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Locating Blockage in Divider Block Lubrication System

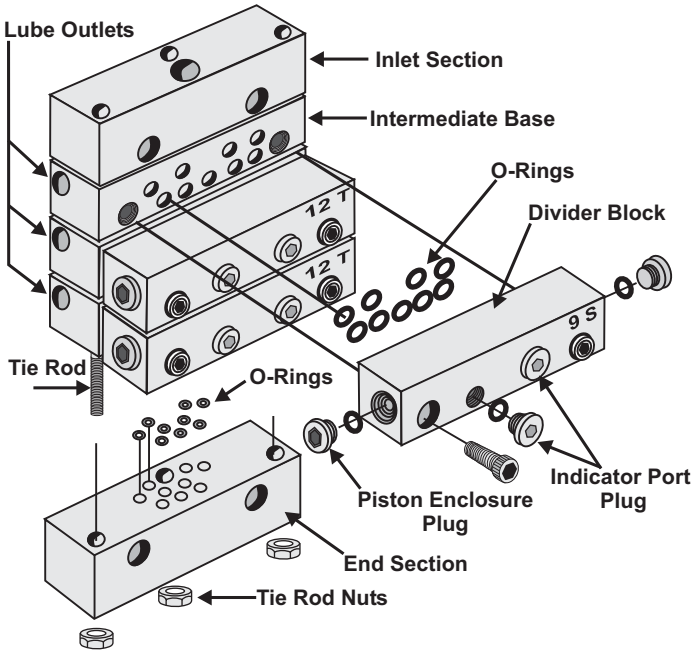


Figure A. Components of The Divider Block Assembly
(see pages 20,21,22)

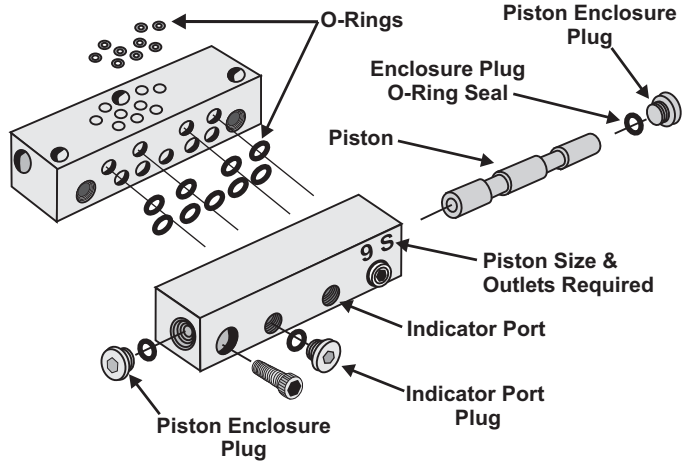


Figure B. Intermediate Base & Divider Block

DIVIDER BLOCK ASSEMBLY DESCRIPTION

The divider block assembly consists of an inlet and end section, intermediate sections plus a minimum of three divider blocks. The divider block baseplate assembly is held together with tie rods and nuts. (Figure A). Each divider block contains a piston of predetermined size to inject a calculated amount of oil into each point receiving lubrication.

A Master Divider Block is the first divider block downstream from the lube pump. A Secondary Divider Block is any divider block receiving oil from the master divider block.

BLOCKAGE IN THE SYSTEM

If blockage occurs in the divider blocks, lube lines, check valves or injection points the system will build excessive pressure attempting to overcome the blockage. Excessive pressure is limited and signaled by the use of pressure indicators and atmospheric rupture assemblies.
When blockage occurs and oil flow discontinues, monitoring devices protect the compressor by alarm or compressor shutdown.

DIVIDER BLOCK IDENTIFICATION

Stamping located on the front of the divider block indicates the quantity of oil discharged by that particular block with each cycle of the piston. The oil discharged with each cycle of the piston is expressed in thousandths of cubic inches (12 = .012 ^{3} in , 9 = .009 ^{3} in , etc.). Divider blocks are manufactured to require one (1) or two (2) outlets unless cross port bars are designed into the system. The number of lube outlets required is indicated by a stamped letter (S= single, one outlet only, T= twin, two outlets required). See Figure B. Never block any outlet that is designed to discharge lubricant.
Notice: Divider block pistons are individually fitted to each bore to extremely close tolerances and cannot be turned end for end or interchanged with other pistons.

CONTAMINATION BLOCKAGE

Dirt or foreign material of any form cannot be tolerated and will cause serious damage or blockage to the lubrication system components. If contamination does not cause immediate malfunction, it will greatly reduce the expected life of the divider block system components. Cleaning the divider block and components will only temporarily solve the problem. The source of contamination must be eliminated. Proper filtration of oil to at least 25 microns before entering the lube system is essential for trouble free dependable lubrication system operation. All filter elements must be changed on a periodic basis.

SEPARATION BLOCKAGE

Hard wax or soap like deposits in the divider block system indicate separation of the lubricant thickener out of solution or the presence of animal fat lubricants. Cleaning the divider block system will only temporarily solve this problem. Consult you lubricant supplier for alternate lubricants. When changing to a new lubricating oil always inquire if they are compatible to avoid problems with the lubricator pumps, divider blocks and check valves.

AIR

Air cannot be tolerated in lines or components. Although not usually the cause of damage to the lube system, air in the lube lines and components is often the cause of system locking, lubrication failure or phantom compressor shutdown. All divider block system components must be full of oil and free of air for proper operation.

714.549.9222 714.979.8240 fax sales@frosteng.com

Locating Blockage Cont...

Blockage in divider block systems is caused by: (1) Crushed Tubing Line (2) Blocked Injection Point (3) Improperly Drilled Fitting (4) Dirt or Foreign Material (5) Air in the System

Make a visual inspection of the system and check for crushed tubing lines. Check to ensure all divider blocks required to discharge oil do not have pipe plugs installed in the base plate outlet. Divider blocks with a letter “T’ stamped on the front should have (2) two outlets open from the base plate. Divider blocks with a letter “S” stamped on the front should have (1) one outlet open on the base plate and one outlet plugged.

ALL SERVICING MUST BE DONE UNDER THE CLEANEST POSSIBLE CONDITIONS
Dirt, foreign material and air are the worst enemies of all lubrication systems. Always use clean filtered oil common to the system when using a purge gun to locate blockage and purging the lubrication system.

(A): Divider Block Systems with One Divider Valve Assembly and Reset Pressure Indicator Pins:

Step A1: Connect a manual lubrication system purge gun to the inlet of the divider block assembly or purge port on the pressure cross assembly as shown on page 8 Figure "C" and slowly operate pump. Continue to raise pressure until an indicator pin pops out. See page 8 Figure "D". If no indicator pin pops out, blockage is in the divider block assembly. See Step 4 page 8. If an indicator pin pops out, the extended pin indicates blockage down the discharge line common to that pin. Remove the tubing connection from the check valve at the injection point common to the divider block with the indicator pin extended out. Slowly operate the purge pump. If high pressure exists check tubing and fittings. If the purge pump operates freely and oil flows from the tubing, connect the purge pump to the check valve at the injection point. Slowly operate the purge pump. If high pressure exists the check valve or the injection point on the cylinder or packing gland is plugged. Correct as necessary. Always test the check valve for reverse leakage by pumping oil into the outlet side. If oil leaks through the check valve replace it immediately.

(B): Divider Block Systems with One Divider Valve Assembly without Reset Pressure Indicator Pins:

Step B1: With manual purge gun connected to the divider block or purge port on the pressure cross assembly as in Step A1, remove each indicator port plug one at a time and slowly operate the pump. Do not exceed 1,000 PSI. If pressure on the gauge holds replace the indicator port plug. Remove and replace each indicator port plug one at a time until pressure drops on the pressure gauge and the divider block cycles freely when operating the purge pump. If the pressure gauge drops after removing an indicator port plug and the divider valve cycles freely the blockage is downstream of that individual divider block. Replace the indicator port plug and remove the tubing connection from the check valve at the injection point. Slowly operate the purge pump. If high pressure exists check tubing and fittings. If the purge pump operates freely and oil flows from the tubing connect the purge pump to the check valve at the injection point. Slowly operate the purge pump. If high pressure exists the check valve or the injection point on the cylinder or packing gland is plugged. Correct as necessary. Always test the check valve for reverse leakage by pumping oil into the outlet side of the check valve. If oil leaks through the check valve replace it immediately. If all indicator port plugs are removed and the divider block will not cycle, blockage is in the divider block assembly.

(C):Divider Block Systems with Master and Secondary Divider Blocks with Pressure Indicator Pins installed:

Step C1: Connect a manual lubrication system purge gun as shown on page 9 Figure "E" to the inlet of the master divider block assembly or purge port on the pressure cross assembly and slowly operate pump. Continue to raise pressure until an indicator pin pops out. See page 8 Figure "D". The pin indicates blockage down the discharge line common to that pin. If an indicator pin pops out, see Step 2. If no indicator pin pops out, blockage is in the master divider block assembly.

(D): Divider Blocks Without Pressure Indicator Pins:

Step D1: With manual purge gun connected to the master divider block or purge port on the pressure cross assembly remove each indicator port plug one at a time and operate the pump. Do not exceed 1,000 PSI. If pressure on the gauge drops and the divider block cycles freely after an indicator plug is removed, the blockage is downstream of that individual divider block. See Step 2. If all indicator port plugs are removed and the master divider block will not cycle, blockage is in this divider block assembly.

Step 2: Testing indicates blockage is located downstream of the Master divider block. If installed remove the indicator pin, or indicator port plug and connect the purge gun to the indicator port on the front of the master divider block that feeds the blocked line. See page 9 Figure "F". Remove all indicator port plugs in the secondary divider block assembly. If oil can be easily pumped through all indicator ports, the blockage is not in the tubing line or the divider valve. See Step 3. If oil does not flow freely through the indicator ports the blockage is in the secondary divider block or its supply line. Disconnect the tubing line from the inlet of the secondary divider block assembly and pump the purge gun to verify blockage is not in the tubing line. If blockage is in the divider block assembly.

Step 3: Remove indicator port plugs or indicator pins from the secondary divider blocks. Connect purge gun to each indicator port of the secondary divider blocks one at a time and slowly operate pump. See page 9 figure "G". If high pressure exists in any port tested blockage has been located. Check tube, fittings, check valves, packing gland and cylinder injection points by pumping oil into each. Correct as necessary.

Locating Blockage Cont...

Step 4: When testing indicates blockage is in the divider block, before disassembly, remove all piston enclosure plugs. See page 6 Figure A. Without removing the pistons use a brass rod and finger pressure only to move each piston back and forth. If all pistons are moveable, replace the enclosure plugs and retest the assembly by pumping oil into the inlet. (Blockage may have been dislodged and the assembly may be in working condition without further service.)

If piston is jammed or wax like substance or dirt is found in the piston bore, the divider block must be disassembled and cleaned. Before removing, make a note of divider block positions on the base from top to bottom. See Figure C. (Example 9T-12T-24T). Working with one block at a time, remove the piston with a brass rod. If the piston is stuck, try removing it in the opposite direction. The piston may have to be forced out by lightly tapping it with a brass rod only. Do not use any type of hard metal object to remove the piston. After removal, thoroughly wash the piston and divider block with a clean suitable solvent. Blow out all ports in the divider block and use a small piece of wire to clean out all passages. Inspect divider block bore and piston for scratches or score marks. If either of these are damaged a new divider block must be installed. The final step is to thoroughly clean the base sections and blow out all ports with compressed air.

Caution: DO NOT use emery cloth, bearing cloth or any type of abrasive substance to clean or smooth any piston or bore. To do so will cause the divider block to bypass and can cause extensive damage to compressor components. Pistons are precision fitted to each bore to extremely close tolerances and cannot be turned end for end or interchanged with other pistons.

After entire divider block assembly has been cleaned, inspected and all blocks and pistons appear in good condition, lubricate and reassemble, positioning the divider blocks on the base in their original order as per notes. Make sure all pistons slide smoothly and fit snugly in divider block bores. After assembly, test for proper operation and purge the system with a purge gun using oil common to the system. **To insure proper operation of the divider block system, it is absolutely necessary that all tubing and components be filled with clean oil common to the system. All air must be purged from tubing and components before start-up.**

Figure "C". Lubrication System with One Divider Block Assembly

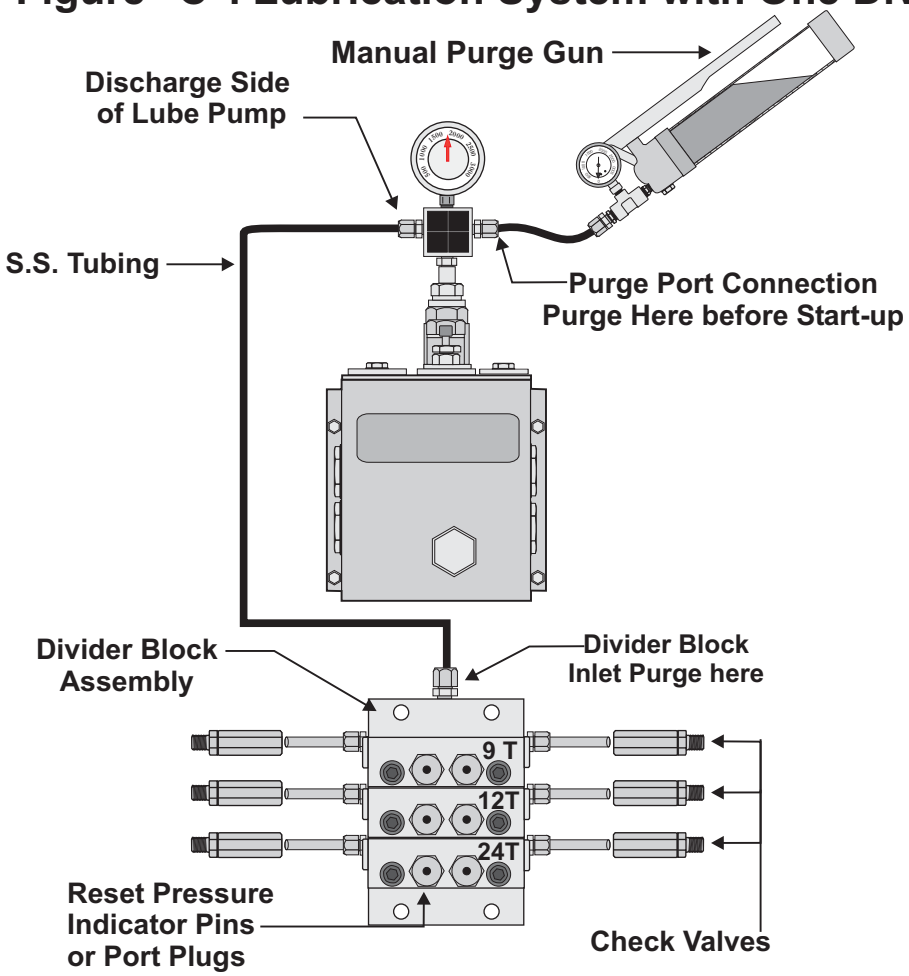
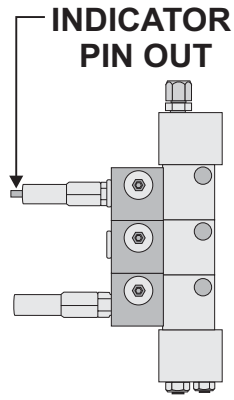


Figure "D".



Divider Block Side View

Locating Blockage Cont...

Figure "E"
Lubrication System with Master and Secondary Divider Blocks

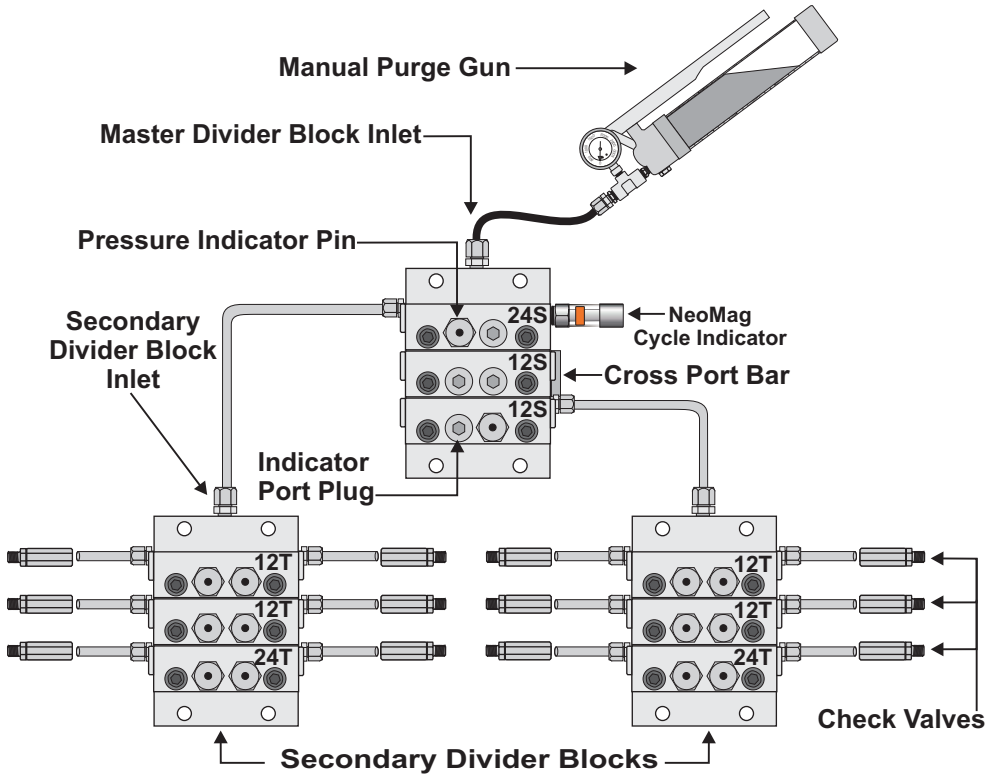
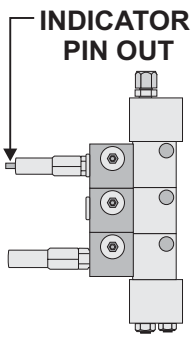


Figure "D".



Divider Block Side View

Figure "F"
Locating Blockage Down Stream of Master Divider Block

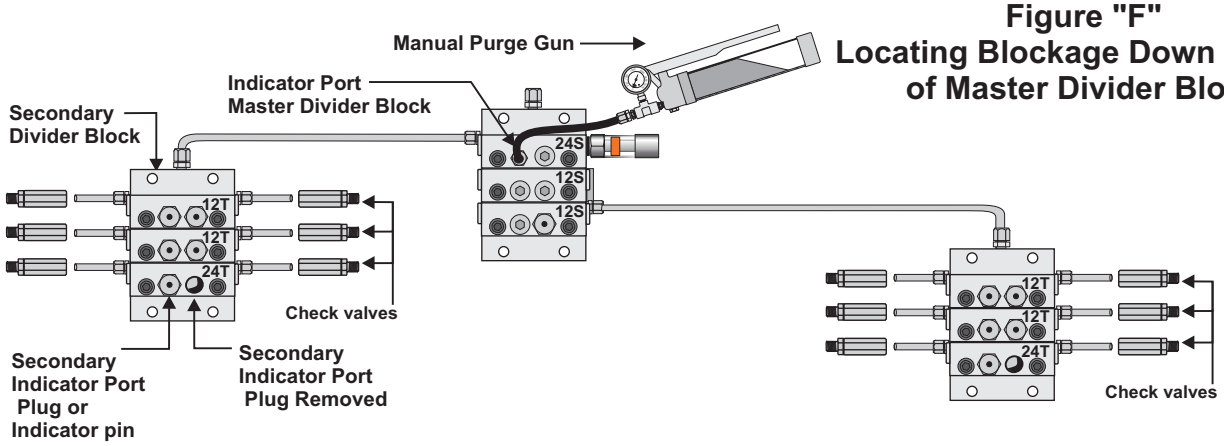


Figure "G"
Locating Blockage Down Stream of Secondary Divider Block