EPV10 Series
Proportional Flow Controls
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Features and Benefits

This EPV series of poppet valves are ideally suited for rotary or linear speed control where response, performance and installed costs are more important than precise control through electronic position feedback.

These poppet valves are suitable for applications up to 30 lpm (8 USpgm).

Application opportunities include: process control systems, pavers, AWP vehicles, agricultural machinery, automobile / service station lifts, blending / mixing systems, conveyor systems, lawn conditioning / grooming, tube bending machines, construction equipment, dock leveling system, press systems, snow groomers winch control as well as on any other equipment in the mobile vehicle and industrial machinery markets.

The EPV10 has several outstanding performance features which give it a unique position in the screw-in cartridge valve market. Valve gain linearity, flow force pressure compensation characteristics above 20 bar (300 psi) and low internal leakage.

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Valve gain linearity</td>
<td>In system operating conditions, the output of the valve will closely track the input signal and it will not be necessary to allow for lead / lag errors between input command and actuator output.</td>
</tr>
<tr>
<td>• Flow force pressure compensation</td>
<td>In systems with pressure drop of at least 20 bar (300 psi) a separate hydrostat is not required to ensure flow compensation over the full operating range of the valve. This means good performance at lower installed costs and a smaller package that is easier to operate and service.</td>
</tr>
<tr>
<td>• Low leakage</td>
<td>Typical leakage is less than 3 cc/min. This means the valve can function as a load holding device when it is in the non energized mode.</td>
</tr>
<tr>
<td>• Optional override features</td>
<td>Screw type and manual type are available.</td>
</tr>
</tbody>
</table>

WARNING: When using the “Screw Type” override, care must be taken to return the override back to its neutral position before reactivating the valve. Failure to take this precaution may result in personal injury or damage to the machine.
# Model Code

**Electro Proportional Flow Control Valve**

**Nominal size**
10 – Size 10

**Block**
(Omit when ordering cartridge only)
A – Aluminum

**Port size in block**
(Omit when ordering cartridge only)
6H – SAE 6 port
8H – SAE 8 port
3G – 3/8” BSPF port

**Voltage rating**
12D – 12 VDC 6.5 ohms
24D – 24 VDC 25.0 ohms

**Manual override option**
M – Pin type
S – Screw type
Omit if not required

**Electrical connections**
W – Flying leads
Q – Dual SAE 1/4” Spade
U – DIN 43650
Y – Metri-Pack
    (Preferred Packard connector)
F – Weather-Pack

**Design number**

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## Functional Symbol & Sectional View

![Functional Symbol & Sectional View](image)
Introduction

Description
The EPV10 is a direct acting, uni-directional, poppet type, 2-way 2-position normally closed proportional flow control valve. This valve is used in applications where proportional control of velocity or position is required.

Operation
In the de-energized position, the EPV10 blocks flow from Port 2 to Port 1, with no reverse flow permitted. When energized, the valve permits proportional flow from Port 2 to Port 1 in direct proportion to the command signal applied to the solenoid coil.

Control
The EPV (Electro Proportional Valve) can be driven by a 12 VDC, 24 VDC or PWM signal. Control of the EPV10 can be as simple as a rheostat for hand-eye coordination systems to the convenience of a power plug or with the sophistication of an amplifier card. Smooth performance has also been achieved through the use of joystick controllers with and without amplifier cards.

The preferred and recommended method of control of the EPV10 is with a PWM controller with the following characteristics:

Nominal supply voltage:
12 / 24 VDC
Minimum current for full function:
1.4 / 0.7 amp
Pulse frequency:
100 + / – 10 Hz
Coil resistance:
6.4 / 25.5 ohms @20°C (68°F)
Threshold current:
Adj. from 400 - 800 mA (12 VDC)
Adj. from 200 - 400 mA (24 VDC)
Adj. from 600 - 1400 mA (12 VDC)
Adj. from 300 to 700 mA (24 VDC)

Ramp:
Optional

Rheostat specifications:
CAUTION
These have a tendency to run hot if used in other than intermittent operations.
12 VDC operation – 10-12 Ω, 20-25 watts
24 VDC operation – 25-30 Ω, 20-25 watts

Power plug options:
(Indoor applications)
EHH-AMP-702
EPAD-SA-1A6-10
(These require 24 VDC power supply to power plug and 12 VDC coil on EPV10)
Amplifier card:
(Indoor applications)
EEA-PAM-523
(Requires 24 VDC power supply and either 12 VDC or 24 VDC coil on EPV10)
Joy stick suppliers:
(Outdoor applications)
OEM Controls, Inc, Shelton, CT
Ph: 203-929-8431
Fax: 203-929-3867
P-Q Controls, Inc., Bristol, CT
Ph: 203-583-6994
Fax: 203-583-6011

Fluids
Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials and additives for protection against wear of components, elevated viscosity and inclusion of air.


Recommendations on filtration and the selection of products to control fluid condition are included in 561.

Recommended cleanliness levels using petroleum oil under common conditions is based on the highest fluid pressure levels in the system:

The table below highlights the recommended cleanliness level for the EPV10 series valves.

<table>
<thead>
<tr>
<th>System Pressure Level bar (psi)</th>
<th>Model</th>
<th>&lt;70–207</th>
<th>207 +</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(&lt;1000 – 3000)</td>
<td>(3000 +)</td>
</tr>
<tr>
<td>EPV10</td>
<td>17/15/12</td>
<td>15/13/11</td>
<td></td>
</tr>
</tbody>
</table>
## Application Data

### Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
<td>30 lpm (8 USgpm)</td>
</tr>
<tr>
<td>Fatigue pressure rated (infinite life)</td>
<td>207 bar (3000 psi)</td>
</tr>
<tr>
<td>Typical application pressure at Port 2</td>
<td>207 bar (3000 psi)</td>
</tr>
<tr>
<td>Operating ambient temperature</td>
<td>−30 °C to +90 °C (-22 °C to +194 °F)</td>
</tr>
<tr>
<td>Typical hysteresis</td>
<td>Less than 4% of rated current at 10 bar pressure drop Pulse Width Modulated (PWM)</td>
</tr>
<tr>
<td>Internal leakage</td>
<td>3 cc/min maximum @ 140 bar (2000 psi) and oil viscosity of 30 cSt</td>
</tr>
<tr>
<td>Oil viscosity range</td>
<td>10–800 cSt</td>
</tr>
<tr>
<td>Fluids</td>
<td>Anti-ware hydraulic oils with Buna–N seals (standard). Phosphate esters (non–alkyl) with Viton® seals are available by request. (\text{Viton® is a registered trademark of E.I. DuPont})</td>
</tr>
<tr>
<td>Electrical requirements</td>
<td></td>
</tr>
<tr>
<td>Coil current for maximum flow</td>
<td>1.4 amps max @ 12 VDC</td>
</tr>
<tr>
<td></td>
<td>0.7 amps max @ 24 VDC</td>
</tr>
<tr>
<td>Recommended PWM frequency</td>
<td>65–150 Hz, application dependent, 100 Hz typical</td>
</tr>
<tr>
<td>Coil resistance @ 20°C</td>
<td>12V  6.5 Ω</td>
</tr>
<tr>
<td></td>
<td>24V  25.0 Ω</td>
</tr>
<tr>
<td>Power consumption @ rated current and</td>
<td></td>
</tr>
<tr>
<td>20°C coil temperature</td>
<td>12 volts  12.8 watts</td>
</tr>
<tr>
<td></td>
<td>24 volts  12.8 watts</td>
</tr>
<tr>
<td>Installation interface</td>
<td>C-10-2 cavity</td>
</tr>
<tr>
<td>Weight (cartridge only)</td>
<td>0.78 Kg (1.72 lbs)</td>
</tr>
</tbody>
</table>

### Step Response Data

- On stroke: 35 msec
- Off stroke: 16 sec
- Typical current step to provide 50% flow
Performance Curves

Flow vs Current
With 10 bar differential between inlet and outlet

Flow vs Pressure Drop
Per % of Input Current
Performance Curves

Flow vs Pressure Drop
Per % of Input Current

Frequency Response Typical
For an amplitude of ±40% maximum stroke (Center to offset) about the 50% position and ΔP = 10 bar (145 psi)
Installation Dimensions

EPV10
mm (inch)

Third angle projection

Port 1 Outlet

Port 2 Inlet

Manual Override

∅ 26,70 (1.051)

∅ 43,5 (1.71)
∅ 25,8 (1.01)

∅ 7,14 (0.281)

160,1 (6.30)

19,05 (0.750)
25,4 (1.00)

9,52 (0.375)

63,5 (2.50)

50,8 (2.00)

∅ 15,8 (0.622)

Port 1 Outlet

Port 2 Inlet

∅ 15,8 (0.622)

∅ 7,14 (0.281)

19,05 (0.750)
25,4 (1.00)

∅ 43,5 (1.71)
∅ 25,8 (1.01)

∅ 26,70 (1.051)

Opening clearance 2,0 (0.08)
### Standard form tooling for C-10-2 cavity

<table>
<thead>
<tr>
<th>Model Code Reference</th>
<th>Model</th>
<th>Port 1</th>
<th>Port 2</th>
<th>Model Code Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-10-2</td>
<td>EPV10</td>
<td>SAE 6</td>
<td>SAE 6</td>
<td>6H</td>
</tr>
<tr>
<td>876700</td>
<td>SAE 6</td>
<td>876701</td>
<td>SAE 8</td>
<td>8H</td>
</tr>
<tr>
<td>566099</td>
<td>G 3/8”</td>
<td>3G</td>
<td></td>
<td>3G</td>
</tr>
</tbody>
</table>

| ▲ BSPF |

For applications over 207 bar (3000 psi), dimensionally interchangeable steel housings are available upon request.

### Roughing Tools

<table>
<thead>
<tr>
<th>Cavity Size</th>
<th>Aluminum</th>
<th>Steel/Cast Iron</th>
<th>Shank Dia. mm (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-10-2</td>
<td>RT-10-2-A-8030</td>
<td>RT-10-2-S-8035</td>
<td>25.4 (1.000)</td>
</tr>
</tbody>
</table>

### Finishing Tools

<table>
<thead>
<tr>
<th>Cavity Size</th>
<th>Tool designation</th>
<th>Shank Dia. mm (inches)</th>
<th>For machining</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-10-2</td>
<td>FT-10-2-AS-8048</td>
<td>25.4 (1.000)</td>
<td>Aluminum or steel</td>
</tr>
</tbody>
</table>

### Coil Kits

<table>
<thead>
<tr>
<th>Type</th>
<th>12V</th>
<th>24V</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>02–154072</td>
<td>02–154073</td>
</tr>
<tr>
<td>Q</td>
<td>02–317154</td>
<td>02–317155</td>
</tr>
<tr>
<td>U</td>
<td>02–154070</td>
<td>02–154071</td>
</tr>
<tr>
<td>Y</td>
<td>02–308808</td>
<td>02–308809</td>
</tr>
<tr>
<td>F</td>
<td>02–308810</td>
<td>02–308811</td>
</tr>
</tbody>
</table>

### Cartridge Seal Kit

Seals for all options included in kit, therefore some models will have extra seals that will not be needed.

### Seal Kits
Standard Cavity Dimensions

**mm (inch)**

Assembly torque
47 – 54 N.m
(35–40 lbf.ft.)