

1 Hydraulic system

1.1 General directions for circuit installation of system

1.1.1 Cleanliness

Before cabling pipelines, make sure that pipelines hollows are thoroughly clean (metal and flexible pipes), likewise fittings and seals.

The same care should be exercised during assembling and servicing operations, adopting clean procedures and working in an environment free of chips, swarf, dust and other possible sources.

1.1.2 Tank

The recommended tank capacity must be 2 ÷ 3 times the pump flow rate Q (unit volume per minute) for intermittent duties, or 6 ÷ 7 x Q for continuous duties, and up to 10 ÷ 12 x Q for heavy duties with demanding continuity, pressure and temperature conditions.

The suggested temperature of the oil in the tank should not exceed 60° C (140° F); if this limit cannot be guaranteed by the dimensions of the tank alone, a heat exchanger must be installed.

1.1.3 Pipeline diameters

The oil speed must be kept within safe limits, beyond which the operation of the system could be adversely affected.

As a general guide, recommendable limits are:

0.5 ÷ 1.5 m/s (1.7 ÷ 5 ft./s) suction

0.8 ÷ 2 m/s (2.2 ÷ 6.6 ft./s) return

2 ÷ 5 m/s (6.6 ÷ 17 ft./s) pressure

Lower speeds are adapted for applications typified by low pressure or continuous duty.

Remember that flow speed in m/s is determined by the formula $[(Q/d^2) \times 21.2]$

where

“Q” is the flow rate in liters/min.

“d” is the internal diameter of the pipe in mm.

1.1.4 Filters

Filtration 10 micron must be assured where solenoid or pilot operated valves are in use, and ≤ 30 micron in other cases. Except in certain special applications, the filter is usually assembled on the return line, that the size of element must be compatible with the maximum unloading flow rate.

1.1.5 Oil

Use only a mineral based hydraulic oil responding to ISO/DIN 6743/4.

The system should be operated only with hydraulic oil containing anti-foaming and antioxidant additives. Other types of fluid can use serious damage and jeopardize its correct operation.

Recommended viscosity is between 20 and 120 mm²/s.

Contamination levels must be no higher than class 18/15 as prescribed by ISO 4406.

Check that the oil level is correct when filling the tank.

Selection of the right viscosity range will depend principally on the temperature and filtration parameters, the oil should be changed following the first 3000 hours operation and every 5000 hours thereafter.

1.1.6 Fittings

The threaded ports of the directional control valve housing are machined to DIN 3852 form x.

Accordingly, fittings with STRAIGHT THREADED ENDS only should be used (e.g. DIN 3852 form A or B).

In the interest of safety, fittings with TAPER THREADED ENDS (e.g. DIN 3852 form C) should never be used, as these can cause deformation and cracks in the valve housing.

Our warranty conditions will be not valid in the case of tapered fittings utilization.

1.2 Directional control valves Operating and maintenance guide-lines

Always exercise the utmost care when carrying out any operation on the valves (assembling, stripping, tests) and pay scrupulous attention to cleanliness: this will prevent the valves from the risk of being seriously damaged attributable to chips, dust and other foreign matter.

When washing a machine to which valves are mounted, never expose the valves themselves to liquids containing detergents or corrosive agents, or to high pressure jets, which may damage them or cause rust and corrosion.

1.2.1 Spools assembling

The location of spools in the valve housing does not present any particular difficulty.

First, make sure the O-ring seals are faultlessly clean, then proceed to insert the spool into its socket, checking for smooth and unhindered sliding movement.

Finally, fit the seals with the relative alignment rings, then fix on the position control and the handle assembly.

1.2.2 Assembling of valve sections

Before proceeding with the assembling of sectional valves, make sure that the mounting surface is strictly flat. Start by locating all the O-rings in their respective seats, applying a light layer of grease.

The bolts must be gradually tightened by small increments up to the prescribed torque (see table chapter 1.9).

Under no circumstances attempt doing this operation without the aid of a torque wrench; the bolts must be torqued up gradually and in alternation, as excessive or unevenly applied force can cause the spools to jam.

Conversely, an insufficient tightening torque can result in oil leaks and extrusion of the seals.

The operation of bolts tightening should be effected with oil components at ambient temperature (20 ÷ 30 C).

After completing the assembling and tightening operations, verify that the spools continue to slide freely and proceed with final testing.