INSTALLATION

-AND-

OPERATION MANUAL

MODEL TC2-S115

SERIAL NO. SS-89-4

HUNT & MOSCROP LTD.
PO 2730

FOR: CRANE & COMPANY, INC.
30 SOUTH STREET
DALTON, MA 01226

PO 8228

March 30, 1989

DO NOT INSTALL OR OPERATE SUPER-TROL SYSTEM BEFORE READING THIS MANUAL

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Reference Dwgs: D-89010 General Arrangement
D-89011 Electrical Schematic
D-89012 Flow Schematic

This system is designed to utilize Boiler Grade Water as the process fluid with a maximum operating temperature of 270 ^{o}F.

* READ CAREFULLY ALL INSTRUCTIONS BEFORE ATTEMPTING INSTALLATION *

CAUTION

BE SURE TO ALLOW THE WATER TO COOL BELOW 150^{o} F. BEFORE SHUTTING PUMP OFF. FAILURE TO DO THIS MAY RESULT IN SERIOUS DAMAGE TO PUMP & PUMP SEALS. IF SYSTEM MAINTENANCE IS TO BE PERFORMED, COOL WATER BELOW 100^{o} F.

USE EXTREME CARE IN VENTING AND REPAIR LEAKS IMMEDIATELY.

INSTALLATION

This Super-Trol System is a precision control system manufactured of high quality components. Extreme care must be used in installing this system. It is also recommended that the installation, operation, and maintenance personnel be thoroughly familiar with these instructions before commencing installation and operation. If the correct procedures are followed, Super-Trol systems will provide many years of dependable service.

In no event should this system be modified in any way or operated outside design parameters (pressure, temperatures, BTU inputs, etc.) without receiving written approval and instructions from the manufacturer.

The Super-Trol Factory Engineering Staff is available to you at your convenience for consultation on installation, start-up, and operation. We invite you to contact us:

Super-Trol Division
300 Huron Street
P.O. Box 4030
Elyria, Ohio 44036-4030
(216) 323-4080
FAX (216) 323-5734

1. PIPING, ELECTRICAL & SYSTEM DESIGN

SYSTEM LOCATION

Install the Super-Trol system as close as possible to the process requiring control. Connect Super-Trol system to equipment with pipes that are run to allow for piping expansion during heat-up.

LEVELING

The Super-Trol System Package Skid must be installed level, preferably on a concrete pad with suitable grouting.

THERMAL EXPANSION AND EXTERNAL PIPING LOADS

All piping systems expand with temperature increase. For carbon steel pipe, the expansion is approximately 0.0760"/10' of pipe length for each 100°F. of temperature increase. The design of the external piping must include sufficient pipe supports, pipe guides, and expansion joints to isolate the Super-Trol system from external piping loads.

PIPE SELECTION & SIZING

The connecting pipe, fittings, and flexible connections between the Super-Trol System and the process equipment being controlled must be properly selected to permit the Super-Trol System to operate at or near design flow conditions to insure close temperature control. This will allow the fluid to transfer the maximum heating or cooling load to the process without causing excessive temperature variation within the equipment.

All piping, fittings, gaskets, seals, sealants, etc. used must be rated and specified for the system fluid and maximum system operating temperature and pressure.

As a general rule, the connecting piping or hose should be at least as large as the connection on the Super-Trol System. If it is absolutely necessary to reduce by one (1) pipe size, the reduction should be made at the point of use to keep the restriction to flow at a minimum.

NOTE: Various types of minimum flow protection devices can be used in the system if desired.

INSULATION

To minimize system heat loss and temperature variation, and to provide personnel protection, it is recommended that all external piping be insulated. The Expansion Tank is not to be insulated.

AIR VENTING

A well designed heat transfer circuit must provide for the venting of air. Air and gases will accumulate at all high points, so the piping should be arranged to create one and not more than two vent points in the system. An Automatic Air Vent for each zone has been shipped (packed loose with system) for installation (by others) at the piping high point. See Flow Schematic for typical piping.

ELECTRICAL HOOK-UP

Connect the correct power service, per system nameplate, to the disconnect within the Super-Trol system. Super-Trol does not punch the input power line hole to allow the customer to select a location convenient to his needs.

EXPANSION TANK

The Super-Trol System is equipped with an expansion tank for the water loop. The expansion tank includes level switches (LSL, LSH) which open and close the water fill solenoid valve (SOV 6). In addition, a high level switch (LSHH) with dump valve (SOV 5) & indicator light (PL7) and a low level switch (LSLL) with alarm light (PL5) are provided. A shutoff valve is included in the piping to the tank to isolate the tank if required. This valve should normally be left open.

EXPANSION TANK PRESSURIZATION

Plant air should be connected to the air supply line. For system operation up to 270 ^{o}F. the regulator (PCV-2) should be set at 40 PSI. A pressure switch is provided to insure that the unit can safely operate at elevated temperatures. The air space above the fluid also provides a cushion for expansion of the fluid during heatup.

If the tank is properly pressurized, release of circulating water to the drain will take place only under emergency conditions.

OPEN DRAIN

The lines indicated should be connected to an open drain. Never connect the Super-Trol system to a pressurized drain line without consulting the Super-Trol Engineering Staff.

If it is impossible to follow these instructions, please contact the Super-Trol factory before making an installation; otherwise, the warranty will be void.

2. BEFORE START-UP

Before starting the Super-Trol System, all pipe connections, unions and other fittings including bolts which hold bonnets to heaters and coolers should be checked for tightness. Although each Super-Trol System is operated at the factory before shipment, the constant vibration during shipment can loosen these items and it is impossible to assure that they will be tight after the system is installed.

Prior to filling, all piping should be flushed and all in-line strainers cleaned.

3. FILLING OF THE SYSTEM

FLUID TYPE

Each system is designed for a specific fluid type. Fill the system only with this fluid. Any change in fluid type must be approved by the factory before the system is filled.

This machine is designed for cooled boiler quality water. In order not to "shock" the rolls when filling, makeup water should not exceed 90 ^{o}F.

Because the unit is pressurized with air, makeup water pressure must exceed the air pressure. Recommended minimum pressure is 60 PSI. If pressure is slightly lower than recommended, the unit will fill slowly, however, in all cases the pressure must exceed the air pressure for the unit to fill.

FILLING and VENTING

The system fluid is filled from the lowest point, to allow the fluid to progressively push the air upward and out through the automatic air vents. When filling, be sure any shutoff valves for process equipment or Air Vents are open so that air will be easily expelled and liquid fills all internal spaces.

When the main disconnect switch is turned on, the system will automatically fill. Water level in the tank at end of filling should be approximately 1/4 to 1/2 filled as observed in the gage glass. This will leave adequate expansion area in the tank for the fluid when heated. The system will not run (LSLL) until a minimum tank level is established.

Check again the Super-Trol system and all external piping and equipment for leaks.

4. ELECTRICAL CHECK-OUT

Momentarily push the start buttons on the Super-Trol system and observe pump rotation (see arrow on pump volute). If the circulating pumps are running backward it should be electrically reversed. This can be accomplished by interchanging any two of the power input leads where they enter the control box.

5. NORMAL OPERATION

A. Turn on main disconnect switch.

B. Push pump "START" button. It may be necessary to momentarily hold the start button until the makeup water pressure returns to normal. Design output can be verified by checking the pressure on the "Discharge Pressure" gage. Subtract "Suction Pressure" from "Discharge Pressure" and use this figure. Pumps are sized for 165 ft. head nominal (72 PSI - cold). This pressure will drop as the temperatures are raised.

C. Caution: Start-up heating rate may exceed allowable heating rate of external equipment. The Controller has a built-in ramp that has been set per the roll manufacturer's recommendations and should not be reset without factory authorization.

6. MANUAL SHUT-DOWN

If maintenance is to be performed, system should be cooled below 100°F before shut-down and the Expansion Tank depressurized before maintenance is started.

A. Press pump "STOP" buttons.

B. Turn the main disconnect switch "OFF".

7. TROUBLESHOOTING

The following is a summary of the most common installation and start-up troubles.

A. Lack of circulation and/or temperature control. Readings rising and falling over wide ranges:

1. Improper piping connections. Trace the piping between the Super-trol system and the equipment to make sure it is correct.

2. Lack of circulation due to either vapor binding of the system, restriction in the system, or improper piping. Refer to the sections above for instructions on air venting and pipe sizing.

3. Pump rotation incorrect. Note that a centrifugal pump will develop some flow regardless of its rotational direction. It will, however, develop proper flow only in the correct direction.

B. System will not run properly - electrical trouble suspected.

1. Turn-off power at main source and recheck each wire and the ground connection at each wire termination.

8. DEPENDABLE SERVICE

If the above procedures are followed closely, and recommended periodic maintenance performed, your Super-Trol system will perform as expected and will give years of dependable service life. If the system is allowed to operate improperly, even for a short period damage may result which will cause premature failure.