Single Zone II Chill Pac
for
Vibrator Temperature Control

Installation, Operation and Maintenance Manual

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Foreword

The intent of this manual is to serve as a guide for placing your Single Zone II Chill Pac (SZCPII) in service and operating and maintaining it properly. It is supplemented by drawings and vendor literature specific to your equipment.

This manual should be thoroughly reviewed before attempting to install or operate the SZCPII. Please also note that technicians performing installation or service work on the SZCPII refrigeration circuit must be certified by an EPA approved organization (for installations outside the USA, consult local authorities for guidance). Although, due to their ever-changing nature, no reference is made herein to current codes, ordinances, etc., all applicable regulations, as well as good operating practices, should be followed. AWS cannot assume liability for installation or operating practices of others that are not in compliance with the recommendations of this manual and its attached documents.

The SZCPII uses R-22, an HCFC refrigerant. In the event of a refrigerant circuit leak or overpressurization, R-22 may be released into the pressroom. R-22 displaces air, and so may cause asphyxiation, and if exposed to flame, may produce toxic fumes. It is therefore recommended that the SZCPII be installed in an adequately ventilated location.

We trust your equipment will have a long and useful life. If you should have any questions, please contact our Customer Service Department, specifying the serial number and model number of the unit as indicated on the nameplate.

Installation

Receiving Inspection

Each unit is skid mounted and boxed or crated to protect it during shipping. Before accepting delivery, check the box or crate for visible damage. If damage is evident, it should be properly documented on the delivery receipt, and the box or crate should be immediately removed to allow for detailed inspection of the unit. Check for broken refrigerant lines, oil leaks, damaged controls, or any other major component torn loose from its mounting point. Any sign of damage should be recorded and a claim filed immediately with the shipping company. In order to expedite payment for damages it is important to record and document damage. An excellent way to do this is by taking pictures. Our Customer Service Department will provide assistance with the preparation and filing of your claims, including arranging for an estimate and quotation on repairs.

Rigging, Handling, and Locating Equipment

Proper rigging methods must be followed to prevent damage to components. Avoid impact loading caused by sudden jerking when lifting or lowering the chiller. Use pads where abrasive surface contact is anticipated.

Electrical Power

All wiring must comply with local codes and the National Electric Code (USA). Voltage must be within the voltage utilization range given in Table 1.

Table 1 - Voltage Utilization Range

Rated Voltage	Utilization Range
230	208 to 254
460	414 to 506
575	516 to 633

If the measured voltage on any leg is not within the specified range, notify the supplier and correct before operating the unit. Voltage imbalance must not exceed two percent. Excessive voltage imbalance between the phases of a three-phase system can cause motors to overheat and eventually fail. Voltage imbalance is determined using the following calculations:

$\%\ \text{Imbalance} = (V_{avg} - V_x) \times 100 / V_{avg}$

$V_{avg} = (V_1 + V_2 + V_3) / 3$

V_x = phase with greatest difference from V_{avg}

For example, if the three measured voltages were 442, 460, and 454 volts, the average would be:

(442 + 460 + 454) / 3 = 452

The percentage of imbalance is then:

(452 – 442) x 100 / 452 = 2.2 %

This exceeds the maximum allowable of 2%.

A disconnect switch is provided for connection of the main power source. A separate fused disconnect is required at the power source (by others)

Electrical phase sequence must be checked at installation and prior to start-up. Operation of the compressor with incorrect electrical phase sequencing will result in mechanical damage. The phasing must be checked with a phase sequence meter prior to applying power. The proper sequence should read “ABC” on the meter. If the meter reads “CBA”, open the main power fused disconnect, and switch two line leads on the disconnect on the SZCPII. All components requiring electric power are wired in-phase at the factory. Do not interchange any load leads that are from the unit contactors or the motor terminals.

WARNING: It is imperative that L1-L2-L3 are connected in the A-B-C phase sequence to prevent equipment damage due to reverse rotation.

CAUTION: The unit requires the main power to remain connected during off-hours to energize the compressor’s crankcase heater. Disconnect main power only when servicing the chiller. The crankcase heater should remain on when the compressor is off to ensure liquid refrigerant does not accumulate in the compressor crankcase.

Remote Air-Cooled Condenser Installation

Install the remote condenser as shown in the attached installation details drawing(s). The required 400 psi relief valve and liquid line check valve are supplied by AWS. Refrigerant piping is to be ACR copper, with all joints brazed using Silfos™ or equivalent.

Before beginning the start-up procedure, leak test the refrigerant circuit with N2 at 150 psig, and evacuate to a pressure of 500 microns or less for a minimum of 12 hours.

For general guidance, consult the Thermal Care Remote Air Cooled Condenser Installation Guidelines Manual.

Press Piping Installation

The details of flow distribution to the vibrators at the printing units vary according to press manufacturer and model, and cannot be addressed here. Consult the press manufacturer or AWS Customer Service for recommendations.

Note: The manual isolation and drain/fill valves shown in the SZCPII Process and Instrumentation Diagram (labeled MV-1 through mv-6; to be provided by the installer) MUST BE IN PLACE BEFORE START-UP. Proper filling and draining of the water ciruit is not possible without these valves.

City Water Connection

The SZCPII has a closed water circuit which must be pressurized by a ***permanent*** city water connection. Local codes may require a backflow preventer (by installer) as shown in the SZCPII Process and Instrumentation Diagram.

Start-Up

The following start-up procedure should be used as a checklist for the initial and all subsequent start-ups of the SZCPII.

1. Assure the main power source is connected properly, that it matches the voltage shown on the nameplate of the unit, and that it is within the voltage utilization range given in Table 1. Electrical phase sequence must be checked at installation and prior to start-up. Operation of the compressor with incorrect electrical phase sequencing will result in mechanical damage to the compressors. The phasing must be checked with a phase sequence meter prior to applying power. The proper sequence should read "ABC" on the meter. If the meter reads "CBA", open the main power fused disconnect and switch two line leads on the disconnect on the SZCPII. All components requiring electric power are wired in-phase at the factory. Do not interchange any load leads that are from the unit contactors or the motor terminals. Once proper power connection and grounding have been confirmed, turn the main power on.

WARNING: It is imperative that L1-L2-L3 are connected in the A-B-C phase sequence to prevent equipment damage due to reverse rotation.

Note: The main power must be on for 24 hours prior to starting the compressor to allow the crankcase heater to sufficiently vaporize any liquid refrigerant that may be present in the compressor.

2. Open the disconnect, open the electrical enclosure, and remove fuses for M1 (compressor). Close the enclosure door and close the disconnect.

3. Check to make sure that all water piping connections are secure.

4. Fill the circuit, clean and treat the system, and sample the treated circuit water and untreated city water using the following procedure:

Note: Refer to the Process and Instrumentation Diagram.

System Cleaning

Water Fill

Be sure that city water is supplied to the unit. Close MV-2, 3, 4, 6. Crack open MV-5. Open MV-1 and the city water isolation valve fully. Loosen the auto vent cap. Turn the system on. The pump will run and the SOL3 will open. Watch MV-1; when water appears, close MV-1 and open MV-2. Allow water to circulate and air to escape from the auto vent for a few minutes. Turn the system off.

Detergent Addition

Close MV- 1, 2, 3, 4, 6. Open MV-5 fully.

Connect hoses to MV-1 and MV-3. Relieve pressure in the system by draining water into a bucket from MV-3. Close MV-3.

Close MV-2. Put the hose connected to MV-3 into a bucket containing 2 cups of CL-200 detergent and 2 gal of water. Put the hose connected to MV-1 into an empty bucket. Turn on the unit. Open MV-3 and crack open MV-1 to allow the detergent to be drawn into the system. Close MV-1, 3. Open MV-2.

Circulation

Allow the pump to run, circulating detergent through the system for at least 8 hours.

Flush

Run a hose from MV-4 to a drain. With the unit running, crack open MV-4 to drain the detergent and allow the system to be flushed with city water.

Treatment

Close MV- 1, 2, 3, 4, 6. Open MV-5 fully.

Connect hoses to MV-1 and MV-3. Relieve pressure in the system by draining water into a bucket from MV-3. Close MV-3.

Close MV-2. Put the hose connected to MV-3 into a container the bucket containing 3 cups of CS-39 corrosion inhibitor and 2 gallons of water. Put the hose connected to MV-1 into an empty bucket. Turn on the unit. Open MV-3 and crack open MV-1 to allow the corrosion inhibitor to be drawn into the system. Close MV-1, 3. Open MV-2.

Sampling

With the unit off, fill a sample bottle (provided by AWS) from MV-4. In addition, fill another sample bottle with city water from the same source that is used to fill the circuit. Send both samples to AWS for analysis. This will ensure that any water quality problems evident at start-up can be treated promptly.

CAUTION: The city water isolation valve should be left open AT ALL TIMES when the SZCPII is in operation. Since system volume can decrease due to minor leakage and ongoing venting of entrapped air, makeup water is occasionally required to maintain a positive pressure at the pump suction. Negative pressure at the pump suction could cause pump cavitation and loss of flow to the press.

5. Verify that the flow switch (FS-1) is open when the pump is off and closed when it is on. If necessary, loosen the two screws on the top of the switch body, re-position the reed switch so that it functions properly, and re-tighten the screws. Leave the SZCPII on with the pump running.

Note: The compressor will not start as long as the flow switch is open. A positive flow must be established through the evaporator before the compressor can operate.

6. Verify that the temperature controller has been programmed **with the parameters listed on the electrical schematic diagram**. Consult the manufacturer's manual (attached) for instruction.

7. Verify that all manual refrigerant valves are open.

CAUTION: Do not operate the unit with the compressor or liquid line service valves "CLOSED". Failure to have these "OPEN" may cause serious compressor damage.

8. Add an initial refrigerant charge (estimated from the Thermal Care Remote Air Cooled Condenser Installation Guidelines Manual) by connecting the charging line to the suction service valve and charging through the backseat port. Close the manual isolation valve on the hot gas bypass line.

9. Open the disconnect, open the electrical enclosure door, and replace fuses for M1 (compressor). Close the enclosure door and close the disconnect. Press the Start button to turn on the SZCP. Lower the press supply (leaving water) temperature set point on the temperature controller using the Up and Down buttons as necessary to start the compressor and complete the charging process.

WARNING: Under no circumstance should the High Refrigerant Pressure (HPS-1), Low Refrigerant Pressure (LPS-1), or Compressor Low Pressure (LPS-2) switches be deactivated. Failure to heed this warning can cause serious compressor damage, severe personal injury or death.

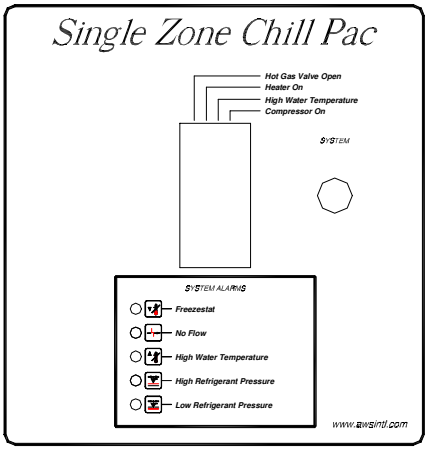
10. Operate the system for approximately 30 minutes or as long as possible. Check the liquid line sight glass. The refrigerant flow past the sight glass should be clear. Bubbles in the refrigerant indicate either low refrigerant charge or excessive pressure drop in the liquid line. A shortage of refrigerant is indicated if operating pressures are low and subcooling is low. Normal subcooling ranges are from 10°F (5.5°F) to 20°F (11°C). If subcooling is not within this range, check the superheat and adjust if required. The superheat should be approximately 10°F (5.5°C). If the operating pressures, sight glass, superheat, and subcooling readings indicate a refrigerant shortage, gas-charge refrigerant as requiredw ith the unit running until operating conditions become normal.

CAUTION: A clear sight glass alone does not mean that the system is properly charged. Also check system superheat, subcooling, and unit operating pressures. If both suction and discharge pressures are low but subcooling is normal, a problem other than refrigerant shortage exists. Do not add refrigerant, as this may result in overcharging the circuit.

11. Open the hot gas bypass valve. The SZCPII should maintain press supply (leaving water) temperature within ±3 °F of set point when there is no load. With the press operating, the press supply temperature should normally be within ±1 °F of set point. If this performance is not observed, re-check the temperature controller parameter values, and adjust as necessary.

The unit is now ready to be placed into service.

Controls



All controls and alarm indicating lights are located on the front of the SZCPII cabinet.

The On/Off switch provides power to all components and starts/stops the pump. The microprocessor temperature controller cycles the compressor and the hot gas bypass solenoid valve to maintain press supply (leaving water)

temperature. The controller also provides the following indications via LEDs: Hot Gas Valve Open, Heater On (when the optional heater is present), High Water Temperature, and Compressor On.

All other controls are relay-based, with fault logic as summarized in Table 2 below.

Table 2 - Fault Logic

Fault	Alarm Indication	Compressor Shut Off	Pump Shut Off	Manual Reset Required	Ready Interlock Lost
No Flow	Light/Beacon	Yes	No	No	Yes
High Refrigerant Pressure	Light/Beacon	Yes	No	Yes	Yes
Low Refrigerant Pressure	Light/Beacon	Yes	No	No	Yes
Freezestat	Light/Beacon	Yes	No	Yes	Yes
High Water Temperature	Light/Beacon	No	No	No	Yes
Pump Fuse	None	No	Yes	Yes	No
Compressor Fuse	None	Yes	No	No	No

Power

Power is provided to the SZCPII components via the disconnect mounted on the electrical controls enclosure and the Start/Stop button on the front door of the cabinet.

Start 

Depressing the Start button will start the pump and enable the compressor. The compressor and condenser fans will start only if the microprocessor temperature controller is calling for cooling because the actual Press Supply (leaving water) temperature is higher than the Set Point temperature.

Note: Once the compressor has cycled off, it will not restart for 4 minutes because of an internal anti-cycle time delay.

Stop 

Depressing the Stop button will shut off the compressor, pump, and condenser fans.

No Flow 

The No Flow light will be illuminated if the flow through the chiller is below the preset acceptable level. This safety will shut off the compressor.

High Refrigerant Pressure 

If the compressor discharge refrigerant pressure exceeds the setting on the high refrigerant pressure safety, the compressor will shut off and the High Refrigerant Pressure light and the alarm beacon on top of the SZCPII cabinet will be illuminated. The High Refrigerant Pressure switch (located at the discharge of the compressor) msut be manually reset.

Low Refrigerant Pressure 

If the compressor suction pressure drops below the setting on the low refrigerant pressure safety, the compressor will shut off and the Low Refrigerant Pressure light and the alarm beacon on top of the SZCPII cabinet will be illuminated. Pressing the Alarm Reset button will reset the Low Refrigerant Pressure fault, as long as the refrigerant pressure has risen back up above the safety's cutout level.

Freezestat 

If the temperature of the water leaving the evaporator drops below the setting on the Freezestat, the compressor will shut off, the Freezestat light and the alarm beacon on top of the SZCPII cabinet will be illuminated. The Freezestat is factory set at 38°F (3°C). The Freezestat is a mechanical device mounted on the electrical controls enclosure. It must be manually reset.

High Water Temperature 

The High Water Temperature light and the alarm beacon on top of the SZCPII cabinet will be illuminated if the Press Supply temperature rises more than 25°F above the Set Point temperature. The High Water Temperature LED will turn off when the water temperature is less than 19°F above the Set Point temperature. This alarm does not stop the operation of any component.

Interlocks

Remote Run Permissive

A dry contact at the press console may be used to provide a remote run permissive to the SZCPII. Contact closure allows local operation via the Start/Stop button.

It may be convenient to use, for example, “press control power on” as the remote run permissive. Then, when the press is shut down, the SZCPII will automatically be shut down also. When press control power is turned on again, the SZCPII will not automatically start, but can again be started locally.

Ready

A dry contact is provided to indicate that the SZCPII is ready for press operation, i.e., flow to the press has been established and no alarms are present. Contact closure indicates the SZCPII is ready. The contact opens whenever any alarm light is illuminated or power to the SZCPII is interrupted.

This contact may be used for remote indication or interlock with press controls.

Principles of Operation

Coolant Circuit

The pump draws water from the press and circulates it through the evaporator. It is in the evaporator where the heat is transferred from the water to the refrigerant. The temperature of the water being delivered to the press is controlled by adjusting the amount of heat transferred in the evaporator.

After leaving the evaporator, the water passes the Freezestat, thermocouple, and flow switch. The Freezestat is a safety control that provides indication of potential water freezing in the evaporator. If freezing were to occur, the evaporator could leak water into the refrigerant circuit and render it inoperable. The thermocouple senses the temperature of the water being delivered to press and communicates this temperature to the microprocessor temperature controller. The Flow Switch detects that water is passing through the evaporator.

The water is then delivered to the press, where it picks up heat and returns to the press return connection. From this connection, the coolant is drawn into the pump, thereby completing the cycle. The Flow Switch is a safety control that is connected to the microprocessor.

Refrigerant Circuit

The heat that is transferred in the evaporator from the water to the refrigerant is used to change the state of the refrigerant from a liquid to a gas. After leaving the evaporator, the refrigerant passes to the compressor.

The compressor is the heart of the refrigeration circuit. It takes the cool, low-pressure gas entering the compressor and compresses it, which creates the hot, high-pressure gas that exits the compressor. Since the compressor is not 100% efficient, some extra heat is added to the refrigerant as it is being compressed.

The hot, high-pressure gas that exits the compressor is delivered to the condenser. In the condenser, the heat is transferred from the refrigerant into the air or water that is passing through the condenser. As the heat is transferred, the refrigerant changes from a gas to a liquid. The condenser has been sized to remove the heat from the press and the heat that was added by the compressor.

After leaving the condenser, the liquid refrigerant passes through the service ball valve, filter drier and sight glass. The filter drier removes any particles or moisture from the refrigerant. The sight glass is used to monitor the stream of liquid refrigerant. The liquid refrigerant then passes through the thermal expansion valve (TXV) which meters the flow into the evaporator where the process starts all over again.

Capacity and temperature control is accomplished with a hot gas bypass system. If press is adding less heat to the circuit than the SZCPII is removing, the press supply temperature will drop. To avoid excessive cycling of the SZCPII compressor (which reduces its life), hot gas is directed from the compressor discharge to the evaporator inlet. This reduces the rate at which heat is rejected from the system at the condenser, allowing the cooling capacity of the SZCPII to follow the heat load of the press with minimal compressor cycling. The microprocessor temperatue controller pulses the hot gas solenoid valve as needed to maintain the press supply temperature to within 1°F (1°C) of the set point when the press heat load is above approximately 25% of the SZCPII cooling capacity.

If the process heat load is extremely low, or even nonexistent, the hot gas bypass system may not be able to put enough of a load on the evaporator, and the water temperature will begin to drop. When the water temperature drops 3°F below the set point temperature, the controller will shut the compressor off. When the water temperature rises to 3°F above the set point the set point temperature, the compressor comes back on. The compressor will remain off for at least four minutes to prevent short cycling.

Components

Compressor

The chiller is equipped with a hermetic scroll compressor. Both the compressor and the motor are encased together and solidly mounted in the cabinet. The compressor is unidirectional and will only pump refrigerant when properly phased. The cool refrigerant suction gas cools the motor windings, and there is an internal thermal fuse to protect the windings from overheating. The compressor is lubricated with oil that travels throughout the system with the refrigerant.

Remote Air Cooled Condenser

The condenser is constructed of heavy gauge copper tubing and aluminum fins for maximum heat transfer capabilities. The condenser has been generously sized so the chiller can operate with full cooling capacities with an outdoor air temperature of up to 95°F. At higher outdoor temperatures, the SZCPII will lose approximately 1% of its cooling capacity per 1°F above 95°F. The SZCPII can operate with an outdoor temperature of up to 110°.

The fan(s) draw cool air into the bottom of the condenser and discharge warm air out the top The discharge air will be approximately 35°F warmer than the intake air.

Evaporator

The evaporator is constructed of stainless steel plates and copper brazing. The refrigerant passes between every other set of plates, while the coolant

flows on the other side of the plates in the opposite direction.

Thermostatic Expansion Valve (TXV)

The TXV separates the high pressure/high temperature side of the refrigeration circuit (the condenser side) from the low pressure/low temperature side of the refrigeration circuit (the evaporator side). The TXV maintains constant superheat at the evaporator outlet, regardless of process load, by precisely metering the amount of refrigerant into the evaporator. Superheat is the difference between the saturated evaporative temperature and the actual measured temperature at the TXV sensor bulb. The superheat is factory set for 10°F to 12°F and should never exceed 15°F. Only a trained refrigeration technician should adjust this valve.

Refrigerant Sight Glass

The refrigerant sight glass is located in the liquid line immediately ahead of the expansion valve. It allows the operator or service technician to observe the flow of liquid refrigerant. Prolonged periods of foaming in the sight glass may indicate a low refrigerant condition or a restriction in the liquid line.

Note: Occasional bubbling in the sight glass may occur at a time when load conditions are changing and the thermostatic expansion valve is adjusting to the new conditions. It can also occur when the Hot Gas Bypass Solenoid Valve (SOL2) is open. These momentary occurrences do not adversely affect the refrigeration circuit operation.

The sight glass can also be used to check if there is moisture in the refrigeration system. If there is moisture in the system, the green dot in the center of the sight glass will turn yellow. If this occurs, the refrigeration circuit should be serviced immediately.

Refrigerant Filter Drier

The filter drier is located in the liquid line between the condenser and the refrigerant sight glass. It is designed to remove any moisture and/or foreign matter that may have gotten into the refrigerant stream. Moisture and foreign matter can cause serious damage to the components of a refrigeration system. For this reason, it is important that the chiller be equipped with a clean filter drier. Replace the filter drier if any of the following conditions occur.

1. The refrigeration system is opened to the atmosphere for repairs or maintenance.

2. Moisture is indicated in the sight glass (the green dot has changed to yellow).

3. An excessive pressure drop develops across the filter drier. This is indicated by a significant temperature difference between the filter inlet and outlet.

Relief Valves

Relief valves are located at the condenser and receiver. These prevent damage to equipment and danger to personnel in the event that heat cannot be removed from the refrigeration circuit (e.g., in the event of a condenser malfunction or closure of a refrigerant valve)

Hot Gas Bypass Valve

This valve is located in the refrigerant line that runs from the compressor discharge to the evaporator inlet. It is designed to artificially load the chiller when the load from the press is less than the maximum cooling capacity of the SZCPII. This is accomplished by directing some of the hot compressor discharge gas directly back into the evaporator rather than through the condenser. The microprocessor temperature controller opens and closes this valve as necessary to maintain the press supply temperature near set point. This improves temperature control, as well as greatly reducing cycling of the compressor. This significantly extends its life of the compressor.

Liquid Line Solenoid Valve

This valve (SOL1), located between the filter and sight glass, is closed when the compressor is shut off. This prevents migration of the refrigerant to the compressor from the condenser. Starting the compressor with liquid in the crankcase could flush out the oil and cause mechanical damage.

Receiver

The receiver provides the refrigeration circuit with liquid refrigerant for start-up. This allows adequate pressure to be maintained at the compressor suction on cold days when some time is required to build up pressure in the condenser.

Pump

The close-coupled centrifugal pump is equipped with a mechanical seal. The pump motor meets NEMA specifications and industry standards.

Pressure Gauge

A pressure gauge is located in the SZCPII piping on the line supplying the press. This can be used to check that the pressure being applied to hoses and rotary unions at the press is not excessive.

Y-Strainer

A Y-strainer with a 20-mesh screen is installed in the water line to help protect the evaporator passages from becoming clogged. It also provides some protection for the press.

High Refrigerant Pressure Switch
The High Refrigerant Pressure switch is designed to limit the compressor discharge pressure within the design parameters of the compressor. The switch is located on the discharge side of the compressor. It must be reset manually. This switch opens at 375 psig.

Low Refrigerant Pressure Switch
The Low Refrigerant Pressure switch is designed to limit the compressor suction pressure within the design parameters of the compressor. The switch is located on the suction side of the compressor. This switch opens at 25 psig and closes at 55 psig.

Compressor Low Pressure Switch
This switch is provided for the protection of the compressor, which can be damaged if subjected to a vacuum. It is never bypassed. It opens opens at 10 psig and closes at 40 psig.

Freezestat
The freezestat control is a mechanical thermostat that senses the water temperature separately from the microprocessor temperature controller. This safety is designed to limit the temperature of the water leaving the evaporator to prevent possible freeze-up. It is factory set at 38 °F.

Note: It is critical that the freezestat is set properly. Freeze-ups can cause extensive damage to several components in the chiller, and the warranty does not cover repairs required due to a freeze-up.

The Freezestat is mounted on the side of the electrical controls enclosure. It must be manually reset.

Flow Switch
This switch is located in the water piping on the supply to press. It is designed to shut the compressor off if there is insufficient water flow through the evaporator. The switch is adjustable; however, no adjustments should be made without prior approval from the factory.

Pressure Regulator
A pressure regulator is supplied on the incoming city water line to ensure that the pressure of the water supplied to the press is low enough to prevent damage to hoses and rotary unions. Since the press supply pressure is the sum of the makeup water pressure and the pump head, press supply pressure can be controlled by regulating the makeup water pressure.

Makeup Water Solenoid Valve
The Makeup Water Solenoid Valve ensures that the circuit is isolated from the city water supply when the unit is not running. This normally closed valve is located between the Pressure Regulator and the Expansion Tank. To allow filling of the circuit during system startup while the pump is disabled, this valve must be opened by connecting a jumper from 24VAC power to the positive electrical terminal of the valve.

Preventive Maintenance

Establishing a preventive maintenance routine according to the recommendations below will help to prolong the life of the SZCPII as well as help to prevent unplanned press downtime. A checklist is provided at the end of this section which can be used to document the preventive maintenance performed.

Once a Week

1. Inspect the remote air-cooled condenser. Remove debris (leaves, cottonwood seeds, etc). that may be lodged in the cooling fins.

2. Check the actual temperature of the water being supplied to the press (PV on the controller) is within 3°F of the set point (SV) temperature when the press is not running, and within 1°F when the press has been running steadily for at least 30 minutes. If temperature is not being controlled within this range, refer to the Troubleshooting Chart or contact the Customer Service Department.

3. Check the pressure gauge. With the pump off, it should read 10-20 psig. With the pump on, it should read at least 50 psig. Lower pressures may allow negative pressure at the pump inlet, which may damage the pump (cavitation). If this is observed, check that the City Water Isolation valve is open, and city water is being supplied to the SZCPII.

4. Check the pump for leaks in the seal area. Replace pump seal if necessary.

5. Check the refrigerant sight glass for air bubbles or moisture indication. If the sight glass indicates that there is a refrigeration problem, have the unit serviced as soon as possible.

Once a Month
Repeat items 1 through 5 as listed above and continue with the following.

6. With the main disconnect shut off and locked out, check the condition of electrical connections at all contactors, starters and controls. Check for loose or frayed wires.

7. Check the incoming voltage to make sure it is within 10% of the design voltage of the SZCPII.

8. Check the amp draws to each leg of the compressor and pump to confirm that they are drawing the proper current.

Every Three Months

Repeat items 1 through 8 listed above and continue with the following.

9. Units are equipped with a Y-strainer between the pump and the evaporator inlet. The strainer basket should be removed and cleaned if necessary.

10. Take a sample from the water circuit. Check the ethylene glycol concentration. If it is less than 30%, add ethylene glycol to obtain a concentration of between 30 and 50%. Also check for leaks in the water circuit, as dilution of the ethylene glycol indicates that makeup water has been added. If the sample shows visible contamination (rust, etc.), contact Customer Service

11. Have the refrigeration circuit inspected by a certified refrigeration technician. Record suction pressure, discharge pressure, and superheat.

AWS SINGLE ZONE II CHILL PAC
Preventive Maintenance Checklist

Model # _____
Serial # _____

Maintenance Activity	Week Number												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Date													
Inspect Condenser													
Temperature Control													
Press Supply Pressure													
Pump Seal													
Refrigerant Sight Glass													
Electrical Connections													
Incoming Voltage													
Compressor L1 Amps													
Compressor L2 Amps													
Compressor L3 Amps													
Pump L1 Amps													
Pump L2 Amps													
Pump L3 Amps													
Clean Y-Strainer													
Glycol Concentration													
Refrigerant Circuit Check													
Refrigerant Suction Pressure													
Refrigerant Discharge Pressure													
Refrigerant Superheat													

Troubleshooting

Problem	Possible Cause	Remedy
Compressor will not start	Compressor fuse	Check supply voltage, amperage of each leg, contactor and wiring
	Compressor contactor	Replace if faulty
	Microprocessor temperature controller	Replace if faulty
	Compressor failure	Contact Customer Service Department for assistance
Pump will not start	Pump fuse	Check supply voltage, amperage of each leg, contactor and wiring
	Pump contactor	Replace if faulty
	Pump failure	Replace if faulty
Low refrigerant pressure	Low refrigerant charge	Contact refrigeration service technician
	Refrigerant leak	Contact refrigeration service technician
	Low refrigerant pressure switch	Check for proper range, replace if faulty
	Condenser fins blocked	Remove debris
	High ambient air temperature	Ambient temperature must be reduced below 110°F
	Condenser fan motor	Replace if faulty
	Condenser fan cycling control	Confirm proper operation, replace pressure switch or P-66 module if faulty
	Refrigerant circuit overcharged	Contact refrigeration service technician
	High refrigerant pressure switch	Replace if faulty

Problem	Possible Cause	Remedy
Freezestat alarm	Low flow through evaporator	Adjust flow to proper level
	Freezestat switch	Replace if faulty
Low pump discharge pressure	Pump running backwards	Switch 2 legs of the incoming power
	Pressure gauge	Replace if faulty
	Pump failure	Replace if faulty
	Excessive flow	Reduce flow
High pump discharge pressure	Closed valves in process piping	Open valves
	Obstruction in piping or process	Remove obstruction
	Clogged Y-strainer	Clean strainer
	Pressure gauge	Replace if faulty
Erratic temperature control	Low coolant flow through evaporator	Adjust flow to proper level
	Intermittent fuseing of chiller capacity	Check to make sure chiller is properly sized for process load
	Hot gas bypass valve	Contact refrigeration service technician
	Microprocessor temperature controller	Replace if faulty
	Thermocouple	Replace if faulty
Insufficient cooling (temperature continues to rise above set point)	Process load too high	Check to make sure chiller is properly sized for process load
	Coolant flow through evaporator too high or too low	Adjust flow to proper level
	Insufficient condenser cooling	See “High Refrigerant Pressure”
	Hot gas bypass valve stuck open	Contact refrigeration service technician
	Refrigeration circuit problem	Contact refrigeration service technician
	Microprocessor temperature controller	Replace if faulty
	Thermocouple	Replace if faulty

Schedule of Attached Documents

Document Number	Author	Description
SZII0006MPI1B	AWS	SZCPII Process & Instrumentation Diagram
SZII0014MID1A	AWS	SZCPII Remote Condenser Installation Details (sheet 1)
SZII0014MID2A	AWS	SZCPII Remote Condenser Installation Details (sheet 2)
SZII0015EWP1A	AWS	SZCPII Wire Pull
SZII0012EEL1E	AWS	SZCPII Electrical Schematic Diagram
SZII0013EPC1B	AWS	SZCPII Control Panel Layout
PXZ SERIES Operation Manual	FUJI	Microprocessor Temperature Controller OM
V4.98.5	ELECTRIC	

Warranty

AWS, a Thermal Care Division warrants its equipment to be free from defects in material and workmanship when used under recommended operating conditions.

AWS, a Thermal Care Division's commitment is limited to replacement (not normal wear and maintenance) and/or repair (e.g. replace pump seal), F.O.B. Niles, IL, of any parts supplied by AWS, a Thermal Care Division found to be defective during the time period shown below. This commitment applies to the original purchaser from the date of start-up.

AWS, a Thermal Care Division is not responsible for any sales, use, excise or other applicable taxes associated with the replacement of parts under this warranty. The warranty does not extend to damage caused by accident, misuse, neglect, or failure to follow published operating procedures, and failures to perform routine maintenance procedures. This warranty shall not apply to equipment that is installed or used in operating conditions or environments deemed as hostile or unusual unless such operating conditions or environments are acknowledged and accepted in writing by AWS, a Thermal Care Division prior to equipment manufacture. This warranty is not transferable.

At no time will AWS, a Thermal Care Division be responsible for loss of prospective or contemplative profits, loss of time due to plant shutdown, or other consequential or special damages to persons or property.

All defective parts become the property of AWS, a Thermal Care Division and must be returned as advised by AWS, a Thermal Care Division

This warranty statement is the expressed warranty for AWS, Inc in its entirety. AWS, a Thermal Care Division assumes no liability for statements or agreements of its employees or others unless made in writing from authorized AWS, a Thermal Care Division personnel. There is an implied equipment warranty for merchantability and fitness for use. All other implied warranties and any liability not based upon contract are hereby disclaimed and denied. This warranty is part of our standard Terms and Conditions of sale (existing separately) for AWS, a Thermal Care Division equipment and services.

Products sold within the United States: One (1) year parts/One (1) year labor
Products sold outside the United States: One (1) year parts/One (1) year labor

Note: This warranty excludes travel expenses/per diem (i.e. air fare, hotel, car, meals). AWS, a Thermal Care Division will require a purchase order prior to onsite visits to cover travel expenses.