

INSTALLATION AND OPERATING INSTRUCTIONS

(2 Through 10-ton Air Cooled Single Stage Chillers)



PORTABLE WATER CHILLERS

COLD SHOT CHILLERS

MARRONE & CO., INC.

14020 INTERDRIVE WEST • HOUSTON, TEXAS 77032

TEL: (281) 227-8400

FAX: (281) 227-8404



IMPORTANT

The United States Environmental Protection Agency (EPA) has issued various regulations regarding the introduction and disposal of refrigerants in this unit. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. Because these regulations may vary due to the passage of new laws we suggest that, any work on this unit be done by a certified technician. Should you have any questions, please contact the local office of the EPA.

- IMPORTANT MESSAGE TO OWNER:

These instructions should be carefully read and kept near the product, for future reference. While these instructions are addressed primarily to the installer, useful maintenance information is included. To insure proper set up, operation, and performance it is recommended that a licensed service professional start this piece of equipment. Have your installer acquaint you with the operating characteristics of the product and periodic maintenance requirements.

CODES AND REGULATIONS

This product is designed and manufactured to permit installation in accordance with National Codes. It is the installer's responsibility to install the product in accordance with National Codes and/or prevailing local codes and regulations. The manufacturer assumes no responsibility for equipment installed in violation of any codes or regulations.

INSPECTION

This product has been inspected at the factory and released to the transportation agency without known damage. Inspect carton's exterior for evidence of rough handling in shipment. Unpack carefully; if damage is found, report immediately to the transportation agency.

REPLACEMENT PARTS

For information on replacement parts, contact Cold Shot Chillers. When ordering parts, give complete model and serial number as shown on the unit nameplate. Most parts will be available through local distributors.



CHILLER SECTION

A. UNPACKING

1. Inspect unit for damage. If found, report immediately to freight carrier and Cold Shot Chillers.
2. Carefully uncrate the machine and remove all banding and protective film wrap.
3. Open cabinets and loosen compressor feet bolts to allow it to “float” on rubber mounts.
4. Test the system service valves with refrigeration gauges to insure refrigerant pressure is present and no undetectable damage (i.e. dropping the unit) has occurred. Once it is established that the unit has positive pressure, proceed to installation and start-up.

B. INSTALLATION AND START-UP

1. Select a location for air-cooled units with adequate air circulation that is as dust free as possible. Allow three (3) feet of clearance around the unit and at least 8’ unobstructed clearance above the unit to allow for proper air flow and service access.
2. Connect piping or hoses to unit, making sure that the inside diameter (I.D.) of the pipe or hose is the same as or greater than unit connections. The total loop length of the system should be no longer than 60 feet. If the piping loop required is greater than 60 feet please contact factory to confirm the pump capacity on your chiller will provide at least 3 gpm/ton of water flow.
3. Connect electrical at terminals tagged in main control box. On 208/230/3Ø systems with high or stinger leg, connect this leg to L2 or middle terminal. Failure to do so will cause early control component malfunction. Be sure selector switch is in “off” position before applying power.
4. On tank equipped units, fill the tank with the desired solution to within 2 inches of the top of tank. On reverse flow units, fill system and bleed air from the highest point of piping. A 15% -25% glycol mixture is recommended. For all standard units, low temperature, and units installed outdoors may require a higher concentration to prevent freezing. See unit nameplate for specific concentration requirements.



5. Once the fluid tank is filled with water quickly turn selector switch to “Pump Only” then to “Off” to rotate pump. On 3-phase models, check for proper pump rotation (clockwise from motor end). The compressor and pump are wired in phase. On 3-phase models with single phase pumps switch to cooling cycle and confirm proper rotation by listening for noisy compressor or carefully checking to see if the top of the compressor begins to warm up. Once proper rotation is confirmed, turn the selector to “Pump Only” and begin to circulate fluid and push out all entrapped air in the system.



6. Operate in “Pump Only” for at least 15 minutes. Shut unit down and clean strainer to remove any debris that may have been in the system. Once all the air is purged from the circuit, the system is free from debris and proper flow of 3 GPM per ton of capacity is verified, set the controller to the desired set point (SV) by pushing the (FUNC) button once, and the up and down scroll buttons on the controller to the desired temperature. (Do not adjust the set point below the temperature listed on the unit nameplate). Once temperature has been programmed, press the (FUNC) button once then the (SMT) button twice to return to normal operations. In addition to the “Set Value” (SV), the controller will also display “Present Value” (PV). “Present Value” is an indication of the current temperature of the fluid in the chiller tank, or “Leaving Fluid Temperature” depending on the specific chiller design.



7. Unit is now ready to turn on. Move the selector switch to “Cooling Cycle” setting and the unit will begin cooling.
8. During the cooling cycle, condenser fans on 3-tons and larger units may turn on and off. This should be expected during normal operation and occurs due to ambient temperature and the amount of heat being returned in the water chiller.
9. While cooling at low load conditions, bubbles may become visible in the refrigerant sight glass. The charging procedure requires the unit to be under full load with 75°F or above water temperature with clear sight glass for optimum performance. Returning fluid temperature should not exceed 100°F on standard units or the chiller will cycle off on head pressure switch and not run. Should this occur, allow water to cool down by running pump only and restarting chiller once water is 100°F or colder.
10. Your new chiller is equipped with a Low Flow Temperature sensor that detects low temperature of the refrigerant. This condition can occur when the fluid in the evaporator nears freezing. This safety will automatically trip and requires manual resetting before the cooling cycle will resume. Do not reset this control unless the exact cause for its tripping is determined.



Generally the cause will be low or insufficient water flow caused by a clogged “Y” strainer or restricted flow in the process. This safety can also be tripped by low ambient conditions overnight or during shipping. Resetting this control and not determining the cause for tripping can cause the evaporator to freeze and rupture.



C. MAINTENANCE*

1. Periodically check condenser coils for dirt or airborne particle build-up. Check deep into the coils with a flashlight and, if dirty, flush coils with a water hose- being careful to disconnect the power first and cover pump to prevent water from entering the vent ports.
2. Set up a schedule to remove the screen from the tank return water line strainer and clean out. Some particles may pass through the screen and collect as sediment in bottom of the tank. Again, disconnect the power then remove the tank drain plug and flush out bottom with water hose.
3. Caster wheels and swivels may require frequent lubrication based on the amount of use. Use good quality bearing grease and pump it into the grease fittings on the axle and swivel.
4. Turn off power to the unit and check the condition of the contactor points for the compressor and pump. Replace them if the edges become jagged or splattered to avoid premature compressor and/or pump failure. Contactor points are consumable and their life is dependant on the amount of use and power characteristics at the unit.

****NOTE: Not performing the above will cause early unit failure and considered abuse which is not covered by warranty.***



C. OPTIONAL HOT GAS BYPASS

1. Some COLD SHOT™ Chillers are equipped with an optional hot gas bypass for capacity control. This hot gas bypass is controlled by the temperature controller.
2. To activate the hot gas bypass set the temperature controller to your desired set point “SV” as described in the “CONTROLLER” section of this manual.

D. MAINTENANCE*

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Cold Shot Chillers

"ECONOMICALLY PRICED DEPENDABILITY"



TECHNICAL SPECIFICATION SHEET

Model ACWC-36-E:

Description:

3-Ton portable air-cooled water chiller system will provide approximately 36,000 BTU/HR of cooling capacity with a leaving fluid temperature of 50°F and an ambient air temperature of 90°F. The chill water system will provide a maximum flow rate of 30 GPM @ 30 PSI.

CAPACITY ±5% AT 50° LCWT / 90°F	3 TON 36,000 BTU /HR
MODEL	ACWC-36-E
COMPRESSOR	COPELAND HERMETIC SCROLL
EVAPORATOR	STAINLESS STEEL / COPPER BRAZED
FLUID CONNECTION	¾" IN 1" OUT
CONDENSER FAN	1
CONDENSER COILS	COPPER TUBE / ALUMINUM FIN
VOLTAGE	208/230/1
MCA	33
DIMENSIONS	40" L x 28" W x 54" H
APPROX. WEIGHT	350 LBS
PUMP HP	1.0
PUMP OUTPUT	30 GPM @ 30 PSI
TANK SIZE	25 GALLON
TANK CONSTRUCTION	304 SS

Controls:

Electronic temperature controller with constant leaving fluid temperature LED readout

Refrigeration Components:

Efficient scroll compressor, sight glass, moisture indicators, balance port expansion valves, filter drier, pump down valves, stainless steel brazed plate evaporator, fan cycling head pressure controls.

Process Fluid Components:

Stainless Steel centrifugal pump, bronze "Y" strainers with 20 mesh stainless steel screen, insulated stainless steel reservoir.

Safety Controls:

High/low pressure safety, internal overloads for compressor and fan motors, low water flow safety with manual reset.

Construction:

Welded steel powder coated frame and cabinet

Warranty:

One year parts / five year compressor

Marrone & Co., Inc.

14020 Interdrive West Houston, Texas 77032 Phone - 800-473-9178 - 281-227-8400 Fax 800-473-9175 - 281-227-8404

1603 Temperature Controller



Issue Date
June 1999

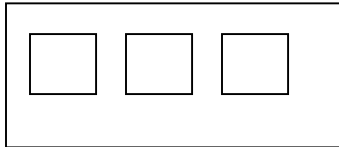
USER'S MANUAL

0037-75214

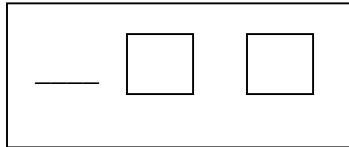
Error messages

OVERRANGE, UNDERANGE and BURN-OUT INDICATIONS

The controller shows the **OVERRANGE** and **UNDERRANGE** conditions with the following



OVERRANGE



UNDERRANGE

Indications:

The sensor leads break can be signalled as:

- For TC input: **OVERRANGE**
- For RTD input **OVERRANGE**

The sensor short circuit detection:

On RTD input, a special test is provided to signal **OVERRANGE** when input resistance is less than 15 ohm (short circuit sensor detection).

Note:

- When the controller is set for one output only, and an **OVERRANGE** is detected, the **OUT 1** turns **OFF** (if reverse action) or **ON** (if direct action).
- When the controller is set for heating/cooling action, and an **OVERRANGE** is detected, **OUT 1** turns **OFF** and **OUT 2** turns **ON**.
- When the controller is set for one output only, and an **UNDERRANGE** is detected, the **OUT 1** turns **ON** (if reverse action) or **OFF** (if direct action).
- When the controller is set for heating/cooling action, and the **UNDERRANGE** is detected, **OUT 1** turns **ON** and **OUT 2** turns **OFF**.
- When an **OVERRANGE** or **UNDERRANGE** is detected, the alarms operate as in the presence of the maximum or the minimum measurable value respectively.

To eliminate the OUT OF RANGE conditions, proceed as follows:

1. Check the input signal source and the connecting line.
2. Make sure that the input signal is in accordance with controller configuration; modify the configuration.

ERRORS

Diagnostics are made at controller power-up and during normal mode of operations. If a fault condition (error) is detected, the lower display will show the message “Err” while the upper display shows the error code.

ERROR DESCRIPTIONS

100 EEPROM memory writing error.

After 2 seconds the controller restarts automatically

If this error persists, send the controller back to the supplier.

150 General hardware error on the CPU card.

If this error persists, send the controller back to the supplier.

200 Protect register memory error.

The controller remakes this check every 2 seconds.

Set the switch ½ in open condition. Switch on the controller. Set the switch ½ in closed condition, and power the controller. If this error persists, send the controller back to your supplier.

ERROR DESCRIPTIONS

201-219 Wrong configuration parameter value (2xx, where xx is the configuration code).

The two least significant digits show the number of the wrong Configuration parameter. Return to the configuration values.

301 RTD calibration error.

**Go to calibration procedure and check the P1 and PH calibrations.
See RTD calibration check.**

305 Thermocouple input calibration error.

**Go to calibration procedure and check the tI and tH calibrations.
See thermocouple Calibration check.**

307 Reference junction calibration error.

**Go to calibration procedure and check the tJ calibration.
See cold junction calibration specs.**

Error Descriptions

- 400 One or more control parameters are out of range with respect to the allowed values.**
It may appear at controller power-up after configuration changes.
Push and hold ▲ and ▼ pushbuttons simultaneously and load all the default parameters.
- 500 Autozero error.**
The controller measures an interval autozero value too negative or too positive. The controller checks this condition every 30 seconds.
If this error persists, send the controller back to your supplier.
- 501 Cold junction measurement errors.**
The controller cannot perform cold junction compensation.
Check the ambient temperature and if necessary, re-calibrate the cold junction. If this error persists, send the controller back to your supplier.

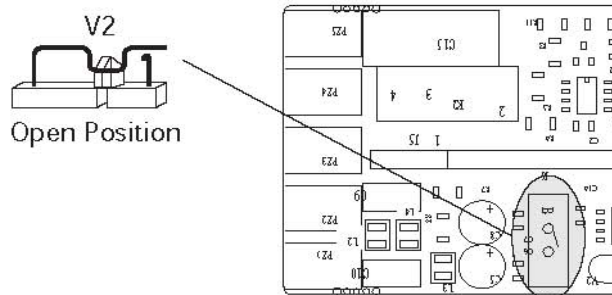
ERROR Descriptions

- 510 Incorrect measured value during calibration procedure.**
Check the input value and, if necessary, calibrate the controller.
If this error persists, send the controller back to your supplier.

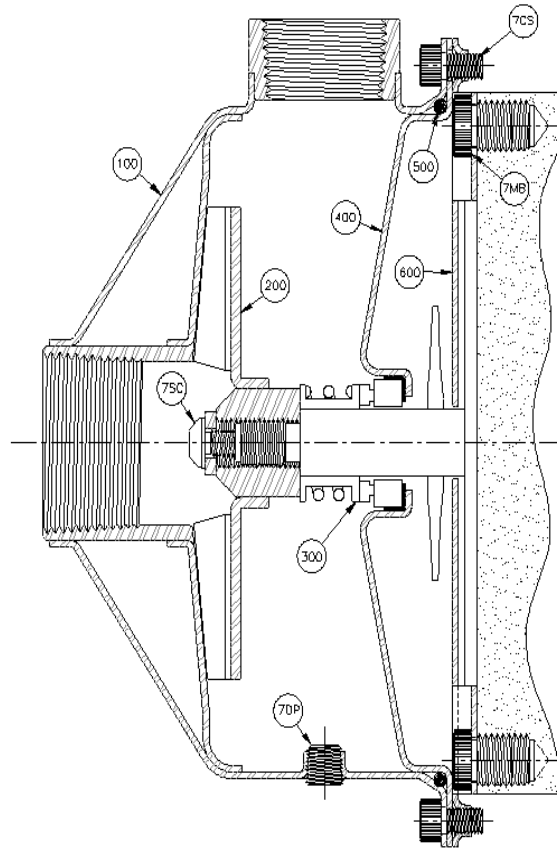
Calibration

Figure 11

Dip Switch Location: To start calibration, V2 must be OPEN.



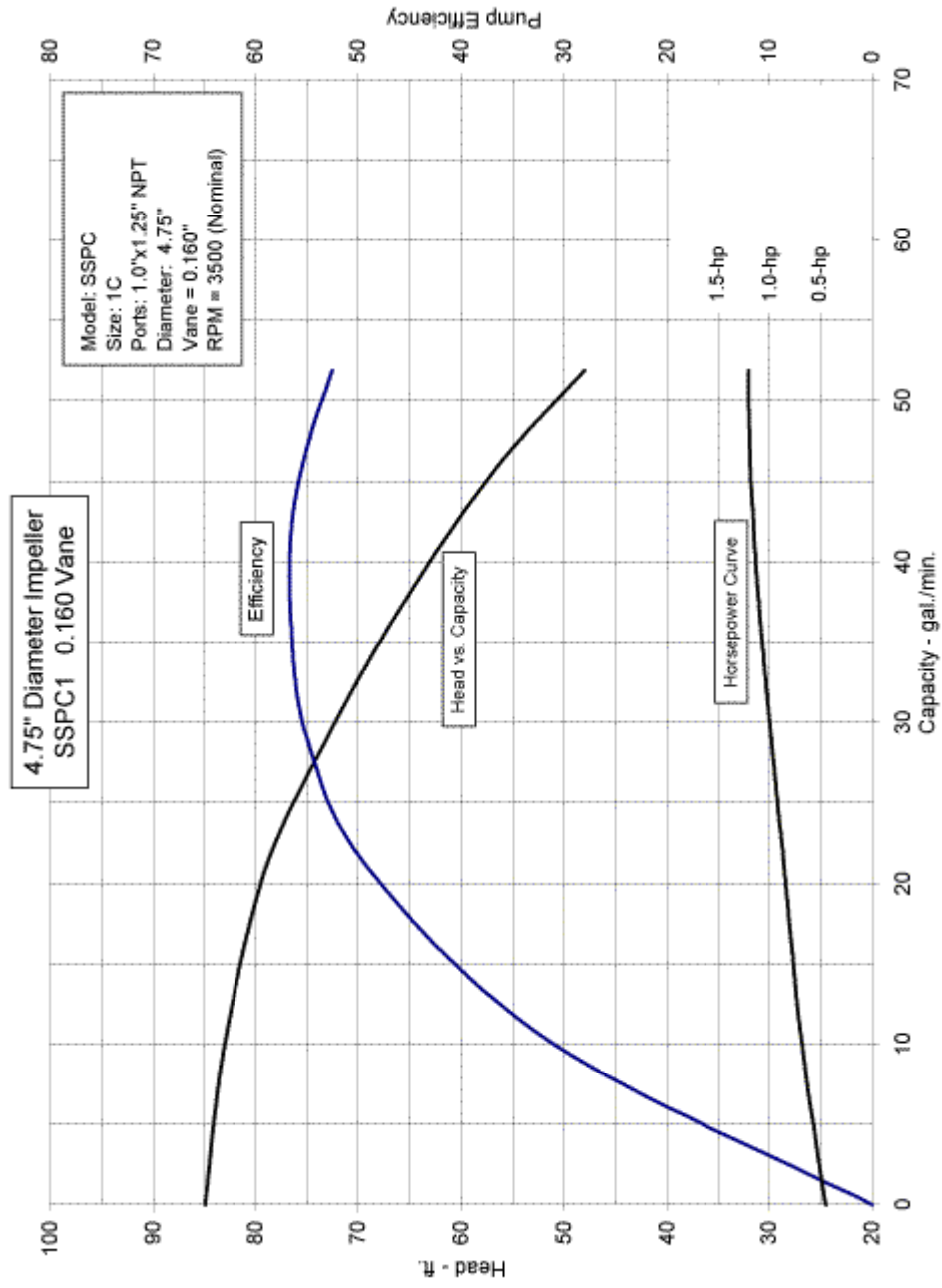
PUMP CROSS SECTION ALL MODELS

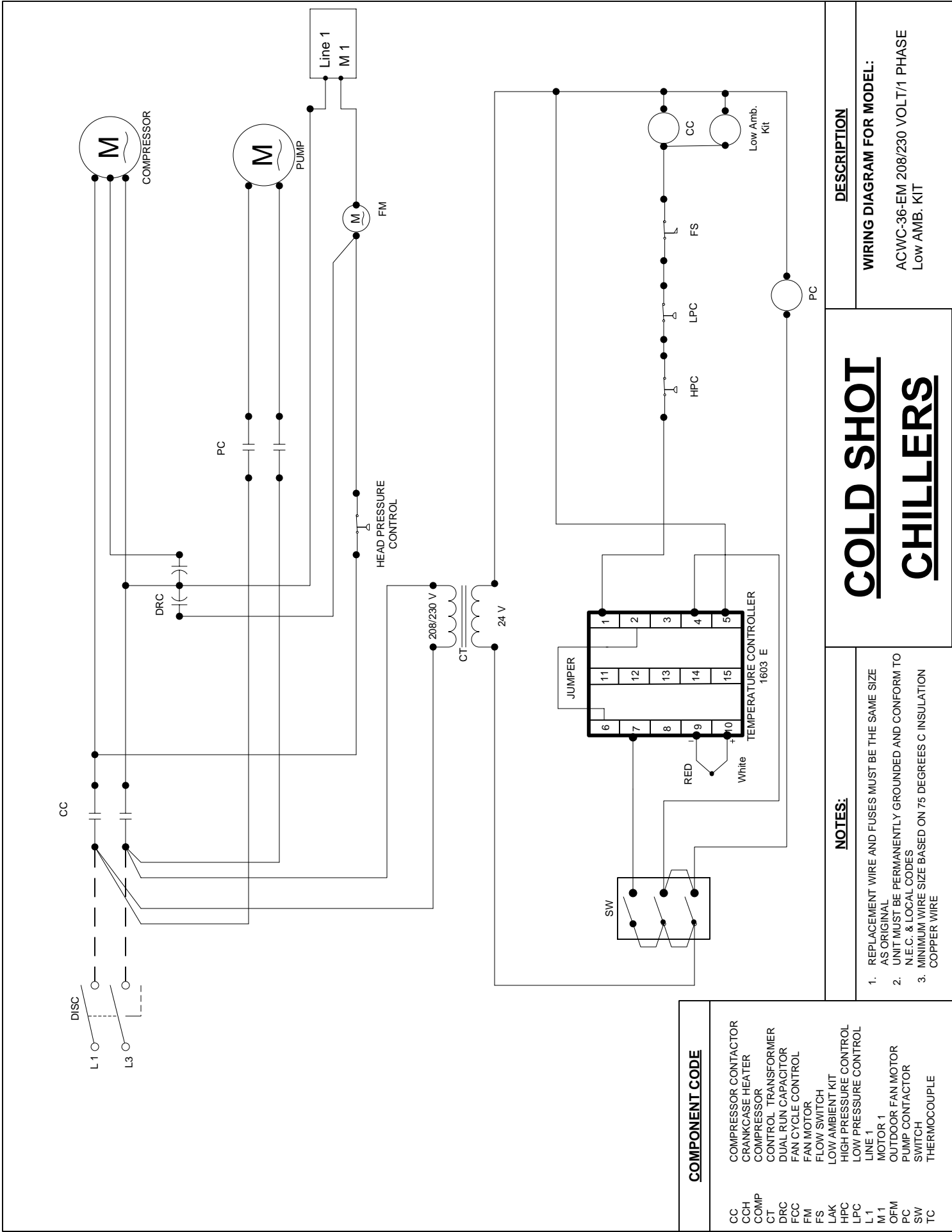


100	CASING	
200	OPEN IMPELLER	
300	MECHANICAL SEAL	
400	SEAL PLATE	
500	CASING O-RING	
600	MOTOR ADAPTER PLATE	
7CS	CASE SCREW	
7DP	DRAIN PLUG 1/8 NPT	
7SC	IMPELLER SCREW, LH THREAD	
7MB	MOTOR BOLT	

PUMP PERFORMANCE CURVE

1.0 HP – Models, ACWC-24-E, ACWC-36-E, & ACWC-60-E





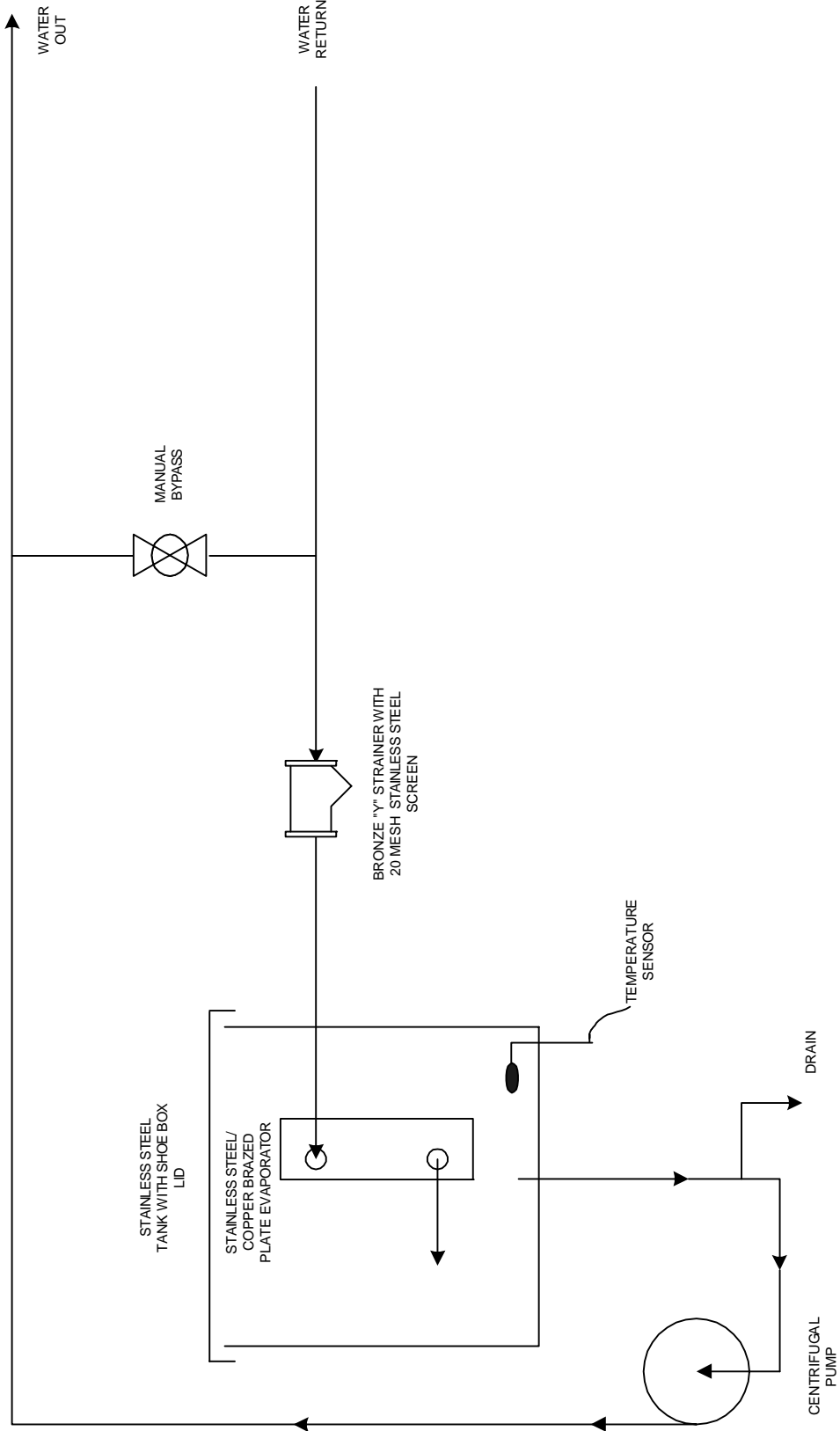
DESCRIPTION
 WIRING DIAGRAM FOR MODEL:
 ACWC-36-EM 208/230 VOLT/1 PHASE
 LOW AMB. KIT

COLD SHOT CHILLERS

- NOTES:**
1. REPLACEMENT WIRE AND FUSES MUST BE THE SAME SIZE AS ORIGINAL
 2. UNIT MUST BE PERMANENTLY GROUNDED AND CONFORM TO N.E.C. & LOCAL CODES
 3. MINIMUM WIRE SIZE BASED ON 75 DEGREES C INSULATION COPPER WIRE

COMPONENT CODE

- CC COMPRESSOR CONTACTOR
- CCH CRANKCASE HEATER
- COMP COMPRESSOR
- CT CONTROL TRANSFORMER
- DRC DUAL RUN CAPACITOR
- FCC FAN CYCLE CONTROL
- FM FAN MOTOR
- FS FLOW SWITCH
- LAK LOW AMBIENT KIT
- HPC HIGH PRESSURE CONTROL
- LPC LOW PRESSURE CONTROL
- L1 LINE 1
- M1 MOTOR 1
- OFM OUTDOOR FAN MOTOR
- PC PUMP CONTACTOR
- SW SWITCH
- TC THERMOCOUPLE



NOTES	
ALL PIPING IS TO BE INSULATED	
COLD SHOT	
DRAWN	ENGINEERING
ISSUED	07/06

SIZE	FSCM NO	DWVG NO	REV
SCALE	1 : 16.67	COLD SHOT CHILLERS CHILL WATER CIRCUIT- STD	
SHEET		SHEET	

START-UP CHECK LIST *** 2 thru 20-TON**

- 1. Is there any physical damage? Yes No
Will this prevent start-up? Yes No
Description: _____

- 2. Unit is installed level as per the installation instructions. Yes No
- 3. Power supply agrees with the unit nameplate. Yes No
- 4. Electrical power wiring is installed properly. Yes No
- 5. Unit is properly grounded. Yes No
- 6. Electrical circuit protection has been sized & installed properly. Yes No
- 7. All terminals are tight. Yes No
- 8. All plug assemblies are tight. Yes No
- 9. Crankcase heaters energized for 24 hours before start-up. Yes No
- 10. All chilled water valves are open. Yes No
- 11. All piping is connected properly. Yes No
- 12. All air has been purged from the system. Yes No
- 13. Chilled water pump is operating with the correct rotation. Yes No
- 14. Water loop volume greater than 6/gal/ton. Yes No
- 15. Proper loop freeze protection provided to _____°F (°C)
Antifreeze type _____ Concentration _____%
- 16. Outdoor piping wrapped with electric heater tape. Yes No

Measure the following:

Discharge Pressure: _____
Suction Pressure: _____
Suction Line Temp: _____
Entering Fluid Temp: _____
Leaving Fluid Temp: _____