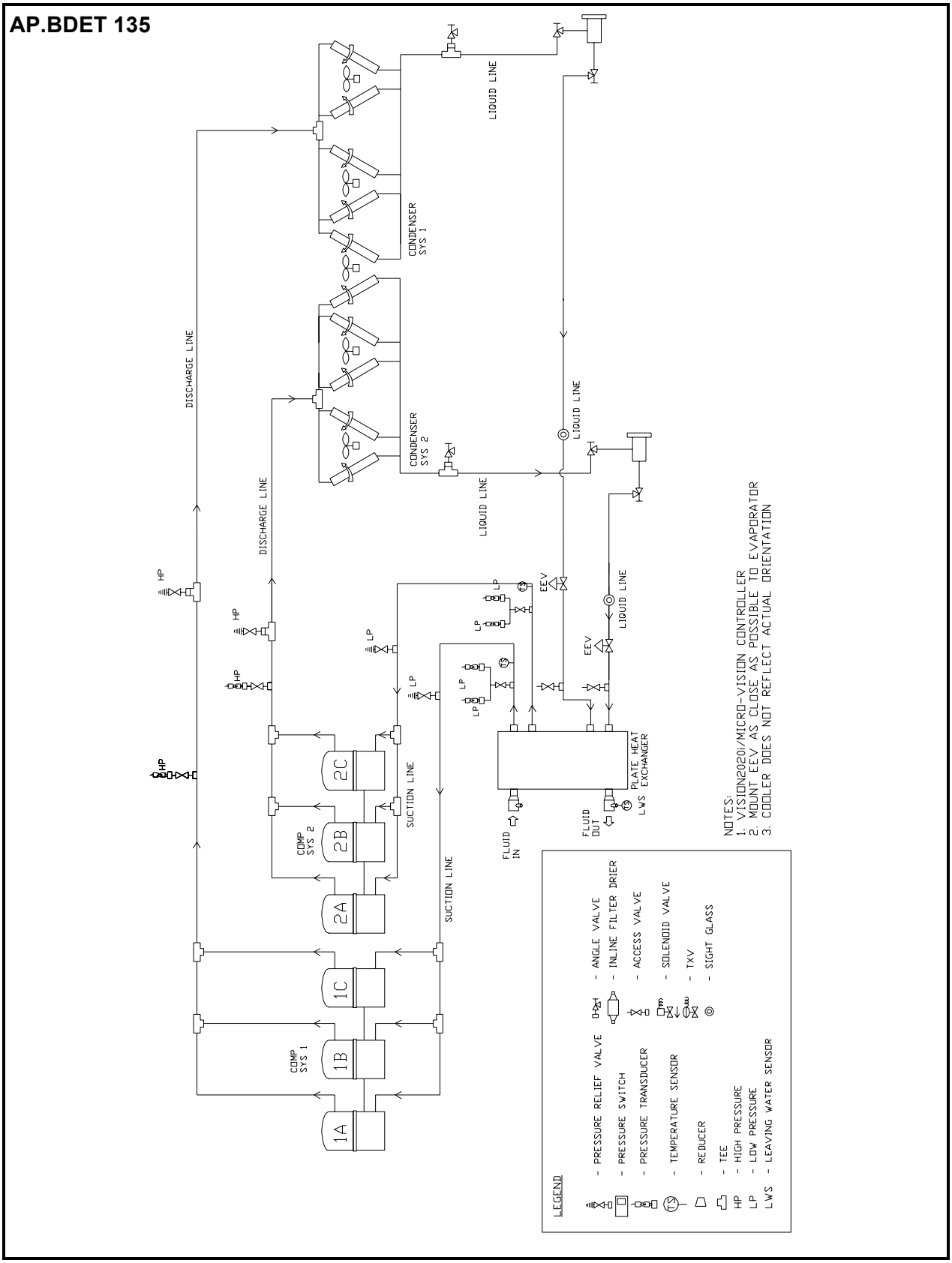
AP.BDET 125



3.0 OPERATION

50Hz

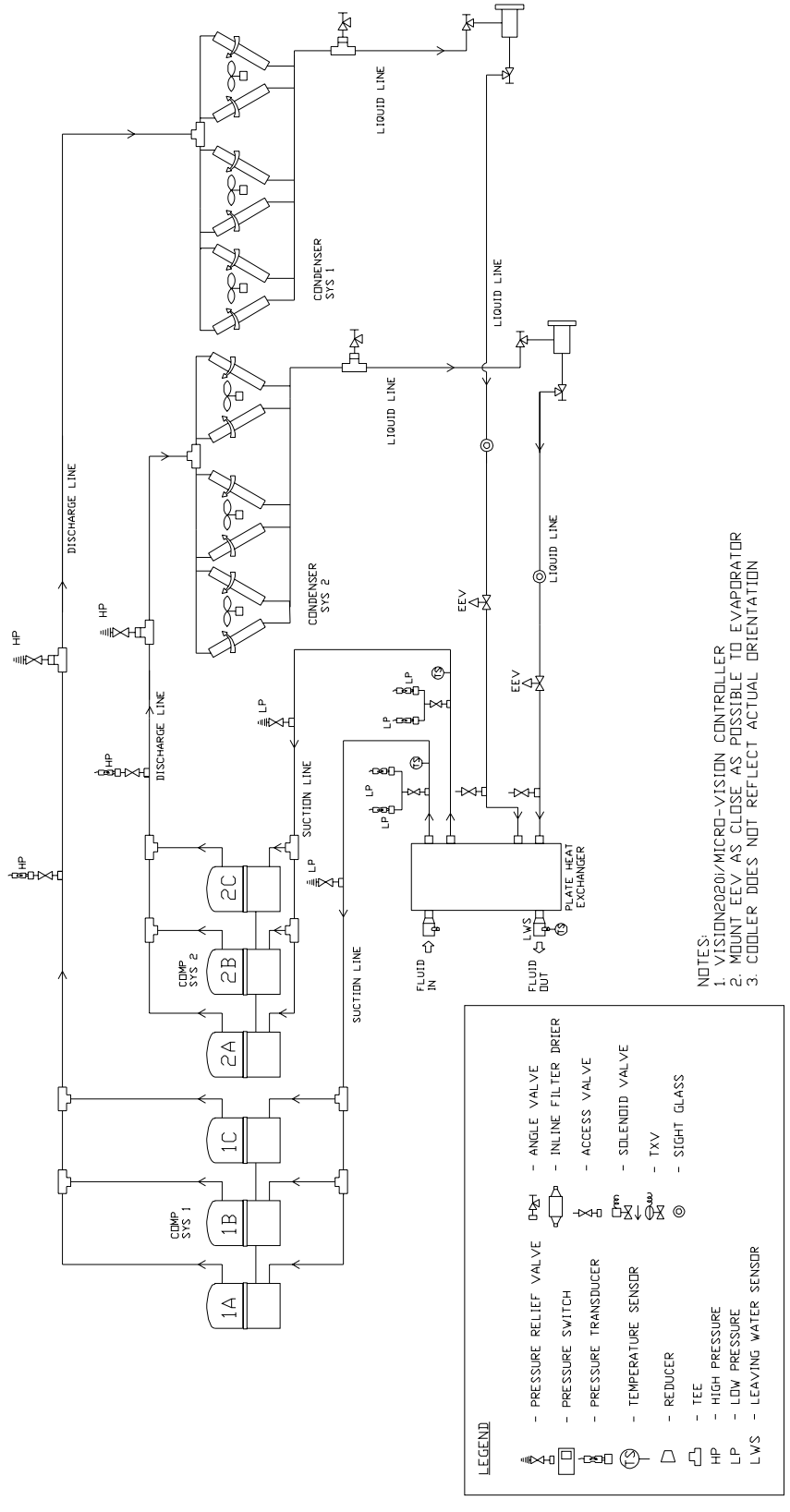
AP.BDET 135



3.0 OPERATION

50Hz

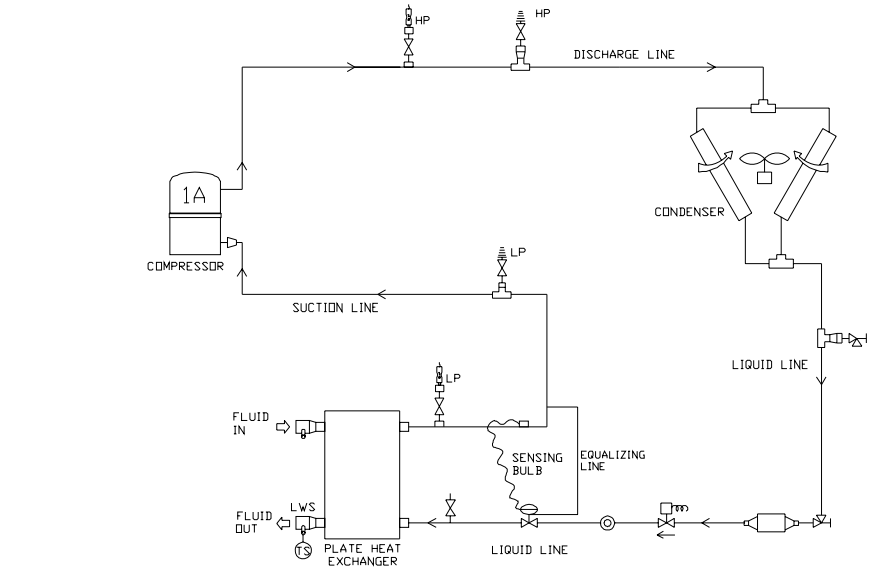
AP.BDET 175



3.0 OPERATION

60Hz (Micro Vision)

AP.BDET 010

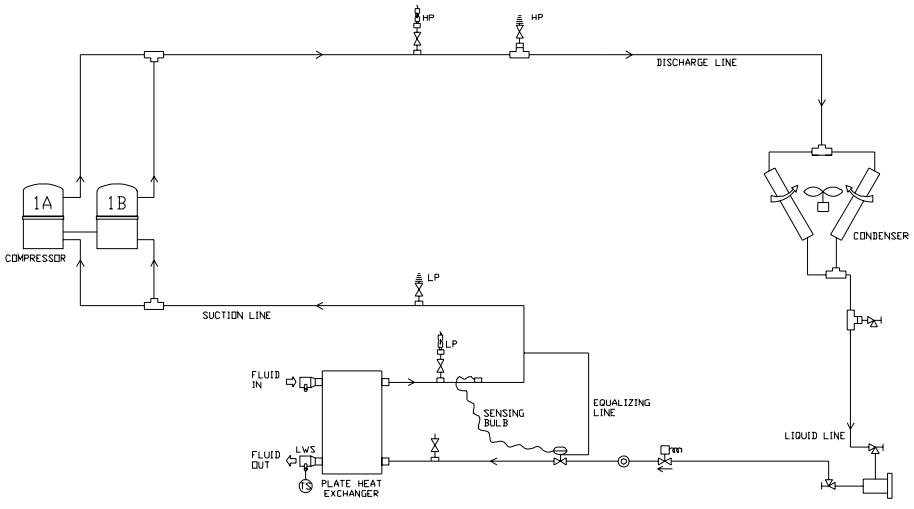


NOTES:
1. VISION 2020i/MICRO-VISION CONTROLLER
2. MOUNT TXV AS CLOSE AS POSSIBLE TO EVAPORATOR
3. COOLER DOES NOT REFLECT ACTUAL ORIENTATION

LEGEND
- ANGLE VALVE
- INLINE FILTER DRIER
- BALL VALVE W/ACCESS VALVE
- ACCESS VALVE
- SOLENOID VALVE
- TXV
- SIGHT GLASS
- PRESSURE RELIEF VALVE
- PRESSURE SWITCH
- PRESSURE TRANSDUCER
- TEMPERATURE SENSOR
- REDUCER
- TEE

HP - HIGH PRESSURE
LP - LOW PRESSURE
LWS - LEAVING WATER SENSOR

AP.BDET 020, 030



NOTES:
1. VISION 2020i/MICRO-VISION CONTROLLER
2. MOUNT TXV AS CLOSE AS POSSIBLE TO EVAPORATOR
3. COOLER DOES NOT REFLECT ACTUAL ORIENTATION

LEGEND
- ANGLE VALVE
- INLINE FILTER DRIER
- BALL VALVE W/ACCESS VALVE
- ACCESS VALVE
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- TEMPERATURE SENSOR
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HP - HIGH PRESSURE
LP - LOW PRESSURE
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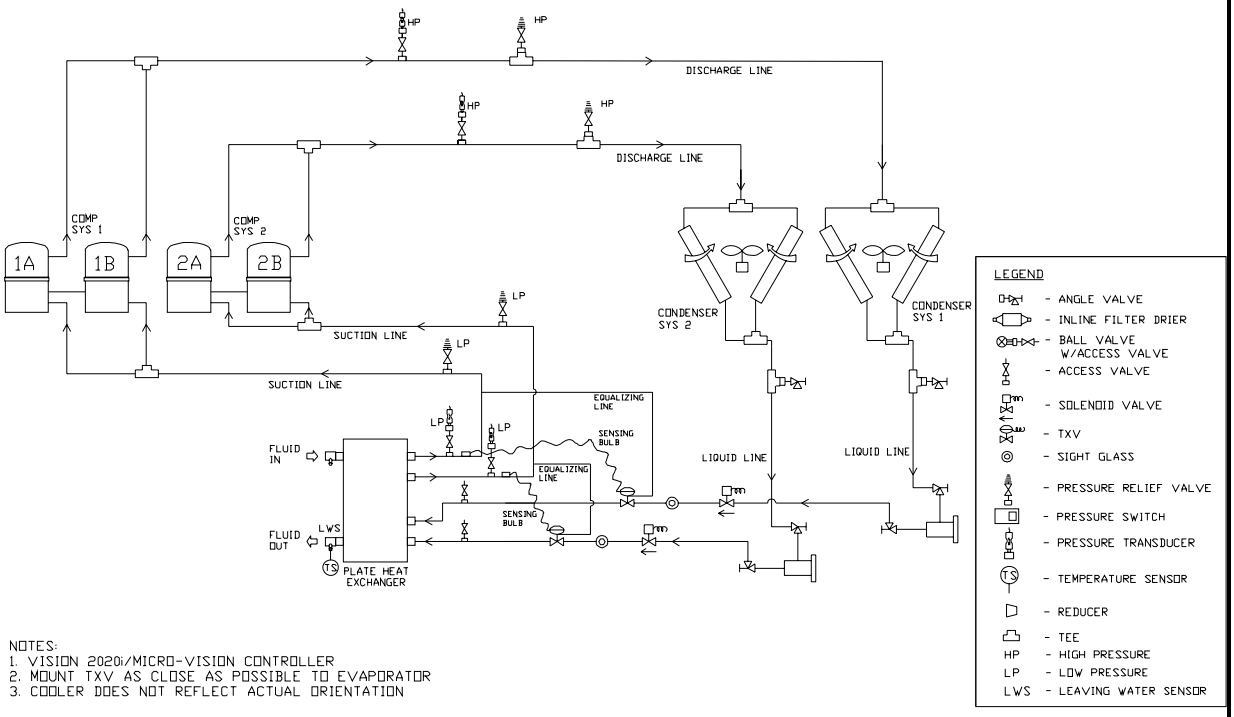
3.0 OPERATION

60Hz (Micro Vision)

AP.BDET 040, 050, 060, 070, 080, 090



NOTES:
1. VISION 2020i/MICRO-VISION CONTROLLER
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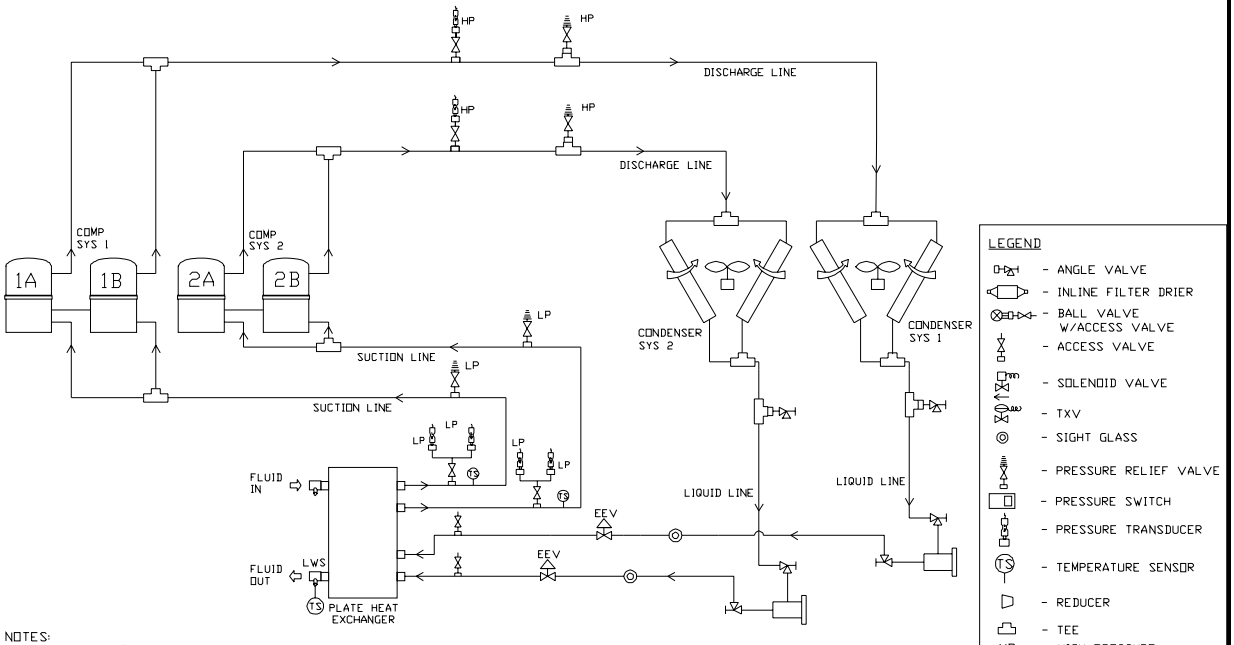
3. COOLER DOES NOT REFLECT ACTUAL ORIENTATION

AP.BDET 100, 120

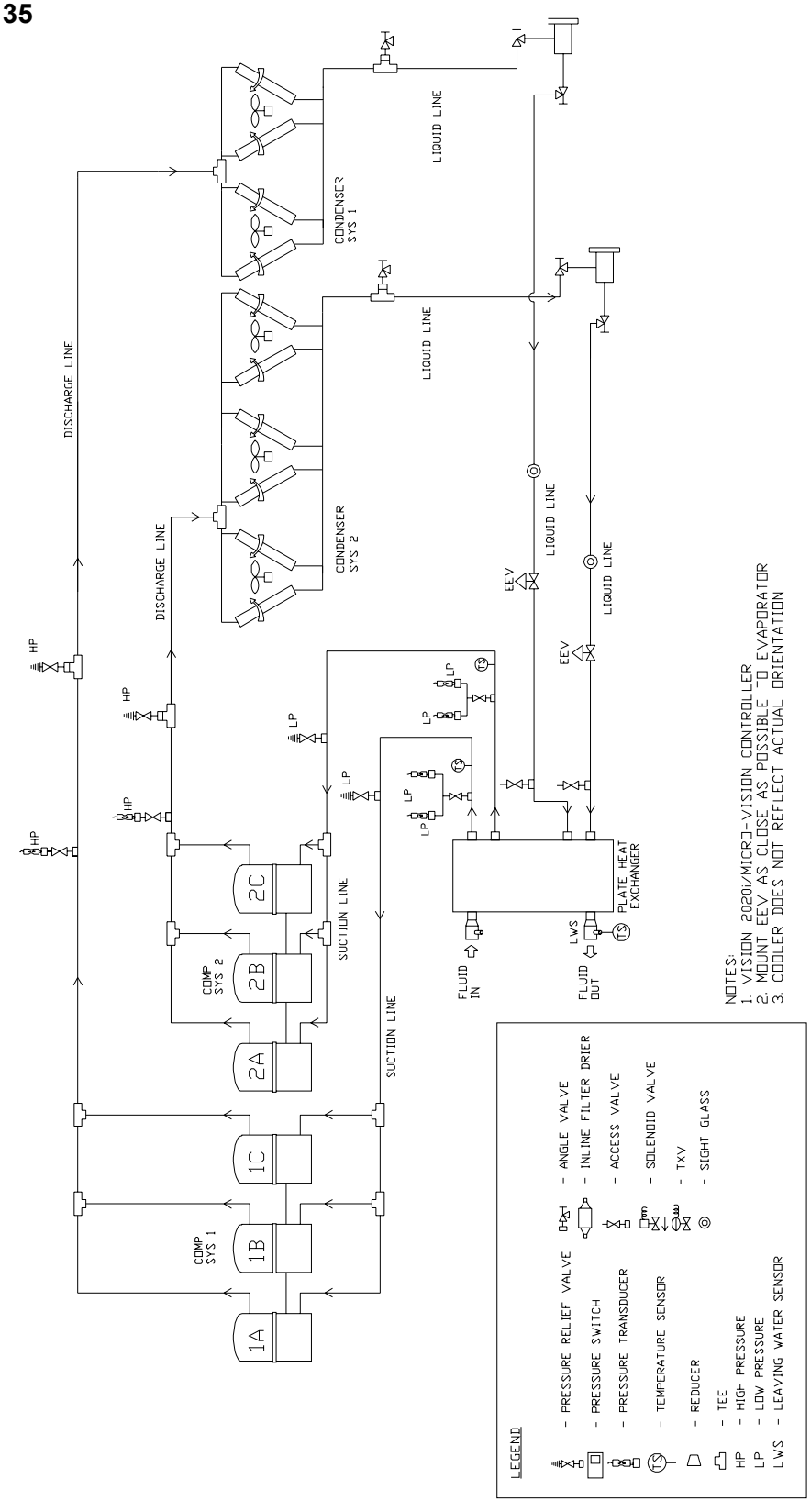


NOTES:
1. VISION 2020i/MICRO-VISION CONTROLLER
2. MOUNT EEV AS CLOSE AS POSSIBLE TO EVAPORATOR
3. COOLER DOES NOT REFLECT ACTUAL ORIENTATION

3.0 OPERATION

60Hz (Micro Vision)

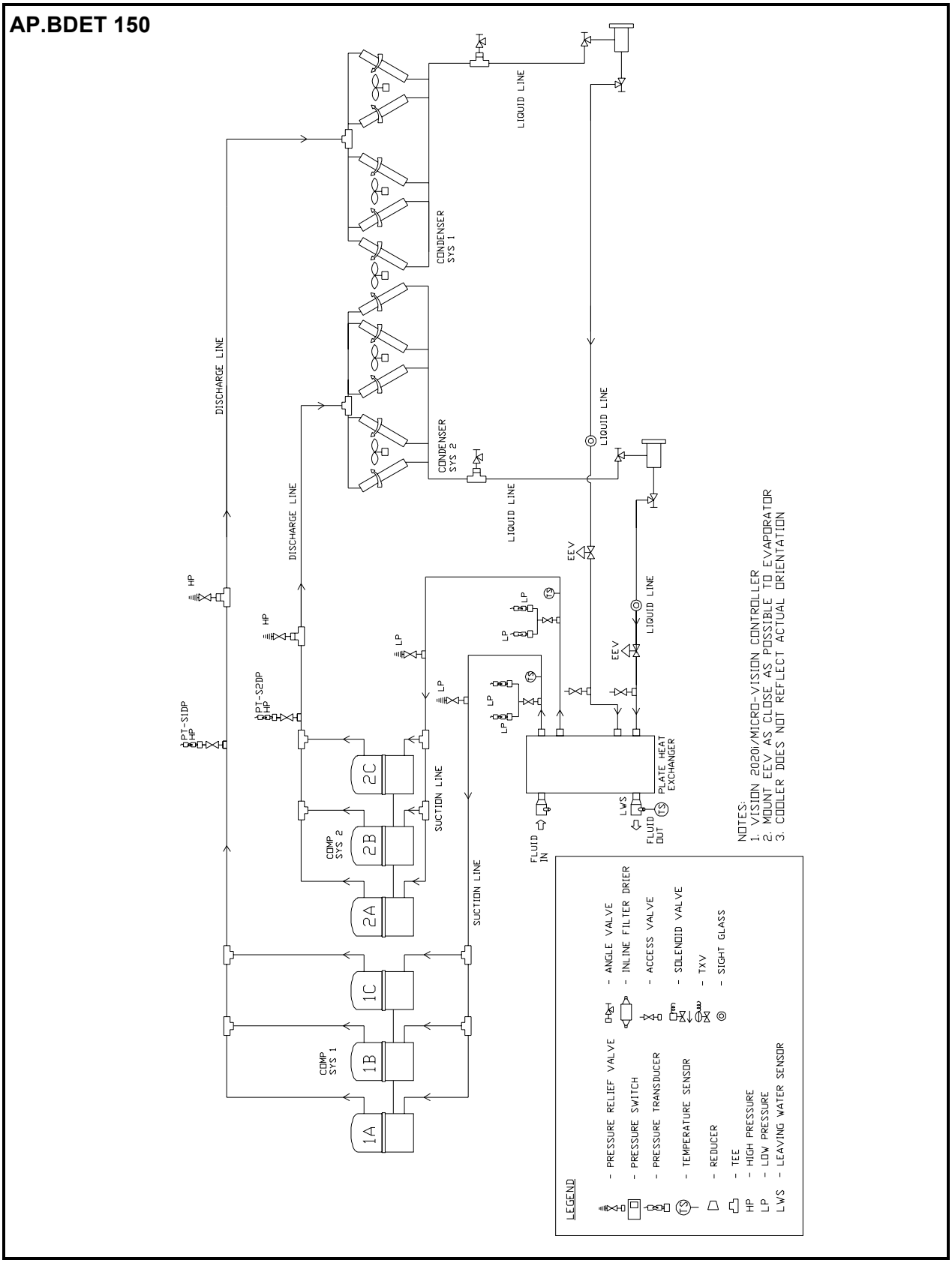
AP.BDET 135



3.0 OPERATION

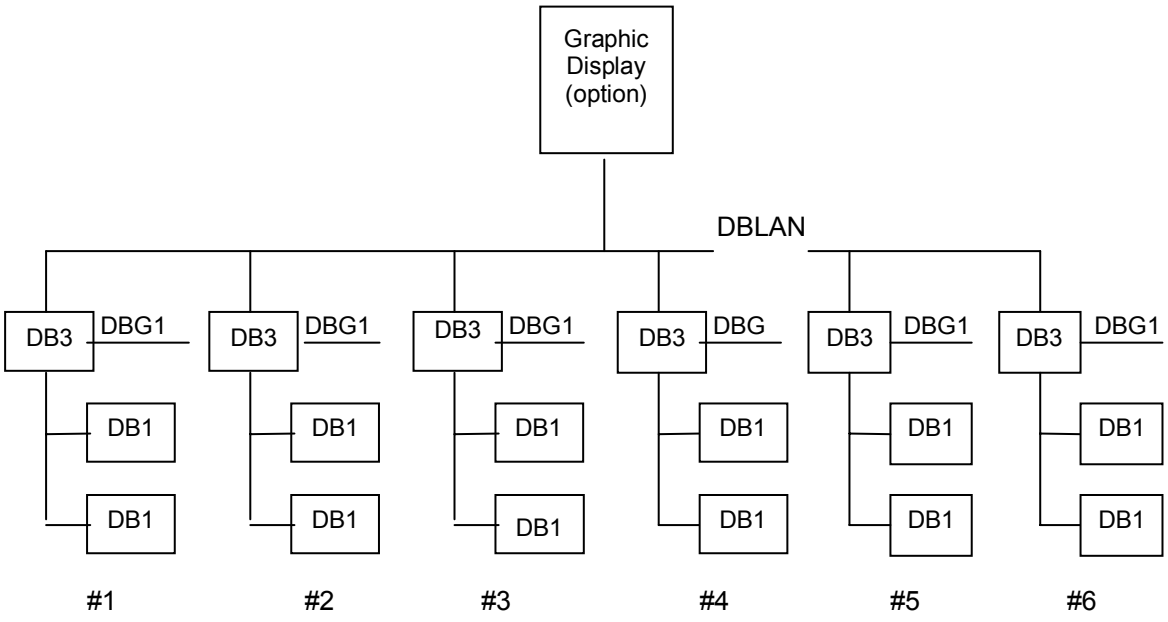
60Hz (Micro Vision)

AP.BDET 150



4.5.2 PRINCIPLE OF OPERATION VIA DBLAN COMMUNICATION BUS

Example: 6 chillers network with 4 units on duty and 2 units standby



Notes

a) Each chiller has a stand-alone master DB3 board and dedicated graphic display with multiple DB1 expanders board connected to J23 on DB3

b) Each chiller DB3 will be connected to DBLAN network through J11 connector

c) The chiller lead/lag selection can be determined by
- Manual lead/lag setpoint
- Schedule and holiday setup
- Alarm conditions

d) The lead/lag selection determine the chiller operation sequence as follows,

Lead chiller selection	Normal chillers operation sequence	When DBLAN fails
1	1, 2 & 3 on duty, 4, 5 & 6 standby	1, 2 & 3 on duty
2	2, 3 & 4 on duty, 5, 6 & 1 standby	2, 3 & 4 on duty
3	3, 4 & 5 on duty, 6, 1 & 2 standby	3, 4 & 5 on duty
4	4, 5 & 6 on duty, 1, 2 & 3 standby	4, 5 & 6 on duty
5	5, 6 & 1 on duty, 2, 3 & 4 standby	5, 6 & 1 on duty
6	6, 1 & 2 on duty, 3, 4 & 5 standby	6, 1 & 2 on duty

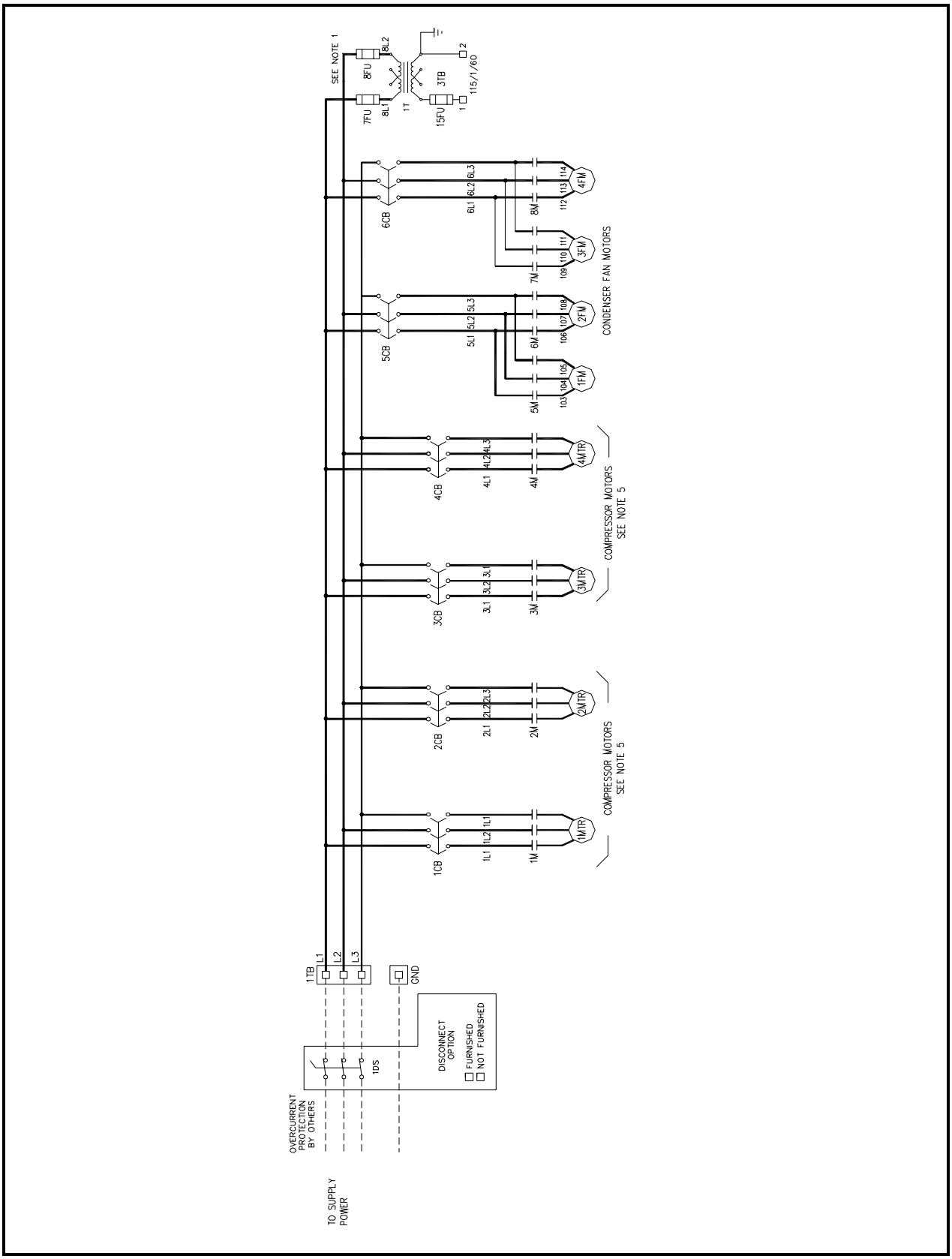
e) If the lead/lag selection is changed over to a different chiller, the sequence of operation will be rotated

f) Each chiller will use a network address setpoint to determine individual chiller network address

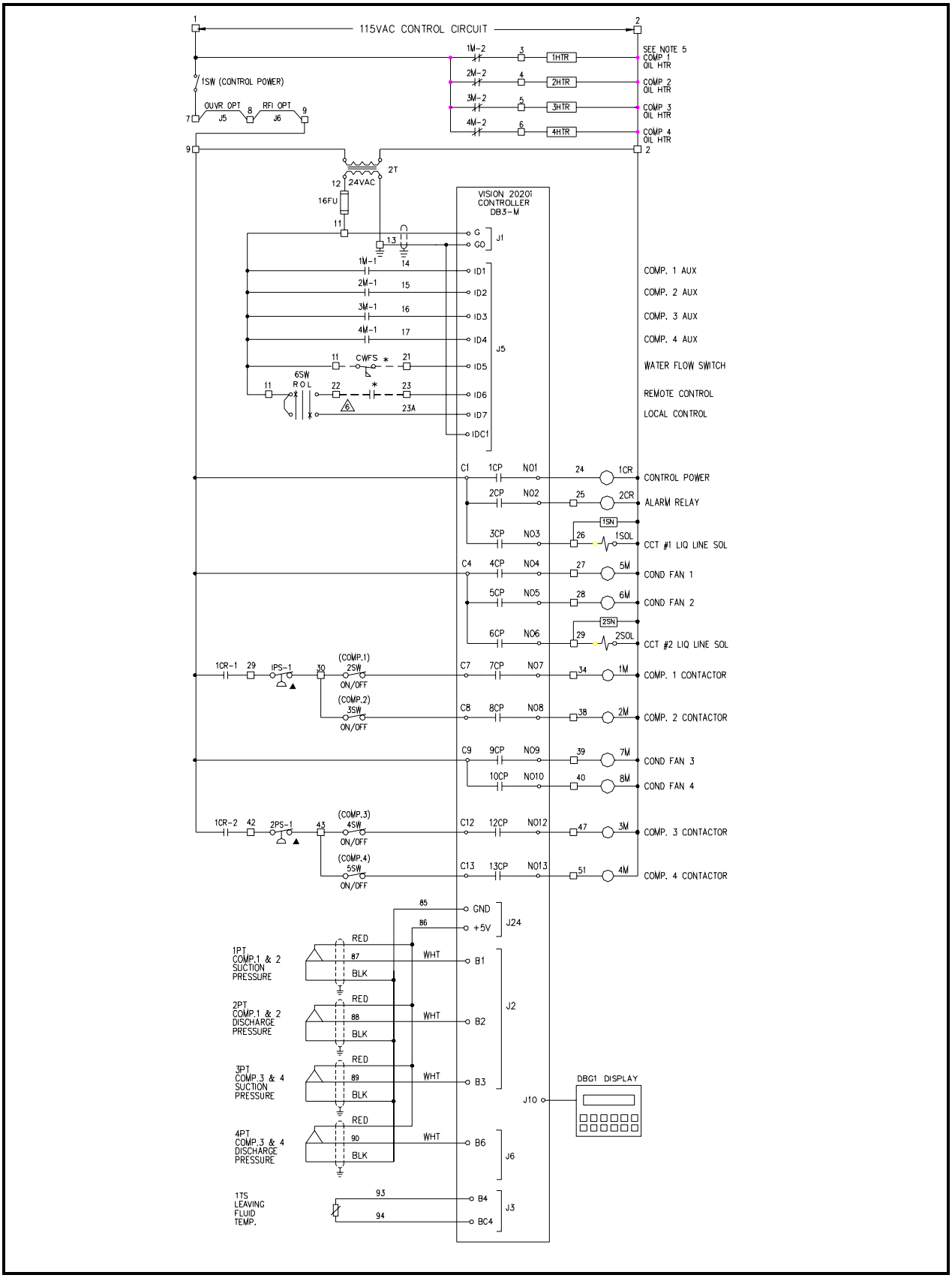
g) Each chiller will require a dedicated chilled water pump or motorized valve digital output, unit enable and chilled flow status digital inputs as well as enable next output command.

4.0 ELECTRICAL

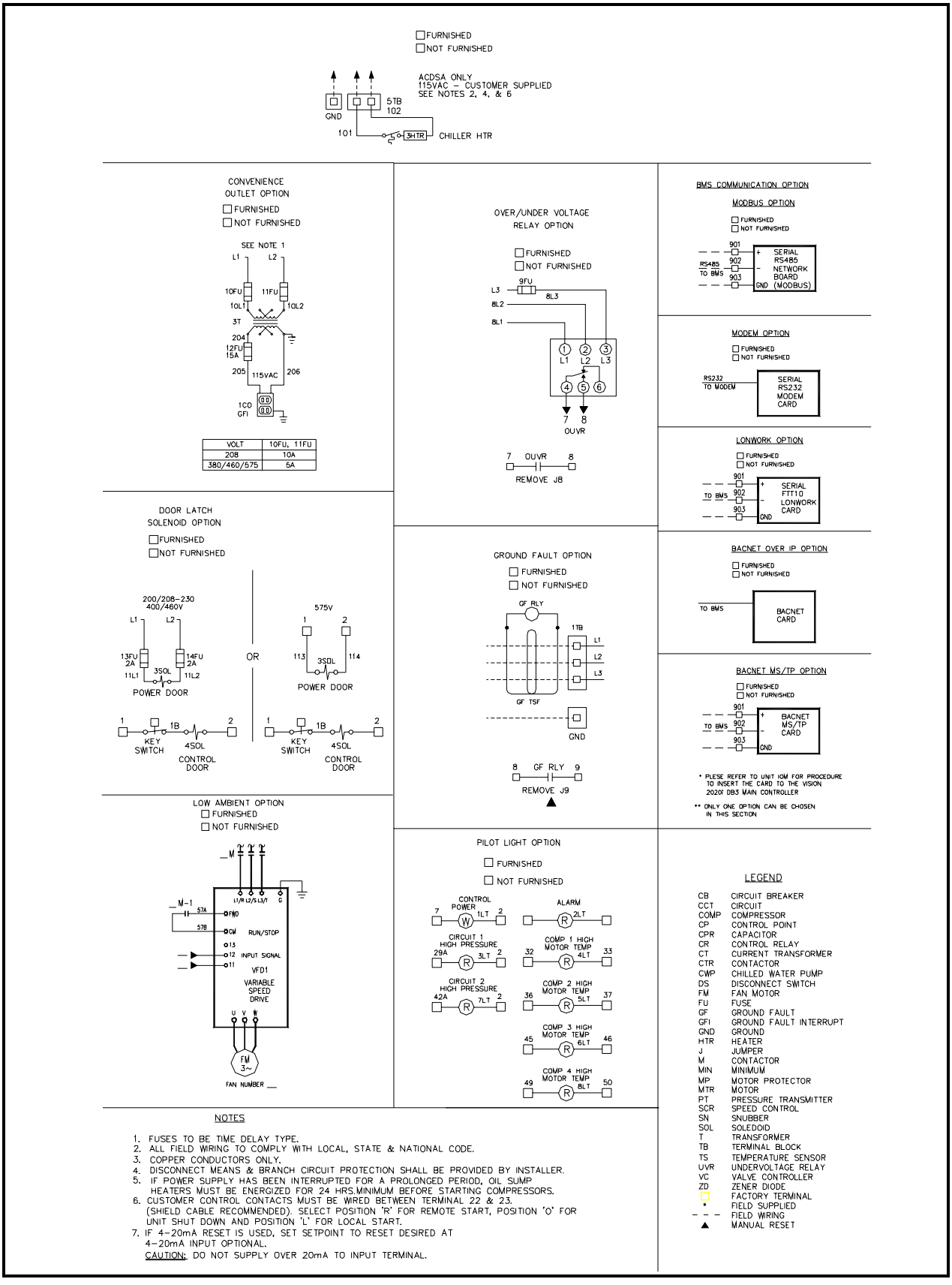
4.6 TYPICAL WIRING SCHEMATIC (50Hz)



4.0 ELECTRICAL



4.0 ELECTRICAL



5.0 MAINTENANCE

5.1 GENERAL

As with all mechanical equipment, a program of regular inspection, cleaning and preventive maintenance by trained personnel will contribute greatly to the long satisfactory service life of this product.

5.2 PERIODIC INSPECTION

Read essential temperatures and pressures periodically to see that they indicate normal operation. It is a good idea to record these readings on a log sheet. If any abnormal operation is observed, try to remedy it. See Trouble Shooting Guide Section.

5.3 MONTHLY INSPECTION

Remove dirt and debris from condenser coil. Shut unit down, open main disconnect, inspect control panel, checking for loose wires, burned contacts, signs of overheated wires, etc. Restart unit and check performance of controls. Check sight glasses for proper refrigerant charge.

5.4 PHE MAINTENANCE

5.4.1 GENERAL

The efficient performance of the evaporator and condenser heat transfer surfaces is essential for efficient performance of your packaged water cooling machine. If these surfaces a ccumulate a film of dirt, scale or slime, their performance efficiency will degrade substantially. The refrigerant side of heat transfer surfaces does not foul since refrigerant is a good solvent and it is in a closed, filtered cycle. Water side surfaces can foul from the water system. A program of water treatment can slow the rate of fouling on heat transfer surfaces, but not eliminate it.

5.4.1.1 Freezing Protection For BPHE

a.) Use a filter < 1mm, 16 mesh (see previous chapter on BPHE maintenance)

b.) Use an anti-freeze when the evaporation temperature is close to liquid-side freezing

c.) Use a freeze protec tion thermostat and flow switch to guarantee a constant water flow before, during and after compressor operation.

d.) Avoid "pump-down" function

e.) When starting up a system, wait a moment before starting the condenser (or have reduced flow through it)

5.4.2 EVAPORATO R CLEANING

5.4.2.1. Cleaning BPHE

Normally very high degree of turbulence in BPHE there is a self-cleaning effect in the channels.

However, in some applications the fouling tendency can be very high.

In such cases, it is always possible to clean the exchanger by circulating a cleaning liquid (CIP-Cleaning In Place).

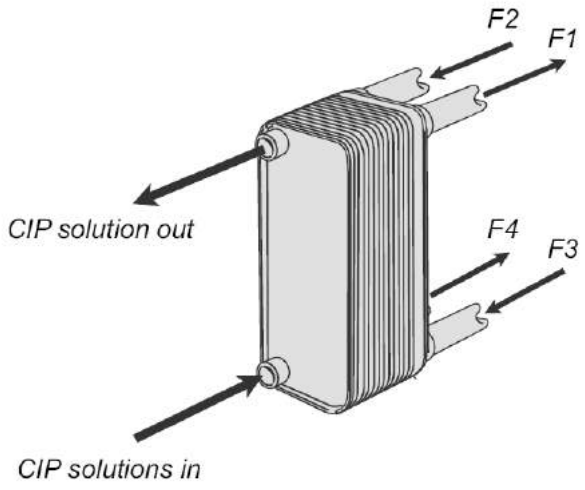
Use a tank with weak acid or, if the exchanger is frequently cleaned, 5% oxalic acid.

Pump the cleaning through the exchanger.

For optimum cleaning, the cleaning solution flow rate should be a minimum of 1.5 times the normal flow rate, preferably in a back-flush mode.

After use, do not forget to rinse the heat exchanger carefully with clean water.

A solution of 1-2% sodium hydroxide (NaOH) or sodium bicarbonate ($NaHCO_2$) before the last rinse ensure that all acid is neutralized. Clean at regular intervals.

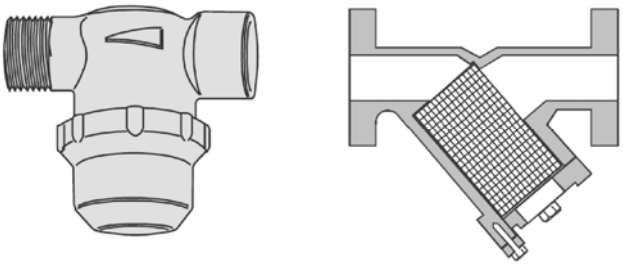


5.0 MAINTENANCE

5.4.2.2. Strainers

If any of the media contains particle larger 1mm (0.04 inches), we recommend that a strainer with a size of 16-20 mesh (number of openings pe inches) is installed before the exchanger.

The particles could otherwise block the channels, causing bad performance, increased pressure drop and risk of freezing.



5.5 AIR COOLED CONDENSER CLEANING

The face of the condenser should be cleaned at least once month during operation. If conditions are bad and condensers pick up dirt very quickly, it is suggested that they can be cleaned more frequently.

If the condenser is allowed to get too dirty , the unit will run at high head pressure and will not give satisfactory performance.

Dirty coils can be cleaned using a soft brush or by flushing with cool water or commercially available coil cleaners.

DO NOT USE HOT WATER OR STEAM. To do so will cause excessive pressure in the system. The face of the condenser should be cleaned at the beginning of the season and periodically thereafter if conditions require.

5.6 ELECTRICAL MALFUNCTION

The unit has four devices designed to protect compressor motors and manual motor controllers from electrical malfunctions: Circuit breakers. starter overload relays, under voltage relay (optional), and motor over temperature protectors.

If the under voltage relay trips, it is a sign of trouble in incoming power. If it trips again after resetting, call your electric utility to investigate the problem. If circuit breaker or motor overload relay or motor over temperature protectors trip, this is a sign of possible motor trouble. DO NOT reset and try to run compressor again. Call authorized service representative to check for motor trouble. Resetting these safety devices and repeated starting could turn a minor motor problem into a costly major motor burnout.

5.7 REFRIGERANT CHARGE

5.7.1 GENERAL

All packaged chiller units are given a complete charge of refrigerant at the factory. The type and amount of refrigerant required is in Physical Specifications. The total refrigerant shown is for the entire system. Since these units have separate circuits, each circuit should be considered separately for charging.

In order to check proper refrigerant charge, look in each liquid line sight glass with the aid of a flashlight during system operation. At all operating conditions, the sight glass should be clear. If bubbles are visible at any operating condition, the circuit is short of charge.

Be careful not to overcharge the machine. overcharging will result in considerable liquid logging in the condenser, and excessive condensing pressure.

To add refrigerant, connect a refrigerant vessel to the 1/4" [6.4mm] back seating port of the suction valve. Purge the air from the tube with refrigerant gas before connecting. With the unit running, open the refrigerant vessel vapor connection slightly. If the refrigerant vessel is warmer than the evaporator, refrigerant will more readily flow from the vessel into the unit.

5.7.2 AIR COOLED PACKAGES

To determine the proper refrigerant charge, check the amount of subcooling if possible. The amount of subcooling at the liquid line (liquid line saturation temperature corresponding to liquid line pressure minus liquid line temperature) should be between 15°F [8.3°C] and 20°F [11.1°C]. Subcooling at the condenser out-subcooler inlet trap should not exceed 5°F [2.8°C]. This sight glass should be clear with no bubbles.

TABLE 5.4 R410A PRESSURE/ TEMPERATURE PROPERTIES

Pressure		Temperature		Pressure		Temperature		Pressure		Temperature		Pressure		Temperature	
psig	kPa	°F	°C	psig	kPa	°F	°C	psig	kPa	°F	°C	psig	kPa	°F	°C
10.8	74.5	-40.0	-40.0	62.2	428.9	10.0	-12.2	169.6	1169.4	60.0	15.6	364.1	2510.4	110.0	43.3
11.5	79.3	-39.0	-39.4	63.7	439.2	11.0	-11.7	172.5	1189.4	61.0	16.1	369.1	2544.9	111.0	43.9
12.1	83.4	-38.0	-38.9	65.2	449.5	12.0	-11.1	175.4	1209.3	62.0	16.7	374.2	2580.0	112.0	44.4
12.8	88.3	-37.0	-38.3	66.8	460.6	13.0	-10.6	178.4	1230.0	63.0	17.2	379.4	2615.9	113.0	45.0
13.5	93.1	-36.0	-37.8	68.3	470.9	14.0	-10.0	181.5	1251.4	64.0	17.8	384.6	2651.7	114.0	45.6
14.2	97.9	-35.0	-37.2	69.9	481.9	15.0	-9.4	184.5	1272.1	65.0	18.3	389.9	2688.3	115.0	46.1
14.9	102.7	-34.0	-36.7	71.5	493.0	16.0	-8.9	187.6	1293.5	66.0	18.9	395.2	2724.8	116.0	46.7
15.6	107.6	-33.0	-36.1	73.2	504.7	17.0	-8.3	190.7	1314.8	67.0	19.4	400.5	2761.4	117.0	47.2
16.3	112.4	-32.0	-35.6	74.9	516.4	18.0	-7.8	193.9	1336.9	68.0	20.0	405.9	2798.6	118.0	47.8
17.1	117.9	-31.0	-35.0	76.6	528.1	19.0	-7.2	197.1	1359.0	69.0	20.6	411.4	2836.5	119.0	48.3
17.8	122.7	-30.0	-34.4	78.3	539.9	20.0	-6.7	200.4	1381.7	70.0	21.1	416.9	2874.4	120.0	48.9
18.6	128.2	-29.0	-33.9	80.0	551.6	21.0	-6.1	203.6	1403.8	71.0	21.7	422.5	2913.1	121.0	49.4
19.4	133.8	-28.0	-33.3	81.8	564.0	22.0	-5.6	207.0	1427.2	72.0	22.2	428.2	2952.4	122.0	50.0
20.2	139.3	-27.0	-32.8	83.6	576.4	23.0	-5.0	210.3	1450.0	73.0	22.8	433.9	2991.7	123.0	50.6
21.1	145.5	-26.0	-32.2	85.4	588.8	24.0	-4.4	213.7	1473.4	74.0	23.3	439.6	3031.0	124.0	51.1
21.9	151.0	-25.0	-31.7	87.2	601.2	25.0	-3.9	217.1	1496.9	75.0	23.9	445.4	3070.9	125.0	51.7
22.7	156.5	-24.0	-31.1	89.1	614.3	26.0	-3.3	220.6	1521.0	76.0	24.4	451.3	3111.6	126.0	52.2
23.6	162.7	-23.0	-30.6	91.0	627.4	27.0	-2.8	224.1	1545.1	77.0	25.0	457.3	3153.0	127.0	52.8
24.5	168.9	-22.0	-30.0	92.9	640.5	28.0	-2.2	227.7	1569.9	78.0	25.6	463.2	3193.7	128.0	53.3
25.4	175.1	-21.0	-29.4	94.9	654.3	29.0	-1.7	231.3	1594.8	79.0	26.1	469.3	3235.7	129.0	53.9
26.3	181.3	-20.0	-28.9	96.8	667.4	30.0	-1.1	234.9	1619.6	80.0	26.7	475.4	3277.8	130.0	54.4
27.2	187.5	-19.0	-28.3	98.8	681.2	31.0	-0.6	238.6	1645.1	81.0	27.2	481.6	3320.5	131.0	55.0
28.2	194.4	-18.0	-27.8	100.9	695.7	32.0	0.0	242.3	1670.6	82.0	27.8	487.8	3363.3	132.0	55.6
29.2	201.3	-17.0	-27.2	102.9	709.5	33.0	0.6	246.0	1696.1	83.0	28.3	494.1	3406.7	133.0	56.1
30.1	207.5	-16.0	-26.7	105.0	724.0	34.0	1.1	249.8	1722.3	84.0	28.9	500.5	3450.8	134.0	56.7
31.1	214.4	-15.0	-26.1	107.1	738.4	35.0	1.7	253.7	1749.2	85.0	29.4	506.9	3495.0	135.0	57.2
32.2	222.0	-14.0	-25.6	109.2	752.9	36.0	2.2	257.5	1775.4	86.0	30.0	513.4	3539.8	136.0	57.8
33.2	228.9	-13.0	-25.0	111.4	768.1	37.0	2.8	261.4	1802.3	87.0	30.6	520.0	3585.3	137.0	58.3
34.2	235.8	-12.0	-24.4	113.6	783.2	38.0	3.3	265.4	1829.9	88.0	31.1	526.6	3630.8	138.0	58.9
35.3	243.4	-11.0	-23.9	115.8	798.4	39.0	3.9	269.4	1857.5	89.0	31.7	533.3	3677.0	139.0	59.4
36.4	251.0	-10.0	-23.3	118.1	814.3	40.0	4.4	273.5	1885.7	90.0	32.2	540.1	3723.9	140.0	60.0
37.5	258.6	-9.0	-22.8	120.3	829.4	41.0	5.0	277.6	1914.0	91.0	32.8	547.0	3771.5	141.0	60.6
38.6	266.1	-8.0	-22.2	122.7	846.0	42.0	5.6	281.7	1942.3	92.0	33.3	553.9	3819.0	142.0	61.1
39.8	274.4	-7.0	-21.7	125.0	861.9	43.0	6.1	285.9	1971.2	93.0	33.9	560.9	3867.3	143.0	61.7
40.9	282.0	-6.0	-21.1	127.4	878.4	44.0	6.7	290.1	2000.2	94.0	34.4	567.9	3915.6	144.0	62.2
42.1	290.3	-5.0	-20.6	129.8	894.9	45.0	7.2	294.4	2029.8	95.0	35.0	575.1	3965.2	145.0	62.8
43.3	298.5	-4.0	-20.0	132.2	911.5	46.0	7.8	298.7	2059.5	96.0	35.6	582.3	4014.8	146.0	63.3
44.5	306.8	-3.0	-19.4	134.7	928.7	47.0	8.3	303.0	2089.1	97.0	36.1	589.6	4065.2	147.0	63.9
45.7	315.1	-2.0	-18.9	137.2	946.0	48.0	8.9	307.5	2120.2	98.0	36.7	596.9	4115.5	148.0	64.4
47.0	324.1	-1.0	-18.3	139.7	963.2	49.0	9.4	311.9	2150.5	99.0	37.2	604.4	4167.2	149.0	65.0
48.3	333.0	0.0	-17.8	142.2	980.4	50.0	10.0	316.4	2181.5	100.0	37.8	611.9	4218.9	150.0	65.6
49.6	342.0	1.0	-17.2	144.8	998.4	51.0	10.6	321.0	2213.2	101.0	38.3	-	-	-	-
50.9	350.9	2.0	-16.7	147.4	1016.3	52.0	11.1	325.6	2244.9	102.0	38.9	-	-	-	-
52.2	359.9	3.0	-16.1	150.1	1034.9	53.0	11.7	330.2	2276.7	103.0	39.4	-	-	-	-
53.6	369.6	4.0	-15.6	152.8	1053.5	54.0	12.2	334.9	2309.1	104.0	40.0	-	-	-	-
55.0	379.2	5.0	-15.0	155.5	1072.1	55.0	12.8	339.6	2341.5	105.0	40.6	-	-	-	-
56.3	388.2	6.0	-14.4	158.2	1090.8	56.0	13.3	344.4	2374.6	106.0	41.1	-	-	-	-
57.8	398.5	7.0	-13.9	161.0	1110.1	57.0	13.9	349.3	2408.4	107.0	41.7	-	-	-	-
59.2	408.2	8.0	-13.3	163.8	1129.4	58.0	14.4	354.2	2442.1	108.0	42.2	-	-	-	-
60.7	418.5	9.0	-12.8	166.7	1149.4	59.0	15.0	359.1	2475.9	109.0	42.8	-	-	-	-

5.0 MAINTENANCE

5.8 TROUBLE SHOOTING

SYMPTOM	POSSIBLE CAUSE	REMEDY
1. Unit will not start	1. Power off 2. Main line open 3. Incorrect wiring 4. Loose terminals 5. Control circuit open	1. Check main disconnect switch. 2. Check main fuses. 3. Check with wiring diagrams. 4. Tighten terminals. 5. Check pump fuses, starter heater elements, pressure and temperature controls.
2. Compressor hums but does not start	1. Low voltage 2. No power on one phase of 3 phase unit 3. Faulty starter or contactor	1. Check at main entrance and at unit. Consult power company if voltage is low and increase wire size to the unit if voltage is normal at main and low at unit. Voltage must be within 10% of motor nameplate rating. 2. Check fuses and wiring. 3. Check the contacts and time delay on part wind start.
3. Compressor cycles on low pressure control	1. Refrigerant shortage 2. No load on chiller 3. Restriction in liquid line	1. Check for leaks and add refrigerant. 2. Check pump operation and water flow. 3. a.) Plugged drier. If temperature drop exists across the drier remove and replace cores. b.) Liquid line or suction valve partially closed. Open valves fully and close in one full turn. c.) Expansion valve clogged or inoperative. Check superheat setting. Check charge and thermo bulb.
4. Compressor cycles on high pressure control	1. Compressor discharge valve partially closed. 2. Air in system 3. Overcharge of refrigerant 4. High pressure control improperly set 5. Main water valve closed 6. Water regulating valve set high or defective 7. Condenser fan inoperative 8. Dirty condenser 9. Fan cycle switches in-operative, or set too high 10. Fan motors not running 11. Fan motor reverse rotation	1. Open valve fully and close with one turn 2. Flush water valve. If pressure in system exceeds the pressure corresponding to the water temperature purge air from compressor gauge connection. 3. Purge system while in operation until bubbles show in sight glass. Close valve and add small amount of refrigerant until sight glass just clears. 4. Adjust the control. 5. Open the water valve. 6. Reset or replace valve. 7. Check, replace or repair set screw (pulley), fan motor, or inoperative fan control. 8. Clean condenser surfaces with brush and/or vacuum. 9. Check and readjust. 10. Check contactor, thermal overload relay, check motor, check capacitor. (If single phase) 11. Reverse two fan motor leads. (3 phase only)

5.0 MAINTENANCE

5.9 SAMPLE LOG SHEET

SHEET NO. .....

American Pro SCROLL COMPRESSOR PACKAGED CHILLER

NAMEPLATE DATA:

UNIT MODEL NO. ..... **UNIT NO**..... **VOLTS:** ..... **Hz** .....

UNIT SERIAL NO. ..... **COMPRESSOR MODEL NOS.**.....

START UP : **DATE**..... **TIME**.....

DATE									
TIME									
ELAPSED TIME METERS									
COMP. NO.									
SUCTION PRESSURE	1.								
	2.								
	3.								
	4.								
DISCHARGE PRESSURE	1.								
	2.								
	3.								
	4.								
DISCHARGE TEMPERATURE	1.								
	2.								
	3.								
	4.								
DISCHARGE SUPERHEAT (DISC. TEMP.-SAT. DISCH.)*	1.								
	2.								
	3.								
	4.								
SUCTION SUPERHEAT (SUCT. TEMP.-SAT. SUCT.)*	1.								
	2.								
	3.								
	4.								
EVAPORATOR WATER TEMPERATURE-IN									
EVAPORATOR WATER TEMPERATURE-OUT									
EVAPORATOR PRESSURE DROP ftwg[kPa]									
EVAPORATOR WATER FLOW USgpm [m³/hr]									
CONDENSER AIR TEMPERATURE-IN (AMBIENT) AC ONLY									
ACTUAL VOLTAGE COMPRESSOR AMPS	1.								
	2.								
	3.								
	4.								
FAN AMPS									
VOLTS									

*USE TABLE 5.4 FOR OBTAINING SATURATED TEMPERATURE

THIS LOG SHEET IS PROVIDED AS A RECOMMENDATION OF THE READINGS THAT SHOULD BE TAKEN ON A PERIODIC BASIS. THE ACTUAL READINGS TAKEN AND THE FREQUENCY WILL DEPEND UPON THE UNITS APPLICATION, HOURS OF USE, ETC. THIS TYPE OF INFORMATION CAN PROVE VERY USEFUL IN PREVENTING AND/ OR SOLVING PROBLEMS THAT MIGHT OCCUR DURING THE LIFE OF THE UNIT.