

TROUBLESHOOTING HYDRONIC SYSTEM PROBLEMS

Below and on the following page are four guides for troubleshooting various problems found in typical hydronic heating systems. Each guide was developed by Bob DeWyze, Director of Training and Education for ITT Fluid Handling Division (retired). Familiarization with this information may provide insight in preventing future repairs required for pumps, valves and other hydronic accessories found in this service parts catalog.

PUMPING SYSTEM TROUBLE ANALYSIS GUIDE		
COMPLAINT	POSSIBLE CAUSE	RECOMMENDED ACTION
No circulation	Set screw not tight, coupler loose on shaft Impeller slipping on shaft Air-bound system Air-bound pump Broken pump coupler Clogged impeller or piping System valve closed Pump electrical circuit broken	Tighten set screw in shaft recess. Check to see if impeller is placed on the key way of the shaft. Tighten impeller nut. Vent system Vent pump casing Replace; check alignment Locate and remove obstruction Open Check all related low and line voltage circuits.
Inadequate circulation	Air-bound system Air-bound pump Clogged impeller or piping Clogged strainer Pump impeller damaged Insufficient NPSH (net positive suction head) Pump too small Partially air-bound pump Pump running backwards (three phase) Improper motor speed	Vent system Vent pump casing Locate and remove obstruction Remove and clean screen Replace Lower pump or raise pressure or relocate Replace pump or impeller Vent pump casing Reverse any two motor leads Check wiring and voltage
Pump or system noise	Entrained air Pump cavitation Pump misalignment Worn pump coupler Excessive water velocity Poor foundation (base-mounted pumps only) Pipe vibration	Vent system Lower pump or raise pressure or relocate (see note below) Re-align pump Replace; check alignment of shafts - replace sagging motor mounts Install balancing cocks or parallel piping. Provide rigid foundation with adequate grouting. Provide adequate pipe support.
Premature failure of pump components	Improper pump (size/type) Improper pump location Pump misalignment Excessive water treatment Over-oiling of pump Under-oiling of pump Pump operating close to or beyond end point of curve Excessive piping load	Replace Relocate Re-align Check manufacturer's instructions Check manufacturer's instructions Check manufacturer's instructions Balance system Provide proper pipe support
Seal failures within 1 year period or less in a closed system	Excessive dirt, sand and oxides Excessive or improper water treatment Pump Cavitation: 1. Improper selection 2. Compression tank location Air-seal without lubricant (water) Excessive temperatures Pumps run without fluid	Clean system Check for proper water treatment recommendations from pump manufacturer. Check pump operation on its curve - overloading High head pump must have compression tank on suction side of pump. Vent air from pump volute Check type of seal and max. operating temperature from manufacturer. Pumps must be primed before operation.
Seal pitting • Oxygen corrosion • Magnetic iron oxide	Caused by wear and excessive amounts of free oxygen. Fresh water feeding carries oxygen into the system.	Check if system has a constant leak.

Note: Cavitation can be identified by low rumbling or sharp rattling noises. This situation is created by the lack of available net positive suction head (NPSH). The pressure at some point in the pump falls below the vapor pressure of the water causing flashing and the formation of bubbles, which are carried into the volute where the higher pressure causes them to implode. This can eventually destroy the pump.

AIR CONTROL SYSTEM PROBLEMS		
COMPLAINT	POSSIBLE CAUSE	RECOMMENDED ACTION
Waterlogged compression tank	Gravity circulation between boiler and tank Leak in tank Leak in gauge glass. Top gasket dries out allowing air to escape.	Install air control system Check with soap solution - replace Check tapping - would most likely be in upper tapping
Insufficient air control in air control devices Boiler top outlet fittings	Dip tube not 2½" below water line in boiler	This is almost impossible to find without taking the supply piping on the boiler apart.
In-Line fitting not working properly	Velocity too high through fitting for air separation. Initial system start-up not performed properly Improper pitch in piping to the tank Leaks in system piping	Check size of fitting - it should be the same as the pipe size Check manufacturer's instructions Check to make sure horizontal pipe is pitched towards the compression tank. Check for leaks
No heat radiation	Air-bound	Vent

TROUBLESHOOTING HYDRONIC SYSTEM PROBLEMS (CONT.)

VALVE SYSTEM TROUBLE ANALYSIS GUIDE		
COMPLAINT	POSSIBLE CAUSE	RECOMMENDED ACTION
No circulation Relief valve opens	Set screw not tight, coupler loose on shaft Defective relief valve Compression tank undersized Waterlogged compression tank Run-away burner Fuel valve stuck in open position Pump not operating High limit control fails Defective reducing valve System operating pressure too high	Tighten set screw in shaft recess Replace Check for proper size - replace Install air control system or drain tank Check controls Check valve Check pump Check control Clean or replace Check static pressure and temperature operation Lift handle rapidly to discharge dirt - still drips - replace
Valve drips	Dirt on seal	
Reducing valve failures	Valve does not feed Strainer plugged Valve seat scaled shut	Check if valve is scaled Clean or replace Turn adjustment screw all the way down to free - if it doesn't - replace
Reducing valve does not reduce pressure Relief valve pops - hot or cold	City pressure too high for valve Reducing valve sticking in open position	Check valve limitation and replace with higher pressure-rated valve. Check valve, replace if necessary
Flo-control valve problems- Gravity circulation	Dirt on seat Stem not turned down all the way Valve body not installed in a horizontal position Air in upper part of valve body Thermostat not working properly	Take cover off and wipe seat Turn handle on stem all the way and seat If in a vertical position, change to horizontal, use straight or angle valve Open cover and vent Check thermostat
Pulsating action Zone valves will not operate (see note below)	Power pill burned out Sticking seal assembly valve will not seal	Check & replace - check electrical connections Check and clean stem and seat for build-up of mineral scale

Note: If valve does not operate, install in a manual full open or partial position to prevent freeze-up.

MISCELLANEOUS SYSTEM PROBLEMS		
COMPLAINT	POSSIBLE CAUSE	RECOMMENDED ACTION
Insufficient heat in one or more zones	Air binding Clogged zone piping Defective zone valve Unbalanced circuits Undersized radiation Broken coupler on pump Motor burn-out Power off	Install air control Locate and remove obstruction Repair or replace Balance Add radiation or more insulation - increase water temperature Check alignment of shafts - replace sagging motor mounts Check pump motor Check electrical connections - power source
Overheating - cold or mild weather	Gravity circulation Defective flo-control valve Zone valve stuck in open position Thermostat not operating Flo-control valve stem in open position Fuel valve stuck in open position Controls not operating properly	Install flo-control valve Clean or repair or replace Check - repair or replace Check - replace Close valve Check - replace if needed Check
Pounding or waterhammer	Lack of system pressure Over-sized compression tank Excessive boiler temperature Pumping into the boiler using high head pumps Use of solenoid valves	Check if static pressure is correct for system See note below Check to see if water is circulating through boiler - stuck fuel valve (1) Increase static pressure above pump head if possible. (2) Move pump to pump away from boiler and discharge into system. Do not use on hydronic systems.
Crackling sound	Boiler full of lime (mineral compounds)	Clean and flush

Note: If a compression tank is so large that system pressure does not build-up in the proper range with temperature increase, boiling may occur in piping or radiation at the high point of the system, particularly when pumping into the boiler.

For additional hydronic system troubleshooting information, contact your local Bell & Gossett Representative.