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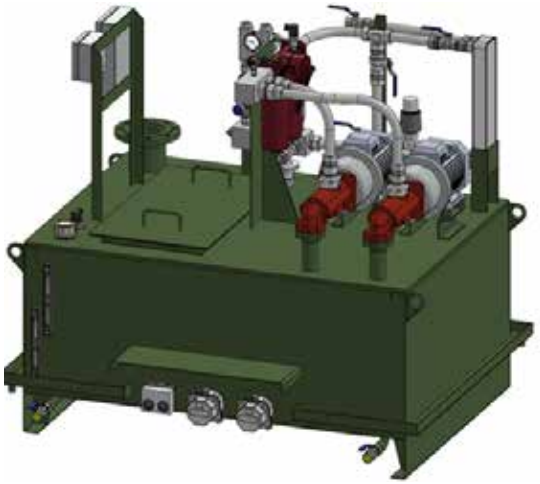
Centralized Automatic Lubrication Systems

Reliable maintenance, especially lubrication, is becoming increasingly important in industrial plant stationary equipment, as well as in a variety of mobile equipment. Individual pieces of equipment are much more complex and expensive. Ever larger capital expenditures for new equipment are shifting more of the responsibility for wear protection to the equipment designer. One way that many of them have solved complex lubrication problems is to use centralized lubrication systems. While automatic centralized systems are expensive at the start, they are very cost effective when compared to the ongoing expense in labor to apply lubricant, or to the dollars spent when a component is over- or under-lubricated during its life cycle, often leading to catastrophic failure.



Advantages of Centralized Lubrication Systems

- Reduce repairs and extend bearing life
- Increase production by eliminating machine downtime
- Reduce labor time by eliminating manual lubrication
- Ensure that inaccessible or inconvenient lubrication points are not overlooked
- Promote more efficient lubrication by lubricating while machine is running
- Reduce energy requirements by decreasing bearing friction
- Eliminate bearing contamination by applying lubricant from a closed circuit
- Enhance safety by eliminating the need to climb on or over machinery for routine lubrication
- Prevent lubricant waste by dispensing precise amounts
- Improve housekeeping by eliminating spillage and keeping machines cleaner

Combined, these advantages result in reduced manufacturing costs, which helps companies remain competitive and increase profits.

Bearing Lubrication & Centralized Lubrication

The most reliable procedure for lubricating bearing surfaces is the application of small, measured amounts of lubricant at regular intervals. This application must be consistent with these factors:

- Size of bearing/lube point
- RPM at which equipment is operating
- Load and thrust specifications of bearing
- Duration of performance demanded by production cycle involved
- Type of seal

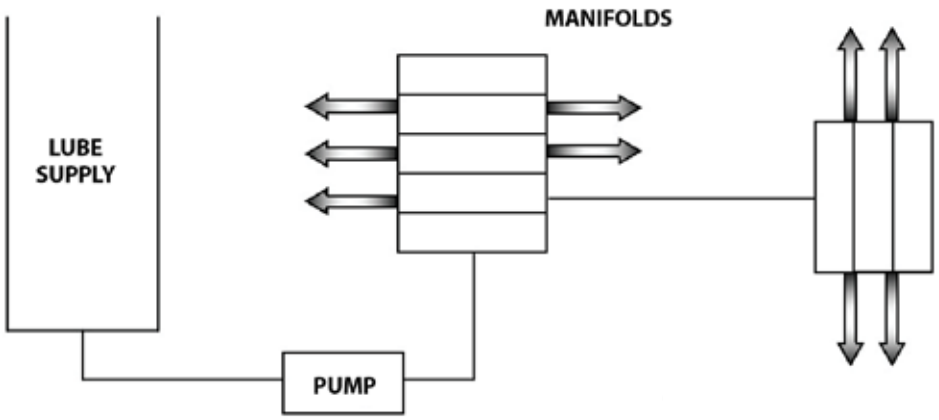
A centralized system takes the human element out of lubrication. The basic system consists of a pump feeding lubricant from a reservoir through supply lines to valves that inject a measured amount into each bearing. Most systems also include timers, failure indicators and other refinements. Six basic types of centralized systems are:

1. Single Line Series Progressive (grease or oil)
2. Single Line Parallel (grease or oil)
3. Dual Line (grease or oil)
4. Single Line Orifice Metering (oil only)
5. Oil Mist (oil only)
6. Oil Recirculation (oil only)

Types of Centralized Lubrication Systems

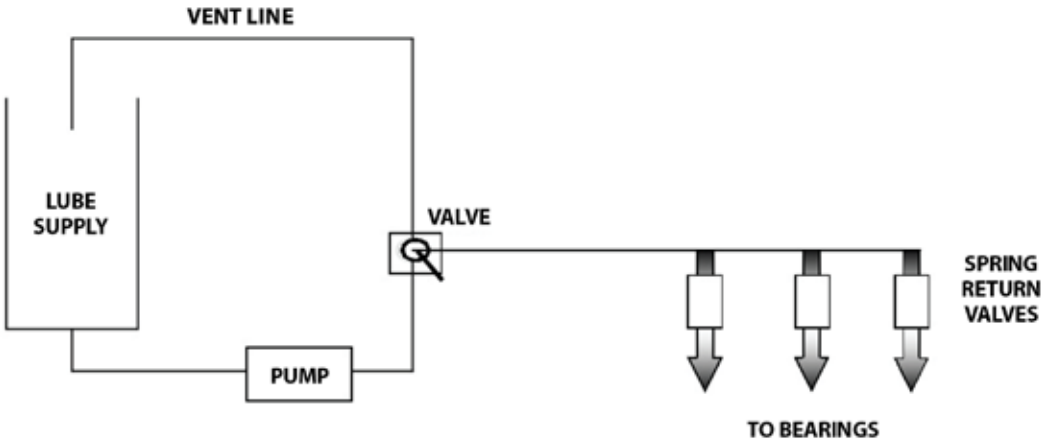
Arrows in the first three diagrams to follow indicate the direction the lubricant flows to the bearing surface.

1. Single Line Series Progressive



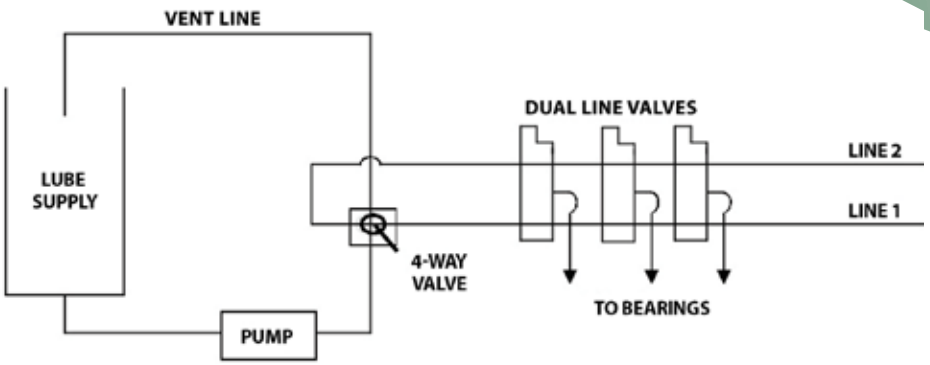
This system has spool valves and divides the pump displacement into many bearing outlets. These valves are nonadjustable, with a system indicator usually located on a master valve. When the pump operates, lubricant is brought from the reservoir to the measuring valves. The valves are continuously cycling as long as there is flow from the pump. A cycle switch, combined with sizing the valve sections correctly, ensures the correct amount of lubricant is delivered to the desired component. This type is typically used where the number of system points are fixed and will not need to be changed

2. Single Line Parallel



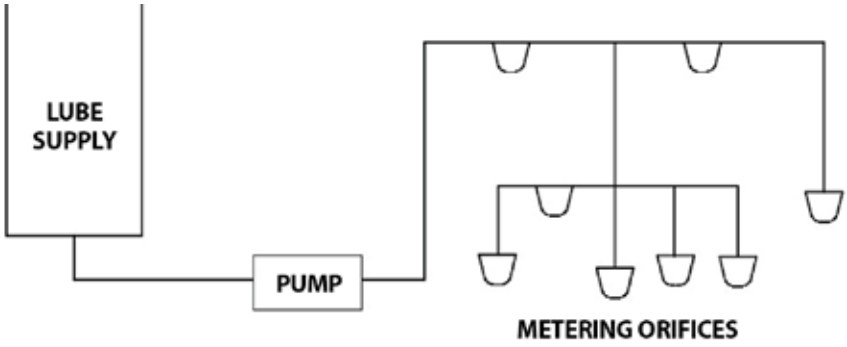
This system has injectors (adjustable or fixed) that dispense the lubricant to each lube point. With the pump operating and the vent valve actuated, pressure in the line forces the piston in the injector to discharge the lubricant to the bearing point. Pumping is continued until all valves have discharged, as determined by a pressure switch. To recycle, the vent valve is returned to its normal position and the system exhausted through the relief line. This causes the springs in the measuring valves to return the pistons for recharging. Each injector has an indicator pin for visual confirmation of actuation. An electric switch can be mounted to the pin for electronic feedback as well. This type is typically used where adjustments may be needed at individual points or where points may need to be added.

3. Dual Line



This system alternates the pressure between two main supply lines. The measuring valves operate independently and offer adjustment and visual indication for each outlet. When the pump is operated with the reversing valve supplying the first line, the lubricant goes from the reservoir to the top inlet of the measuring valve. To recycle, the four-way valve is shifted 90 degrees, directing flow through the second line, which supplies lubricant to the bottom inlet of the measuring valve. This type is usually used where long runs or low temperatures are encountered. Points can easily be added.

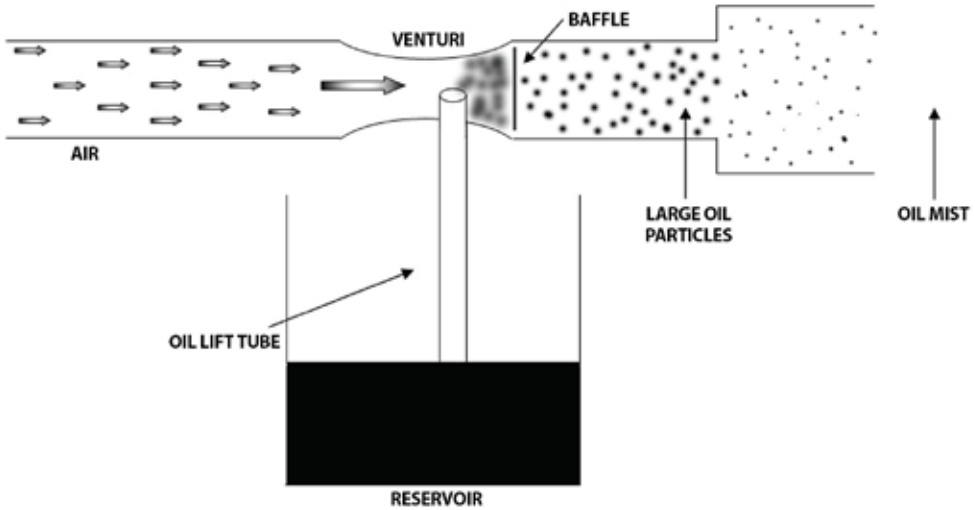
4. Single Line Orifice Metering



This system supplies oil to several lube points, each equipped with a fixed orifice. The number of points can vary to the extent that the pump displacement can be increased or decreased. However, there are no adjustments at the orifices. Pressure gauges can be located at various junctions. This type is typically used in machine tools.

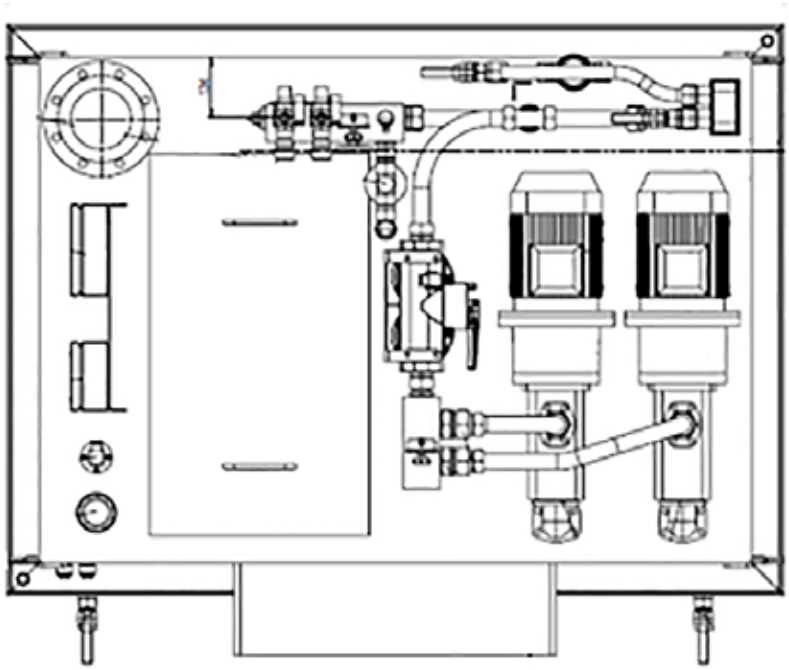
5. Oil Mist

This system is entirely different from the ones discussed previously. A venturi picks up and atomizes the lubricant, generally a light oil. A baffle removes the larger droplets, and gentle air pressure carries the oil mist stream to the bearing. In as much as the particle size is in micron range, there is limited condensation in the piping system. At the bearing, an orifice reclassifies the mist into larger droplets that enter the bearing. The air coming through the tubing tends to keep the bearing cool, and the slightly increased pressure in the bearing keeps out dirt and dust. Some systems heat the oil for easier atomization. This type is very efficient and uses very small quantities of oil.



6. Oil Recirculation

This system is used to pump oil to bearings or gears to lubricate them as well as to purge them of wear debris and, if necessary, to remove heat introduced into the oil because of friction. Reservoir, pumps, filters, oil coolers, reservoir heating, pressure control and instrumentation are selected depending on the duty cycle and the viscosity of the lubricant required to be pumped. These can be fitted on top of the oil reservoir or on a separate skid to form a compact unit, but also, for larger systems, as individual items of equipment mounted on site and piped up to the plant being served.



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