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TEL 0771-22-8600, FAX 0771-28-2021

* Specifications and dimensions on this catalog are subject to change without notice.
Precautions for Selecting Dowmax Motors

**WARNING**

1. Attention should be paid to the following matters when selecting Dowmax motors. Carefully read and understand the manual thoroughly before using the product.
2. Check that the hydraulic system is planned in a manner to satisfy the matters described in the catalogue, instruction manual, delivery drawing, manufacturing specifications, etc. Proper special attention is given to the following:

1. The performance curves shown in this catalogue show the summary (average value) of data on motors that have already been run. Provide sufficient margin of safety when selecting motors in accordance with specific applications. When motors are new (before commissioning), they may fail to achieve the performance stated in the catalogue. Contact us if that will cause any problem.
2. In cases where high back pressure is applied to the outlet line of the motor in special application, the performance described in the catalogue may not be exhibited. Contact us if the back pressure applied to the outlet line of the motor exceeds 0.098MPa (78g/cm²).
3. In cases where the motor is turned by a load, it is necessary to apply boost pressure to the suction line of the motor to prevent cavitation. The boost pressure is subject to the motor speed and the viscosity of hydraulic fluid. In general, apply pressure that exceeds the minimum, boost pressure shown for each model.
4. In cases where external load torque is applied to the motor shaft while the motor is at rest, the motor will turn (slip due to the leakage inside the motor. If there is no supply circuit, cavitation occurs and the motor goes out of control. For example, a tractor will drop suddenly.) Use a mechanical brake, as necessary, in these cases.
5. In cases where the inertial force of a driving body is large, abnormal pressure will be produced. Measure the pressure of the actual motor, and use a brake valve if the peak pressure exceeds the maximum value. Besides, the other parts may be damaged. Plan pipe installation in a manner to satisfy matters described in the related instruction manual.
6. Precautions for mechanical brake.
7. Mechanical brake of Dowmax motor is reverse-operation type, the brake is released when brake pilot line is pressurized.
   a. Pay attention, when planning hydraulic circuit, to the brake pilot line not being pressurized at any time the brake is necessary, even if its at an instant time.
   b. When residual pressure remains at the brake pilot line, brake torque decreases proportionally to the residual pressure. Brake torque shown in this catalogue is for the brake pilot line pressure of 0.07MPa.

**CAUTION**

1. Use the recommended hydraulic fluid shown in instruction manual. When five-resistant fluid is used, strictly observe the cautions and notes described in the instruction manual. Standard motors cannot be used when phosphate-water is used as hydraulic fluid. In that case, select the seal code of V or X (seal material: fluoroelastomer). As in the case of water-based hydraulic fluid, the motor life can substantially be shortened depending on the type of five-resistant fluid. (Contact us for the expected life of motor under specific operating condition.)
2. When the direction of rotation of the motor is to be changed frequently, select motors with a spline shaft.
3. Metal chips, sand, and other foreign substances contained in hydraulic fluid will adhere to the cooling surface of the motor, advancing the abrasion of component parts and causing malfunction and failure of the motor. Present entry of dust, and be sure to install a filter in the circuit. Refer to the related instruction manual for the filter specifications.
4. Precautions regarding the drain port position and drain piping are described in the related instruction manual. Be sure to refer to them and reflect them in the piping plan.
5. When installation of motor with its shaft facing upward is desired, select “Dowmax motor, installing the shaft upward” (mentioned before) that permits air bleeding from the case.
6. Keep the drain pressure inside the motor case below 0.03MPa (0.2 kgf/cm²). Take care the pressure as it rises depending on the tank position and the length and diameter of pipes. The pressure on the low-pressure side of the main port must be higher than the drain pressure.
7. When the shaft is exposed to water or seawater, the standard seal will allow the shaft to rust, and the abraded seal may cause leakage. In such a case, select or specify models made to the double oil seal specifications.

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<td>ME175</td>
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<td>ME350B</td>
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<tr>
<td>ME600B</td>
<td>51</td>
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<tr>
<td>ME750B</td>
<td>51</td>
</tr>
<tr>
<td>ME850B</td>
<td>51</td>
</tr>
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<td>ME1300A</td>
<td>51</td>
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<td>ME1900</td>
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<td>51</td>
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2-Speed Motor

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<td>TM150AP100</td>
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<tr>
<td>TM500B</td>
</tr>
<tr>
<td>TM600BC2560+18250C</td>
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<tr>
<td>TM750BC2560+18C300C</td>
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<td>TM850BC2570+18C300C</td>
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<tr>
<td>TM300F-8501+BP121-C</td>
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<td>TM300F-8502+BR250-C</td>
</tr>
<tr>
<td>TM100C+CHPL-605-S-P</td>
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<tr>
<td>ME150G+CHPL-665-S-P</td>
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<tr>
<td>ME175G+CHPL-665-S-P</td>
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<tr>
<td>ME300BG+CHPL-720-S-P</td>
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<td>ME350BG+CHPL-720-S-P</td>
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<tr>
<td>ME600BG+CHPL-840-S-P</td>
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<td>ME1300AG+CHPL-1080-S-P</td>
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<td>ME1900G+CHPL-1200-S-P</td>
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<td>ME100C+CHPL-960-26-P</td>
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<td>ME850BG+CHPL-1320-26-P</td>
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<td>ME2600G+CHPL-1440-26-P</td>
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</table>

Dowmax Motor with Planetary-Gear Double Reduction

<table>
<thead>
<tr>
<th>81</th>
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<tbody>
<tr>
<td>ME100C+CHPL-960-26-P</td>
</tr>
<tr>
<td>ME150G+CHPL-960-26-P</td>
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<td>ME600BG+CHPL-1080-26-P</td>
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<td>ME750BG+CHPL-1200-26-P</td>
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<td>ME850BG+CHPL-1320-26-P</td>
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<tr>
<td>ME2600G+CHPL-1440-26-P</td>
</tr>
</tbody>
</table>

- Counter Balance Valve with Brake Valves

SAFETY PRECAUTIONS: Read the instruction manual carefully and thoroughly before using the product, and then use it correctly.
ME Low Speed High Torque Motor is a double swash plate type axial piston motor and has highest performance at low speed range.

- Wide range of models-13 displacements from 99 to 4097 cm³/rev are available.
- High pressure—Continuous operating pressure 27.5Mpa (280kgf/cm²) & 24.5Mpa (250kgf/cm²).
- Smooth operation at low speed. Multiple pistons and double swash plate result in smooth rotation at speeds down to 1 rev/min.
- High starting torque and high overall efficiency.
- Compact and easy installation.
- Robust construction.
- Quiet operation.
- Unaffected by thermal shock (good for starting at cold temperature).
- Speed pickup system is available.

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DowMAX, is respectively registered trade mark.
Structure and Operation

Fluid entering the supply port is directed via internal passages and timing plate to the center of the cylinder bores. Fluid pressure forces the pistons apart causing the slippers to slide on the angled faces of the swash plates and rotate the barrel and shaft assembly. After work, fluid is exhausted through the timing plate and internal passages to the return port.

Performance Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Displacement cm³/rev</th>
<th>Rated Pressure Mpa(kgf/cm²)</th>
<th>Peak Pressure Mpa(kgf/cm²)</th>
<th>Rated Torque N·m @ 1500 rpm</th>
<th>Rated Speed rpm</th>
<th>Max. Speed rpm</th>
<th>Rated Horsepower kW/PS</th>
<th>Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME100</td>
<td>99</td>
<td>27.5 (280)</td>
<td>31.9 (325)</td>
<td>432 (45)</td>
<td>1000</td>
<td>1000</td>
<td>45 (62)</td>
<td>22</td>
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<tr>
<td>ME150a</td>
<td>152</td>
<td></td>
<td></td>
<td>667 (68)</td>
<td>600</td>
<td>800</td>
<td>42 (57)</td>
<td>42</td>
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<tr>
<td>ME175a</td>
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<td></td>
<td>765 (78)</td>
<td>600</td>
<td>800</td>
<td>48 (65)</td>
<td>42</td>
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<tr>
<td>ME300B</td>
<td>300</td>
<td></td>
<td></td>
<td>1320 (135)</td>
<td>660</td>
<td>800</td>
<td>90 (123)</td>
<td>60</td>
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<tr>
<td>ME350B</td>
<td>360</td>
<td></td>
<td></td>
<td>1530 (156)</td>
<td>660</td>
<td>800</td>
<td>106 (144)</td>
<td>60</td>
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<tr>
<td>ME600B</td>
<td>600</td>
<td></td>
<td></td>
<td>2620 (267)</td>
<td>500</td>
<td>600</td>
<td>137 (186)</td>
<td>96</td>
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<tr>
<td>ME750B</td>
<td>750</td>
<td></td>
<td></td>
<td>3280 (334)</td>
<td>450</td>
<td>520</td>
<td>154 (210)</td>
<td>123</td>
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<tr>
<td>ME850B</td>
<td>848</td>
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<td></td>
<td>3708 (378)</td>
<td>450</td>
<td>540</td>
<td>155 (211)</td>
<td>123</td>
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<tr>
<td>ME1300A</td>
<td>1345</td>
<td></td>
<td></td>
<td>5250 (536)</td>
<td>200</td>
<td>390</td>
<td>138 (188)</td>
<td>170</td>
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<td>ME1900</td>
<td>1868</td>
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<td></td>
<td>7290 (743)</td>
<td>140</td>
<td>260</td>
<td>128 (174)</td>
<td>270</td>
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<tr>
<td>ME2600</td>
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<td></td>
<td></td>
<td>10070 (1026)</td>
<td>110</td>
<td>230</td>
<td>159 (216)</td>
<td>350</td>
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<td>ME3100</td>
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<td></td>
<td>12120 (1230)</td>
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<td>230</td>
<td>186 (253)</td>
<td>364</td>
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<tr>
<td>ME4100</td>
<td>4097</td>
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<td>15990 (1630)</td>
<td>75</td>
<td>200</td>
<td>211 (287)</td>
<td>520</td>
</tr>
</tbody>
</table>

- Limit of hydraulic fluid temperature: −20°C to 60°C.
- Limit of hydraulic fluid viscosity: 15–500cSt (Advisable fluid viscosity range: 25–100cSt).
- ME150, ME175 is a special double swash plate motor.

Coding

<table>
<thead>
<tr>
<th>Special Specification Number</th>
<th>ME 4100 — CWAS</th>
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<tbody>
<tr>
<td>Special spec.: S-Special Specification</td>
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<tr>
<td>Ports: No indication</td>
<td>Standard metric ports</td>
</tr>
<tr>
<td>A &amp; B-Special ports for counter Balance valves (see table below)</td>
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</tr>
<tr>
<td>E-SAE port</td>
<td></td>
</tr>
<tr>
<td>Seal: No indication</td>
<td>Standard seal (Nitrile Rubber)</td>
</tr>
<tr>
<td>V-Viton seal for phosphate ester fluid</td>
<td></td>
</tr>
<tr>
<td>W-Double seal (Nitrile Rubber)</td>
<td></td>
</tr>
<tr>
<td>X-Double seal (Viton)</td>
<td></td>
</tr>
<tr>
<td>Motor Shaft: G-Metric parallel keyed shaft with screws for key retention plate (std.)</td>
<td></td>
</tr>
<tr>
<td>P-Metric spline shaft</td>
<td></td>
</tr>
<tr>
<td>G-Metric hollowed spline shaft</td>
<td></td>
</tr>
<tr>
<td>B-1/10 tapered shaft</td>
<td></td>
</tr>
<tr>
<td>K-Inch size parallel keyed shaft</td>
<td></td>
</tr>
<tr>
<td>H-Inch size spline shaft</td>
<td></td>
</tr>
<tr>
<td>S-Other special shaft</td>
<td></td>
</tr>
<tr>
<td>Design No.: 1st design change “A”</td>
<td></td>
</tr>
<tr>
<td>Motor Size (Metric Displacement)</td>
<td></td>
</tr>
<tr>
<td>Series: High pressure series Dowmax motor</td>
<td></td>
</tr>
</tbody>
</table>

Selection Chart

This chart indicates the relation of actual torque and shaft rotation at the rated pressure of 27.5MPa (280 kgf/cm²) and 24.5MPa (250kgf/cm²).

Given the required torque and shaft speed the appropriate model can be selected from the diagram. When the operating pressure differs from 27.5 or 24.5MPa (280 or 250kgf/cm²), refer to the performance data for the respective model.
### ME100

**Displacement**: 99cm³/rev

**Rated Pressure**: 27.5MPa (280kgf/cm²)

**Peak Pressure**: 31.9MPa (325kgf/cm²)

**Rated Torque**: 432N·m (44kgf·m)

**Rated Speed**: 1000rpm

**Max. Speed**: 1000rpm

**Rated Horse Power**: 45kW (62PS)

**Mass**: 22kg

**Nominal Dimensions**

- **JIS B3301**: Shaft with screw for key retention
  - Shaft code: C

- **M12×15**: Main part
  - 2-M5 depth 9
  - M5 depth 17

- **JIS D2001 Involute Spline 35 X19/1.67 (Class 6)**
  - **Shaft code**: 6 (Single oil seal)
  - **Shaft code**: BW (Double oil seal)

**Performance Data**

- **Fig. 1 Mechanical Efficiency**
- **Fig. 2 Volumetric Efficiency**
- **Fig. 3 Starting Torque**
- **Fig. 4 External Leakage**
- **Fig. 5 Minimum Boost Pressure**
- **Fig. 6 Pressure Drop**

**FLUID: SHELL TELLUS 64 (Viscosity 37St at 50°C)**

The graphs shown are mean values obtained for production units.

**Important Note**: It is important that sufficient back pressure is maintained when the motor is operated as a pump or when the load exceeds the motor, to prevent cavitation.

**Important Note**: Pressure necessary to run motor without load is shown for various speeds.
**ME300B**

**Displacement**  
300 cm³/rev

**Rated Pressure**  
27.5 MPa (280 kgf/cm²)

**Peak Pressure**  
31.9 MPa (325 kgf/cm²)

**Rated Torque**  
1320 N·m (134 kgf·m)

**Rated Speed**  
660 rpm

**Max. Speed**  
800 rpm

**Rated Horse Power**  
90 kW (123 PS)

**Mass**  
60 kg

---

### Performance Data

**Fig. 1 Mechanical Efficiency**

Mechanical efficiency at various speeds is shown for 4 operating pressures.

**Fig. 2 Volumetric Efficiency**

Volumetric efficiency at various speeds is shown for 4 operating pressures.

**Fig. 3 Starting Torque**

Starting torque versus effective pressure is shown. (Due to viscosity, oil will not affect the starting torque efficiency.)

**Fig. 4 External Leakage**

External leakage from motor drain port relative to various speeds is shown for 4 operating pressures.

**Fig. 5 Minimum Boost Pressure**

Pressure necessary to run motor without leaks is shown for various speeds.

---

**FLUID : SHELL TEILLUS 56 (Viscosity 37/55 at 50°C)**

The graphs shown are mean values obtained for production units.
**ME350B**

**Displacement**
350 cm³/rev

**Rated Pressure**
27.5 MPa (280 kgf/cm²)

**Peak Pressure**
31.9 MPa (325 kgf/cm²)

**Rated Torque**
1530 N·m (156 kgf·m)

**Rated Speed**
660 rpm

**Max. Speed**
800 rpm

**Rated Horse Power**
106 kW (144 PS)

**Mass**
60 kg

---

**Nominal Dimensions**

**Splined shaft**
- Shaft code: F
- Shaft depth: 8 mm

**Tapered shaft (1/10 taper)**
- Shaft code: B (Single oil seal)
- Shaft depth: 8 mm

**JIS D2001 Involute Spline**
- 45° X10×2.5 (Class B)

---

**Performance Data**

**Fig. 1 Mechanical Efficiency**
- Mechanical efficiency at various speeds is shown for 4 operating pressures.

**Fig. 2 Volumetric Efficiency**
- Volumetric efficiency at various speeds is shown for 4 operating pressures.

**Fig. 3 Starting Torque**
- Starting torque versus effective pressure is shown. Oil viscosity will affect the starting torque efficiency.

**Fig. 4 External Leaksage**
- External leakage from motor drain port, relative to various speeds is shown for 4 operating pressures.

**Fig. 5 Minimum Boost Pressure**
- Pressure necessary to run motor without load is shown for various speeds.
**ME600B**

### Nominal Dimensions

- **Displacement**: 600 cm³/rev
- **Rated Pressure**: 27.5 MPa (280 kgf/cm²)
- **Peak Pressure**: 31.9 MPa (325 kgf/cm²)
- **Rated Torque**: 2620 Nm (267 kgf·m)
- **Rated Speed**: 500 rpm
- **Max. Speed**: 600 rpm
- **Rated Horse Power**: 137 kW (186 PS)
- **Mass**: 96 kg

### Performance Data

**Fig. 1 Mechanical Efficiency**

Mechanical efficiency at various speeds is shown for 4 operating pressures.

**Fig. 2 Volumetric Efficiency**

Volumetric efficiency at various speeds is shown for 4 operating pressures.

**Fig. 3 Starting Torque**

Starting torque versus effective pressure is shown. Oil viscosity will not affect the starting torque efficiency.

**Fig. 4 External Leakage**

External leakage (from motor drain port) relating to contact speeds is shown for 4 operating pressures.

**Fig. 5 Minimum Boost Pressure**

It is important that sufficient start pressure is maintained, when the motor is operated as a pump or when the load exceeds its motor, to prevent cavitation.

**Fig. 6 Pressure Drop**

Pressure necessary to run motor without load is shown for various speeds.

### Fluid: SHELL TELLUS 56 (Viscosity 37 cSt at 50°C)

The graphs shown are mean values obtained for production units.
### Performance Data

**Fig. 1 Mechanical Efficiency**

Mechanical efficiency at various speeds is shown for 4 operating pressures.

**Fig. 2 Volumetric Efficiency**

Volumetric efficiency at various speeds is shown for 4 operating pressures.

**Fig. 3 Starting Torque**

Starting torque versus effective pressure is shown. On viscosity will not affect the starting torque efficiency.

**Fig. 4 External Leakage**

External leakage (from motor side ports) relation to coolant speeds is shown for 4 operating pressures.

**Fig. 5 Minimum Boost Pressure**

**Fig. 6 Pressure Drop**

Pressure necessary to run motor without load is shown for various speeds.

---

**ME750B**

**Displacement**
750cm³/rev

**Rated Pressure**
27.5MPa (280kgf/cm²)

**Peak Pressure**
31.0MPa (325kgf/cm²)

**Rated Torque**
3280N·m (334kgf·m)

**Rated Speed**
450rpm

**Max. Speed**
520rpm

**Rated Horse Power**
154kW (210PS)

**Mass**
123kg

---

**Nominal Dimensions**

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitch Size</td>
<td>55, 65, 80, 100</td>
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<tr>
<td>Pitch Size</td>
<td>6, 9, 12, 16, 20, 25, 32, 40, 48, 63</td>
</tr>
</tbody>
</table>

**Displacement**
750cm³/rev

**Rated Pressure**
27.5MPa (280kgf/cm²)

**Peak Pressure**
31.0MPa (325kgf/cm²)

**Rated Torque**
3280N·m (334kgf·m)

**Rated Speed**
450rpm

**Max. Speed**
520rpm

**Rated Horse Power**
154kW (210PS)

**Mass**
123kg

---

**FLUID / SHELL TELLUS 56 (Viscosity 37/55 at 50°C)**

The graphs shown are mean values obtained for production units.

---

**JIS B3301**
Shaft with screw for key retention
Shaft code: C

**JIS D2001 Involute Spline**
60 x 22 x 2.5 (Class b)

<table>
<thead>
<tr>
<th>Table</th>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>SHAPE</td>
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<tr>
<td>Male</td>
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<tr>
<td>Male</td>
<td>Number of teeth</td>
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<tr>
<td>Male</td>
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<tr>
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<tr>
<td>Male</td>
<td>Outer dia.</td>
<td>55.5</td>
</tr>
<tr>
<td>Male</td>
<td>Inner dia.</td>
<td>54</td>
</tr>
<tr>
<td>Female</td>
<td>SHAPE</td>
<td>2.5</td>
</tr>
<tr>
<td>Female</td>
<td>Module</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>Number of teeth</td>
<td>9</td>
</tr>
<tr>
<td>Female</td>
<td>Grade</td>
<td>2.5</td>
</tr>
<tr>
<td>Female</td>
<td>Gear dia.</td>
<td>41.915</td>
</tr>
<tr>
<td>Female</td>
<td>Outer dia.</td>
<td>52</td>
</tr>
<tr>
<td>Female</td>
<td>Inner dia.</td>
<td>50</td>
</tr>
</tbody>
</table>

---

**DIRECTION OF ROTATION**
R: SUPPLIED HIGH PRESSURE OIL AT PORT R
L: SUPPLIED HIGH PRESSURE OIL AT PORT L
## Performance Data

### Mechanical Efficiency

**Fig. 1 Mechanical Efficiency**

Mechanical efficiency at various speeds is shown for 4 operating pressures.

<table>
<thead>
<tr>
<th>Motor Speed (rpm)</th>
<th>Efficiency at 50°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>0.9</td>
</tr>
<tr>
<td>1000</td>
<td>0.95</td>
</tr>
<tr>
<td>1200</td>
<td>0.97</td>
</tr>
<tr>
<td>1400</td>
<td>0.98</td>
</tr>
</tbody>
</table>

### Volumetric Efficiency

**Fig. 2 Volumetric Efficiency**

Volumetric efficiency at various speeds is shown for 4 operating pressures.

<table>
<thead>
<tr>
<th>Motor Speed (rpm)</th>
<th>Efficiency at 50°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>0.9</td>
</tr>
<tr>
<td>1000</td>
<td>0.95</td>
</tr>
<tr>
<td>1200</td>
<td>0.97</td>
</tr>
<tr>
<td>1400</td>
<td>0.98</td>
</tr>
</tbody>
</table>

### Starting Torque

**Fig. 3 Starting Torque**

Starting torque versus effective pressure is shown. Oil viscosity will not affect the starting torque efficiency.

<table>
<thead>
<tr>
<th>Pressure Difference (MPa)</th>
<th>Starting Torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>0.1</td>
<td>250</td>
</tr>
<tr>
<td>0.2</td>
<td>300</td>
</tr>
<tr>
<td>0.3</td>
<td>350</td>
</tr>
</tbody>
</table>

### External Leakage

**Fig. 4 External Leakage**

External leakage from motor shaft pump in relation to various speeds is shown for 4 operating pressures.

<table>
<thead>
<tr>
<th>Motor Speed (rpm)</th>
<th>Leakage (mL/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>150</td>
</tr>
<tr>
<td>1200</td>
<td>200</td>
</tr>
<tr>
<td>1400</td>
<td>250</td>
</tr>
</tbody>
</table>

### Minimum Boost Pressure

**Fig. 5 Minimum Boost Pressure**

Minimum boost pressure is shown.

<table>
<thead>
<tr>
<th>Minimum Boost (MPa)</th>
<th>Boost Pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>0.3</td>
<td>0.7</td>
</tr>
<tr>
<td>0.4</td>
<td>0.9</td>
</tr>
</tbody>
</table>

### Pressure Drop

**Fig. 6 Pressure Drop**

Pressure necessary to run motor without load is shown for various speeds.

<table>
<thead>
<tr>
<th>Motor Speed (rpm)</th>
<th>Pressure Drop (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>0.1</td>
</tr>
<tr>
<td>1000</td>
<td>0.2</td>
</tr>
<tr>
<td>1200</td>
<td>0.3</td>
</tr>
<tr>
<td>1400</td>
<td>0.4</td>
</tr>
</tbody>
</table>

## Nominal Dimensions

**Dimensions in mm**

- **Main part**
  - 2-G1
- **Gear**
  - B1: 19.0 mm
  - B2: 15.7 mm
- **Shaft**
  - 1/10 taper
  - Shaft code: B (Single oil seal)
  - 1/10 taper
  - Shaft code: BW (Double oil seal)

## Displacement

- **Displacement**: 848 cm³/rev

## Rated Pressures

- **Rated Pressure**: 27.5 MPa (280 kgf/cm²)
- **Peak Pressure**: 31.9 MPa (325 kgf/cm²)

## Rated Torque

- **Rated Torque**: 3708 N·m (378 kgf·m)

## Rated Speed

- **Rated Speed**: 400 rpm

## Maximum Speed

- **Max. Speed**: 450 rpm

## Rated Horse Power

- **Rated Horse Power**: 155 kW (211 PS)

## Mass

- **Mass**: 123 kg
**Performance Data**

- **Fig. 1 Mechanical Efficiency**
- **Fig. 2 Volumetric Efficiency**
- **Fig. 3 Starting Torque**
- **Fig. 4 External Leakage**
- **Fig. 5 Minimum Boost Pressure**
- **Fig. 6 Pressure Drop**

**Displacement**
- 1345 cm³/rev

**Rated Pressure**
- 24.5 MPa (250 kgf/cm²)

**Peak Pressure**
- 31.9 MPa (325 kgf/cm²)

**Rated Torque**
- 5250 N·m (535 kgf·m)

**Rated Speed**
- 200 rpm

**Max. Speed**
- 390 rpm

**Rated Horse Power**
- 138 kW (188 PS)

**Mass**
- 170 kg

---

**Nominal Dimensions**

- Displacement: 1345 cm³/rev
- Rated Pressure: 24.5 MPa (250 kgf/cm²)
- Peak Pressure: 31.9 MPa (325 kgf/cm²)
- Rated Torque: 5250 N·m (535 kgf·m)
- Rated Speed: 200 rpm
- Max. Speed: 390 rpm
- Rated Horse Power: 138 kW (188 PS)
- Mass: 170 kg

**Fig. 1 Mechanical Efficiency**
- Mechanical efficiency at various speeds is shown for 4 operating pressures.

**Fig. 2 Volumetric Efficiency**
- Volumetric efficiency at various speeds is shown for 4 operating pressures.

**Fig. 3 Starting Torque**
- Starting torque versus effective pressure is shown. Oil viscosity will not affect the starting torque efficiency.

**Fig. 4 External Leakage**
- External leakage (from normal oil pump) relative to various speeds is shown for 4 operating pressures.

**Fig. 5 Minimum Boost Pressure**
- It is important that sufficient start pressure is maintained, when the motor is operated or at a pump or when the load exceeds the motor, to prevent cavitation.

**Fig. 6 Pressure Drop**
- Pressure necessary to run motor without load is shown for various speeds.
**ME2600**

**Nominal Dimensions**

<table>
<thead>
<tr>
<th>Dimension in mm</th>
<th>Main part</th>
<th>2φ10-1.5</th>
<th>M6×8</th>
<th>Drain port</th>
<th>2φ12-1.5</th>
<th>M6×8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tapered shaft</td>
<td>(1/10 tap)</td>
<td>(1/10 tap)</td>
<td>(1/8 tap)</td>
<td>(1/8 tap)</td>
<td>(1/8 tap)</td>
<td>(1/8 tap)</td>
</tr>
<tr>
<td>Shallow/area of shaft</td>
<td>chrome plated</td>
<td>chrome plated</td>
<td>chrome plated</td>
<td>chrome plated</td>
<td>chrome plated</td>
<td>chrome plated</td>
</tr>
<tr>
<td>Drill/depth</td>
<td>5.2</td>
<td>5.2</td>
<td>5.2</td>
<td>5.2</td>
<td>5.2</td>
<td>5.2</td>
</tr>
<tr>
<td>M12/depth</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>M16/depth</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>M18/depth</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>M20/depth</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>M22/depth</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
</tbody>
</table>

**Displacement**

- 2578 cm³/rev

**Rated Pressure**

- 24.5 MPa (250 kgf/cm²)

**Peak Pressure**

- 31.0 MPa (325 kgf/cm²)

**Rated Torque**

- 10060 N·m (1026 kgf·m)

**Rated Speed**

- 110 rpm

**Max. Speed**

- 230 rpm

**Rated Horse Power**

- 159 kW (216 PS)

**Mass**

- 350 kg

---

**Performance Data**

**Fig. 1 Mechanical Efficiency**

- Mechanical efficiency at various speeds is shown for 4 operating pressures.

**Fig. 2 Volumetric Efficiency**

- Volumetric efficiency at various speeds is shown for 4 operating pressures.

**Fig. 3 Starting Torque**

- Starting torque versus effective pressure is shown. All viscosity will not affect the starting torque efficiency.

**Fig. 4 External Leakage**

- External leakage (from motor drain port) relative to various speeds is shown for 4 operating pressures.

**Fig. 5 Minimum Boost Pressure**

- It is important that sufficient inlet pressure is maintained, when the motor is operated as a pump or when the load overruns the motor, to prevent cavitation.

**Fig. 6 Pressure Drop**

- Pressure necessary to run motor without load is shown for various speeds.
**Nominal Dimensions**

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIRECTION OF ROTATION</strong></td>
<td>R: SUPPLIED HIGH PRESSURE OIL AT PORT R</td>
</tr>
<tr>
<td></td>
<td>L: SUPPLIED HIGH PRESSURE OIL AT PORT L</td>
</tr>
<tr>
<td><strong>Main port 2-G1-1/2 depth 26</strong></td>
<td>4-M13 depth 35</td>
</tr>
<tr>
<td><strong>JIS B3201-5</strong> Shaft with screw for key reception Shaft code: C</td>
<td></td>
</tr>
<tr>
<td><strong>Splined shaft</strong> Shaft code: I</td>
<td></td>
</tr>
<tr>
<td><strong>Tapered shaft (1/10 taper)</strong> (Single all seal)</td>
<td></td>
</tr>
<tr>
<td><strong>Details of main port</strong></td>
<td></td>
</tr>
<tr>
<td><strong>RS 0.1 - 0.3</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Details of G</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tapered shaft (1/10 taper)</strong> (Double all seal)</td>
<td></td>
</tr>
</tbody>
</table>

**JIS D2001 Involute Spline 95 X17X5 (Class b)**

- **Module**: 9.5
- **Number of teeth**: 17
- **Profile**: 20°
- **Angle**: 17°
- **Pitch diameter**: 40.828 mm
- **Root diameter**: 39.472 mm
- **Outer dia.**: 94
- **Inner dia.**: 83
- **Modulus**: 1.0

**Performance Data**

- **Displacement**: 3104 cm³/rev
- **Rated Pressure**: 24.5 MPa (250 kgf/cm²)
- **Peak Pressure**: 31.0 MPa (325 kgf/cm²)
- **Rated Torque**: 1210 Nm (1235 kgf·m)
- **Rated Speed**: 110 rpm
- **Max. Speed**: 230 rpm
- **Rated Horse Power**: 186 kW (253 PS)
- **Mass**: 364 kg

**FLUID**: SHELL TELLUS 56 (Viscosity 37/53 at 50°C)

The graphs shown are mean values obtained for production units.

- **Fig. 1 Mechanical Efficiency**
- **Fig. 2 Volumetric Efficiency**
- **Fig. 3 Starting Torque**
- **Fig. 4 External Leakage**
- **Fig. 5 Minimum Boost Pressure**
- **Fig. 6 Pressure Drop**

It is important to maintain sufficient oil pressure when the motor is operated as a pump or as a load overruns the motor, to prevent cavitation.

Pressure necessary to run motor without load is shown for various speeds.
### Performance Data

**Fig. 1 Mechanical Efficiency**
- Mechanical efficiency at various speeds is shown for 4 operating pressures.

**Fig. 2 Volumetric Efficiency**
- Volumetric efficiency at various speeds is shown for 4 operating pressures.

**Fig. 3 Starting Torque**
- Starting torque versus effective pressure is shown. Oil viscosity may not affect the starting torque efficiency.

**Fig. 4 External Leakage**
- External leakage (from motor drain) relative to various speeds is shown for 4 operating pressures.

**Fig. 5 Minimum Boost Pressure**
- It is important that sufficient inlet pressure is maintained, when the motor is operated as a pump or when the load exceeds the motor, to prevent overloading.

**Fig. 6 Pressure Drop**
- Pressure necessary to run motor without backflow is shown for various speeds.
Nominal Dimensions of inch size shaft and SAE ports

ME100-KE (HE)

ME175-KE (HE)

ME150-KE (HE)

ME300KE (HE)
Nominal Dimensions of inch size shaft and SAE ports

ME350BKE (HE)

ME600BKE (HE)

ME750BKE (HE)

ME850BKE (HE)
Nominal Dimensions of inch size shaft and SAE ports

ME1300AKE (HE)

ME2600-KE (HE)

ME1900-KE (HE)

ME3100-KE (HE)
Nominal Dimensions of inch size shaft and SAE ports
ME4100-KE (HE)
### Specification of Spline

#### ME100
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 16/32**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15
|--------------|------------|------------|----------------|------------|-----------|------------|---------------|--------------|------------|------------|----------------|------------|-----------|------------|---------------|--------------|------------|

#### ME150 & ME175
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 12/24**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15

#### ME300B & ME350B
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 12/24**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15

#### ME600B
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 8/16**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15

#### ME750B & ME850B
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 5/10**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15

#### ME1300A
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 5/10**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15

#### ME1900
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 5/10**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15

#### ME2600
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 5/10**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15

#### ME3100
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 5/10**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15

#### ME4100
**Type Of Spline: Involute: Flat Root Side Fit**
**Pressure Angle 30°: Pitch 5/10**
Class 1 Fit: To B. S. 3550 Or A. S. A. -B5-15
BEARING LIFE AND ALLOWABLE RADIAL LOAD FOR SHAFT

ME750B

Allowable Radial Load

Distance from mounting surface (mm)

Fig. 1

Fig. 2

Fig. 3

Allowable Radial Load

Pressure (MPa)

ME850B

Allowable Radial Load

Distance from mounting surface (mm)

Fig. 1

Fig. 2

Fig. 3

Allowable Radial Load

Pressure (MPa)

ME1300A

Allowable Radial Load

Distance from mounting surface (mm)

Fig. 1

Fig. 2

Fig. 3

Allowable Radial Load

Pressure (MPa)

ME1900

Allowable Radial Load

Distance from mounting surface (mm)

Fig. 1

Fig. 2

Fig. 3

Allowable Radial Load

Pressure (MPa)

ME2600

Allowable Radial Load

Distance from mounting surface (mm)

Fig. 1

Fig. 2

Fig. 3

Allowable Radial Load

Pressure (MPa)

ME3100

Allowable Radial Load

Distance from mounting surface (mm)

Fig. 1

Fig. 2

Fig. 3

Allowable Radial Load

Pressure (MPa)
BEARING LIFE AND ALLOWABLE RADIAL LOAD FOR SHAFT

ME4100

Fig. 1

Fig. 2

Fig. 3
**DOWMAX® ME MOTOR**

**DOWMAX Motor Standardized for Special Functions**

- The following motors with special functions are available. Select an appropriate motor that best suits your requirements.

1. **DOWMAX Motors with Rotation Detecting Shaft**
   - These motors are for speed control use on injection molding machines, steel rolling mills, window, etc. In these applications, they sense relay motions and detect rotational speed for control.
   - Each DOWMAX motor in the ME Series can be supplied with a rotation detecting shaft.
   - Refer to drawing: D24400B.

2. **DOWMAX Motors with Water-Methyl-hydraulic Fluid Use (with flushing circuit)**
   - Water-methyl fluid, commonly employed as fire-resistant hydraulic oil, shortens bearing life because of its low lubricating property. This DOWMAX motor is equipped with internal flushing circuit in order to extend the bearing life.
   - Refer to drawing: D244010 and D244010 (with low control valve).

3. **DOWMAX for installing the shaft upward**
   - With oil blowing hole ---- An oil blowing hole (plug) is provided in the end cover in order to facilitate oil filling in the motor casing before operation.
   - Refer to drawing: D244035.
   - With special drain port ---- The high pressure portion of the motor (when its shaft is to be upward) is provided with a special drain port to completely blow the motor casing with oil.
   - Refer to drawing: D244035.

4. **Coating and rustproofing**
   - In addition to the standard coating, 8 types of coating system are standardized for DOWMAX motors.
   - Refer to drawing: D266108.
   - The coated surfaces (excluding the non-coated part of all DOWMAX motors) are rustproofed. This standard rustproofing is valid for approx. three months. Contact us if the storage period will be longer than that or the motor is to be used in a corrosive atmosphere.

5. **Others**
   - Contact us for motors with special capacities, such as 150, 450, and 550 v以為o.
   - Contact us for the cold-resistant specification for operation at temperatures from -20°C to +40°C. Standard motors are usable up to +60°C.
   - A socket welding type flanges is shown in this catalogue for main port piping. A screw type flange is also available. Refer to drawing: D244015 (long flanges, screw connection) and D244020 (short flanges, screw connection).

---

**Array of DOWMAX Base Products**

- **(with Planetary-Gear Reducer)**
- **(with Mechanical Brake)**
- **(DOWMAX)**
- **(with Rotation Detector with Counter Balance Valve)**

---

**DOWMAX® 2-Speed Motor**

The structure of this 2-speed motor is simple because of a construction where the front and rear piston travel independently, making use of the advantages of the opposed piston and double swash plates motor.

- **HIGH STARTING EFFICIENCY** Because of the same working structure as standard DOWMAX motor.
- **GOOD LOW-SPEED PERFORMANCE** Because of multi-piston construction.
- **SLIM CONFIGURATION** Motor diameter is same as standard DOWMAX motor.
- **CHANGE-OVER BETWEEN LARGE AND SMALL DISPLACEMENT CAN BE DONE WHILE RUNNING WITH A LOAD.**
- **NO SEPARATE PILOT PRESSURE IS REQUIRED FOR CHANGE-OVER BECAUSE OF THE SELF PRESSURE UTILIZED AS A PILOT PRESSURE.**

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- Coding, Change-Over Circuit in 2-Speed Operation .......... 53
- MK300 ........................................ 55
- MK600 ........................................ 57
- Bearing Life And Radial Load ..................................... 59
### Performance Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Displacement cm³/rev</th>
<th>Rated Pressure MPa (kgf/cm²)</th>
<th>Peak Pressure MPa (kgf/cm²)</th>
<th>Rated Torque N•m (kgf•m)</th>
<th>Max. Speed rpm</th>
<th>Max. Stroke(cm)</th>
<th>Stroke Volume cm³</th>
<th>Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK300</td>
<td>304/152</td>
<td>24.5 (250)</td>
<td>31.9 (325)</td>
<td>1190/594 (121/61)</td>
<td>600/800</td>
<td>300/600</td>
<td>3.1 (325)</td>
<td>60</td>
</tr>
<tr>
<td>MK600</td>
<td>602/201</td>
<td>24.5 (250)</td>
<td>31.9 (325)</td>
<td>2350/1180 (245/120)</td>
<td>300/600</td>
<td>3.1 (325)</td>
<td>4.1 (110)</td>
<td></td>
</tr>
</tbody>
</table>

- Limit of hydraulic fluid temperature: 20°C ~ 80°C
- Limit of hydraulic fluid viscosity: 15 ~ 500cSt (Advisable fluid viscosity range: 25 ~ 100cSt)
- In case motors are used, as it's output shaft to be positioned upward, special specification should be applied. In this case, please contact us.

### Construction & Working Principle

In the Fig.1 the high pressure fluid flowing in from the main port enters through the passage in the thrust relay plate. It then flows into the port which opens at the shaft end surface which slides against the timing plate, and branches into both right and left cylinders. One flow reaches the piston bore at the right side of the cylinder block, after passing through port holes of the shaft and cylinder block. The other flows into the piston bore at the left side through the groove in the main spool and port holes in the shaft and cylinder block. Thus the drive shaft starts to rotate via the rotation of cylinder block which is caused by the tangential force on the two edges raised by the self-movement of piston (the pistons are located in the cylinder block which is integral with a shaft). The low-pressure fluid, after working on the pistons, is pushed back to the pistons in the cylinder bore, flows out from the low-pressure main port, through the passage in the reverse way as it came in.

Fig. 2 shows a case of large displacement. When high pressure fluid is fed to the pilot pressure port B, it arrives at the pilot piston chamber 3 through the passage 1 and 2, and pushes the pilot piston 6 to the right. With the pilot piston 6 pushed to the right side, the main spool 9 also moves to the right by the piston rod 7. The groove 8 on the main spool corresponds to the position shown in Fig. 3. With this movement of the main spool, the high pressure fluid coming from the main port flows into both passage 10 and 11 and acts on the right side piston, thus working as a large displacement motor.

Fig. 3 shows a case of small displacement. When high pressure fluid is fed to the pilot pressure port A, it flows to the pilot piston chamber 5 through the passage 4, and pushes the pilot piston 6 to the left. With the movement of the pilot piston 6 to the left side, the main spool 9 also moves to the left by the piston rod 7. The groove 8 on the main spool corresponds to the position shown in Fig. 3. With this movement of the main spool, the high pressure fluid coming from the main port flows only to the passage 15, working force only on the right side piston thus working as a small displacement motor.

In this case, although high pressure fluid does not flow to the left side pistons, it reciprocates in the cylinders repeating suction and discharge stroke along with the shaft rotation. This is made possible because the groove 8 around the main spool is positioned as shown by which each left side cylinder is chambered through the passage 12. Further, as the passage 12 is connected with the hole 10, fluid is supplied and cooled through the flow to the drain.

### Change-over Circuit in 2-Speed Operation

**[Example of 2-speed change-over circuit]**

1. Where a F2 flange with solenoid valve is used.
2. Where a F2 flange with manual valve is used.
3. Where a F2 flange is used.
4. Where a F1 flange (without shuttle valve) is used.

**[Change-over condition]**

1. Solenoid Valve is actuated.
2. Fluid is supplied and cooled through the flow to the drain.

**[Basic conditions of a change-over operation]**

1. Where a F2 flange with solenoid valve is used. However, when a separate pilot pressure other than system pressure is used, it must be higher than the system pressure.
2. Where the solenoid pressure is actuated at the stop position of the main spool, the change-over can be done. If the pressure is below 100kPa (1kgf/cm²), or if the pressure acts off the stop of the main spool, the change-over cannot be done if the system pressure is below 100kPa (1kgf/cm²).
3. Where a F2 flange with manual valve is used.
4. Where a F1 flange (without shuttle valve) is used.

**[Model Code & Symbols]**

- **MK 300**

- **C**

- **F2 A S**

**Special Specification Number**

- **S** — Special Specification

**Valve Code**

- 
  - A — Solenoid Valve, AC100V
  - B — Solenoid Valve, AC200V
  - C — Solenoid Valve, DC12V
  - D — Solenoid Valve, DC24V
  - M — MANUAL

**Flange**

- F1 — Flange w/o Shuttle Valve Rc3/4 Port
- FA — Flange w/o Shuttle Valve 1/4-12UN-2B Port
- F2 — Flange w/ Shuttle Valve Rc3/4 Port
- FB — Flange w/ Shuttle Valve 1/4-12UN-2B Port

**Seal Code**

- No Sign — Standard Seal (Nitrile Rubber)

**Shaft Code**

- C — Paralleled key shaft with screws for key retention plate (Slit)
- P — Metric spline shaft
- K — Inch size key shaft
- H — Inch size spline shaft

**Design No.**

- (Beginning with and in alphabetical order hence forth)

**Motor Size**

- (Metric Displacement)

**Model Code**: DOWMAX 2-speed series motor
## Nominal Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Displacement</th>
<th>Rated Pressure</th>
<th>Peak Pressure</th>
<th>Relied Torque</th>
<th>Max Speed</th>
<th>Change-over Pilot Pressure</th>
<th>Max. Pressure for Pilot Port</th>
<th>Pilot Piston Slides Volume</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK300-CF1</td>
<td>304/152 cm³/rev</td>
<td>24.5 MPa (350 kgf/cm²)</td>
<td>31.9 MPa (450 kgf/cm²)</td>
<td>1190/984 Nm (121/11 kgf·m)</td>
<td>6500 rpm</td>
<td>65 MPa (950 kgf/cm²) (or if off pressure, 88.8 MPa (1300 kgf/cm²))</td>
<td>51.9 MPa (750 kgf/cm²)</td>
<td>10 cm³</td>
<td>8 kg</td>
</tr>
<tr>
<td>MK300-CF2</td>
<td>400/200 cm³/rev</td>
<td>30 MPa (440 kgf/cm²)</td>
<td>35 MPa (520 kgf/cm²)</td>
<td>1250/1000 Nm (128/10 kgf·m)</td>
<td>7000 rpm</td>
<td>70 MPa (1050 kgf/cm²) (or if off pressure, 93.6 MPa (1380 kgf/cm²))</td>
<td>56.9 MPa (830 kgf/cm²)</td>
<td>12 cm³</td>
<td>10 kg</td>
</tr>
<tr>
<td>MK300-CF2A</td>
<td>450/225 cm³/rev</td>
<td>35 MPa (520 kgf/cm²)</td>
<td>40 MPa (590 kgf/cm²)</td>
<td>1300/1050 Nm (133/11 kgf·m)</td>
<td>7500 rpm</td>
<td>80 MPa (1180 kgf/cm²) (or if off pressure, 106.8 MPa (1570 kgf/cm²))</td>
<td>64.9 MPa (950 kgf/cm²)</td>
<td>15 cm³</td>
<td>12 kg</td>
</tr>
<tr>
<td>MK300-CF2B</td>
<td>500/250 cm³/rev</td>
<td>40 MPa (590 kgf/cm²)</td>
<td>45 MPa (670 kgf/cm²)</td>
<td>1350/1100 Nm (138/11 kgf·m)</td>
<td>8000 rpm</td>
<td>90 MPa (1330 kgf/cm²) (or if off pressure, 119.8 MPa (1770 kgf/cm²))</td>
<td>74.9 MPa (1120 kgf/cm²)</td>
<td>18 cm³</td>
<td>15 kg</td>
</tr>
<tr>
<td>MK300-CF2M</td>
<td>550/275 cm³/rev</td>
<td>45 MPa (670 kgf/cm²)</td>
<td>50 MPa (740 kgf/cm²)</td>
<td>1400/1150 Nm (143/12 kgf·m)</td>
<td>8500 rpm</td>
<td>100 MPa (1490 kgf/cm²) (or if off pressure, 131.8 MPa (1940 kgf/cm²))</td>
<td>84.9 MPa (1240 kgf/cm²)</td>
<td>20 cm³</td>
<td>17 kg</td>
</tr>
</tbody>
</table>

**Performance Data**

**Flow Chart - SHELL TELLUS 56 (Viscosity 37 cSt at 50°C)**

The graphs shown are mean values obtained for production units.
This brake is a wet multi-disc type and is of a pressure-release type (negative brake type) where the brake is on at all time and is released only when the pilot fluid is led through the brake releasing port. Any adjustment after initial installation is not required.

The mechanical brake provides the following two types. Select one depending on application.

- Cartridge type mechanical brake which enables easy mounting and dismounting with the hydraulic motor (BB, SC, BP, BR types)
- Integral shaft type mechanical brake which is compact and light weight (MB type)

The mechanical brake is highly durable as it has adopted wet type multiple discs/plates.

Having a large torque capacity, it is suited for a wide range of applications.

Safe operation is ensured as it is a pressure-release type (brake is only released by applying pressure).

Being compact in construction, it is easy to design its installation on any equipment.

It provides a large radial load capability, because of a large capacity roller bearing being adopted on the drive shaft.

The brake motor has a quick access for servicing as the removal of either brake or motor can easily be made.
Structure & Operating Principle

Structure of integral shaft type mechanical brake (MB type: Above drawing shows MB300B.)

Structure of cartridge type mechanical brake (BB, BC, BP, BR types)

The internal structure of the mechanical brake is shown above. The friction plates and steel plates are located one side the other, and the braking torque is generated by the friction force applied when the spring presses these plates. The friction plates are placed on the splined drive shaft for cartridge type and on the brake spline for integral shaft type, which are connected to the motor shaft with a key. The steel plates are placed on the brake cylinder for cartridge type and brake plunger for integral shaft type by splines. The braking torque is generated by the force of the spring, and when a pressure higher than a spring force is applied in the brake releasing port, the friction plates and steel plates are separated and the brake is released. When the pressure at the brake releasing port is lowered, the brake plunger is pressed against the friction plate by the spring force, and the brake torque is generated by the friction force between the plates.

Performance Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Displacement cm³/cm³ (rev)</th>
<th>Rated pressure MPa (40)</th>
<th>Peak pressure MPa (40)</th>
<th>Rated speed rpm (10)</th>
<th>Max. speed rpm (5)</th>
<th>Static brake torque kgf·cm (12)</th>
<th>Brake releasing pressure MPa (12)</th>
<th>Brake cylinder volume cm³ (12)</th>
<th>Mass kg (12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB100-C40</td>
<td>27.5 (280)</td>
<td>432 (44)</td>
<td>1000</td>
<td>1000</td>
<td></td>
<td>392 (12.5)</td>
<td></td>
<td>13</td>
<td>34</td>
</tr>
<tr>
<td>MB150AP100</td>
<td>31.9 (325)</td>
<td>667 (68)</td>
<td>600</td>
<td>800</td>
<td></td>
<td>980 (100)</td>
<td></td>
<td>20</td>
<td>71</td>
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<tr>
<td>MB175AP100</td>
<td>175</td>
<td>765 (78)</td>
<td>600</td>
<td>800</td>
<td></td>
<td>1470 (150)</td>
<td></td>
<td>89</td>
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<tr>
<td>MB300BP150</td>
<td>300</td>
<td>1320 (134)</td>
<td>660</td>
<td>800</td>
<td></td>
<td>2450 (250)</td>
<td></td>
<td>31.9 (325)</td>
<td>190</td>
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<tr>
<td>MB3350BP150</td>
<td>360</td>
<td>1530 (156)</td>
<td>660</td>
<td>800</td>
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<td>2940 (300)</td>
<td></td>
<td>58</td>
<td>217</td>
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<tr>
<td>PER1000-100</td>
<td>600</td>
<td>2620 (267)</td>
<td>500</td>
<td>600</td>
<td></td>
<td>2940 (300)</td>
<td></td>
<td>37</td>
<td>102</td>
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<tr>
<td>PER1000-150</td>
<td>750</td>
<td>3290 (334)</td>
<td>400</td>
<td>520</td>
<td></td>
<td>3940 (300)</td>
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<td>PER1000-300</td>
<td>934</td>
<td>4600 (470)</td>
<td>600</td>
<td>800</td>
<td>1190 (121)</td>
<td>3940 (300)</td>
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<td>70</td>
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<tr>
<td>PER1000-400</td>
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<td>5500 (559)</td>
<td>800</td>
<td>1110</td>
<td>3940 (300)</td>
<td>3940 (300)</td>
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<td>80</td>
<td></td>
</tr>
<tr>
<td>PER1000-500</td>
<td>1170</td>
<td>6600 (670)</td>
<td>1000</td>
<td>1400</td>
<td>3940 (300)</td>
<td>3940 (300)</td>
<td></td>
<td>90</td>
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</tr>
<tr>
<td>PER1000-600</td>
<td>1290</td>
<td>7700 (779)</td>
<td>1200</td>
<td>1600</td>
<td>3940 (300)</td>
<td>3940 (300)</td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>PER1000-700</td>
<td>1410</td>
<td>8800 (889)</td>
<td>1400</td>
<td>1800</td>
<td>3940 (300)</td>
<td>3940 (300)</td>
<td></td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>PER1000-800</td>
<td>1530</td>
<td>9900 (999)</td>
<td>1600</td>
<td>2000</td>
<td>3940 (300)</td>
<td>3940 (300)</td>
<td></td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

EXAMPLES OF APPLICATION

Winch Circuit.
A case where the mechanical brake is applied to hold the load, when a change-over lever at neutral.

Truck (carrier) Drive Circuit.
A case where the mechanical brake is used in combination with counter balance valve with brake valves, for traction drive use.

When this mechanical brake is used as dynamic brake, the friction plate will slip against steel plate, and in some cases excessive heat would be generated by friction. In such a case, please contact us.

CAUTION: In case motors are used as it’s output shaft to be positioned upward, some modification would be necessary. In this case, please contact us.
**MB100-C40**

### Hydraulic Motor
- Displacement: 99 cm³/min
- Rated pressure: 27.5 MPa (280 kg/cm²)
- Peak pressure: 31.9 MPa (325 kg/cm²)
- Rated torque (theoretical): 432 N·m (449 kgf·m)
- Rated speed: 1000 rpm
- Max. speed: 1000 rpm

### Mechanical Brake
- Static brake torque: 392 N·m (409 kgf·m)
- Brake releasing pressure: 1.2 MPa (12.5 kg/cm²)
- Endurable press. of brake cylinder: 31.9 MPa (325 kg/cm²)
- Brake cylinder stroke volume: 100 cm³
- GD²: 0.08 kg·cm²
- Casing capacity: 0.7 L
- Mass: 34 kg

---

### Output Shaft
- Special specification number
- Port
  - No indication: Standard specification
  - S: Special specification
- Brake torque
  - No indication: Standard metric port
  - C100: Counterbalance valve fits with standard metric port (No. code)
  - E: Unfitted thread port
- Output shaft
  - C: Standard shaft (New JIS key straight shaft)
  - P: Metric Spline shaft
  - B: Special shaft

---

### Brake Characteristics
The brake torque is generated in proportion to the force exerted between the friction plates and steel plates. Therefore, the brake torque varies with the pressure at the brake releasing port and the drain pressure in the motor case. The chart, right, shows the relationship between the brake torque vs. the pressures at the brake releasing port and the drain pressure in the motor case. Brake torque varies due to unevenness of friction coefficient between friction plate and steel plate. The curve shows the lower limit of these values.

---

### Allowable Radial Load

---

### Bearing Life

---

**OUTLINE DIMENSIONS**

- Port for brake releasing Br Rc1/8
- Port for brake releasing Br Rc1/8
- Eye bolt M8
- O/R 14 (Mounting Bolt size M12)

---

**JIS D2001 Involute Spline 35 X19X1.667 (Class B)**
- Helix angle: 0°.85°
- Tooth form: Dukihak
- Module: 1.667
- Pressure angle: 25°
- Number of teeth: 19
- Depth: 31.667
- Outer dia.: 37.819
- Pin dia.: 33
- Inner dia.: 31.050
- (3 teeth)

---

**CODING**

- MB 100 — C 40
- Special specification number
- Port
- Brake torque
  - No indication: Standard metric port
  - C100: Counterbalance valve fits with standard metric port (No. code)
  - E: Unfitted thread port
- Output shaft
  - C: Standard shaft (New JIS key straight shaft)
  - P: Metric Spline shaft
  - B: Special shaft

---

**NOTE**

1. If motors are operated within the proper ratings and conditions, the operational life is determined by the Bearing Life.
2. Bearing life varies due to the direction of radial load to shaft.
3. The graph shown is the bearing life (5x10⁵ rpm) at 500 rpm shaft speed for various pressures and radial loads.
4. When the shaft speed differs from 500 rpm, the bearing life can be obtained by the formula below:

   \[ B_{500} = \frac{B_{500}}{\sqrt{V}} \]

   \( V \): shaft speed

5. In case where the radial load acts at a different location to the midpoint of the shaft projection, please refer to us.
6. Applications with axial thrust loads should be referred to us.
7. When external fluid is used, bearing life becomes remarkably short. In this case please refer to us.
**OUTLINE DIMENSIONS**

**Hydraulic Motor**
- Displacement: 152 / 175 cm³/Rev
- Rated pressure: 275 ± 280 MPa (kgf/cm²)
- Peak pressure: 310 ± 325 MPa (kgf/cm²)
- Rated torque (theoretical): 667 ± 765 N-m (kgf-m)
- Rated speed: 600 rpm
- Max. speed: 800 rpm

**Mechanical Brake**
- Static brake torque: 581 (1000) N-m (kgf-m)
- Brake releasing pressure: 1.0 ± 1.1 MPa (kgf/cm²)
- Endurable press. of brake cylinder: 31.9 ± 325 MPa (kgf/cm²)
- Brake cylinder stroke volume: 20 cm³
- GPD: 0.25 kg/m²
- Casing capacity: 1.0 ft³
- Mass: 71 kg

**CODING**

**MB 175 A P 100**

- Special specification number
- No indication: Standard specification
- S: Special specification

**Port**
- A: C100 (counter balance valve mounting port)
- B: C300 (counter balance valve mounting port)

**Brake torque**
- Specification: 100 / 080 / 060 / 040 / 020

**DOWMAX model No.**
- Model: 152 / 179

**BEARING LIFE**

**NOTE**
1. If motors are operated under the proper ratings and conditions, the operational life is determined by the Bearing Life.
2. Bearing life varies due to the direction of radial load to shaft.
3. The graph shown is the bearing life (B-15k) at 100 rpm shaft speed for various pressures and radial loads.
4. When the shaft speed differs from 100 rpm the bearing life can be obtained by the formula below:
   \[ B - 15k (rpm) = \frac{B - 15k (100rpm)}{\text{Shaft speed}} \]
   where B - 15k is Bearing Life obtained in the graph at 100 rpm.
5. In case where the x-axis load acts at a different location to the midpoint of the shaft projection please refer to us.
6. When motor is used in Motor-Out circuit, pressure in the figure shall be a sum of motor inlet and outlet pressure.
7. When water glycol fluid is used, bearing life can be remarkably shortened. In this case please refer to us.
ME600BCS2550+BB250BC

**Hydraulic Motor**
- Displacement: 600 cm³/rev
- Rated pressure: 27.5 MPa (280 kgf/cm²)
- Peak pressure: 31.9 MPa (325 kgf/cm²)
- Rated torque (theoretical): 2620 N·m (267 kgf·m)
- Rated speed: 500 rpm
- Max. speed: 600 rpm

**Mechanical Brake**
- Static brake torque: 2460 N·m (250 kgf·m)
- Brake releasing pressure: 1.2 MPa (12 kgf/cm²)
- Endurable press. of brake cylinder: 31.9 MPa (325 kgf/cm²)
- Brake cylinder stroke volume: 580 cm³
- GD²: 0.91 kg·m²
- Casing capacity: 2.7 l
- Mass: 100 kg

**Special specification number**
- No indication: Standard specification
- S: Special specification
- C: Standard shaft (New JIS key straight shaft)
- P: Metric Spindle shaft
- B: Special shaft

**BRAKE CHARACTERISTICS**

The brake torque is generated in proportion to the force exerted between the friction plates and steel plates. Therefore, the brake torque varies with the pressure at the brake releasing port and the brake pressure in the motor case. The chart, right, shows the relationship between the brake torque and the pressure at the brake releasing port and the static brake pressure in the motor case. Brake torque varies due to unevenness of friction coefficient between friction plates and steel plates. The curve shows the lower limit of these values.

**ALLOWABLE RADIAL LOAD**

**BEARING LIFE**

**NOTE:**
1. If motors are operated within the proper ratings and conditions, the operational life is determined by the Bearing Life.
2. Bearing life varies due to the direction of radial load to shaft.
3. The graph shown is the bearing life (B-15 Life) at 100 rpm shaft speed for various pressures and radial loads.
4. When the shaft speed differs from 100 rpm, the bearing life can be obtained by the formula below:
   
   B-15 Life = (Bearing Life obtained in the graph at 100 rpm) × Actual Shaft Speed

   In case where the side load acts at a different location to the midpoint of the shaft, please refer to 1.
5. Applications with axial load loads should be referred to our Engineers.
6. When water-glycol fluid is used, bearing life becomes remarkably short, in this case please refer to us.
With a recent trend that a larger capacity is required for machinery like those for construction, ship/marine equipment and steel mill, a compact hydraulic motor with a larger torque capacity is much more required.

Geared motor Dowmax (using Sumitomo planetary reduction gear) is developed to answer this requirement and they are already proving its merits in many fields including the shield tunneling machines, steel mill equipment.

**Hydraulic Motor**: Dowmax MOTOR - a reputable low-speed high torque motor for its superior performance and reliability owing to the structure of the double swash plate and opposed multiple piston.

**Reduction Gear**: Sumitomo planetary gears boast impact-resistance, superior anti-wear features, reliability for long-time use and compact size, as they are manufactured with high-quality material through heat treatment and high-precision gear cutting, based on the principle of an effective load distribution.

This catalogue is useful for frequent use.

- Single-Stage Reduction Gear with Dowmax Motor (Reduction ratio: 5053)
- Double-Stage Reduction Gear with Dowmax Motor (Reduction ratio: 2553)

Dowmax motor is developed with planetary gear suitable for the application of Shield Tunneling.

All kind of Dowmax motor (2-speed, with Mechanical Brake, with Counter Balance Valve etc.) and special motor and planetary gear reduction motor combined together are compatible.

Moreover motors can be made compatible for high torque, high reduction ratio other than specified in this catalogue.

We appreciate your enquiry in this regard.
Shield Tunneling Application

**DOWMAX Motor With Planetary Gear Reduction Are Widely Used In Shield Tunneling Application Due To Outstanding Durability And High Efficiency.**

**High Performance Result**
- Good result in all Shield Tunneling Operation.

**High Pressure Application**
- Rated pressure 20.6 MPa, Max. pressure 24.5 MPa

**Compact**
- Compact and light weight due to special DOWMAX shape.

**Outstanding Durability**
- DOWMAX and planetary gear has sufficient durability for Shield Tunneling Operation.

**Smooth Operation**
- Even at full power DOWMAX with Planetary Gear can be run smoothly and noise free.

**Smooth Operation Even At Low Speed**
- With excellent performance at Low Speed and Positioning performance DOWMAX can be used as Electroter also.

### SPECIFICATION

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Equivalent Output (kW)</th>
<th>Rated Pressure MPa</th>
<th>Max. Pressure MPa</th>
<th>Rated Torque N·m</th>
<th>Max. Torque N·m</th>
<th>Rated Speed (rpm)</th>
<th>Usable Rated Load (kW)</th>
<th>Right (Unit) Rated Load (kW)</th>
<th>Mass (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME2600-G+CPHFL-132D-R-5-P</td>
<td>1/5.053</td>
<td>13005</td>
<td>20.6 (250)</td>
<td>24.5 (250)</td>
<td>40810 (438)</td>
<td>48260 (484)</td>
<td>20</td>
<td>333</td>
<td>155</td>
<td>1100</td>
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<tr>
<td>ME1300AG+CPHFL-160A-25-P</td>
<td>1/2.97</td>
<td>30985</td>
<td>20.6 (250)</td>
<td>24.5 (250)</td>
<td>40205 (398)</td>
<td>51450 (515)</td>
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<td>640</td>
<td>230</td>
<td>1450</td>
</tr>
<tr>
<td>ME150-G+MRP17025-250-ED</td>
<td>1/0.63</td>
<td>4717</td>
<td>20.6 (250)</td>
<td>24.5 (250)</td>
<td>4710 (105)</td>
<td>11821 (190)</td>
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<td>160</td>
<td>128</td>
<td>252</td>
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<td>ME1300AG+MRP180112-HD</td>
<td>1/6</td>
<td>8700</td>
<td>20.6 (250)</td>
<td>24.5 (250)</td>
<td>4710 (2502)</td>
<td>5910 (1060)</td>
<td>15</td>
<td>250</td>
<td>142.5</td>
<td>500</td>
</tr>
</tbody>
</table>

*Rated output torque and peak output torque is 95% of efficiency.

- For the service life refer other catalogue in conjunction with this catalogue as life varies with different models.

- Rated speed is suitable for the rated pressure.

- In case of overuse pressure used continuously, there are other models also suitable for application according to use.

- Please enquire for any further requirement.

- This catalogue is exclusively for Shield Cutter Drive. Therefore useful for Horizontal use only.

- In case of requirement of shift in Upward or Downward direction please contact us as it becomes special specification.

- In case DOWMAX motors of this series are required to be used for the operation other than cutter and of that Shield Tunneling please discuss with us.

- DOWMAX motor with Planetary Gear can also be built with other reduction ratio as well as torque specification than those mentioned in the catalogue.

- We appreciate your enquiry for these models.

### SELECTION CHART

This chart indicates the relation of actual torque and shaft rotation at the rated pressure of 20.6MPa.

Given the required torque and shaft speed the appropriate model can be selected from the diagram.

When the operating pressure differs from 20.6MPa, refer to the performance data for the respective model.

### Bearing Life

1. **Radial Load**
   - The load applied radially on the midpoint of the shaft extension should be less than the value indicated below.

<table>
<thead>
<tr>
<th>Pressure MPa</th>
<th>Radial Load KN</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.6</td>
<td>3.8</td>
</tr>
</tbody>
</table>

2. **Bearing Life**
   - The gear box bearing life will vary as shown on the chart depending on the radial load imposed on the output shaft. The chart indicates the bearing life (B-10 Life) when the output speed is 20 rpm with the varied pressures and the radial load magnitudes.

   - When the output speed is other than 20 rpm, it is obtained by the following formula:

     \[ \text{B-10 life} \times \frac{20}{\text{output speed}} \]

   - (Bearing life obtainable on the chart) \times \frac{20}{\text{speed}}

   - The bearing life, when the load point is not at the middle of shaft extension, is different from the chart. Refer to factory in such a case.

3. **Lubrication**
   - Quantity of lubricating oil: for horizontal use

<table>
<thead>
<tr>
<th>Lubricating Oil</th>
<th>for horizontal use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 L for gear oil equivalent to ISO Viscosity 320 at 80°C</td>
<td></td>
</tr>
</tbody>
</table>

4. For detailed information for motor, please refer to other page.
**ME1300AG+CPHFL-160A-23-P**

**Gear Parts No. : DY0335B**

- Equivalent Displacement: 30,895 cm³/rev
- Gear Ratio: 1/22.97
- Output Torque: 96,226 N·m
- Max. Output Torque: 114,551 N·m
- Rated Speed: 10 rpm

**Bearing Life**

1. Radial Load
   - The load applied radially on the midpoint of the shaft extension should be less than the value indicated below.
   - Pressure: MPa
     - 25.6

2. Bearing Life
   - The load applied to the bearing life will vary as shown on the chart depending on the capacity of the bearing. The chart indicates the bearing life (50% Life) when the load applied is 15 rpm with the applied pressure and the radial load magnitude.
   - When the output speed is other than 15 rpm, it is obtained by the following formula:
     \[
     \text{Bearing life} = \frac{50 \text{ Life}}{\text{Applied speed}}
     \]
   - (Bearing life obtainable on the chart) × \(\frac{10}{\text{Applied speed}}\)

3. Lubrication
   - Quantity of lubricating oil
     - For horizontal use: 460 cc
     - For vertical use: 32 cc

4. For detailed information for motor, please refer to other page.

**ME150-G+MRP1702S-280-ED**

**Gear Parts No. : DY0006A**

- Equivalent Displacement: 4,717 cm³/rev
- Gear Ratio: 1/31.03
- Output Torque: 14,710 N·m
- Max. Output Torque: 17,652 N·m
- Rated Speed: 20 rpm

**Bearing Life**

1. Radial Load
   - The load applied radially on the midpoint of the shaft extension should be less than the value indicated below.
   - Pressure: MPa
     - 25.6

2. Bearing Life
   - The load applied to the bearing life will vary as shown on the chart depending on the radial load imposed on the output shaft. The chart indicates the bearing life (50% Life) when the output speed is 20 rpm with the applied pressure and the radial load magnitude.
   - When the output speed is other than 20 rpm, it is obtained by the following formula:
     \[
     \text{Bearing life} = \frac{50 \text{ Life}}{\text{Applied speed}}
     \]
   - (Bearing life obtainable on the chart) × \(\frac{10}{\text{Applied speed}}\)

3. Lubrication
   - Quantity of lubricating oil
     - For horizontal use: 460 cc
     - For vertical use: 32 cc

4. For detailed information for motor, please refer to other page.
Dowmax® Hydraulic Motor with PLANETARY GEAR

**ME1300AG+MRP1801N-112-HD**

**Gear Parts No. : DY0455A**

<table>
<thead>
<tr>
<th>Equivalent Displacement</th>
<th>8,070 cm³/rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear Ratio</td>
<td>1/6</td>
</tr>
<tr>
<td>Output Torque</td>
<td>25,125 N·m</td>
</tr>
<tr>
<td>Max. Output Torque</td>
<td>29,910 N·m</td>
</tr>
<tr>
<td>Rated Speed</td>
<td>15 rpm</td>
</tr>
</tbody>
</table>

### Bearing Life

1. **Radial Load**
   - The load applied radially on the midpoint of the shaft extension should be less than the value indicated below.

<table>
<thead>
<tr>
<th>Pressure (MPa)</th>
<th>25.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial Load (kN)</td>
<td>290</td>
</tr>
</tbody>
</table>

2. **Bearing Life**
   - The gear box bearing life will vary as shown on the chart depending on the radial load imposed on the output shaft. The chart indicates the bearing life (B-10 Life) when the output speed is 15 rpm with the varied pressures and the radial load magnitudes.
   - When the output speed is other than 15 rpm, it is obtained by the following formula:
     \[ B-10 \text{ Life} = \frac{15 \times \text{output speed}}{15} \]
   - The bearing life, when the load point is not at the middle of shaft extension, is different from the chart. Refer to factory in such a case.

3. **Lubrication**
   - Quantity of lubricating oil
     - for horizontal use
     - for gear oil equivalent to ISO VV200 [ambient temp. 0~35°C]

4. For detailed information for motor, please refer to other page.
Counter Balance Valve with Brake Valves

This counter balance valve generates the braking pressure in the hydraulic motor, proportional to the load in lowering loads at slewing, running and winching operations and thus prevent overrunning of motor forced by loads.

In addition, the counter balance valve contains housed brake valves to protect the hydraulic motor from overloads as well as smooth acceleration and deceleration of load.
Counter Balance Valve with Brake Valves

MODEL CODE

CW 300 Y X — A ※ S

- Special Specification No.
- Special Specification Code
- Seal Code
- No sign: Standard Specification
- S: Special Specification
- No sign: Standard Seal (nitrile rubber)
- V: Viton Seal (Fluoro-rubber)
- Accessory Sub-plate Code for Direct Connection with Dovmax (refer to the table below)
- Design Code: (beginning with - and in alphabetical order henceforth)
- Cracking pressure
- No sign: Standard cracking pressure
- X: Higher cracking pressure model
- Special Function Code
- No sign: Standard Product
- Y: With mechanical brake release port
- Z: With stroke adjusting mechanism for main spool
- W: Y function + Z function
- Rated Flow (l/min)
- Series Code
- C: Counter Balance valve with two-directional brake valve
- CW: Counter Balance valve with one-directional brake valve

SPECIFICATION

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated Flow (l/min)</th>
<th>Automatic Device of Return Leakage Pressure Relief (if Applicable)</th>
<th>MASS kg</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>C100</td>
<td>100</td>
<td></td>
<td>7</td>
<td>Allows smooth acceleration/deceleration at slewing, running and winching operations.</td>
</tr>
<tr>
<td>C100Y</td>
<td></td>
<td></td>
<td></td>
<td>To be used for hydraulic motors with mechanical brake, an automatic brake release ports is provided.</td>
</tr>
<tr>
<td>C100Z</td>
<td></td>
<td></td>
<td></td>
<td>To be used for devices at low flow rate and greater load changes, and matching with machines to be easily adjusted from outside.</td>
</tr>
<tr>
<td>C100W</td>
<td>9.8—27.5 (100—280)</td>
<td></td>
<td>19</td>
<td>Allows smooth acceleration/deceleration at slewing, running and winching operations.</td>
</tr>
<tr>
<td>C300B</td>
<td>300</td>
<td></td>
<td></td>
<td>To be used for hydraulic motors with mechanical brake, an automatic brake release ports is provided.</td>
</tr>
<tr>
<td>C300VY</td>
<td></td>
<td></td>
<td></td>
<td>To be used for devices at low flow rate and greater load changes, and matching with machines to be easily adjusted from outside.</td>
</tr>
<tr>
<td>C300ZB</td>
<td></td>
<td></td>
<td></td>
<td>Both Y and Z functions above are combined.</td>
</tr>
<tr>
<td>C300WB</td>
<td></td>
<td></td>
<td>24</td>
<td>This one-directional counter balance valve is used for winches allowing smooth rolling down operation.</td>
</tr>
</tbody>
</table>

Operation Principle

1. Two-directional counter balance valves, C100, C300B

(During acceleration)

When the directional valve is switched to either direction to accelerate the hydraulic motor, assuming that the valve is switched to the (a) side, the fluid will be introduced to the Av port. Then, the fluid is directed to the spring chamber As at the edge surface of the main spool through the pilot passage Ap of the counter balance valve and thus, the main spool will move to the right direction. Then, the fluid flown into the Av port is introduced to the hydraulic motor from the Av port through the check valve in the main spool. As the hydraulic motor cannot absorb all the fluid flown into the Av port until acceleration has been completed, the fluid pressure will rise up to the relief valve set pressure and the excessive fluid is discharged to the return line from the relief valve Ra.

(During neutral brake)

When the directional valve is returned to the neutral position, the pressure of Av and Bv become equivalent, reaching the tank pressure and thus the main spool of the counter balance valve will be pushed back to the neutral position by the spring force. As the return line is closed by the check valve in the main spool, the pressure at the return side will be raised up to the relief valve set pressure and the hydraulic brake is applied to the motor to stop rotation.

(Prevention of overrun)

When the hydraulic motor is going to overrun exceeding the pump discharge volume due to external loads, the pressure at the inflow side decreases and the main spool will return to the neutral position. Thus the brake is applied to the hydraulic motor and overrun is prevented.

2. One-directional Counter balance Valve CW300A

(During Rolling up)

When the directional valve is switched to the (a) side and the fluid is introduced from the Av port, the fluid will be directed to the hydraulic motor inlet from Av port through the check valve in the counter balance valve, and the load will be raised. The fluid drained from the hydraulic motor outlet will be discharged to the Bv port through Bv port.

(During Rolling down)

When the directional valve is switched to the (b) side, the fluid will be flown into the Bv port. The fluid introduced to the Bv port is directed to the main spool end surface through the pilot passage Bp. If the pilot pressure becomes higher than the spool spring force, the main spool will move to the left and the return side passage will be opened. The fluid flown into the Bv port is introduced to the hydraulic motor inlet through the Bm port and the load is lowered. The fluid discharged from the hydraulic motor outlet is drained to the Av port through the Av port. When the load is going to overrun exceeding the pump discharge volume due to gravity, the pressure at the inflow side of the motor is reduced and the pilot pressure decreases. Thus, the main spool is returned to the right side by the spring force and the return line is closed, which generates the pressure at the outlet side of the hydraulic motor and overrun is prevented.
Counter Balance Valve with Brake Valves

C100

<table>
<thead>
<tr>
<th>Rated Flow</th>
<th>100 ℓ /min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusting Range of Relief Valve Set Pressure</td>
<td>9.8～27.5MPa (100～280kgf/cm²)</td>
</tr>
<tr>
<td>Main Spool Cracking Pressure</td>
<td>0.57MPa (5.8kgf/cm²)</td>
</tr>
<tr>
<td>(Higher Cracking Pressure Model)</td>
<td>1.31MPa (13.4kgf/cm²)</td>
</tr>
<tr>
<td>Check Valve Cracking Pressure</td>
<td>0.015MPa (0.15kgf/cm²)</td>
</tr>
<tr>
<td>Mass</td>
<td>7kg</td>
</tr>
</tbody>
</table>

C100Y

C100W

APPLICATION EXAMPLE

SUB-PLATE DIMENSION for DOWMAX HYDRAULIC MOTOR DIRECT CONNECTION

<table>
<thead>
<tr>
<th>Motor Model</th>
<th>ME101</th>
<th>ME102</th>
<th>ME103</th>
<th>ME104</th>
<th>ME105</th>
<th>ME106</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>280</td>
<td>40</td>
<td>40</td>
<td>35</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Y</td>
<td>116</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>Z</td>
<td>280</td>
<td>80</td>
<td>80</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

Numbers in ( ) for ME 100 show sub plate dimensions in direct connection with C100Y & C100W. ME100 with motor can be directly connected without sub plate.
**C300 □ B**

**Rated Flow**: 300 ℓ/min

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusting Range of Relief Valve Set Pressure</td>
<td>9.8<del>27.5MPa (100</del>280kgf/cm²)</td>
</tr>
<tr>
<td>Main Spool Cracking Pressure</td>
<td>0.59MPa (6.0kgf/cm²)</td>
</tr>
<tr>
<td>(Higher Cracking Pressure Model)</td>
<td>1.18MPa (12kgf/cm²)</td>
</tr>
<tr>
<td>Check Valve Cracking Pressure</td>
<td>0.015MPa (0.15kgf/cm²)</td>
</tr>
<tr>
<td>Mass</td>
<td>19kg</td>
</tr>
</tbody>
</table>

**STANDARD PERFORMANCE DATA**

1. **Pressure Override Performance**

   ![Graph showing pressure override performance with flow rate on the x-axis and pressure on the y-axis.](image)

2. **Pressure Drop**

   ![Graph showing pressure drop with flow rate on the x-axis and pressure drop on the y-axis.](image)

**APPLICATION EXAMPLE**

![Application example diagram](image)

**SUB-PLATE DIMENSION for DOWMAX HYDRAULIC MOTOR DIRECT CONNECTION**

<table>
<thead>
<tr>
<th>Motor Model</th>
<th>ME110</th>
<th>ME125</th>
<th>ME150</th>
<th>ME175</th>
<th>ME200</th>
<th>ME225</th>
<th>ME250</th>
<th>ME275</th>
<th>ME300</th>
<th>ME325</th>
<th>ME350</th>
<th>ME375</th>
<th>ME400</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>60</td>
<td>65</td>
<td>70</td>
<td>75</td>
<td>80</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>Y</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Z</td>
<td>60</td>
<td>65</td>
<td>70</td>
<td>75</td>
<td>80</td>
<td>85</td>
<td>90</td>
<td>95</td>
<td>100</td>
<td>105</td>
<td>110</td>
<td>115</td>
<td>120</td>
</tr>
</tbody>
</table>

![Sub-plate dimension diagram](image)
Counter Balance Valve with Brake Valves

**CW300A**

**Rated Flow**
300 l/min

**Adjusting Range of Relief Valve Set Pressure**
9.8～27.5MPa (100～280kgf/cm²)

**Main Spool Cracking Pressure**
0.87MPa (8.9kgf/cm²)

**Higher Cracking Pressure Model**
1.37MPa (14kgf/cm²)

**Check Valve Cracking Pressure**
0.69MPa (7.0kgf/cm²)

**Mass**
24kg

---

**OUTLINE DIMENSIONS and CIRCUIT DIAGRAM**

**APPLICATION EXAMPLE**

**STANDARD PERFORMANCE DATA**

1. Pressure Overside Performance

2. Pressure Drop

**SUB-PLATE DIMENSION for DOWMAX HYDRAULIC MOTOR DIRECT CONNECTION**

Motor Model | MG150 | MG170 | MG180 | MG200 | MG250 | MG300 | MG350 | MG400 | MG500 | MG600 |
---|---|---|---|---|---|---|---|---|---|---|
X | | | | | | | | | | |
Y | 140 | 140 | 140 | 150 | 160 | 145 | 150 | 145 | 145 | 165 |
Z | 86 | 86 | 90 | 110 | 84 | 94 | 120 | 110 | | |