Mobile Directional Control Valve

CMJ Sectional Valve
Rate Pressure: 230bar
Flow rate 60, 80L/min
# Table of Contents

- General Introduction ........................................................................................................ 3
- Operation Data .................................................................................................................. 4
- CMJ60 ................................................................................................................................ 5
  - Schematic and Installation ............................................................................................. 5
  - Specifications and Spool Types ....................................................................................... 7
  - Characteristics Curves ..................................................................................................... 9
- CMJ80 ................................................................................................................................ 10
  - Schematic and Installation ............................................................................................. 10
  - Specifications and Spool Types ....................................................................................... 12
  - Characteristics Curves ..................................................................................................... 14
General Introduction

Features & Benefits

- Open center sectional control valve
- Max. pressure: 230 bar
- Two flow options available: 60 LPM; 80 LPM
- Using low friction seals and wipers
- Low pressure drop and low noise through optimized casing and oil path design
- Flexible configuration for multiple functions
- Low hysteresis and high dynamic valve design
- Low internal leakage due to optimum spool design
- High market acceptance due to reliability and durability
- Three Main Relief Valves provide added system protection in complex excavator applications. (Market leading design)
- P1 and P2 can purge additional flow from P3 through special patented circuit design to achieve higher work circuit speeds
- Load Holding valve for Boom Holding
- Multiple valve port relief configurations available
- For traction drive control, P1 and P2 separately supply left and right traction, while P3 supplies other functions, e.g. bucket load will not impact the traction speed during “travel straight mode”

Typical Applications

- Excavator and mini excavator
- Backhoe loader
- Horizontal directional drilling
- Forklift
- Agricultural machinery

Notes

Other larger mono-block valves are available on request, please consult AP product marketing for further information.

The open center system is widely applied in compact machinery, e.g. typically mini excavator. Compared with other systems, open center systems are market-proven products with competitive cost and high levels of reliability.

This catalogue introduces two types of open center sectional valves applicable to 5–7 Ton mini excavator applications.
# Operation Data

<table>
<thead>
<tr>
<th>Model</th>
<th>CMJ60</th>
<th>CMJ80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spool specification</td>
<td>Spool Dia = 14.5 mm</td>
<td>Spool Dia = 16.0 mm</td>
</tr>
<tr>
<td></td>
<td>Spool Stroke = 8.0 mm</td>
<td>Spool Stroke = 8.0 mm</td>
</tr>
<tr>
<td>Rated pressure</td>
<td>220 bar</td>
<td>230 bar</td>
</tr>
<tr>
<td>Max. pressure</td>
<td>240 bar</td>
<td>250 bar</td>
</tr>
<tr>
<td>Pilot port rated pressure</td>
<td>40 bar</td>
<td>40 bar</td>
</tr>
<tr>
<td>Max. flow</td>
<td>P1, P2 – 60 LPM</td>
<td>P1, P2 – 80 LPM</td>
</tr>
<tr>
<td></td>
<td>P3 – 40 LPM</td>
<td>P3 – 40 LPM</td>
</tr>
<tr>
<td>Max. back pressure</td>
<td>Peak – 20 bar</td>
<td>Peak – 20 bar</td>
</tr>
<tr>
<td></td>
<td>Normal – 8 bar</td>
<td>Normal – 8 bar</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-20 – 90 °C</td>
<td>-20 – 90 °C</td>
</tr>
<tr>
<td>Hydraulic oil</td>
<td>ISO VG 46 Equivalent</td>
<td>ISO VG 46 Equivalent</td>
</tr>
<tr>
<td>Main relief setting</td>
<td>220 bar @ 40 LPM</td>
<td>230 bar @ 50 LPM</td>
</tr>
<tr>
<td>Overload relief setting</td>
<td>240 bar @ 10 LPM</td>
<td>250 bar @ 20 LPM</td>
</tr>
<tr>
<td>Internal leakage</td>
<td>8 cc/min @ 70 bar &amp; 37Cst</td>
<td>8 cc/min @ 70 bar &amp; 37Cst</td>
</tr>
<tr>
<td>Typical vehicle application</td>
<td>5 Ton</td>
<td>5-7 Ton</td>
</tr>
</tbody>
</table>

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Schematic of typical mini excavator application
CMJ60

60L/min

Installation, mm

Name plate
Part No.
Serial No.

Torque
3 kgf.m

Torque
3 kgf.m

Torque
2 kgf.m

273.5

Pumo inlet (P1, P2, P3) 3-pf1/2

Torque
4 kgf.m

51.2

Cyl. port 17-pf1/2

A11

A10

Pf 1/2(t2)

Torque
1.5 kgf.m

4-10 Thru

Torque
3 kgf.m

**CMJ60**

**Specifications and Spool Types**

**Section schematic function - Hydraulic pilot control**

1. Hydraulically Operated, 3-Position Spool and regeneration from A to B line, while the spool is moved to the right direction.

![Diagram 1](image1)

2. Hydraulically Operated, 3-Position Spool which has orifice in B->T line only.

![Diagram 2](image2)

3. Hydraulically Operated, 3-Position Spool which is opened to T from A and B port in neutral condition.

![Diagram 3](image3)

4. Hydraulically Operated, 3-Position Spool which has P->B line, while the spool is moved to the right direction.

![Diagram 4](image4)

**Section schematic function - Manual control**

1. Manually Operated, 3-Position Spool which is opened to T from A and B port in neutral condition.

![Diagram 5](image5)

**Inlet section schematic (Mini excavator applications)**

A Travel Straight function is integrated in inlet block. In order to make this function work normally, a pilot pressure from pilot gear pump is needed to supply to PP port.

![Diagram 6](image6)
CMJ60
Exploded View

Pressure drop curve

\( \Delta P \) of P-T Neutral Flow

\( \Delta P \) of P-C

\( \Delta P \) of C-T

Flow Rate (lpm)

Flow Rate (lpm)
CMJ60

Auxiliary Valves’ Characteristic

Static Characteristic

Main relief valve

Dynamic Characteristic

Overload relief valve

Holding valve

Note:
Above configurations are for mini excavator applications. All other configuration, please consult AP product marketing.
Schematic of typical mini excavator application
CMJ80
80L/min

Installation, mm

Approximately 90 mm (maintenance clearance of relief V/V)

Approximately 230 mm (maintenance clearance of main spool)

Approximately 90 mm (maintenance clearance of relief V/V)
Section schematic function - Hydraulic pilot control

1. Hydraulically Operated, 3-Position Spool.

2. Hydraulically Operated, 3-Position Spool which is opened to T from A and B port in neutral condition.

3. Hydraulically Operated, 3-Position Spool which does not have Return (A→T or B→T) line.

Travelling straight section (Mini excavator)

A separated Travelling Straight section is used to combine flow of P3 to P1 and P2 circuits when Travelling Straight function is activated. To increase travel speed.
CMJ80
Exploded View

Pressure drop curve

$\Delta P$ of P-T Neutral Flow

$\Delta P$ of P-C

$\Delta P$ of C-T
CMJ80
Auxiliary Valves’ Characteristic

Static Characteristic

Main relief valve

Dynamic Characteristic

Overload relief valve

Holding valve

Note:
Above configurations are for mini excavator applications. All other configuration, please consult AP product marketing.