P1M Series Mobile Open Circuit
Medium Pressure Axial Piston Pumps
MSG28-2712-01/P1M/US   Effective: May 2020
Designed for Mobile. Built to Perform.

P1M Series delivers higher speeds and efficiency that increases machine productivity, reduces costs, and extends pump life in a robust, compact envelope.

1. Patented inlet design increases speed ratings and fill capabilities while reducing erosion, cavitation, & pressure ripples
2. Compact package allows fit into tighter spaces
3. Best-in-class power density due to higher pressure ratings, speeds, and efficiency.
4. Fast response EDC for increased productivity
5. Nine piston design reduces pressure ripples
6. Optional dual shaft seals for wet PTO mounting for all sizes

Technical Specifications

<table>
<thead>
<tr>
<th></th>
<th>Units</th>
<th>28cc (cc/rev)</th>
<th>45cc (cc/rev)</th>
<th>54cc (cc/rev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement</td>
<td>cc/rev (in3/rev)</td>
<td>28 (1.71)</td>
<td>45 (2.75)</td>
<td>54 (3.29)</td>
</tr>
<tr>
<td>Maximum Continuous Pressure</td>
<td>bar (psi)</td>
<td>280 (4060)</td>
<td>280 (4060)</td>
<td>250 (3625)</td>
</tr>
<tr>
<td>Maximum Speed (at 1 bar abs inlet pressure)</td>
<td>rpm</td>
<td>3300</td>
<td>3000</td>
<td>2900</td>
</tr>
<tr>
<td>Weight (non-thru drive)</td>
<td>kg (lbs)</td>
<td>16.8 (37)</td>
<td>20.5 (45)</td>
<td>21.3 (47)</td>
</tr>
<tr>
<td>Weight (thru drive)</td>
<td>kg (lbs)</td>
<td>21.3 (47)</td>
<td>25.9 (57)</td>
<td>26.8 (59)</td>
</tr>
<tr>
<td>Maximum Case Pressure</td>
<td>bar (psi)</td>
<td>2.0 (29) or 0.5 (7.3) above inlet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid Temperature Range</td>
<td>C (F)</td>
<td>-40 to 95 (-40 to 203)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid Viscosity Continuous Range</td>
<td>cSt</td>
<td>7 to 160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Fluid Viscosity</td>
<td>cSt</td>
<td>5000 (cold start only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Intermittent Fluid Viscosity</td>
<td>cSt</td>
<td>6 (less than 1% of duty cycle)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Model Ordering Code

<table>
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<th>Control Bore Options</th>
<th>Additional Control Information</th>
<th>Port Standard</th>
<th>Port Block Options</th>
<th>Shaft</th>
<th>Paint</th>
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<td>Pump Family</td>
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<td>Control Pad Options</td>
<td>Rotation Options</td>
<td>Port Flange Options</td>
<td>Port Type Options</td>
<td>Shaft Seal Options</td>
<td>Paint Options</td>
</tr>
</tbody>
</table>

## Displacement Options
- 028: 28cc/rev
- 045: 45cc/rev
- 054: 54cc/rev
- 065: 54cc/rev (in development)
- 085: 85cc/rev (in development)

## Design Series Options
- A: Design Series A (45 & 54cc)
- B: Design Series B (28, 65, 85cc)

## Control Options - Control Pad
- 00: None
- PC: Pressure Compensator
- LS: Load Sense with Pressure Compensator
- LB: Load Sense with Bleed Orifice
- RC: Remote Compensator
- EP: Electronic Pressure (in development)

## Control Options - Control Bore
- 00: None
- ED: Electronic Displacement
- EU: Electronic Unload (45 & 54cc)
- VS: Maximum Volume Stop

## Additional Control Information
- 00: None
- 1H: 12 VDC; Max Default
- 1L: 12 VDC; Min Default
- 2H: 24 VDC; Max Default
- 2L: 24 VDC; Min Default
- ##: 50-99% Max Displacement (vol stop only)

## Rotation Options
- R: Clockwise from Shaft End
- L: Counterclockwise from Shaft End

## Sensor Options
- 0: None
- D: Displacement Sensor

## Mounting Flange Options
- B2: SAE-B 2-bolt (28, 45, 54cc)
- C4: SAE-C 4-bolt (45 & 54cc)
- C6: SAE-C 2/4-bolt (65 & 85cc)

## Port Standard Options
- S: SAE Work & Aux Ports
- M: Metric Work & Aux Ports

## Port Block Options
- S: Side Ports, no thru drive
- E: End Ports, no thru drive
- A: SAE-A 2-bolt Thru Drive; 9T coupling
- H: SAE-A 2-bolt Thru Drive; 11T coupling
- B: SAE-B 2-bolt Thru Drive; 13T coupling
- Q: SAE-B 2-bolt Thru Drive; 15T coupling
- C: SAE-C 2/4-bolt Thru Drive; 14T coupling
- N: SAE-C 2/4-bolt Thru Drive; 17T coupling
- T: Thru Drive with Cover, no coupling

## Port Type Options
- F: Flanged
- T: Threaded

## Shaft Options
- B: SAE-B, 13T (28, 45, 54cc)
- Q: SAE-BB, 15T (28, 45, 54, 65cc)
- J: SAE-BB, 15T, no undercut (45 & 54cc)
- C: SAE-C, 14T (45, 54, 65, 85cc)
- N: SAE-CC, 17T (85cc only)

## Shaft Seal Options
- S: Single FKM Shaft Seal
- D: Dual FKM Shaft Seal

## Paint Options
- 0: No Paint
- P: Paint Black

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### Performance Charts

#### 28cc Efficiency Chart

![28cc Efficiency Chart](image)

#### 45cc and 54cc Efficiency Chart

*Note: 54cc is rated to 250 bar*

![45cc and 54cc Efficiency Chart](image)
**Controls**

**Electronic Displacement Control (EDC)**

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>12VDC</th>
<th>24VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance (@ 20 C)</td>
<td>5.5 Ohm</td>
<td>22 Ohm</td>
</tr>
<tr>
<td>Max Current</td>
<td>2.2 A</td>
<td>1.1 A</td>
</tr>
<tr>
<td>PWM Signal*</td>
<td>100-250 Hz</td>
<td></td>
</tr>
<tr>
<td>Recommended min Dither Amplitude</td>
<td>350 mA</td>
<td>175 mA</td>
</tr>
<tr>
<td>Connector</td>
<td>Deutsch DT04-2P</td>
<td></td>
</tr>
</tbody>
</table>

* Good results found with superimposed 35Hz dither

**Example Control Schematics**

- **EDC (min default) with Remote Compensator**
- **EDC (max default) with Load Sense and Pressure Compensator**
- **Load Sense with Pressure Compensator**
- **Electronic Unload with Load Sense and Pressure Compensator**

**Electrical Displacement Control**

Displacement vs. Current, Nominal Characteristics

Electrical Displacement Control

**Displacement vs. Current, Nominal Characteristics**

- 12V Coil
- 24V Coil

**Technical Data**

- 12VDC: Resistance = 5.5 Ohm, Max Current = 2.2 A, PWM Signal = 100-250 Hz, Recommended min Dither Amplitude = 350 mA
- 24VDC: Resistance = 22 Ohm, Max Current = 1.1 A, PWM Signal = 100-250 Hz, Recommended min Dither Amplitude = 175 mA

**Connector**: Deutsch DT04-2P

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* Good results found with superimposed 35Hz dither
Applications

Increase machine performance on the job
The next generation mobile pump, P1M, increases equipment’s machine performance and delivers unrivaled benefits, including:

- Smaller footprint
- Less emission & fuel consumption
- Improved machine response time
- Increased efficiency
- Longer pump life
- Reduced noise

Power Management in Mobile Equipment

EDC regulates flow based on system feedbacks in order to match desired horsepower scenario.

P1M is the perfect solution for:

- Construction
- Agriculture
- Mining
- Drilling
- Cranes
- Material Handling
- Utility Vehicles
- Forestry Equipment
- Refuse
- Rough Terrain Vehicles
- Military
### P1M Dimensions

#### 28cc

<table>
<thead>
<tr>
<th>P1M-028 Port Sizes</th>
<th>Ports</th>
<th>SAE Flanged</th>
<th>SAE Threaded</th>
<th>Metric Flanged</th>
<th>Metric Threaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;A&quot; Inlet</td>
<td>1-1/4&quot; Code 61</td>
<td>SAE-20</td>
<td>DN32</td>
<td>M42x2</td>
<td></td>
</tr>
<tr>
<td>W Threads</td>
<td>7/16-14 UNC-2B</td>
<td>-</td>
<td>M10x1.5-6H</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&quot;B&quot; Outlet</td>
<td>3/4&quot; Code 61</td>
<td>SAE-12</td>
<td>DN19</td>
<td>M27x2</td>
<td></td>
</tr>
<tr>
<td>Y Threads</td>
<td>3/8-16 UNC-2B</td>
<td>-</td>
<td>M10x1.5-6H</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>SAE-4</td>
<td>M12x1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1, D2, D3</td>
<td>SAE-8</td>
<td>M22x1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note A:** SAE flanged ports conform to SAE J518  
**Note B:** SAE o-ring port conforms to SAE J514  
**Note C:** Metric flanged ports conform to ISO 6162  
**Note D:** Metric o-ring boss port conforms to ISO 6149-1

#### End Ports

(CCW rotation shown)

#### Side Ports

(CCW rotation shown)

#### Thru Drive

(CCW rotation shown)

**Note:** For opposite rotation, inlet and outlet location are swapped.
P1M Dimensions
45 & 54cc

End Ports
(CCW rotation shown)

Side Ports
(CW rotation shown)

Thru Drive
(CCW rotation shown)

Note: For opposite rotation, inlet and outlet location are swapped.

P1M-045/054 Port Sizes

<table>
<thead>
<tr>
<th>Ports</th>
<th>SAE Flanged</th>
<th>SAE Threaded</th>
<th>Metric Flanged</th>
<th>Metric Threaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;A&quot; Inlet</td>
<td>1-1/2&quot; Code 61</td>
<td>SAE-24</td>
<td>DN38</td>
<td>M48x2</td>
</tr>
<tr>
<td>W Threads</td>
<td>1/2-13 UNC-2B</td>
<td>-</td>
<td>M12x1.75-6H</td>
<td>-</td>
</tr>
<tr>
<td>&quot;B&quot; Outlet</td>
<td>1&quot; Code 61</td>
<td>SAE-16</td>
<td>DN25</td>
<td>M33x2</td>
</tr>
<tr>
<td>Y Threads</td>
<td>3/8-16 UNC-28</td>
<td>-</td>
<td>M10x1.5-6H</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>SAE-4</td>
<td>M12x1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1, D2, D3</td>
<td>SAE-10</td>
<td>M22x1.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note A: SAE flanged ports conform to SAE J518
Note B: SAE o-ring port conforms to SAE 1926
Note C: Metric flanged ports conform to ISO 6162
Note D: Metric o-ring boss port conforms to ISO 6149-1