

CONDITIONS AND INSTRUCTIONS FOR VALVES

In general there are different conditions existing under which HYDAC valves can be used in hydraulics.

These conditions are depending on the corresponding valve and described on the depending datasheet in detail.

These conditions are:

1. Pressure
2. Flow rate
3. Hydraulic fluid
4. Ambient temperature range
5. Media operating temperature range
6. Viscosity of the fluid
7. Contamination level (filtration) of the operating fluid
8. Nominal current and voltage
9. MTTF_D values
10. Tightening torque

1. PRESSURE

Each valve is designed for a certain maximum pressure at which it can be operated without risk to the environment and life. For this value, we assume the warranty, as we have demonstrated in tests. It varies from valve to valve.

2. FLOW RATE

Each valve is designed for a certain maximum flow - due to its nominal size. At this flow it is still reasonable to operate the valve. An operation above this value will boost the power dissipation and could cause a functional disorder - even a complete malfunction - or damage the valve.

The flow rate also varies from valve to valve.

In order to achieve the specified switching performance and switching time of pilot-operated valves, it is necessary that a minimum pressure and volume flow are already present at the valve during the magnetically initiated switching process. In order to avoid a negative impact on the service life, it is necessary that a minimum pressure and volume flow are present at the valve during the magnetically initiated opening process.

3. HYDRAULIC FLUID

In order to achieve the specified switching performance and switching time of pilot-operated valves, it is necessary that a minimum pressure and volume flow are already present at the valve during the magnetically initiated switching process. In order to avoid a negative impact on the service life, it is necessary that a minimum pressure and volume flow are present at the valve during the magnetically initiated opening process.

4. AMBIENT TEMPERATURE RANGE

The ambient temperature has a direct effect on the used materials in the valve, e.g. their mechanical strength. Generally, the maximum temperature depends primarily on the sealing materials.

HYDAC defines here:

- NBR:
Hydro valves from -30 °C up to +100 °C
Solenoid valves from -20 °C up to +60 °C
- FKM:
Hydro valves from -20 °C up to +100 °C
Solenoid valves from -20 °C up to +60 °C

There are also solenoid temperature valves (TT), where the seals look are specially designed for low temperatures.

Other influences of temperature:

- brittle fracture of steel at low temperatures
- relaxation of springs made of spring steel at higher temperatures
- fusing of coils at continuous operation under high current and at high temperatures (see point 8)

5. MEDIA OPERATING TEMPERATURE RANGE

Like the ambient temperature, the media temperature range has a direct effect on the used materials in the valve, e.g. their mechanical strength. Generally, the maximum temperature depends primarily on the sealing materials.

HYDAC defines here:

- NBR: from -30 °C to +100 °C (solenoid valves -20 °C)
- FKM: from -20 °C to +120 °C (all other influences see point 4)

6. VISCOSITY

HYDAC valves may be used generally only in specific viscosity ranges, as in too thin or thick liquids, the designated features can not be fulfilled. These viscosities are also different for single valves, but in average in the range of 10 mm²/s to 420 mm²/s.

7. CONTAMINATION LEVEL

Filtration and the associated particle size of contaminants in the hydraulic oil is the most important point in the operation of a hydraulic system. The correct function and lifetime of a hydraulic valve correlates closely with the contamination level, e.g. larger particles cause increased abrasion. The filtration classes mentioned in the brochure represent a minimum requirement for operation.

Exceeding these limits can lead to immediate failure of the valves in the system if they stuck in critical areas. For extended lifetime of the valve, we recommend the use of improved filtration with a reduced number of large particles, like we also use in the validation of our products.

8. NOMINAL CURRENT AND VOLTAGE

Solenoid coils for directional valves are - unless otherwise specified - designed to function safely in continuous operation in the voltage range of +/-15 % of the nominal voltage at a maximum ambient temperature of 60 °C.

Solenoid coils for proportional valves are designed to function safely in continuous operation with the maximum current specified on the coil at a maximum ambient temperature of 60 °C.

All solenoid coils must always be provided with good heat dissipation. Overvoltage/overcurrent can lead to coil failures.

9. MTTF_D VALUES

We confirm the usage of basic and well-tried safety principals to DIN EN ISO 13849-2:2012, charts C.1 and C.2 for the design of the most of our hydraulic valves. (Confirmation in each datasheet of the valve).

The customer is responsible for the implementation and the operation of our valves due to the a.m. standard as well as the adherence of the operation conditions under „Specifications“ of each datasheet.

DIN EN ISO 13849-1: 2016 allows the adaptation of the MTTF_D value to the average number of annual operations.

Unless otherwise specified, industrial valves are designed for 10,000,000 and cartridge or plug-in valves for 2,000,000 switching cycles in accordance with DIN EN ISO 13849-1:2016.

10. TIGHTENING TORQUE

You need to observe the recommended tightening torque during assembling the valve into a housing.

New brochures indicate separate values for housings made of steel or aluminum.

The screw connection between the valve and the housing must be lubricated before joining. The lubricant must be compatible with the sealing materials.

In general: When no information about the tolerance range for the torque is given, use a tool type II class A or B with specification according to DIN EN ISO 6789.