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# Temperature Corporation

PORTABLE CHILLER ACP & WCP SERIES  
OPERATION AND INSTALLATION MANUAL

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# PORTABLE CHILLER

## ACP & WCP SERIES

### Operation and Instruction Manual

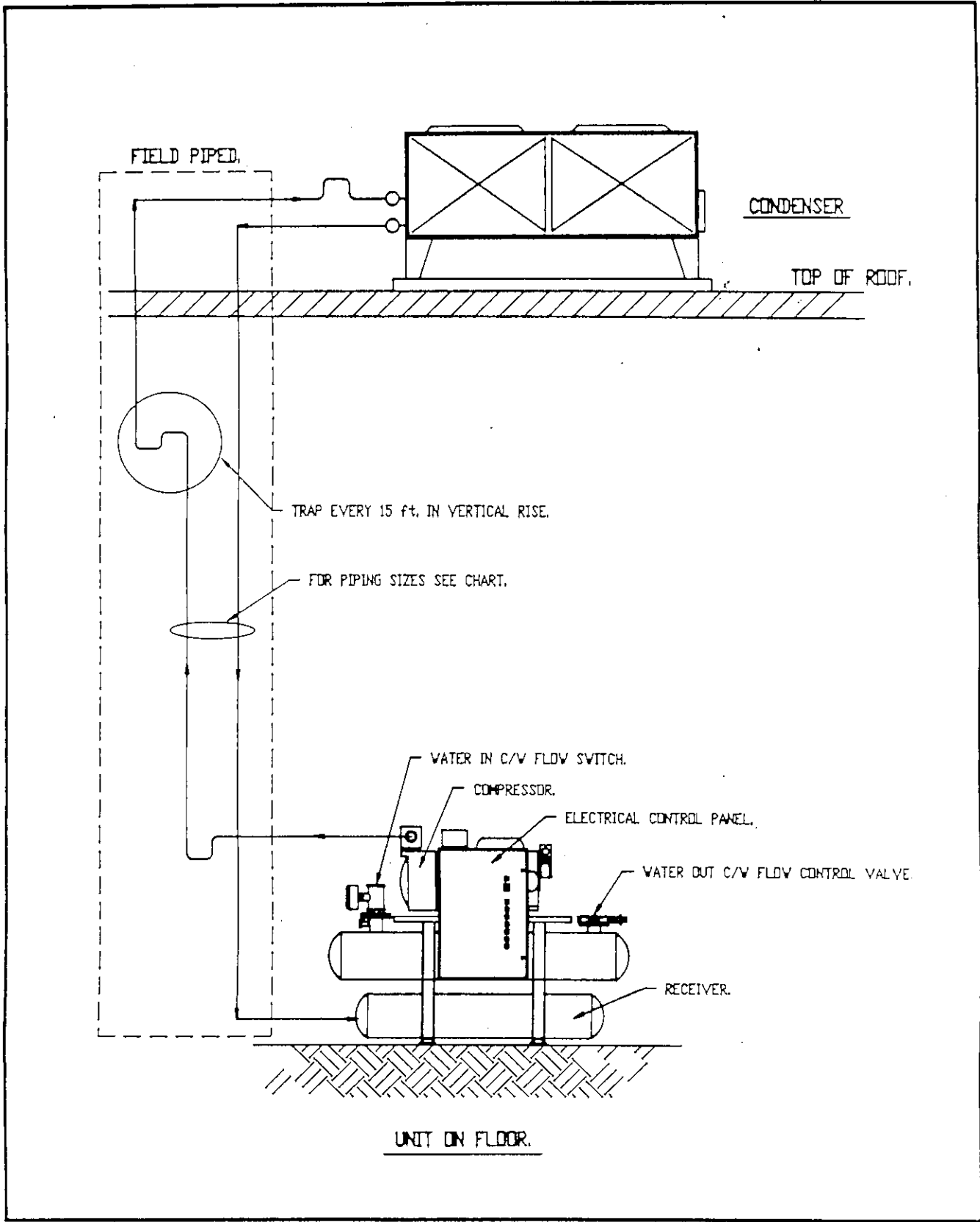
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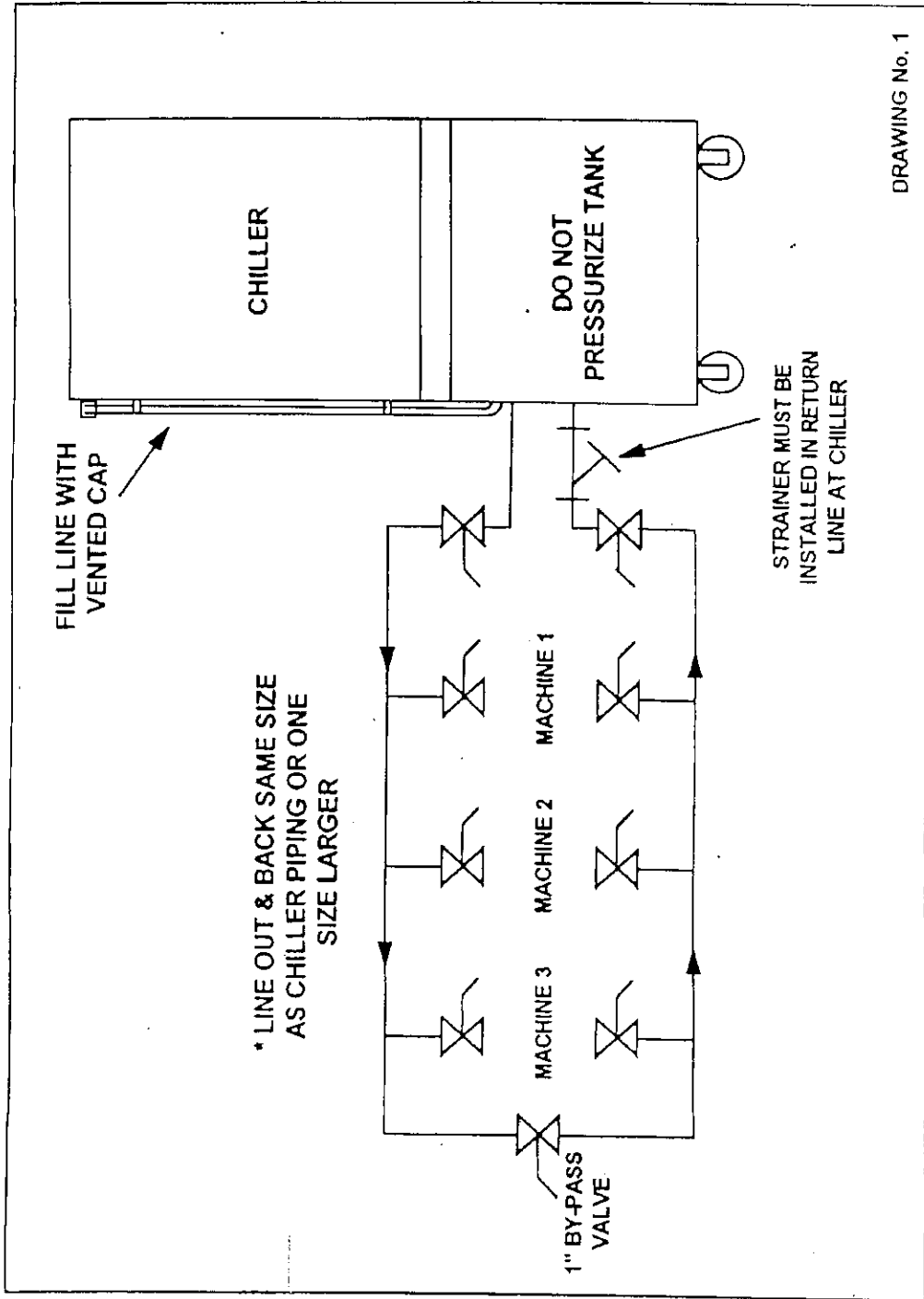
CUSTOMER NAME: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

MODEL NUMBER: \_\_\_\_\_ DATE OF SHIPMENT: \_\_\_\_/\_\_\_\_/\_\_\_\_



RECOMMENDED FOR MULTI-MACHINE CONNECTIONS



DRAWING No. 1

\* LINE OUT & BACK SAME SIZE AS CHILLER PIPING OR ONE SIZE LARGER

STRAINER MUST BE INSTALLED IN RETURN LINE AT CHILLER

1.0.0      **INTRODUCTION**

Your **PORTABLE CHILLING SYSTEM** has been carefully assembled and engineered to give trouble free service with a minimum of maintenance.

Your unit is self-protecting by a series of safety controls integrated in the control system. These have been timely set to obtain both adequate protection and optimum efficiency from your unit.

Water temperature is controlled by adjusting the thermostat. Since this is sensing from the chiller vessel inlets it should be set approximately **10° F. above desired leaving water temperature.** However, **ON NO ACCOUNT** must the leaving water temperature be **LOWER THAN 40° F.** unless a glycol solution is used and adjustments are made to the controls by a qualified refrigeration serviceman.

Other than the thermostat, adjustment of controls and valves by unqualified personnel is done at a very severe risk of permanent damage to the unit, loss of efficiency and **BROKEN WARRANTY AGREEMENT.**

Before you start to install your unit, we urge you to carefully read through and digest this literature to familiarize yourself with its contents.

**TO PREVENT PERSONAL INJURY AND/OR DAMAGE TO THE EQUIPMENT, THIS MANUAL SHOULD BE USED FOR REFERENCE ONLY. ANY SERVICE SHOULD BE PERFORMED BY LICENSED SERVICE PERSONNEL QUALIFIED IN THEIR RESPECTIVE FIELDS.**

**2.0.0 UN-CRATING AND CHECKING UNIT FOR DAMAGE**

2.1.0 Remove packaging material and examine unit for shipping damages. The **CONSIGNEE** is responsible for making claims to the transportation agent and any damage should be reported immediately.

2.2.0 Units can be rolled into Position. However, if it is necessary to lift the unit, this should be done by the bottom frame only.  
If you must use lifting cables or chains, be careful not to damage components, controls or pipes.

**3.0.0 LOCATING YOUR UNIT**

3.1.0 It is recommended that the unit be as close as possible to the process machinery.

3.2.0 The unit must be located inside a building that is heated during the winter months (minimum room temperature 50° F.).

3.3.0 Unit should be located on a flat level floor.

3.4.0 Since the unit is portable, clearance for service is not critical as the unit can be rolled away from obstructions for access to panels.

3.5.0 During operation, the air cooled unit must have adequate clearance around the condenser inlet for air movement and condenser outlet for hot air discharge.

**4.0.0 INSTALLATION**

4.1.0 You have now determined the desired location of the unit. The chiller comes with casters and can be rolled into position. If it is necessary to lift the unit this should be done by the bottom frame only. If you must use lifting cables or chains, be careful not to damage components, controls or pipes.

4.2.0 Check to ensure that power supply agrees with nameplate. Supply voltage must be within plus or minus 10 percent.

4.3.0 Power should be supplied through a fused disconnect.

4.4.0 Check power source for voltage unbalance.

5.0.0 FILL TANK

5.1.0 **DO NOT** connect city water supply line directly to reservoir, it has not been designed to withstand pressure. Reservoir is vented to atmosphere, do not change or obstruct vent line during installation. On systems with process piping above reservoir, a stand pipe should be installed on vent line and fill line to a level above the highest point in the system.

5.2.0 A plastic liquid level gauge has been installed on the tank to view water level.

6.0.0 PROCESS CONNECTIONS

6.1.0 ALL units are equipped with two chilled water connections.

- (A) Water to process (from evaporator coils)
- (B) Water from process ( to reservoir)

It is important that all external connections be full size to minimize pressure losses.

6.2.0 If the unit is not supplied with shut-off valves, these should be supplied by the customer.

6.3.0 To operate efficiently, the chiller vessel must be kept clean. It is strongly recommended that *ethylene glycol* be included in the chilled water system to prevent rusting and freezing of chiller vessel. Failure through a plugged or contaminated chiller vessel is not covered by our warranty.

6.4.0 Condenser piping (water cooled units.)

The condenser is supplied with one water-in connection and one water-out connection. Piping into the condenser must be minimum connection size and pressure at the condenser a minimum of 40 PSIG.

Piping from condenser must be minimum connection size up to 100 ft. run. If run exceeds 100 ft. contact Temperature Corporation or your local representative.

If main water lines to and from the condenser are used to feed other equipment it is advisable to install shut-off valves at both water in and out lines, adjacent to the condenser, so the condenser can be isolated for service purposes if required without cutting off water supply to other equipment.

- 6.4.2 To operate efficiently the condenser must be kept clean. It is strongly recommended that water treatment additives to control calcium and magnesium scale, algae and fungi, together with regulated bleed-off, be included in the condenser (cooling tower) water system. The additives should also contain chemical corrosion inhibitors. Unit failure through plugged or contaminated condensers is not covered by our warranty.
- 6.5.0 Condenser water piping.  
see drawing # 3
- 7.0.0 **PRE-START-UP**
- 7.1.0 **DO NOT** switch unit on. Make a complete visual check of unit for possible damage sustained during installation.
- 7.2.0 **WITH POWER OFF** Check all terminal screws in control panel, making sure they are tight.
- 7.3.0 Fill reservoir through fill pipe. Replace cap after filling.
- 7.4.0 A minimum of six (6) hours before start-up and with chiller switch in "off" position, turn on the supply disconnect. This allows the compressor crankcase heater to evaporate the refrigerant in the crankcase oil.
- 7.5.0 A process heat load must be available to the chiller for start-up.
- 8.0.0 **START-UP SEQUENCE ACP SERIES CHILLERS**
- 8.1.0 Mains power (3 phase to unit) must be on 6 hours before the chiller has to run. The chiller on/off switch is to be left in the off position. This allows the compressor crankcase heater to boil off any liquid refrigerant in the oil preventing damage to the compressor.
- 8.2.0 Filling the tank: **DO NOT CONNECT CITY WATER LINE or HOSE DIRECTLY TO THE TANK.** Our tank is vented to the atmosphere and is not designed to withstand any water pressure. Pressurizing the tank is dangerous and will damage tank.
- 8.2.1 Fill the tank with a hose until the water level can be seen in the clear plastic fill tube. Shut off the water supply and start the pump (see item 8.3.0 for correct pump rotation). As the water is circulated and fills the process equipment the water level will fall. Keep topping up the tank until the water level is constant.



8.2.2 It is also recommended that a water/glycol mix be used even if you are operating the chiller at 50° F. (10° C). At 50° F. leaving water temperature a 20% to 25% solution can be used.

8.3.3 This will protect the chiller vessel in event the unit is operated below 32° F. and will also prevent scaling in water channels and steel pipes.

8.3.0 Check rotation of the chiller pump, there is an arrow on the pump for correct rotation. This must be set correctly.

8.4.0 Set temperature on controller to process temperature desired. DO NOT SET BELOW 55°F. WITHOUT A WATER/GLYCOL SOLUTION. Entering process water temperature is sensed, not leaving water temperature.

8.5.0 To operate with a water/glycol solution see the chart in service manual for the proper mixture at a desired process temperature. Glycol percentage is determined by subtracting 15° F. (8.3° C.) from the desired operating temperature.

IE: If 30° F. process water is required the water/glycol percentage is based on 15 F process water temperature.

8.5.1

CHILLER OPERATING TEMPS.	MINIMUM % ETHYLENE GLYCOL
40 ° F	15%
35 ° F	20%
30 ° F	25%
25 ° F	30%

Type of GLYCOL recommended is an industrial grade inhibited ethylene glycol with an anti-foam agent.

8.6.0 **DO NOT RESTRICT THE CHILLED WATER FLOW**, if the chiller connection is 1" and your process is ½" a by-pass line must be installed. The by-pass should be sized to ensure that the combined size of the process pipe and by-pass add up to the same diameter as the chiller line out.

8.6.1 The by-pass should be connected from the process line out back to the return line to the tank, and a valve should be installed to properly adjust the by-pass flow.

8.6.2 If the by-pass is not installed the flow of water through the chiller vessel is reduced and can freeze causing sever damage to the chiller vessel and voiding warranty.

- 8.6.3 If you are installing a line out to the plant and connecting to multiple machines it is recommended that the bypass be installed at the furthest point from the chiller. **See drawing No.1.**
- 8.7.0 Check the level of the fluid in the holding tank after chiller has been operating a few minutes, the level will fall due to filling of the process equipment, lines and as air is vented through the tank fill. Top up as needed.
- 8.8.0 Recommended settings switches and differentials for Honeywell two (2) switch temperature controller used on single compressor chiller units. Models ACP-3, 5, 7.5, 10 and 15.
- |  |          |
|--|----------|
| Cut in compressor (set point & switch 1) | - 50° F. |
| Differential (switch 1)                  | - 5° F.  |
| Hot-gas (switch 2)                       | - 55° F. |
| Differential (switch 2)                  | - 2° F.  |
- 8.9.0 Recommended settings switches and differentials for Honeywell four (4) switch temperature controller used on dual compressor chiller units. Models ACP-10D, 15D and 20D.
- |  |          |
|--|----------|
| Cut in compressor 1 (set point & switch 1) | - 53° F. |
| Differential (switch 1)                    | - 2° F.  |
| Hot-gas compressor 1 (switch 2)            | - 55° F. |
| Differential (switch 2)                    | - 1° F.  |
| Cut in compressor 2 (switch 3)             | - 56° F. |
| Differential (switch 3)                    | - 2° F.  |
| Hot-gas compressor 2 (switch 4)            | - 58° F. |
| Differential (switch 4)                    | - 1° F.  |
- 8.9.1 When set point is adjusted (moving switch 1 only) all other switch settings and differentials follow the new set point without adjusting them.

9.0.0 TROUBLE SHOOTING CHART

**NOTE:** All repairs to the unit should be done by qualified service personnel. (IE. for refrigeration, a licensed refrigeration mechanic, for electrical, a licensed electrician etc.). For mechanical repairs please call our main company telephone number which is monitored 24 hours, seven days a week.

Safety controls are set for water Operation (45° F. L.W.T.). For lower operating temperatures glycol must be used and controls must be reset by qualified personnel.

9.1.0 SYMPTOM 1: UNIT WILL NOT START

CAUSE		REMEDY	
9.1.1	Power off.	1.	Check main disconnect.
9.1.2.	Main line open.	2.	Check fuses.
9.1.3	Loose terminals.	3.	Tighten terminals with "POWER OFF"
9.1.4.	Water Flow light not on.	4.	See Section 9.7.1,2,4.
		5.	Failed flow switch. Have switch checked, repair or replace if defective.
9.1.5	Control circuit open.	6.	Check control voltage fuses and transformer.

9.2.0

**SYMPTOM 2: COMPRESSOR HUMS BUT DOES NOT START.**

CAUSE		REMEDY	
9.2.1	Contactors.	1.	Check contacts and contactor operation.
9.2.2	Low voltage.	2.	Check voltage at main and at the unit. If voltage is okay at the main but voltage is low at the unit increase the wire size. If low at main, consult Power Co. Voltage must be +/- 10% nameplate rating.
9.2.3.	No power on one phase of a three phase unit.	3.	Check fuses in control panel and main disconnect. Also check wiring.
		4.	Check main plant fuse and wiring.
		5.	If problem is with the main power supply coming into the plant, call local power company.
9.2.4	Loose terminals.	6.	Tighten terminals with "POWER OFF."

9.3.0

**SYMPTOM 3: (cont'd) SHUTS OFF ON HIGH PRESSURE CONTROL, AUTOMATICALLY RESETS WHEN DISCHARGE PRESSURE FALLS TO A "SAFE" LEVEL.**

~ CONTROL LOCATED INSIDE CHILLER UNIT.

**WATER COOLED CONDENSER**

CAUSE		REMEDY	
9.3.6	Water regulation valve.	1.	Adjust condenser water regulating valve to maintain 190 to 210 PSIG refrigerant head pressure. If valve is defective have valve repaired or replaced by a refrigeration serviceman.
9.3.7	Insufficient condenser water flow.	2.	Check condenser water pumping system.
9.3.8	Condenser water temperature too high.	3.	Check cooling tower for proper operation (i.e.; tower fans, fan belts and spray nozzles.
9.3.9	Condenser water tube scaled.	4.	Clean with brushes and chemicals approved by Budget Chillers.
9.3.10	Excess refrigerant.	5.	Have refrigeration serviceman purge system while operating until bubbles first appear in sight glass. Then have unit recharged until glass just clears.
9.3.11	Air in system.	6.	Have refrigeration serviceman purge the system.
9.3.12	Improperly set high pressure control.	7.	Have refrigeration serviceman reset or replace the control if defective.

9.3.0

**SYMPTOM 3: SHUTS OFF ON HIGH PRESSURE CONTROL, AUTOMATICALLY RESETS WHEN DISCHARGE PRESSURE FALLS TO A "SAFE" LEVEL.**  
 ~ CONTROL LOCATED INSIDE CHILLER UNIT.

**INDOOR AIR COOLED CONDENSER**

CAUSE		REMEDY	
9.3.1	Insufficient condenser air flow.	1.	Check condenser filter for dirt, fins may be plugged with dirt or foreign material.
		2.	Fan belts (if used) may be loose and need adjusting.
		3.	Check the rotation.
9.3.2	Fan motor not operating.	4.	Have electrician check fuses and wiring.
		5.	Have electrician check motor starter and overloads.
		6.	Have electrician check motor. Repair or replace if defective.
9.3.3	Excess refrigerant.	7.	Have refrigeration serviceman purge system while operating until bubbles first appear in sight glass. Then have unit recharged until glass just clears.
9.3.4	Air in system.	8.	Have refrigeration serviceman purge the system.
9.3.5	Improperly set high pressure control.	9.	Have refrigeration serviceman reset or replace the control if defective.

9.4.0

**SYMPTOM 4: COMPRESSOR CYCLES ON LOW PRESSURE CONTROL, AUTOMATICALLY RESETS WHEN SUCTION PRESSURE RISES TO A "SAFE" OPERATING LEVEL.**  
 ~ CONTROL LOCATED INSIDE CHILLER UNIT.

CAUSE		REMEDY	
9.4.1	Low refrigerant charge.	1.	Check for adequate refrigerant charge (bubbles or misty sight glass indicates low charge). If charge is low, have system checked for leaks and recharged by a refrigeration serviceman.
9.4.2	Improperly set low pressure control.	2	Have refrigeration serviceman reset control or replace if defective.
9.4.3	Restriction in liquid line.	3.	Clogged filter drier. Check for pressure or temperature drop and have drier core replaced by a refrigeration serviceman.
		4	Liquid line valve or suction valve on compressor is partially closed. Open fully.
		5.	Liquid line solenoid not opening fully or leaking during off cycle. Have repaired or replaced if defective by a refrigeration serviceman.
		6.	T.X. valve plugged or inoperative. Check thermal bulb and capillary tube for damage. Have repaired or replaced if defective by a refrigeration serviceman.
9.4.4	Head pressure too low. (Water cooled)	7.	Adjust condenser water regulating valve to maintain 190 to 210 PSIG refrigerant head pressure. Have refrigeration serviceman repair valve or replace if defective.
9.4.4a	Head pressure too low. (Air cooled)	8.	Check that entering air temperature is above 60° F. If below 60° F. find out reason why.

9.5.0

**SYMPTOM 5: COMPRESSOR SHUTS OFF ON INTERNAL OVERLOAD. CONTROL AUTOMATICALLY RESETS IN 2 MINUTES.**

<b>CAUSE</b>		<b>REMEDY</b>	
9.5.1	Control does not reset.	1.	Have compressor windings and internal solid state safety control checked by a refrigeration serviceman. Have it repaired or replace if defective.

9.6.0

**SYMPTOM 6: UNIT SHUTS OFF ON FREEZESTAT CONTROL. REQUIRES MANUAL RESET. (CUT OUT IS NORMALLY 42° F. FOR WATER OPERATION.)**

**~ INDICATED BY RED FREEZESTAT LIGHT "ON"**

<b>CAUSE</b>		<b>REMEDY</b>	
9.6.1	Low water flow.	1.	Check valves to ensure they are opened.
		2.	Check if pump is operating.
		3.	Check and clean filter in the chilled water circuit.
9.6.2	Chiller vessel plugged.	4.	Call a refrigeration serviceman to inspect the vessel for foreign material in the chiller inlet or scaling on the tubes.
9.6.3	Improperly set freezestat control.	5.	Have refrigeration serviceman reset control or replace if defective.



9.7.0

**SYMPTOM: 7. LOW OR NO PROCESS PRESSURE OR WATER FLOW INDICATED WHEN FLOW LIGHT IS "NOT" ILLUMINATED. CONTROL IS LOCATED ON LEG OF CHILLER.**


CAUSE		REMEDY	
9.7.1	No flow or pressure.	1.	Check if water valves are opened.
		2.	Check pump for correct rotation.
		3.	Check filter in the chilled water circuit and clean.
		4.	Check inlet to pump if plugged.
		5.	Check pressure switch (or flow switch) re-adjust or replace if defective.
		6.	Have electrician check fuses and wiring.
		7.	Have electrician check motor. Repair or replace if defective.

9.8.0

**SYMPTOM: 8. COOLING CAPACITY INADEQUATE.**

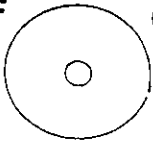
CAUSE		REMEDY	
9.8.1	Low refrigerant charge.	1.	See section 9.4.1.
9.8.2	Hot-gas by-pass valve stuck open.	2.	Have repaired or replaced if defective by a refrigeration serviceman.
9.8.3	Plugged or inoperative T.X. valve.	3.	See section 9.4.2.
9.8.4	Plugged filter	4.	Check filter in chilled water circuit and clean.
9.8.5	Inefficient compressor.	5.	See section 9.4.3.
9.8.6	Air in system.	6.	Purge air, see section 9.3.6.

**TEMPERATURE CORPORATION**



PROCESS  
COOLING  
HEATING  
WEIGHING  
BLENDING  
GRINDING

OFF      ON



+      COMP 1 RUN

+      POWER ON      +      HOT GAS

+      FLOW      +      FREEZESTAT  
(MANUAL RESET)

11.0.1

ELECTRICAL SINGLE COMPRESSOR HONEYWELL  
CONTROLLER

ITEM	DEVICE	DESCRIPTION
1	1M	COMPRESSOR MOTOR CONTACTOR
2	1MTR	COMPRESSOR MOTOR
3	IOL	COMPRESSOR MOTOR INTERNAL OVERLOAD
4	FTB	FAN TERMINAL BLOCK
5	CF-1	FAN MOTOR CAPACITOR
6	2MTR	FAN MOTOR
7	CCH-1	COMPRESSOR CRANKCASE HEATER 1
8	CCH-2	COMPRESSOR CRANKCASE HEATER 2
9		
10	1R-1	COMPRESSOR CONTACTOR RELAY CONTACT
11	1MC	COMPRESSOR CONTACTOR COIL
12		
13	1FU	PUMP FUSES, 10 AMP, LP-CC TYPE
14	3M	PUMP STARTER WITH HEATER OVERLOADS
15	3MTR	PUMP MOTOR
16	1TMS	LINE VOLTAGE TO 24V TRANSFORMER
17	2FU	24V FUSE, 3.2 AMP, BUSS GMQ TYPE
18		
19	1S	PUMP ON/OFF SWITCH
20	1FSW	WATER FLOW SWITCH
21	3MOL	PUMP STARTER THERMAL OVERLOAD CONTACT
22	3MC	PUMP STARTER COIL
23	1TSW	TEMPERATURE CONTROLLER, HONEYWELL TYPE
24	2TSW	FREEZESTAT THERMOSTAT
25	1S	LIQUID LINE SOLENOID COIL 1
26	LPCO	LOW REFRIGERANT PRESSURE SAFETY CONTROL
27	HPCO	HIGH REFRIGERANT PRESSURE SAFETY CONTROL
28	2S	HOT-GAS SOLENOID COIL
29	2R	FREEZESTAT RELAY
30	2R-1	RELAY CONTACT FOR FREEZESTAT FAIL LIGHT

- 12.0.0 OPERATION INSTRUCTION**
- 12.1.0 The fused disconnect to your unit should be on a minimum of four to six hours before unit is started; this is to allow the crankcase heater to evaporate any refrigerant in the oil. It is advisable to leave the disconnect on at all times except for extended shut-downs.
- 12.2.0 On a water cooled unit, cooling tower pump(s) must be turned on.
- 12.3.0 Set thermostat to desired temperature. This must not be set lower than 55° F. unless sufficient glycol has been added to prevent freezing. (See 8.4.0 for mixture).
- 12.4.0 Turn chiller switch to "ON".
- 12.5.0 Allow unit to run for ten minutes and check the refrigerant sight glass. Sight glass should be clear and center button green. If there are bubbles in the liquid line sight glass, allow the unit to run but call a qualified refrigeration serviceman in as soon as possible. If the button in the sight glass is bright yellow shut unit down immediately and call in a qualified serviceman. This procedure must be done when the unit is started up or a minimum of once a month.
- 12.6.0 Check crankcase oil (semi-hermetic compressors only) by observing oil compressor. Oil should be halfway up the sight glass (do not consider foam on the top of oil.) This procedure must be done when the unit is started up or a minimum of once a month.
- 12.7.0 Observe the unit for short cycling compressor starting up and stopping frequently. Unit must not be allowed to run for an extended period on short cycle conditions. Call Temperature Corporation for control adjustments.
- 12.8.0 Observe unit for abnormal vibrations and abnormal noises from the compressor and piping.
- 12.9.0 Check and clean condenser inlet air filters. This should be done as required depending on plant air conditions. **DO NOT** run the unit without a filter as a plugged condenser is not covered under our warranty agreement.
- 12.10.0 When shutting down unit, turn chiller switch to "OFF". Leave disconnect ON except for long periods of shut down time.

- 12.11.0 Controls and valves must not be tampered with, it is only necessary to adjust the thermostat as required.
- 12.12.0 Failure through plugged contaminated or corroded chiller vessel is not covered by warranty.

**13.0.0 MAINTENANCE**

- 13.1.0 The pumps and machine connections should be checked regularly for leaks.
- 13.2.0 Check glycol solution concentration regularly.
- 13.3.0 Pump motors should be checked regularly for plugged air inlets, leading to overheating.
- 13.4.0 Pump and fan bearings should be checked for noise and lubrication. Lubricate bearing only as often as manufacturer specifies.
- 13.5.0 Check refrigerant sight glass for;
  - 1 - Color - Dot should be Green, if Yellow shut chiller off immediately and call Temperature Corporation.
  - 2 - Sight glass should be clear, if bubbles are present call Temperature Corporation.
- 13.5.0 Chiller and tower tank water should be clean. Tank may have to be drained periodically to replace system water and clean debris from tank. Dirty water can cause excessive plugging of heat exchangers and pump seal wear.

CHILLER INFO

MODEL # \_\_\_\_\_  
 SERIAL # \_\_\_\_\_  
 VOLTAGE \_\_\_\_\_  
 NAME AMPS \_\_\_\_\_  
 RUN AMPS \_\_\_\_\_  
 DATE \_\_\_\_\_

CONDENSING UNIT INFO

MODEL # \_\_\_\_\_  
 SERIAL # \_\_\_\_\_  
 COMP 1 # \_\_\_\_\_  
 SERIAL # \_\_\_\_\_  
 COMP 2 # \_\_\_\_\_  
 SERIAL # \_\_\_\_\_

COMP 1

COMP 2

COMPRESSOR RUN AMPS		
HIGH PRESSURE		
LOW PRESSURE		
SUPER HEAT		
COND. - AIR/WATER IN TEMP		
COND. - AIR/WATER OUT TEMP		
CHILLER WATER IN TEMP		
CHILLER WATER OUT TEMP		
CHILLER INLET PRESSURE		
CHILLER OUTLET PRESSURE		
CHILLER WATER FLOW		
FREON TYPE & CHARGE LBS		
PUMP RUN AMPS		
PUMP NAMEPLATE AMPS		
PUMP OVERLOAD SETTING AMPS		