INSTALLATION & OPERATION INSTRUCTIONS

HORIZONTAL FEEDWATER TANKS FOR CHSI BOILERS

CHROMALOX

HT-IOM-2024-0927
January 2025

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⚠WARNING

Do not operate, or allow others to operate, service or repair this equipment unless you (they) fully understand all applicable sections of this manual and are qualified to operate/maintain the equipment.

Prior to the commencement of any work requiring the removal of cover plates and the opening of the control panel box, the electrical supply to the boiler must be disconnected.

Assure all electrical connections are powered down prior to attempting replacement or service of electrical components or connections of the equipment.

Label all wires prior to disconnecting when servicing controls. Wiring errors can cause improper and dangerous operation.

Operating the equipment beyond its design limits can damage the equipment and can also be dangerous.

Do not operate the equipment outside its limits. Do not try to upgrade the equipment performance by unapproved modifications. Unapproved modifications can cause injury and damage.

Contact your Chromalox Representative before modifying the equipment.

Defective equipment can injure you or others. Do not operate equipment which is defective or has missing parts. Make sure all repairs or maintenance procedures are completed before using the equipment. Do not attempt repairs or any other maintenance work you do not understand.

Never attempt to operate equipment that has failed to pass all the safety checks.

Please read these instructions and save for reference.

INTRODUCTION

OVERVIEW

Prior to shipment, the following inspections and tests are made to ensure the highest standards of manufacturing for our customers:

· Material inspections
· Manufacturing process inspections
· American Society of Mechanical Engineers (ASME) welding inspection (if applicable)
· ASME hydrostatic test inspection (if applicable)
· Electrical components inspection
· Operating test
· Final engineering inspection
· Crating inspection

This manual is provided as a guide to the correct operation and maintenance of your Chromalox equipment, and should be read in its entirety and be made permanently available to the staff responsible for the operation of the Feedwater Tank. It should not, however, be considered as a complete code of practice, nor should it replace existing codes or standards which may be applicable. Chromalox reserves the right to change any part of this installation, operation and maintenance manual.

Installation, start-up, and maintenance of this equipment can be hazardous and requires trained, qualified installers and service personnel. **Trained personnel are responsible for the installation, operation, and maintenance of this product, and for the safety assurance of installation, operation, and maintenance processes. Do not install, operate, service or repair any component of this equipment unless you are qualified and fully understand all requirements and procedures. Trained personnel refers to those who have completed Chromalox Service School training specific to this product.**

When working on this equipment, observe all warnings, cautions, and notes in literature, on stickers and labels, and any additional safety precautions that apply. Follow all safety codes and wear appropriate safety protection. Follow all jurisdictional codes and consult any jurisdictional authorities prior to installation.

RECEIVING INSPECTION

The customer should examine the equipment for any damage. It is the responsibility of the installer to ensure all parts supplied with the equipment are fitted in a correct and safe manner.

WARNINGS & CAUTIONS

WARNINGS and CAUTIONS appear in various chapters of this manual. It is critical that all personnel read and adhere to all information contained in WARNINGS and CAUTIONS.

· WARNINGS must be observed to prevent serious injury or death to personnel.

· CAUTIONS must be observed to prevent damage or destruction of equipment or loss of operating effectiveness.

All Warnings and Cautions are for reference and guidance purposes, and do not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes or regulations.

In addition, there are bolded **Notes** throughout the manual, which are included as additional information for essential and effective operation and conditions.

DISCLAIMERS & LOCAL CODES

Installation of the equipment shall conform to all the requirements or all national, state and local codes established by the authorities having jurisdiction or, in the absence of such requirements, in the US to the National Electric Code (NEC)/ National Fire Protection Association (NFPA) 70 latest edition, and the specific instructions in this manual. Authorities having jurisdiction should be consulted prior to installation.

When required by local codes, the installation must conform to the ASME Safety Code for Controls and Safety Devices (CSD-1).

⚠WARNING

Competent personnel in accordance with all applicable local codes should carry out the placement and rigging of the Chromalox equipment. All state and jurisdictional codes beyond the scope of the applicable ASME Boiler and Pressure Vessel Codes, for its corresponding classification, should be followed in all cases. Jurisdictional authorities must be consulted prior to installation.

Failure to provide required and safe access to the equipment could impede commissioning and maintenance. Service technicians are instructed not to commence commissioning if hazardous conditions exist.

SAFETY COMPONENTS: The end user of the boiler must maintain all labels on the boiler in clean, legible condition. All connections and safety devices, both mechanical and electrical, must be kept clean, with ease of access for inspection, use and maintenance.

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INSTALLATION

PRODUCT OVERVIEW

The feedwater tank should be located to permit access to operating controls, instruments and inspection openings.

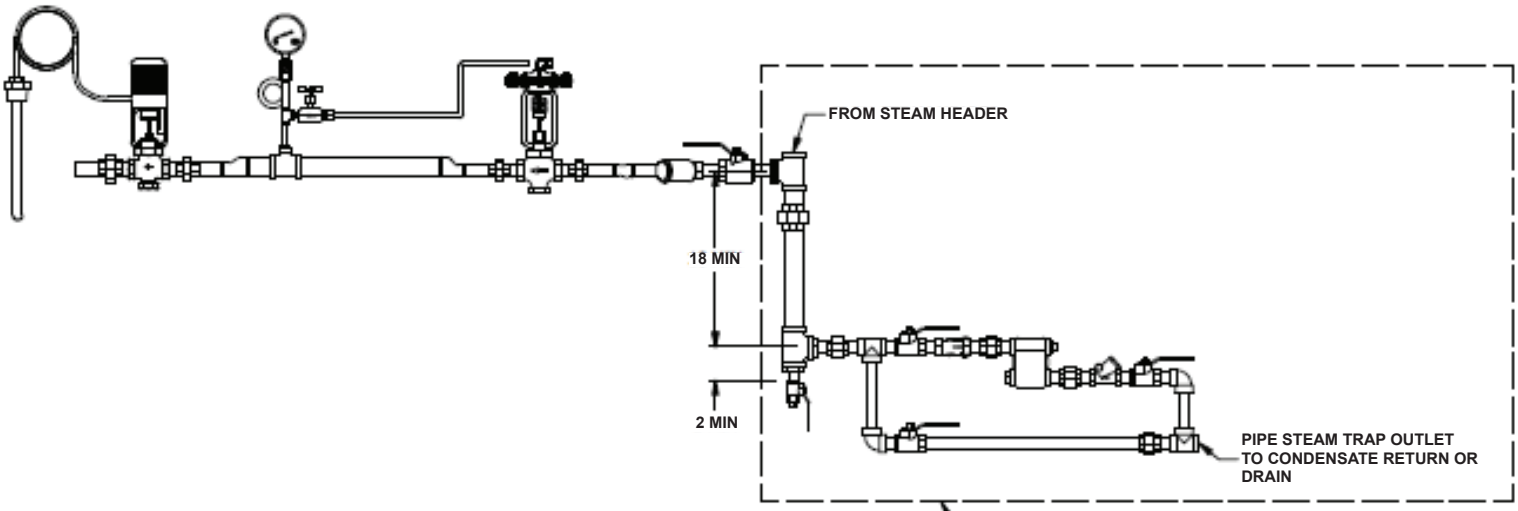
The foundation should be level and designed to support the load. Calculations should be based upon the maximum or filled weight of the system.

RIGGING & PIPING

Qualified riggers should be used to place the system on the foundation. All rigging equipment must be carefully placed to avoid damaging or loosening piping, nozzles and other parts of the assembly.

The system should be securely bolted to the foundation.

1. Prior to piping, all foreign material or debris must be removed to prevent possible malfunctions. Clean tank by flushing with hose.
2. Avoid imposing any piping strain on the pump(s). Provide expansion joints and independently supported pipe hangers where necessary.
3. Isolating valves are installed to allow for cleaning or repairs.
4. Make-up water and pump discharge piping must be sized in accordance with any applicable local or state codes. Sizing should be determined by flows, pressures, and distances, not pump size.
5. Install a stop valve, throttling/globe valve, and one check valve in the pump discharge line and one on boiler. One of the two check valves are typically mounted on the boiler.
6. Vent piping should be vertical, full size, free of valves, bends or restrictions and piped to a safe location.
7. Over flow piping should be full size, free of obstructions and piped to a safe location. Overflow piping may be over 140 deg. F and may require cooling prior to going to drain.
8. Fulton recommends that preheat piping remains level or sloped in the direction of flow. All preheat valving must be located above the highest possible water level in the tank. A drip leg with condensate drain protection must be piped at the preheat inlet. Preheat piping that fails to comply with the above installation instructions will not receive warranty consideration. See “Recommended Preheat Piping” below.



RECOMMENDED PREHEAT PIPING

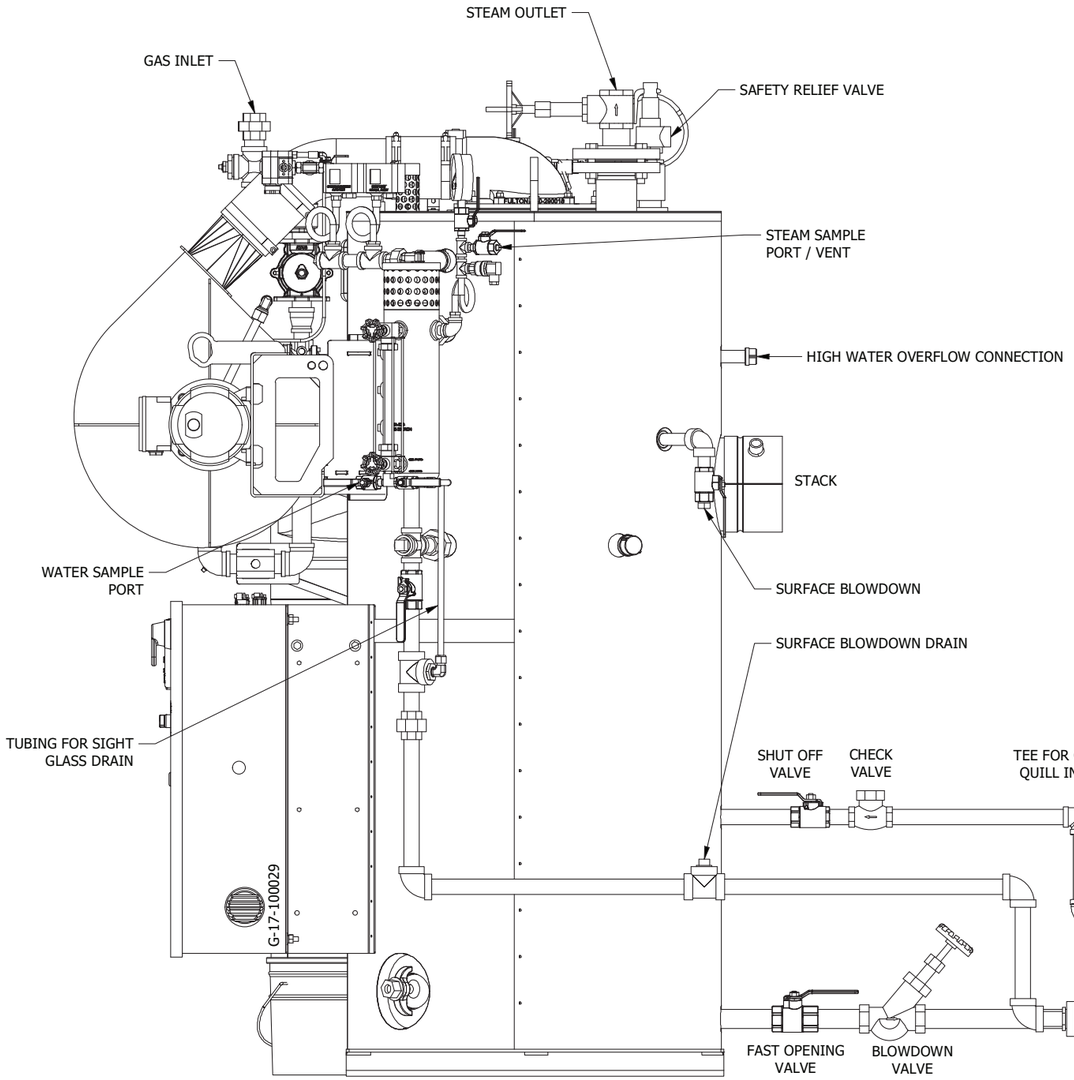


FIGURE 2 - HORIZONTAL FEEDWATER TANK PIPING

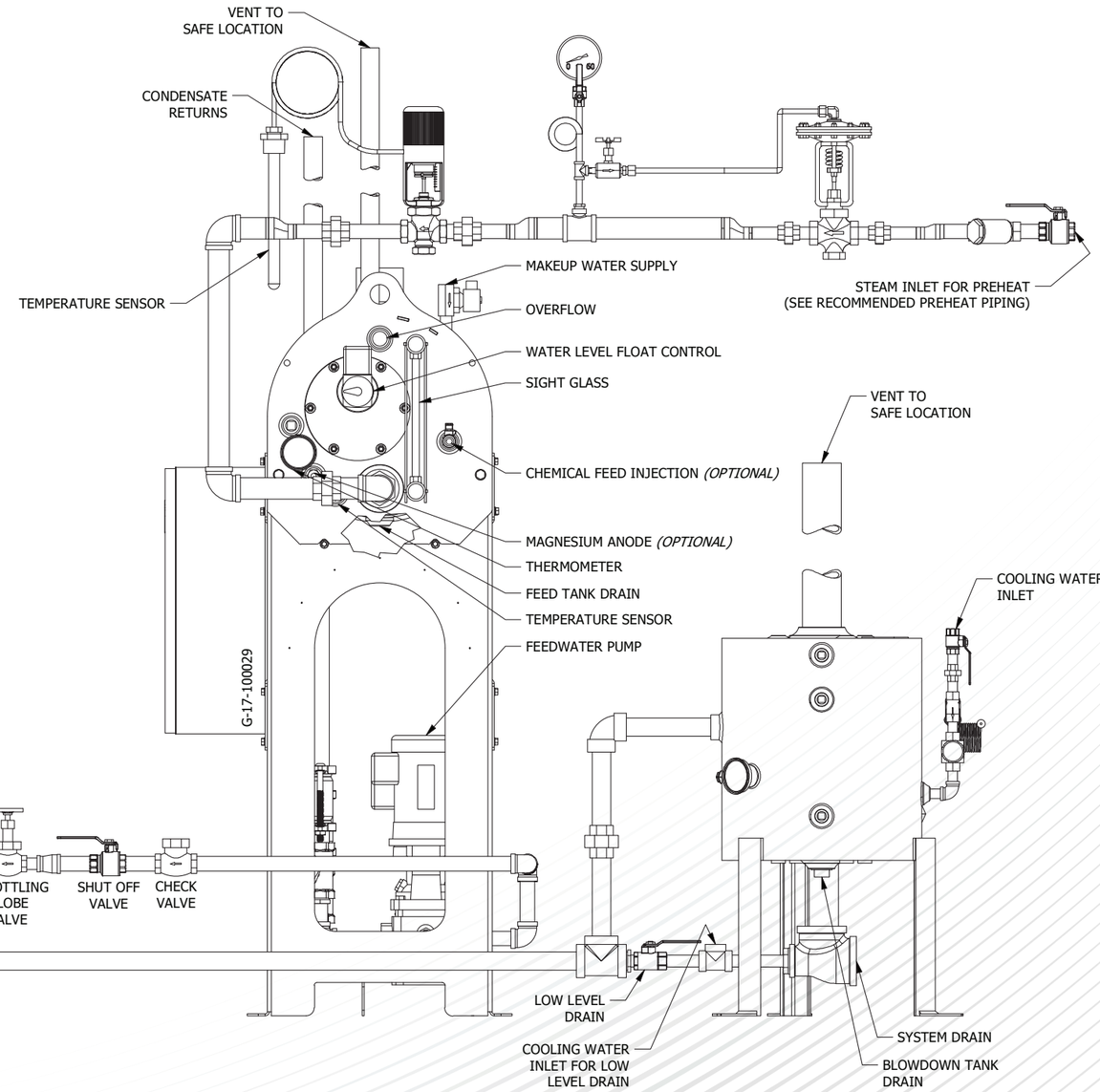


FIGURE 2 (CONTINUED) - HORIZONTAL FEEDWATER TANK PIPING

⚠WARNING

Improper installation or maintenance of gauge glass and connections can cause immediate or delayed breakage resulting in bodily injury and/or property damage.

WATER GAUGE & GAUGE GLASS INSTALLATION

NOTE: Only properly trained personnel should install and maintain water gauge glass and connections. Wear safety glasses during installation. Before installing, make sure all parts are free of chips and debris. Keep gauge glass in original packaging until ready to install.

1. Verify the proper gauge has been supplied.
2. Examine the gauge glass and packings carefully for damage before installation. Do not use the glass if it contains any scratches, chips or any other visible signs of damage.
3. Do not subject the gauge glass to bending or torsional stresses.
4. Apply Teflon tape or pipe dope to pipe threads. Install top gauge fitting (fitting without a drain valve) into the uppermost tapping. Wrench tighten the fitting until is snug and the glass outlet is pointing at five o'clock (about 1/8 turn from its final downward vertical position).
5. Install the bottom gauge fitting (the fitting with a drain valve) until it is snug and the glass outlet is pointing directly upward. Verify top and bottom fittings are threaded into the tappings the same number of turns (distance A - distance B).
6. Remove glass packing nut, friction washer and glass packing from the fittings, and replace them in the same order on both ends of the gauge glass. Push both packings about an inch up the gauge glass.
7. Gently insert one end of the glass into the top gauge fitting. Keeping the glass inside the top fitting, gently rotate the top gauge fitting clockwise until vertically aligned with the bottom gauge fitting, then insert glass into bottom fitting until glass bottoms out on the the shoulder inside the bottom fitting.
8. Carefully raise glass about 1/16" and slide lower glass packing down until the glass packing contacts the lower gauge fitting. Do Not allow the glass to remain in contact with any metal.
9. Carefully slide upper glass packing up as far as possible.
10. Hand tighten both glass packing nuts, then tighten 1/2 turn more by

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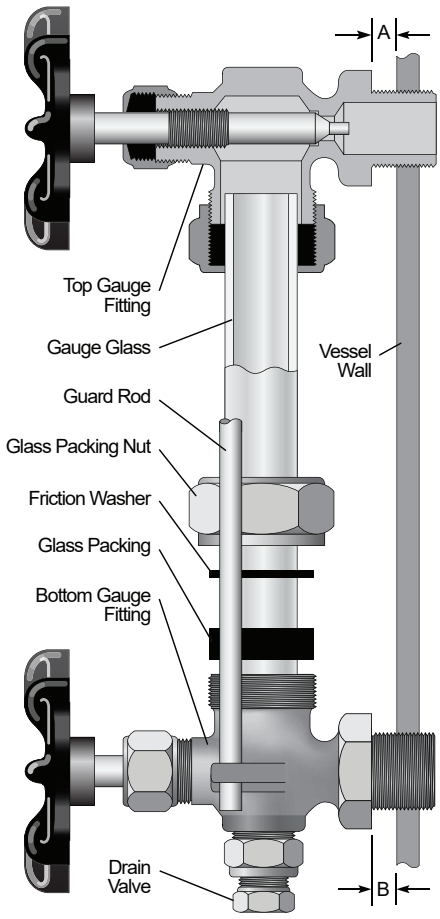

FIGURE 3 - GAUGE GLASS ASSEMBLY

FLOAT VALVE ASSEMBLY

See Figure 4.

1. Apply Teflon tape or pipe dope to all pipe threads. Assembly rod to float and valve.
2. Screw square D float switch into appropriate coupling on the face of the feedwater tank.
3. Adjust float valve (water level should be approximately 1" from top of sight glass). Water level may need to be adjusted based on the condensate return frequency to prevent overflow.

WARNING: Incoming water pressure to float valve cannot exceed 40 PSIG. Use PRV if pressure is above 40 PSIG.

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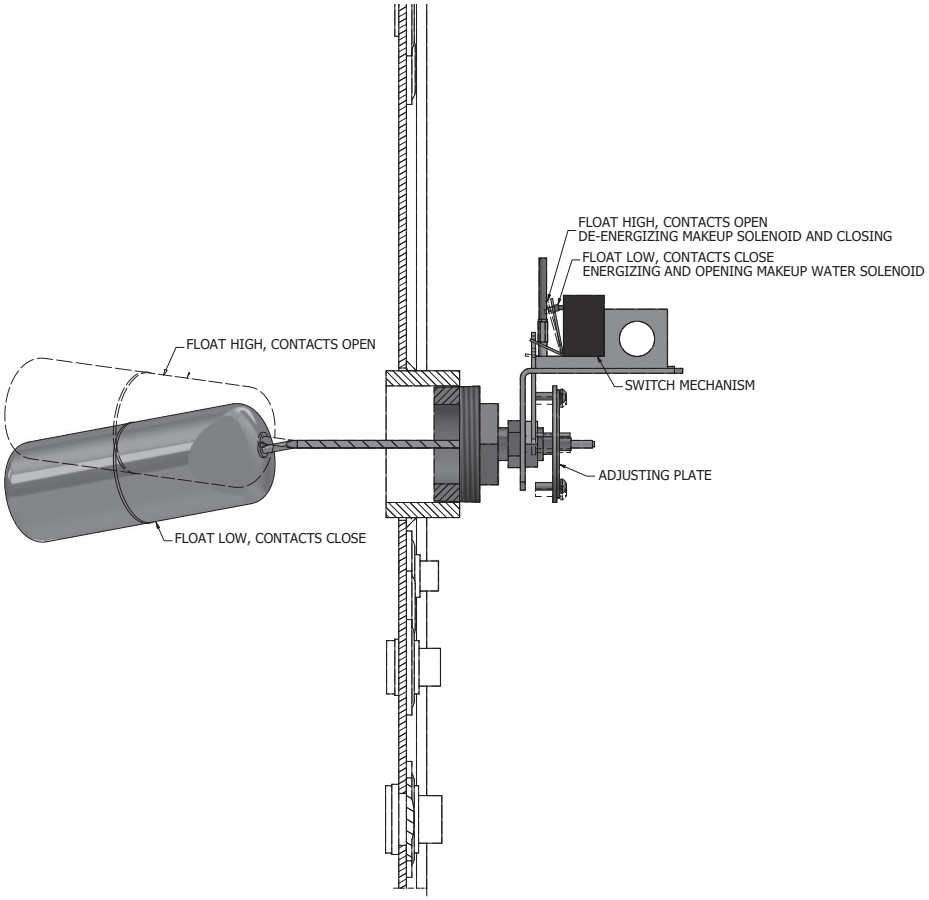

FIGURE 4 - HORIZONTAL FEEDWATER SQUARE D FLOAT SWITCH

⚠CAUTION

A temperature exceeding 120 F (49 C) in the boiler room may cause premature failure of electrical components. Provisions should be made to maintain an ambient temperature of 120 F (49 C) or less (the panel box interior should not exceed 125 F [52 C]).

⚠WARNING

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WIRING

1. Check voltage, phase and hertz available against motor nameplate for compatibility.
2. Be sure leads for dual voltage motors are connected properly.
3. Install power and control wiring to magnetic starter in accordance with the National Electric Code and local requirements.

COUPLING ALIGNMENT

Coupling between pump and motor has been properly aligned at the factory. However, shipping, rigging and piping of the system often disturb this, making realignment necessary. Check by applying a straight edge across coupling halves at 90 degrees and 180 degrees. The straight edge should rest evenly on both coupling halves. If necessary, shim pump and/or motor to bring coupling into perfect alignment horizontally and vertically. Check pump for free rotation by turning coupling by hand.

ACCESSORIES

Optional accessories should be installed in accordance with the manufacturer's instructions. Preheat kit: If the tank is equipped with a preheat kit, follow mounting and wiring instructions included in preheat kit parts box.

OPERATION

SYSTEM START-UP

1. Inspect all pipe connections to be sure they are secure. Examine all controls and valves to assure each is operating freely and properly.
2. Thoroughly flush vessel and all associated piping until there is no indication of rust or foreign debris.
3. Make certain all instruments and gauges are operating and indicating properly.
4. Make certain pump rotates in direction shown by arrow on pumping casing.
5. Open all valves on suction, discharge and make-up water lines.
6. Make sure there is sufficient water in receiver (approximately 1/2 full).
7. Before performing a leak test, be sure to isolate the tank. Tank should not be pressurized as part of leak test. This can lead to serious injury or death.
8. Multiple operation cycles should be observed if possible.
9. To fully understand system operation, operator must be familiar with all parts of this manual.

⚠WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/ professional codes and regulations. Failure to follow instructions may result in a fire or explosion, causing property damage, personal injury, or loss of life.

⚠WARNING

DO NOT run pump dry. Irreparable damage to the seal can result.

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MAINTENANCE & TROUBLESHOOTING

MAINTENANCE

1. Inspect all controls for proper operation. Lubricate all moving parts as required.
2. Clean and check water gauge glass for presence of oil. If detected, find the source and eliminate it.
3. Make periodic inspection of the pump mechanical seal(s) for leakage. Replace seal if necessary following the pump manufacturer's instructions.
4. Pump bearings may or may not require lubrication depending on a particular pump. Follow the pump manufacturer's instructions.
5. Clean pump strainer of debris.
6. Drain and flush tank yearly.

TROUBLESHOOTING

The following pages contain a troubleshooting guide that will assist in the diagnosis and correction of minor field problems. In any case requiring additional assistance, contact your local authorized Chromalox Representative.

TROUBLESHOOTING GUIDE

PROBLEM	CHECK
Pump rotates freely but does not pump	1. Excessive feed water temperature (normal max. 180°F for Burks or MTH pumps only) will result in flashing at pump inlet. This is usually caused by leaky check valve between pump and boiler or failure of steam traps to close tightly. Repair or replace defective equipment at once before causing damage to pump. 2. Obstruction in suction line. This can be determined by a visual check or installing a compound gauge (reading vacuum and pressure) in the pump suction line close to the pump. An unrestricted line will product a pressure reading on the gauge of approximately 1 PSIG while the pump is running. A vacuum reading on the gauge indicates an obstruction which must be eliminated. Be sure to remove strainer basket, scrub clean and reinstall. 3. Motor not up to rated speed. Check speed with tachometer. 4. Wrong direction of rotation. Check arrow on pump casing. 5. Broken pump shaft. Check shaft at both end. 6. Pump sized too small.
Pump vibrates or is very noisy	1. Misalignment of pump and motor. Check coupling and piping strain. 2. Bent or broken shaft. 3. Pump impeller binding. Check for foreign matter in pump, bent impeller, or mineral deposits on impeller, channel ring or spacer. If mineral deposits occur, have the water analyzed and treated by a reliable chemical treatment company. Remove any mineral deposits from pump parts. 4. Worn bearings. Replace. 5. Pump cavitation. High water temperatures or a suction line restriction, such as a clogged strainer, will cause cavitation. Any restriction must be corrected immediately or severe pump damage will result.
Receiver overflows constantly	1. Make-up valve seat worn, not sealing tight. Replace valve. 2. Make-up valve float water logged or disconnected. Replace. 3. Lower the level of make-up water to allow more tank volume for condensate

TROUBLESHOOTING GUIDE

PROBLEM	CHECK
Motor Failure	1. Tripped starter overload. Reset and check motor and pump for proper operation. 2. Improper power supply. Check voltage and motor nameplate data. 3. Incorrect connections. Check wiring diagram. 4. Mechanical failure. Check for free rotation and examine bearings. 5. Short circuited windings. Indicated by blown fuse or failure to start. Motor must be replaced. 6. Overload. Check pump for proper operation and free rotation. 7. One phase open in three phase curcuit. Check power supply lines.
Starter overload tripped	1. Reset and inspect pump and motor for proper operation.
Motor fails to start	1. Make certain boiler level switch is functioning properly. 2. Check control circuit for continuity.
Preheat kit solenoid valve does not open	1. Check wiring to the solenoid valve and aquastat. 2. If faulty, replace solenoid and or aquastat.

Limited Warranty:
Please refer to the Chromalox limited warranty applicable to this product at
http://www.chromalox.com/customer-service/policies/termsofsale.aspx.

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