Compact Valve Block

Type M8

Nominal size 16...32
Series 1X
Maximum control pressure:
• pump side 350 bar
• actuator side 420 bar
Maximum flow 2 x 450 L/min

Overview of contents

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>1</td>
</tr>
<tr>
<td>Technical features</td>
<td>2</td>
</tr>
<tr>
<td>Function, circuit diagram for excavator valve block</td>
<td>3</td>
</tr>
<tr>
<td>Installation and service notes</td>
<td>4</td>
</tr>
<tr>
<td>Technical data</td>
<td>4</td>
</tr>
<tr>
<td>Operating Curves</td>
<td>4 to 6</td>
</tr>
<tr>
<td>Spool selection, Port sizes</td>
<td>7</td>
</tr>
<tr>
<td>Unit dimensions</td>
<td>8 to 15</td>
</tr>
<tr>
<td>Primary and secondary valves</td>
<td>16</td>
</tr>
</tbody>
</table>

Features

Compact valve blocks, series M8 are primarily used for the control of standard functions in track driven and wheeled excavators, such as arms, buckets, transmission, dipper and slew (swing) within a 2 circuit hydraulic system.

They may even be usefully used in drilling devices and cranes. Compact valve block M8 replaces the previous 4 axis valve blocks in 2 circuit controls.

The advantage of this type over a separated design lies in the reduced time and effort required for assembly and piping.
Technical features

- Valve control to the 6/3 way principle
- Proportional control characteristic
- Further fine control range for sensitive flow control
- Hydraulic control by means of pilot operated device type TH, electrical control available on request
- Spool axes: for size 16 min. 8 to max. 10
  for size 18 min. 7 to max. 9
  for size 22 7
  for size 25 6
  for size 32 min. 6 to max. 8
- Various circuit variations (parallel/tandem/series)
- Simultaneous control of various actuators possible
- Internal flow summation of max. 3 actuators (Other actuators possible externally)
- Spools for track transmission controls with integrated deceleration functions
- Priority circuit for slew operation
- Flange mountable flow divider with compensator valve for transmission spool axes, ports for tank, cooler and anticavitation
- Various primary and secondary cartridge valves

Spool stroke, control characteristics
The spool stroke is divided into approx. 30 % control land overlap, approx. 50 % fine control range and approx. 20 % residual stroke for creating fully opened cross-section.
Optimum fine control is achieved by means of the fine control grooves in the pilot devices.

Deceleration spool
These are used in hydrostatic transmissions in tracked vehicles and are used to avoid the over-running of the drive in both directions of travel. Controlled, cavitation-free downhill travel is achieved by control of the return oil opening dependent on the feed pressure.

Warning: For the deceleration spool to function correctly system optimisation must be carried out on the vehicle.

Before going into series production, the valve must be tested in situ and final installation certified as being correct!

Ordering Code
Project department together with the customer will specify the ordering code for the valve blocks of series M8.
Function, circuit diagram for excavator valve block

The block mainly comprises the housing, the control spool with return springs (1), built-in primary cartridge valves (3) and secondary cartridge valves (4), as well as load holding valves (2). Connected to pump P1 (5) are usually arm (12, spool axis 1) and bucket (13, spool axis 2), as well as transmission L (14, spool axis 3). Arm and bucket may be supplied with fluid either in parallel or in series, i.e. both functions may be carried out simultaneously. If these functions are not used, the pump flow is available for control of the transmission.

Pump P2 (6) usually supplies the slew (17, spool axis 7), dipper (16, spool axis 6) and transmission R (15, spool axis 5). The slew has priority over the dipper and transmission (tandem circuit). The dipper function has priority over the transmission. Flow from pump P2 not required for these functions may [by operating the C valve (10)] be used for the external summation with another actuator.

If neither arm, bucket nor transmission L (spool axes 1-3) are operated, flow from pump P1 may be made available by internally activating the summation valve (9) of spool axis 6 (control of dipper) (dipper summation).

By means of the transmission compensation valve (7) the remaining oil from pumps P1 and P2 may be combined for the supply of both spool axes for the transmissions. Hence various operations may be carried out during travel, without the vehicle deviating from its path of travel. If only the transmission spools are operated, the transmission compensation valve is then at rest and only a residual compensation is carried out.

Preload valves (11) arranged in the return cause the return oil to be divided between the cooler and tank. The return oil which has built up may only be removed via port “S” and then fed to the slew motor for the purpose of anti-cavitation.

In addition to the model of the compact valve block described here, further variations exist, which our project department MH-V is willing to provide information on. Similarly help is provided for the design of hydraulic controls using M8 valve blocks.

1 Control spool  
2 Load holding valve  
3 Primary valve  
4 Secondary valve  
5 Port for pump 1  
6 Port for pump 2  
7 Transmission compensation valve with residual oil at rest  
8 Spool with integrated deceleration function  
9 Summation valve (internal, dipper summation)  
10 C valve external summation  
11 Preload valves  
12 Port: arm  
13 Port: spoon  
14 Port: left transmission  
15 Port: right transmission  
16 Port: dipper  
17 Port: slew (swing)  

P1; P2 pump ports  
Pst, a., b. control ports  
S anti-cavitation port  
K cooler port  
T tank port  
L leakage oil port  
M pressure gauge port  
C Port for external summation
Installation and service notes

Installation
The installation position of the compact valve block is optional. Mechanical distortion is not permissible.

Service notes
- Primary and secondary valves may be exchanged without disassembling block. They must not be adjusted by the customer.
- If a control spool needs to be removed, only the long cover of the spool axis needs to be removed first.

Technical data (For operation outside these parameters, please consult us!)

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Mineral oil (HL, HLP) to DIN 51 524</th>
<th>Phosphate ester (HFD-R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid temperature range °C</td>
<td>20 to + 80</td>
<td></td>
</tr>
<tr>
<td>Viscosity range mm²/s</td>
<td>10 to 380</td>
<td></td>
</tr>
<tr>
<td>Degree of contamination of fluid (maximum permissible) ISO 4406 (C) Class 20/18/15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow, max. Size L/min</td>
<td>2 x 110 2 x 150¹ 2 x 200² 2 x 230 2 x 300 2 x 350</td>
<td></td>
</tr>
<tr>
<td>Operating pressure (maximum)</td>
<td>bar 350</td>
<td>bar 420</td>
</tr>
<tr>
<td>Control pressure, max. bar</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Fine control range bar</td>
<td>8 ... 19 for control curve 06</td>
<td>8 ... 25 for control curve 70</td>
</tr>
<tr>
<td>Weight</td>
<td>See Unit dimensions on pages 8 - 15 (approx. weights) Exact weight will depend on the equipment used.</td>
<td></td>
</tr>
</tbody>
</table>

¹) with brake piston 007  ²) without brake piston

Operating Curves (measured at $\nu = 41 \text{ mm}^2/\text{s}$ and $\vartheta = 50 \degree \text{C}$)

Size 16

Through flow resistance $P_1 \rightarrow$ actuator

Through flow resistance actuator $\rightarrow$ tank

Bypass resistance
Operating Curves (measured at $v = 41 \text{ mm}^2/\text{s}$ and $\vartheta = 50 \degree \text{C}$)

**Size 18**

Through flow resistance $P1 \rightarrow$ actuator

Through flow resistance actuator $\rightarrow$ tank

Bypass resistance

**Size 22**

Through flow resistance $P1 \rightarrow$ actuator

Through flow resistance actuator $\rightarrow$ tank

Bypass resistance

1) for brake piston 007
Operating Curves (measured at $\nu = 41 \text{ mm}^2/\text{s}$ and $\vartheta = 50 ^\circ \text{C}$)

**Size 25**

Through flow resistance pump → actuator

Through flow resistance actuator → tank

Bypass resistance

**Size 32**

Through flow resistance pump → actuator

Through flow resistance actuator → tank

Bypass resistance
Spool selection

Symbols

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Size16</th>
<th>Size16</th>
<th>Size 22</th>
<th>Size 25</th>
<th>Size 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 001</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>= 002</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>= 003</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>= 005</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>= 006</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>= 007</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>= 009</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>= 026</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>= 115</td>
<td></td>
<td></td>
<td></td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>= 139</td>
<td></td>
<td></td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>= 149</td>
<td>•</td>
<td>•</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Port sizes

<table>
<thead>
<tr>
<th>Port</th>
<th>Size 16</th>
<th>Size 16</th>
<th>Size 22</th>
<th>Size 25</th>
<th>Size 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, C, P2</td>
<td>M27 x 2</td>
<td>SAE 3/4” 6000 PSI</td>
<td>SAE 3/4” 6000 PSI</td>
<td>SAE 1” 6000 PSI</td>
<td>SAE 1 1/4” 6000 PSI</td>
</tr>
<tr>
<td>A6, B6</td>
<td>M33 x 2</td>
<td>SAE 1” 6000 PSI</td>
<td>SAE 1” 6000 PSI</td>
<td>SAE 1 1/4” 6000 PSI</td>
<td>SAE 1 1/4” 6000 PSI</td>
</tr>
<tr>
<td>P1, P2</td>
<td>SAE 3/4” 6000 PSI</td>
<td>SAE 1” 6000 PSI</td>
<td>SAE 1” 6000 PSI</td>
<td>SAE 1 1/4” 6000 PSI</td>
<td>SAE 1 1/4” 6000 PSI</td>
</tr>
<tr>
<td>K</td>
<td>SAE 1” 3000 PSI</td>
<td>SAE 1 1/4” 3000 PSI</td>
<td>SAE 1 1/4” 3000 PSI</td>
<td>SAE 1 1/2” 3000 PSI</td>
<td>SAE 2 3000 PSI</td>
</tr>
<tr>
<td>T</td>
<td>SAE 1” 3000 PSI</td>
<td>SAE 1 1/2” 3000 PSI</td>
<td>SAE 1 1/2” 3000 PSI</td>
<td>SAE 2” 3000 PSI</td>
<td>SAE 2 1/2” 3000 PSI</td>
</tr>
<tr>
<td>a, b, L</td>
<td>1/4” BSP</td>
<td>1/4” BSP</td>
<td>1/4” BSP</td>
<td>1/4” BSP</td>
<td>1/4” BSP</td>
</tr>
<tr>
<td>Pst</td>
<td>1/4” BSP</td>
<td>1/4” BSP</td>
<td>1/4” BSP</td>
<td>1/4” BSP</td>
<td>–</td>
</tr>
<tr>
<td>M1</td>
<td>1/4” BSP</td>
<td>1/4” BSP</td>
<td>M22 x 1,5</td>
<td>M22 x 1,5</td>
<td>M22 x 1,5</td>
</tr>
<tr>
<td>S</td>
<td>M26 x 1,5</td>
<td>M33 x 2</td>
<td>M33 x 2</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Port sizes

<table>
<thead>
<tr>
<th>Port</th>
<th>Size 16</th>
<th>Size 16</th>
<th>Size 22</th>
<th>Size 25</th>
<th>Size 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 10x15,5</td>
<td>50,8±0,2</td>
<td>33,9±0,2</td>
<td>33,9±0,2</td>
<td>33,9±0,2</td>
<td>33,9±0,2</td>
</tr>
<tr>
<td>M 12x16</td>
<td>57,15±0,2</td>
<td>42,9±0,2</td>
<td>42,9±0,2</td>
<td>42,9±0,2</td>
<td>42,9±0,2</td>
</tr>
<tr>
<td>M 14x19</td>
<td>58,74±0,2</td>
<td>42,9±0,2</td>
<td>42,9±0,2</td>
<td>42,9±0,2</td>
<td>42,9±0,2</td>
</tr>
<tr>
<td>M 10x14</td>
<td>69,85±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
</tr>
<tr>
<td>M 12x16</td>
<td>77,8±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
</tr>
<tr>
<td>M 12x18</td>
<td>88,9±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
<td>50,8±0,2</td>
</tr>
</tbody>
</table>

• = available
Unit dimensions: M8-16, variation 1, 2 and 3 (Dimensions in mm)

Variation 3
(basic block with 2-axis extension)

Variation 2
(basic block with single axis extension)

Variation 1 (extendable)

For dimensions see page 7
Weight: approx. 90 kg

Weight: approx. 95 kg

Weight: approx. 113 kg

1. Bleed
2. Nameplate
3. Blanking plate (only variation 1)
4.1. Extension piece (single axis)
4.2. Extension piece (2-axis)
5. Transport aid
6. Pisten stroke limitation
7. Mounting bores
Unit dimensions: M8-18, variation 1 (Dimensions in mm)

7-axis valve block (not extendable)

For dimensions see page 7

Weight: approx. 112 kg
Unit dimensions: M8-18, variation 2; 3 and 4 (Dimensions in mm)

Variation 4
(basic block with 2-axis extension)

Variation 3
(basic block with single axis extension)

Variation 2
(extendable)

For dimensions see page 7
Weight: approx. 140 kg

Weight: approx. 127 kg

Weight: approx. 115 kg

For explanations of items see page 9
Unit dimensions: M8-22, variation 1 (Dimensions in mm)

7-axis valve block (not extendable)

For dimensions see page 7
Weight: approx. 148 kg

1 Bleed
2 Nameplate
5 Transport aid
6 Pisten stroke limitation
7 Mounting bores
**Unit dimensions: M8-22, variation 2** (Dimensions in mm)

7-axis valve block (not extendable)

For dimensions see page 7

Weight: approx. 150 kg

1 Bleed
2 Nameplate
5 Transport aid
7 Mounting bores
Unit dimensions: M8-25 (Dimensions in mm)

6-axis valve block (not extendable)

For dimensions see page 7
Weight approx. 187 kg

1 Bleed
2 Nameplate
5 Transport aid
7 Mounting bores
Unit dimensions: M8-32, variation 1 (Dimensions in mm)

7-axis valve block (not extendable) *)

*) Dimensions for 6-axis valve block on request

1 Bleed
2 Nameplate
5 Transport aid
7 Mounting bores
Unit dimensions: M8-32, variation 2 (Dimensions in mm)

For dimensions see page 7
Weight approx. 350 kg

8-axis valve block (not extendable)

1 Bleed
2 Nameplate
5 Transport aid
7 Mounting bores
Primär- und Sekundärventile

Primary valves available:
- Pressure relief valve, pilot operated, without anti-cavitation
- Pressure control/anti-cavitation valve, pilot operated
- Pressure control/anti-cavitation valve pilot operated with pressure isolation stage
- Pressure relief valve pilot operated with pressure isolation stage

Secondary valves available:
- Pressure relief valve, pilot operated without anti-cavitation
- Pressure control/anti-cavitation valve, pilot operated
- Anti-cavitation valve
- Pressure relief valve with pressure isolation stage (off)
- Pressure relief valve with pressure isolation stage (on)

Project department will be pleased to provide information on the availability and application possibilities for these valves for the various sizes of compact block series M8.