

INSTALLATION AND OPERATING INSTRUCTIONS

(10 Through 20-ton Air Cooled Two Stage Chillers)



PORTABLE WATER CHILLERS

ZARSKY WATER CHILLERS MARRONE & CO., INC.

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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. 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 Zarsky Water 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 Zarsky Water 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. Quickly turn selector switch to “Pump Only” then to “Off” to rotate pump. Check for proper pump rotation (clockwise from motor end). The compressors and pump are wired in phase. Once proper rotation is confirmed, turn the selector to “Pump Only” and begin to circulate fluid and purge 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 removed 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 scroll buttons on the controller. 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 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. Adjust the set point using the “up” and “down” scroll buttons on the temperature controller.
10. 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.
11. 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. HOT GAS BYPASS

1. Your new Chiller is equipped with hot gas bypass for capacity control. This hot gas bypass is controlled by the temperature controller. This option is not activated as shipped from the factory.

2. To activate the hot gas bypass set "A1SP" on the temperature controller to your desired set point "SV" as described in the "CONTROLLER" section of this manual. To insure proper operation be sure that "SV" and A1SP" are the same value.

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.***

CAPACITY ± 5% AT 50°F CW / 95°F AMBIENT	10-TON 120,000 BTU/HR	15-TON 180,000 BTU/HR	20-TON 240,000 BTU/HR
MODEL	AWCW-120-E	AWCW-180-E	AWCW-240-E
VOLTAGE / PHASE	208/230/3 460/3	208/230/3 460/3	208/230/3 460/3
MIMIMUM CIRCUIT AMPS	50.5 / 27.3	87.5 / 46.3	103 / 48
DIMENSIONS (APPROX)	40"Wx61"Lx75"H	40"Wx84"Lx75"H	40"Wx84"Lx75"H
WEIGHT	1700 LBS	1900LBS	2000 LBS
PUMP – hp	1 1/2	2	3
PUMP OUTPUT	55 GPM@ 30 PSI	76 GPM@ 30 PSI	95 GPM@ 30 PSI
TANK SIZE	41 GAL	80 GAL	80 GAL
PIPE SIZE –NPT	1 ¼" IN, 1" OUT	1 ½" IN, 2" OUT	1 ½" IN, 2" OUT

Controls:

Two stage electronic temperature controller with constant tank temperature LED readout

Refrigeration Components:

Efficient scroll compressors, sight glass, moisture indicators, balance port expansion valves, filter drier, pump down valves, stainless steel brazed plate evaporator.

Process Fluid Components:

Stainless Steel centrifugal pump, bronze “Y” strainer with 20 mesh stainless steel screen, insulated stainless steel reservoir.

Safety Controls:

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

Construction:

Welded steel powder coated frame and cabinet

Warranty:

One year parts / five year compressor

Chromalox 1603E Temperature Controller

Cold Shot Chillers Part# TCCH-000-160-3-0 (1603E-11150)



Chromalox®

PRECISION HEAT AND CONTROL



1. OPERATOR MODE

The display and modification of the operator parameters can be protected by a secret code.

1.1 PRELIMINARY COMMENTS

It is assumed, at this point, that the instrument has been correctly configured by the supplier/manufacturer.

The upper display indicates the value measured. The lower display indicates the operating set point (below this condition is defined as "Normal display").

DO NOT MODIFY ANY PARAMETER SETTINGS WITHOUT FIRST CONTACTING COLD SHOT CHILLERS. Changes to the settings without first contacting Cold Shot Chillers will void all warranties.

1.2 INDICATORS

OUT1 Lit up when output 1 is ON. (*Call for cooling*)

OUT2 Serves two functions, when used as alarm indication: (*see electrical diagram for details*)

- 1) Lit if only Alarm1 is in alarm condition.
- 2) Flashing at slow rate of about one blink every 2 seconds (0.5 Hz) if only Alarm 2 is in alarm condition. (*Typically for second stage purposes or when used for Hot Gas Bypass*)
- 3) Flashing at fast rate of about two blinks every second (2 Hz) if both alarms are in alarm condition.

°C Lit up if the temperature is displayed in °C.

°F Lit up if the temperature is displayed in °F.

SMT Flashes when the first part of the SMART algorithm is active. Lit when the second part of the SMART algorithm is active.

In addition:

a) The decimal point on the right hand of the LSD of the upper display, flashes when the instrument is working with SP2.

b) The decimal point on the left hand of the LSD of the lower display, flashes when the display shows the time count down.

1.3 FUNCTION OF THE PUSHBUTTONS

FUNC Saves the new value of the selected parameter and goes to the next parameter (increasing order).

SMT Enables or disables the SMART function and scrolls back all the parameters without saving them.

▲ Increases the value of the selected parameter.

▼ Decreases the value of the selected parameter.

▼ + FUNC Enables/disables the "LAMP TEST".

NOTE: The operator parameters must be modified within 10 seconds. If, during operator parameter modification, no pushbutton is pressed during this time, the instrument automatically reverts to the "normal display mode". Saving only the parameter modifications which were followed by pressing the FUNC pushbutton.

1.4 DIRECT MODIFICATION OF THE SET POINT

The set point value can be modified without using the **FUNC** pushbutton. When direct access to set point modification is required, proceed as follows:

- 1) Press pushbutton **▲** or **▼** for more than 2 seconds; the set point value will be displayed and it will start to change.
- 2) Using the **▲** and **▼** pushbuttons, set the desired value.
- 3) When the desired value is reached, **DO NOT** press any pushbutton, the new set point will become operative 2 seconds after the pushbuttons were last pressed and the instrument will return to the "normal display". If during this procedure the modification is not to be saved, press the **FUNC** pushbutton immediately (within 2 seconds); the instrument automatically returns to the normal display without saving the new set point.

1.5 LAMP TEST

To check the display efficiency, Press pushbuttons **▼ + FUNC**. The instrument will turn ON, with a 50% duty cycle, all the LEDs of the display (this state is called LAMP TEST). No time out is applied to the LAMP TEST.

To return to the normal display mode, press pushbuttons **▼ + FUNC** again. No other keyboard functions are available during the LAMP TEST.

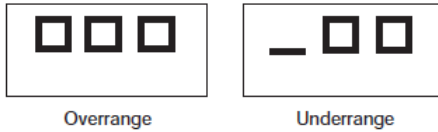
Chromalox 1603E Temperature Controller

Cold Shot Chillers Part# TCCH-000-160-3-0 (1603E-11150)

2. ERROR MESSAGES

2.1 MEASUREMENT ANOMALY SIGNAL

The instrument display shows the OVERRANGE and UNDERRANGE conditions with the following indications:



The sensor break can be signaled as:

- for TC/mV input: OVERRANGE or UNDERRANGE selected by a solder jumper
NOTE : When:

- The instrument is set for one control out only and an OVERRANGE is detected, the OUT 1 turns OFF (if reverse action) or ON (if direct action).
- The instrument is set to use two control outs and an OVERRANGE is detected, OUT 1 turns OFF and OUT 2 turns ON.
- The instrument is set for one control out only and an UNDERRANGE is detected, the OUT 1 turns ON (if reverse action) or OFF (if direct action).
- The instrument is set to use two control outs and an UNDERRANGE is detected, OUT 1 turns ON and OUT 2 turns OFF.

NOTE: When an overrange or an underrange is detected, the alarms operate as if the instrument had detected the maximum or the minimum measurable value respectively.

To eliminate the out of span condition, proceed as follows:

- 1) Check the input signal source and the connecting line.
- 2) Make sure that the input signal is in accordance with the instrument configuration. Otherwise, modify the input configuration (see section 4).
- 3) If no error is detected, send the instrument to your supplier to be checked.

2.2 ERROR MESSAGES

Diagnostics are made on switching on and during normal operation.

If the instrument detects an error condition the display will show:

“ERR” in the lower display and the code which identifies the type of error in the upper display.

The complete list of all the possible errors follows in numerical order.

Some errors automatically reset the instrument: if the error persists, contact the supplier and provide code.

2.3 LIST OF POSSIBLE ERRORS

- 100** EEPROM writing error. Consult your supplier.
- 150** Generic CPU error. Consult your supplier.
- 2xx** Error in the configuration parameters. The two less significant figures indicate the number of the incorrect parameter (e.g. 209 ERR indicates error of parameter P9). Press SMT and FUNC, then set the parameter correctly. See section 4.
- 301** RTD input calibration error. Contact your supplier.
- 305** TC input calibration error. Contact your supplier.
- 307** RJ input calibration error. Contact your supplier.
- 400** Error in the operator parameters. To deal with the problem, enter the predefined parameters (“Default Parameters”, see section B), pressing pushbuttons ▲ and ▼ at the same time. Then set the operator parameters. This will not reset the configuration parameters.
- 500** Auto-zero error. Contact your supplier.
- 502** RJ error. Contact your supplier.
- 510** Error during calibration. Contact your supplier.

3. MAINTENANCE

WARNING - Electric shock Hazard

Disconnect all power before servicing controller. Failure to do so could result in personal injury or property damage.

- 1) SWITCH THE EQUIPMENT OFF (power supply, relay out, etc.).
- 2) Take the instrument out of its case.
- 3) Using a vacuum cleaner or a compressed air jet (max. 3 kg/cm²) remove all deposits of dust and dirt which may be present on the louvers and on the internal circuits being careful not to damage the electronic components.
- 4) To clean external plastic or rubber parts use only a cloth moistened with:
 - Ethyl Alcohol (pure or denatured) [C₂H₅OH] or
 - Isopropyl Alcohol (pure or denatured) [(CH₃)₂CHOH] or - Water (H₂O).
- 5) Make sure that there are no loose terminals.
- 6) Before putting the instrument back in its case, make sure that it is perfectly dry.
- 7) Put the instrument back and turn it ON.

CHROMALOX CONTROL 1603 E

UNLOCK THE SYSTEM:

HOLD SMT & FUNC TOGETHER

CONFIGURATION (CNF)

PRESS THE UP BUTTON TO 408 THEN PRESS FUNC

BACK TO CNF

PRESS FUNC – KEEP PRESSING UNTIL P 11. CHANGE P 11 TO ZERO THEN PRESS FUNC.

SYSTEM IS UNLOCKED

PRESS SMT BACK TO CNF.

PRESS FUNC AND SMT TOGETHER.

MOVE TO THE DESIRED CONFIGURATION THAT NEED TO CHANGE THEN PRESS FUNC.

REPEAT THE STEPS TO LOCK SYSTEM BACK.

CHANGE P 11 TO 1 TO LOCK THE SYSTEM.

ALWAYS PRESS FUNC AFTER CHANGING A CONFIGURATION.

IF YOU HAVE ANY QUESTIONS PLEASE CALL.

**CONTROLLER PARAMETERS
CHROMALOX 1603E**

PARAMETERS	STANDARD Single-HGB	STANDARD Two Stage	LOW TEMP	ECB	EOR	EUS
P1 INPUT TYPE & RANGE VALUE	9	9	9	9	9	9
P2 LOW SCALE RANGE (°F)	0	0	0	0	0	0
P3 HIGH SCALE RANGE (°F)	600	600	600	600	600	600
P4 OUT 1 ACTION	dir	dir	dir	dir	dir	dir
P5 OUT 2 FUNCTION	I	I	I	I	I	I
P6 ALARM 1 OR COOLING CONFIG.	L.A.	L.A.	L.A.	L.A.	L.A.	L.A.
P7 ALARM 1 ACTION	rEU	rEU	rEU	rEU	rEU	rEU
P8 ALARM STANDBY	OFF	OFF	OFF	OFF	OFF	OFF
P9 * OFFSET ADJUSTMENT (°F)	0	0	0	0	0	0
P10 INPUT THRESHOLD	0	0	0	0	0	0
P11 SAFETY LOCK	1	1	1	1	1	1
P12 CONTROL OUTPUT	InF	InF	InF	InF	InF	InF
P15 SMART FUNCTION	0	0	0	0	0	0
P21 EXTENSION OF ANTI RESET WIND UP	10	10	10	10	10	10
P22 OPTION FEATURE SELECTION	3	3	3	3	3	3
P23 ALARM 2 CONFIGURATION	H.A.	H.A.	H.A.	H.A.	H.A.	H.A.
P24 ALARM 2 ACTION	dir	dir	dir	dir	dir	rEU
P25 ALARM 2 STANDBY	OFF	OFF	OFF	OFF	OFF	OFF
SP SET POINT (°F)	50	50	50	50	60	60
AL 1 ** ALARM 1 THRESHOLD (°F)	37	37	15	32	37	45
H5 1 ALARM 1 HYSTERESIS	2.5	2.5	2.5	1.0	1.0	1.5
AL 2 ALARM 2 THRESHOLD (°F)	10	5	10	5	5	1
HS 2 ALARM 2 HYSTERESIS	.1	.1	.1	.1	.1	.1
P6 PROPORTIONAL BAND	0	0	0	0	0	0
H5 HYSTERESIS FOR ON/OFF	.5	.5	.5	.2	1.0	.7
rL SET POINT LOW (°F)	35	0	0	35	35	45
rH (°F) SET POINT HIGH (°F)	125	125	125	125	125	125

* Setting dependent on controller and thermocouple. Modify only to match actual with indicated temperature.

** Settings dependent on type of refrigerant and Leaving fluid temperature. Notation is required that fluid must have freeze protection.