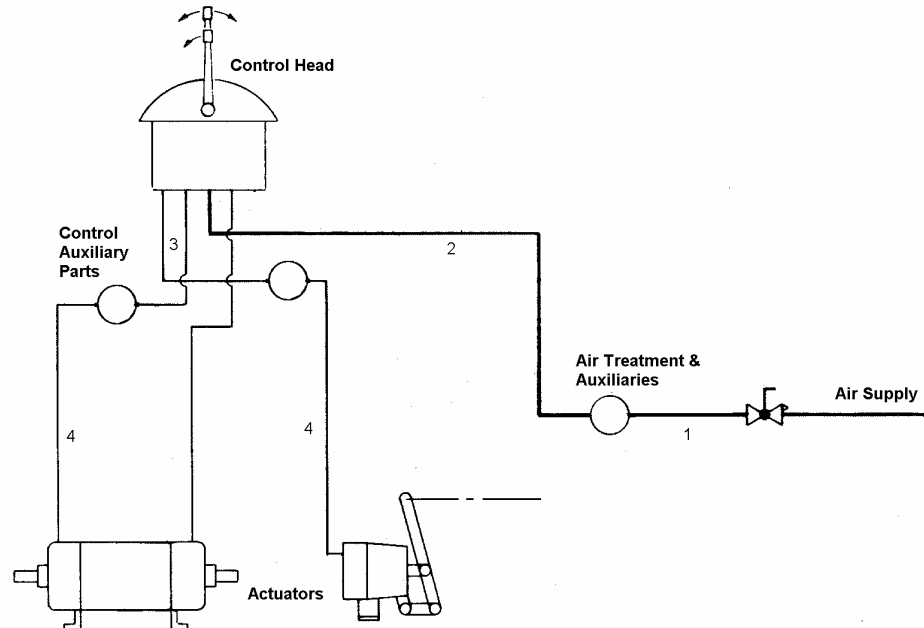


## TROUBLESHOOTING GUIDE FOR BASIC PNEUMATIC CONTROL SYSTEMS NOT INCLUDING THE TIME DELAY SYSTEMS

The most important factor during the installation of a pneumatic control system is to avoid dirt entering the tubing and control components. This could cause valves to leak or stick.

Troubleshooting should be done one section at a time starting from the air source right to the end of the line.



The first thing to check if control failure occurs is the air preparation unit and source of supply (filter, regulator, lubricator). It is important that the filter is kept drained and clean periodically. The regulator should be set at a minimum of 90 psi (higher pressures in some cases). The lubricator should be filled with a #10 hydraulic oil. At the end of the air preparation unit, a good flow of air should be available and an additional test gauge might be necessary to confirm the pressure regulator setting.

In order to troubleshoot the system, it is best to have full bottle(s) of compressed air available, shut down all running engines to obtain a silent ship. Place control head into forward idling position and listen for air rushing through control head downstream to actuator. Then follow control lines to the engine room and check for leaks right to the actuator. When the control head is returned to its neutral position, listen for the air exhausting through exhaust ports. Repeat same procedure for reverse direction and for engine speed section.

When the control head is placed in forward position and air leaks through the reverse side of the clutch valve, (or vice versa) the clutch actuator is leaking. Check and replace seals as necessary. On a multi-station system, if the air leaks through the actuated head, the problem lies in that same head. If air leaks through another (inactive) head, the problem lies in the shuttle valve system. This can be easily traced from either head. Once the shuttle valve is found, remove dirt or replace seals.

If no movement takes place in either clutch or throttle actuator, remove the air lines connected to same. Actuate control head to see if air pressure is available. If air pressure is available, remove and dismantle actuator to find worn or damaged seals, or dirt in the system. Repair as necessary. If rolling diaphragm needs replacing, ensure correct installation (fabric side of diaphragm is piston side, rubber side of diaphragm is pressure side). When re-assembling, ensure good lubrication of all seals and moving parts with oil or very light grease. Cleanliness during re-assembly is of utmost importance.



If the air pressure does not reach the end of the line attached to the actuator, the fault would be in the control head, or possible clogged shuttle valves or damaged tubing. Check all outgoing ports from the control head to ensure that full line pressure for the clutch actuation and variable air pressure at the throttle ports are available. Check that there are no plugs in the exhaust ports.

If no air flow for the clutch is detected, check needle valve on 2540 series heads for correct position. The needle valve should be open approximately two to three turns. Also check adjustment screws for operating valve spool so that half the mechanical movement of the cam is closing the valve and the remaining half is opening the valve.

If these screws are not properly adjusted, the valve could have very little supply capabilities and lots of exhaust volume. This would cause the clutch to engage very slowly or not at all. Turn screw down to correct problem. If the screw is turned down too far, plenty of supply air is available but the air will exhaust very slowly or not at all. Turn screw up. If no air passes through the valve, remove same and repair. If the valve poppet shows a small amount of damage, use a piece of sandpaper or emery cloth, place same on a flat surface to smoothen the seal. Replace "O" rings if necessary.

If the throttle valve is not performing to original setting, it can be adjusted with the upper or lower adjusting screw. Please see our sheet on General Installation and Adjustment Instruction for Variable Control Heads. Dirt will cause this valve to either leak or stick. Dismantle, clean and install new parts as needed. When replacing diaphragm, make sure piston side of diaphragm is facing piston.

It is also possible that a lack of supply air is caused by the station transfer system. If the control stations are far apart, it is important that the palm valve 3517 is depressed long enough to ensure a complete shift of the 3403 or 3405 station transfer valve. Improper adjustment of the screws operating the valve spool could again cause either a slow charge or discharge of the control system during station transfer. Check that half the travel is available for the charge of the control system and half for the exhaust. Again the poppet in this valve can be cleaned with sandpaper or emery cloth. Replace "O" ring if needed.

Very often linkages between our actuator and gear control valve lever and governor lever are improperly installed or matched. It is very important that a gear control valve is moved to the full gear engaged position and not beyond. It is also important that the linkage provides alignment in neutral position. The linkage must be at 90 degrees to the levers in the neutral position. The axis of rotation must be on the same plane. The actuator controlling the engine governor must have the same pressure range as the control head. Again the linkage must be installed to provide complete movement of the actuator from idle to maximum RPM without bottoming the governor lever in either direction. If the pressure range or actuator stroke does not match to the engine speed setting device, engine speed control can be very erratic.