

Pumps which have the engine gear directly on the pump drive shaft must be mounted squarely and torqued evenly to the engine flange. Otherwise edge loading can cause failure of the engine gear teeth. (See Fig. 44)

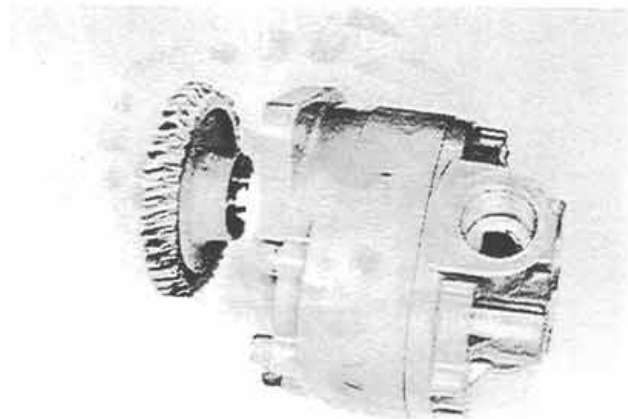


Figure 44:

During the reassembly of this type of pump, ensure that the large radius in the pump housing and the triangular opening in the pressure plates register on the inlet side of the pump when completely assembled. (See Fig. 45)

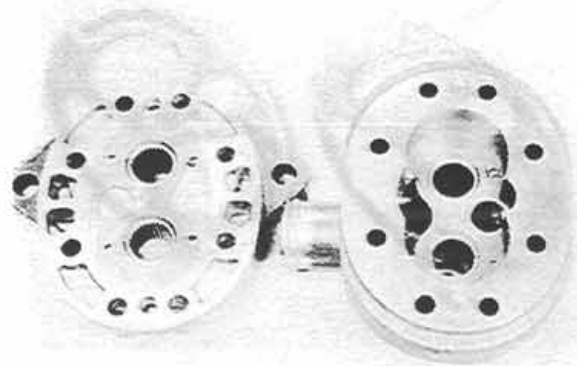


Figure 45:

Steering valve assemblies which did not pass tests should be opened for inspection. In certain cases a unit may have been removed for an obvious reason which did not require testing. For example, internal seizure. Regardless of the type of problem, a reasonable attempt should still be made to pin down the direct cause. All mating surfaces of the spools and housing have a matched fit with a clearance that is rated in millionths of an inch. Knowing this makes it easy to realize that contamination and temperature play a major role in the life and performance of the valve.

You may encounter a complaint from a customer that said, "It steers normally, but sometimes locks up before operating normally again." The symptom described here is thermal shock. When the hydraulic system is operating at a much higher temperature than the steering valve and suddenly the steering is used, a fast temperature change may "swell" the spools inside of the housing. (See Fig. 46)

After the whole assembly stabilizes in temperature, it will usually resume normal functions. Remember that a small quantity of oil at system temperature must pass through the valve during neutral steering demands. If any blockage prevents proper flow and temperature stability, then thermal shock can occur. Inside the steering valve, ensure that all passages are open and all parts are absolutely free of debris. Note that it would also be wise to check the entire load-sense circuit for cleanliness. (See Fig. 47)

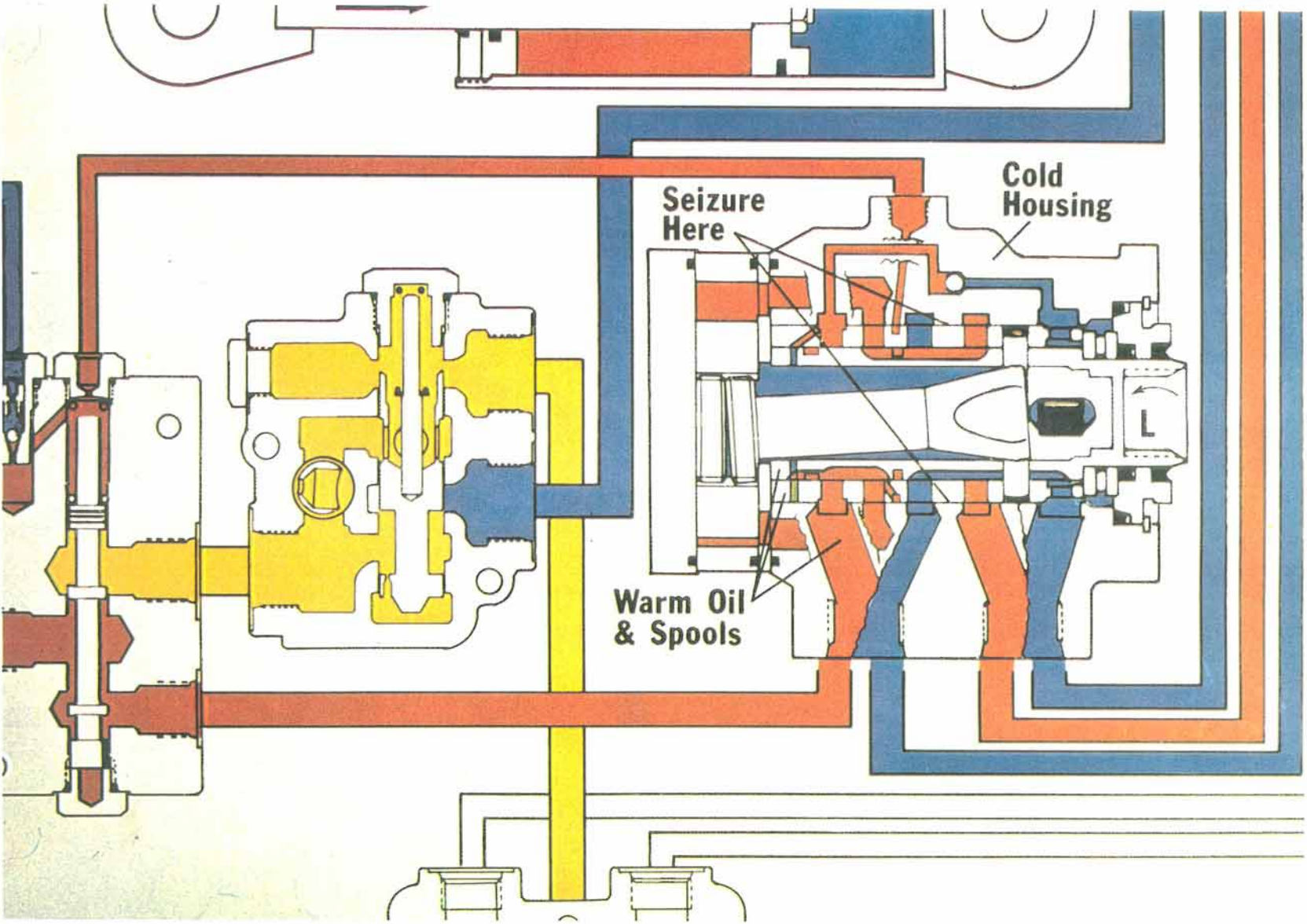


Figure 46:

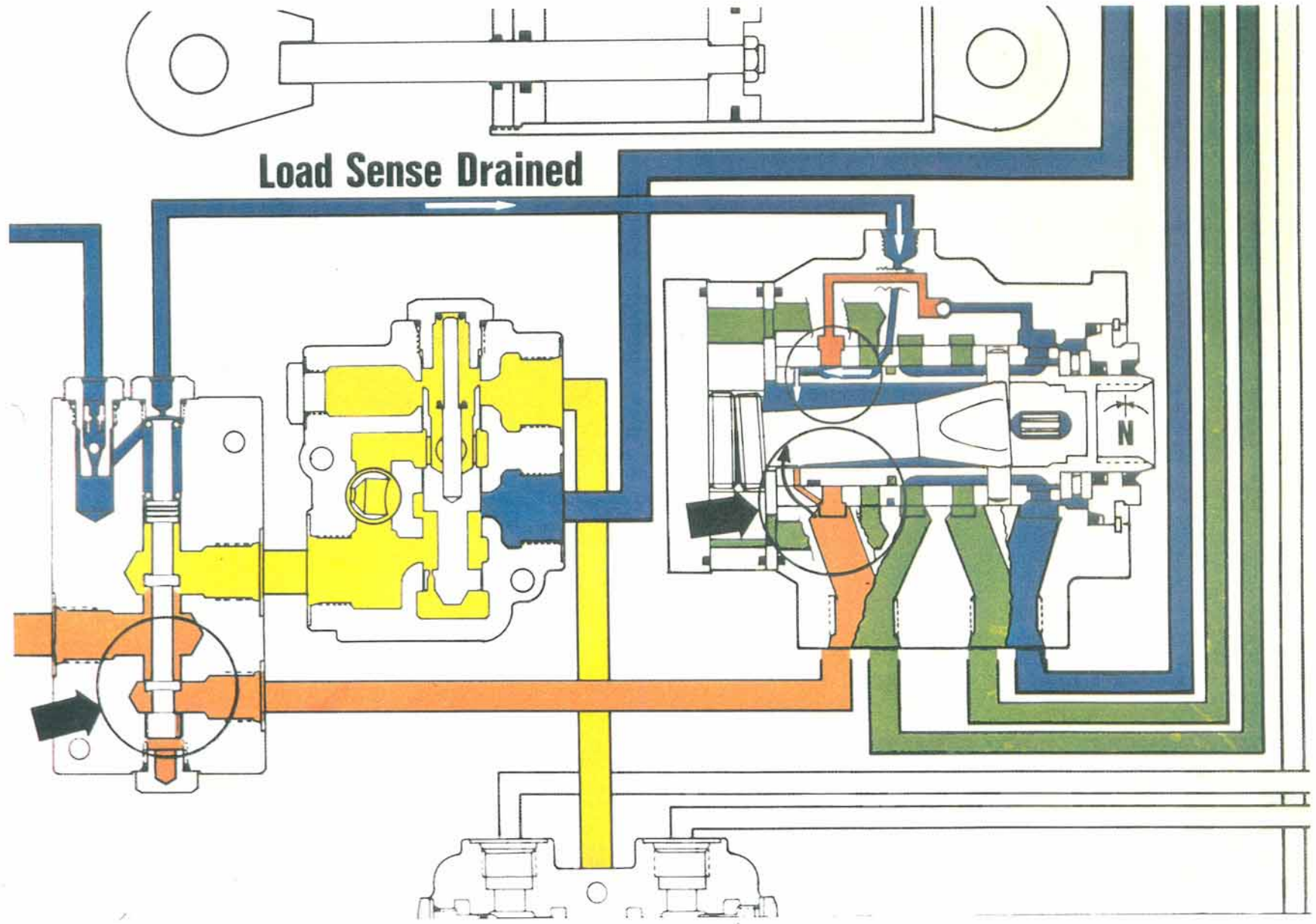


Figure 47:

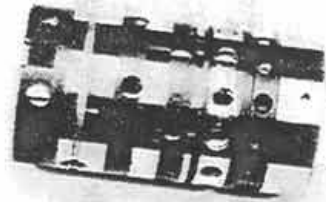


Figure 48:

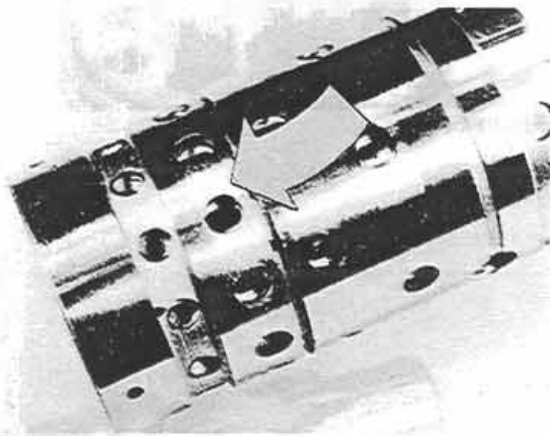


Figure 49:

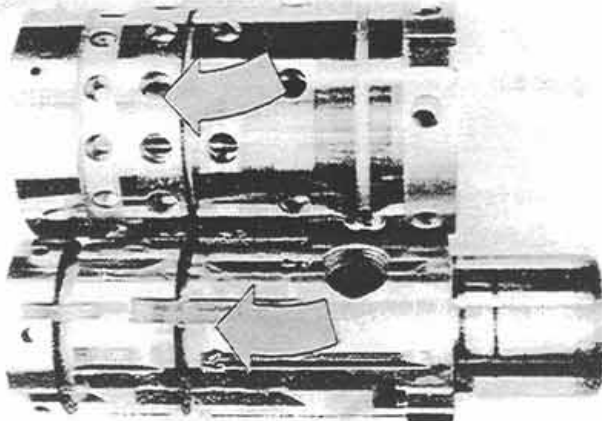


Figure 50:

When we remove the spools from the housing and see lacquer deposits, it indicates that the system has operated at very high temperatures. An operating characteristic like thermal shock may occur, but if accompanied by lacquer coating of the spools, then overheating is the principal cause. Do not confuse other residues that may look like lacquer. If they can be readily wiped off, there is no cause for concern in reference to overheating. If the mating surfaces are not damaged and the valve operated well except for the temporary sticking, it may be reused after cleaning and after correcting the overheating system. Cleaning can be done with a powerful chemical such as carburetor cleaner. It is rare that mating finishes become damaged only by a temperature influenced seizure, but if this has happened, do not reuse the valve. (Fig. 48)

The manner in which contamination affects the valve can have varied, or even a combination of visual signs. Again, it is dependent upon particle size, type and amount. When we see a surface that appears chipped, scuffed or worn, it is unacceptable for further use as uncontrolled internal leakage will affect performance. Wear that is seen here is the result of dirt being present in the oil. Nothing may happen at first, but wear is increased with continued usage. (See Fig. 49)

With oil which contains metal particles such as a failure from another part of the system, there is a tendency for chipping or scoring at the metering edges of the ports. If severe or sudden enough, it can end with total seizure of the unit. The example shown indicates such a condition and had to be pressed apart. (See Fig. 50)

Look for good correlation between the gerotor and outer spool. All driving members which connect the two should have no visible wear, other than being polished. This is necessary to maintain correct timing for proper delivery in either direction. Gerotor and stator running clearance is generally disregarded. Rather, judge the finish condition in the same manner as described for the spools. (See Fig. 51)

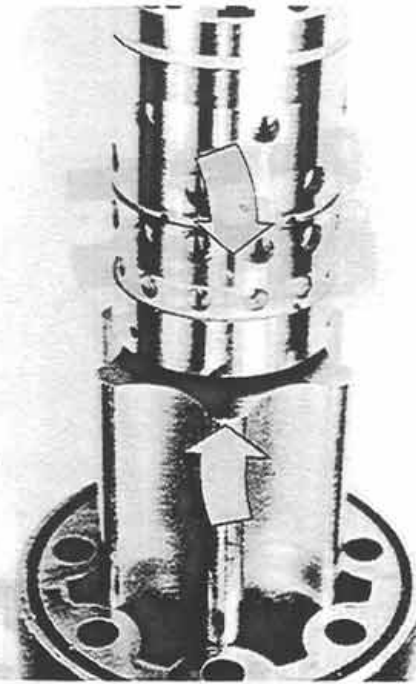


Figure 51:

When correctly assembled, the following parts must fit as described. The notched ends of the centering springs should face toward the gerotor end of the spools. (See Fig. 52)

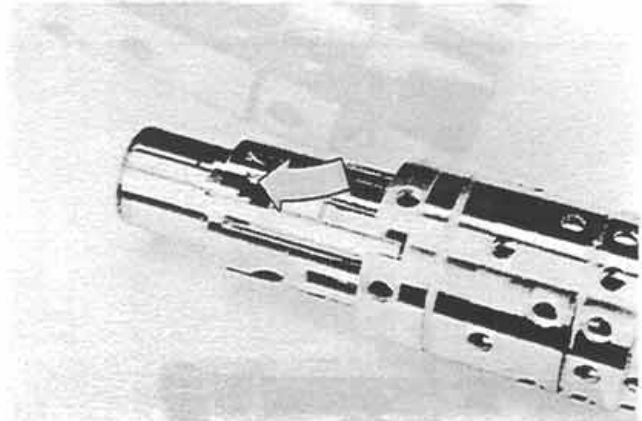


Figure 52:

When the spools are positioned correctly, the timing marks will register. (See Fig. 53)

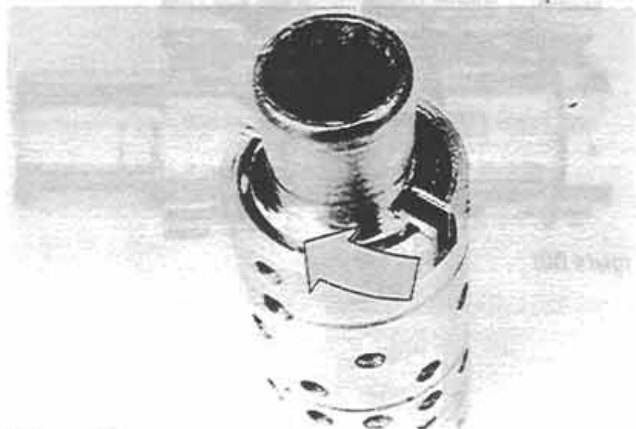


Figure 53:

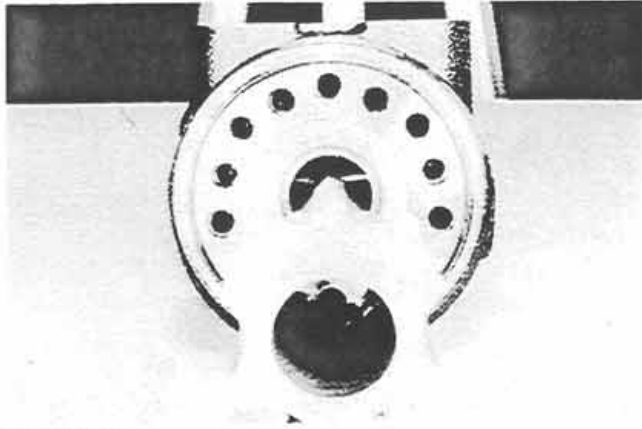


Figure 54:

Imagine a line passing centrally through any two valleys of the gerotor. It must be parallel to the drive pin and port face of the housing. (See Fig. 54)