Servovalves
D761 Series
ISO 10372 Size 04

Operating Instructions

Australia
Melbourne

Austria
Vienna

Brazil
São Paulo

China
Shanghai

China
Hong Kong

England
Teesside

Finland
Helsinki

France
Paris

Germany
Bühlingen

India
Bangalore

Ireland
Ringaskiddy

Italy
Malnate (VA)

Japan
Hinatashita

Korea
Hwamju

Malaysia
Kuala Lumpur

Netherlands
Amsterdam

Philippines
Baguio

Russia
Moscow

Singapore
Singapore

Spain
Orio

Sweden
Göteborg

USA
East Aurora (NY)

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Service - worldwide
1. Safety Instructions

1.1 Warnings and symbols
- Refers to special orders and prohibitions to prevent damage.
- Refers to special orders and prohibitions to prevent injury or property damage.

1.2 Correct application
- The valves series D761 are control valves suited for electrohydraulic position-, velocity-, pressure- and force control. The valves are designed for flow rate control in hydraulic systems that operate with mineral oil based fluids. Others using the valves for purposes other than those mentioned above is considered contrary to the intended use. The user bears entirely the risk of such misuse.

1.3.3 All safety and danger prevention instructions of the regulations relevant to accident prevention and environmental protection must be followed. In addition to the operating instruction, observe also all instructions coming from the machine/plant manufacturer.

1.4 Selection and qualification of personnel
- Only well-trained and instructed personnel are allowed to work with MOOG control valves.

1.5 Safety instructions for specific operational phases
- Take the necessary precautions to ensure that the machine/plant is used only when in a safe and reliable state. Check the machine/plant at least once per working shift for obvious damage and defects (i.e. leakage), report any changes to the responsible group / person immediately. If necessary, stop the machine/plant immediately and secure it.
- In the event of malfunctions, stop the machine/plant immediately and secure it. Have any defects rectified immediately.
- If the machine/plant is completely shut down for maintenance and repair work at the valve, it must be secured against inadvertent start up by:
  - Locking the principal control elements and removing the key.
  - Attaching a warning sign to the main switch.

1.6 Organisational measures
- We recommend to include this operating instruction into the maintenance plan of the machine / plant.
- In addition to the operating instruction, observe also all other generally applicable legal and other mandatory regulations relevant to accident prevention and environmental protection. Instruct the operator accordingly.
- All safety and danger prevention instructions of the machine/plant must meet the requirements of EN 982.

1.6.4 Setting up
- Work with electrohydraulic valves must be carried out only by personnel having special knowledge and experience in plants using electrohydraulic controls.

2. Tools, Spare Parts and Accessories

2.1 Tools
- Tools are required for installation, nulladjustment and filter replacement.

2.1.1 Mounting of the valve requires Allan wrench SW 6

2.1.2 For jam nut, cranked ring wrench 3/8”

2.1.3 For adjusting pin, Allan wrench 3/32”

2.1.4 Assembly of crisp contacts of the connector as per description section 3.3.1 on page 4

2.2 Spare Parts

<table>
<thead>
<tr>
<th>MOOG Part No.</th>
<th>Description</th>
<th>Dimensions / Notes</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>42082 022</td>
<td>O-ring, ports P, T, A, B</td>
<td>ID 10,2 x Ø 1,78</td>
<td>FPM Sh 85</td>
</tr>
<tr>
<td>42082 013</td>
<td>O-ring, port X</td>
<td>ID 9,25 x Ø 1,78</td>
<td>FPM Sh 85</td>
</tr>
<tr>
<td>A67999 005</td>
<td>Replaceable filter disk</td>
<td>13 mm</td>
<td>0.65 µm nominal</td>
</tr>
<tr>
<td>A25163 013</td>
<td>O-ring, for filter change</td>
<td>ID 13 x Ø 1,5</td>
<td>FPM Sh 85</td>
</tr>
<tr>
<td>66098 040 006</td>
<td>Seal ring, port X (internal/external)</td>
<td>M6 x 6 DIN EN ISO 4762-8.8</td>
<td>1 pcs.</td>
</tr>
<tr>
<td>A25528 040</td>
<td>Seal ring, port X</td>
<td>ID 4,5 / AD 7</td>
<td>1 pcs.</td>
</tr>
</tbody>
</table>

2.3 Accessories (not included in delivery)

<table>
<thead>
<tr>
<th>MOOG Part No.</th>
<th>Description</th>
<th>Dimensions / Notes</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>54744 004</td>
<td>Mounting connector, 4-pole, M1 C505/1/48-2S</td>
<td>waterproof, protection IP65</td>
<td></td>
</tr>
<tr>
<td>A03665-080-045</td>
<td>Mounting bolts</td>
<td>M8x45 DIN EN ISO 4762-10.9</td>
<td>4 pcs.</td>
</tr>
<tr>
<td>55272 001</td>
<td>Mounting manifold</td>
<td>see special data sheet</td>
<td></td>
</tr>
<tr>
<td>55272 002</td>
<td>Flashing plate (for internal pilot supply)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The complete tool set for crimping can be obtained from MOOG by ordering part no. C21166 001.

A67999 (see sketch chapter 5.1, Filter replacement, page 4)

1.4.2 Work with electrohydraulic valves must be carried out only by personnel having special knowledge and experience in plants using electrohydraulic controls.

A67999 instead use special grease (LUBRICANT MOOG NO. A22596). Normal grease must not be used.

As per description section 3.3.1 on page 4

For values having BUNA o-rings (letter E in type designation) normal grease must not be used.

The complete tool set for crimping can be obtained from MOOG by ordering part no. C21166 001.

Our quality management system is certified in accordance with DIN EN ISO 9001.
6. Malfunctions, Causes, and Elimination

For trouble shooting D761 Series valves use of MOOG Valve Tester Model BM665A is suggested. See Operation Instruction “MOOG Valve Tester”

5. Maintenance

Besides regular visual inspection for external leakage and filter replacement, valve maintenance work is not required.

All repairs of MOOG valves can only be performed at facilities listed in MOOG Worldwide Service Network (see back cover).

5.1 Filter replacement

The built-in filter disk protects orifices and nozzles against coarse contaminants. With severe contamination the valve response will be slowed down.

Remove 4 internal hex bolts (34) using Allan wrench (SW3). Remove cover (8). Remove the filter disk (13) now accessible by using a scriber or a fine screwdriver as an extraction tool.

Check O-rings (58) and (59) for damage. Replace if necessary.

5.1.3 Insert o-ring (58) behind the filter disk first. Then insert the new filter disk (13) such that the side with the notch at the rim points outward. Mount the second o-ring (58) on the cover (8) using clean grease and mount cover to the valve body. Torque the 4 bolts (34) to 4 Nm.

Check valve for external leakage after pressurizing it.

5.1.4

6.2 No hydraulic response of the valve

- Check coil resistance using an Ohmmeter. (see page 5 for value).
- Check for electric input signal.
- Check the mating connector for corrosion!
- Is hydraulic pressure present?
- Is the filter disk contaminated?
- Check filter disk for contamination.
- Check whether input signal is stable.
- Check filter disk with the electric command signal.

5.3 Leakage at the mounting surface of the valve

- Have all seals been installed properly at ports A, B, P, T and X?
- How have the mounting bolts been tightened correctly?
- Have the mounting bolts been tightened correctly?
- Pay attention to the required torque!
- Tighten bolts diagonally changing!

6.1 Leakage at the mounting surface of the valve

Leakage at the mounting surface of the valve must be observed.

6.3 Instability of the system, plant oscillates

- Is pilot pressure present?
- Is the filter disk contaminated?
- Check the mating connector for corrosion!
- Check whether input signal is stable.
- Is hydraulic pressure present?

5.4 At zero command signal the load drifts slowly (open loop)

Adjust valve null according to 4.3

5.5 With hydraulic 0 valve goes hard over

- Orifices contaminated (plugged).
- Send valve to MOOG service center.

7. Declaration of Manufacturer

A Declaration of Manufacturer according to EC machine directive 98/37/EG is available for servo valves D761 Series and will be supplied upon request.

2.2 Technical data

| Series | DN... | DN...
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting pattern</td>
<td>150 10072 - 04 - 0 - 92</td>
<td>150 10072 - 04 - 0 - 92</td>
</tr>
<tr>
<td>Pilot connection</td>
<td>optional, internal or external</td>
<td>optional, internal or external</td>
</tr>
<tr>
<td>Mounting direction</td>
<td>any, fixed or movable</td>
<td>any, fixed or movable</td>
</tr>
<tr>
<td>Vibration</td>
<td>30 g, 3 axes</td>
<td>30 g, 3 axes</td>
</tr>
<tr>
<td>Mass</td>
<td>[g]</td>
<td>1</td>
</tr>
<tr>
<td>Rated flow Q</td>
<td>[l/min]</td>
<td>see nameplate of the valve</td>
</tr>
<tr>
<td>Max. valve flow Q</td>
<td>[l/min]</td>
<td>see nameplate of the valve</td>
</tr>
<tr>
<td>Null leakage flow</td>
<td>total, max.</td>
<td>[%]</td>
</tr>
<tr>
<td>Null leakage flow</td>
<td>pilot stage only</td>
<td>[%]</td>
</tr>
<tr>
<td>Pilot flow</td>
<td>max. at 100% step input</td>
<td>[%]</td>
</tr>
<tr>
<td>Max. operating pressure p</td>
<td>port X, X, A, B</td>
<td>[bar]</td>
</tr>
<tr>
<td>Temperature range</td>
<td>port T</td>
<td>[°C]</td>
</tr>
<tr>
<td>Operating fluid</td>
<td></td>
<td>Fluid</td>
</tr>
<tr>
<td>Viscosity</td>
<td>recommended</td>
<td>[mm²/s]</td>
</tr>
<tr>
<td>System filtration</td>
<td>High pressure filter, mounted in the main flow without bypass, but with dirt alarm</td>
<td></td>
</tr>
</tbody>
</table>

Class of cleanliness according to ISO 4406 for normal operation 14/11 for longer life 13/10 or better

NAS 1638 for normal operation 5 for longer life 4 or better

Filter rating | for normal operation | for longer life |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 0.75 (µm absolute)</td>
<td>0 - 0.75 (µm absolute)</td>
<td></td>
</tr>
<tr>
<td>0 - 0.75 (µm absolute)</td>
<td>0 - 0.75 (µm absolute)</td>
<td></td>
</tr>
<tr>
<td>0 - 0.75 (µm absolute)</td>
<td>0 - 0.75 (µm absolute)</td>
<td></td>
</tr>
</tbody>
</table>

For additional technical information, such as dimensions, ordering information etc. see catalog D761 Series.
3. Installation

3.1 General Information

3.1.1 Compare model number and valve type with information from the hydraulic schematic or bill of material.

3.1.2 The valve can be mounted in all directions, fixed or moveable.

3.1.3 Check mounting surface for planeness (0.02 mm for 100 mm) and surface roughness (Ra <1 µm).

3.1.4 Pay attention to cleanliness of mounting surface and surrounding when installing the valve.

3.1.5 Use lint-free tissue to clean!

3.1.6 Before installation, remove protection plate from the valve and keep it for later repair.

3.1.7 Pay attention to correct position of ports and location of o-rings during installation.

3.1.8 Use socket head bolts according to DIN EN ISO 4762 (diameter 9.52 for mounting, strength class 10.9, and tighten them diagonally changing according to table. Torque tolerance +/- 10%.

3.2 Conversion Internal/External

3.2.1 The pilot connection mode is indicated on the nameplate (see 3.1.6 Before installation, remove protection plate from the valve and keep it for later repair.

3.2.2 For the location of the code letter see example of type designation.

3.3 Electric connection

The specified mating connector is designed for crimp contacts of size 16. Formed connectors had solder contacts.

3.3.1 Instruction for Crimping

If you order the connector the necessary socket contacts are enclosed in the delivery bag of the mating connector supplied with the valve.

3.3.2 Connector wiring

Bore

<table>
<thead>
<tr>
<th>Type designation letter</th>
<th>B</th>
<th>A</th>
<th>N</th>
<th>H</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated current [mA]</td>
<td>± 15</td>
<td>± 40</td>
<td>± 60</td>
<td>± 7.5</td>
<td>± 20</td>
</tr>
<tr>
<td>Inductance (at 60 Hz)</td>
<td>0.59</td>
<td>0.18</td>
<td>0.10</td>
<td>0.023</td>
<td>0.064</td>
</tr>
<tr>
<td>Electrical power [W]</td>
<td>2.2</td>
<td>0.66</td>
<td>0.36</td>
<td>0.023</td>
<td>0.064</td>
</tr>
<tr>
<td>Connections for valve opening</td>
<td>P B A A' T</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Before applying electric signals the pilot stage has to be pressurized.

4. Setting up

This information is valid for new installations to be put into operation as well as for repair cases.

4.1 Filling the hydraulic system

Use oil in new class. Therefore the system should generally be fill by using a filter, this filter/each filter should at least comply with the following requirements: b ≥ 75 (10 µm absolute).

4.2 Flushing the hydraulic system

Before the hydraulic system is put into operation for the first time (also after modifications) it has to be flushed carefully according to the instructions of the manufacturer of the machine/plant.

4.2.4 The flushing process can be considered successful when a cleanliness class of 14/11 according ISO 4406 is achieved. Observe temperature!

4.4.1 Minimum flushing time can be calculated as follows:

\[ t = \frac{V}{Q} \cdot 5 \]

where:

- V is volume of reservoir (Litre)
- Q is flow rate of the pump (Litre/min)
- t is flushing time (min)

4.3 Null adjustment

The hydraulic null of the valve is preset at the factory with a tolerance of +/- 2% of rated signal. If necessary this null can be adjusted by the user of the valve.

4.3.1 Procedure: Clean the valve externally. Remove the locking nut.

- Mount cracked ring wrench 3/8” on jam nut.
- Insert 3/8” Allen wrench through ring wrench opening into internal hex of adjustor.
- Release jam nut just enough (approximately 1/2 turn) to enable turning of the adjustor.

Clockwise rotation of the adjustor will increase flow out of port B.

4.3.2 Connector wiring

For operation in parallel, series or single coil mode the corresponding wiring must be done in the mating connector by the customer.

D761 Series

D761 Series