Mobile Valves
Proportional - Load Sensing

Model CML60
325 bar
60 L/min
Up to 8 sections
Eaton Fixl® Compliant

EATON
Powering Business Worldwide
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Product Overview

The Eaton CML60 mobile valve is a load sensing, sectional proportional valve with a highly versatile design that offers extensive relief options through the use of standard C-10-2 relief cavities. The CML60 valve can be utilized across the breadth of pump types ranging from fixed displacement pumps to pressure compensated, load sensing variable displacement pumps.

Increased productivity is the key user benefit of the CML60 load sensing proportional valve. This operator efficiency is achieved because each valve function is proportional to the spool position under all load conditions and independent of the number of valve functions in operation providing the total demand flow is less than pump flow. Additional benefits of the CML60 load sensing proportional valve include energy savings due to less fuel consumption and heat dissipation.

Rated Flow:
Inlet: to 100 l/min (26.3 USgpm)
Section: to 60 l/min (15.8 USgpm)

Rated Fatigue Pressure per NFPA T2.6.1:
280 bar (4050 psi) Inlet
• Qualified at 1 million cycles at 325 bar [4700 psi] test pressure
300 bar (4350 psi) Work Ports
• Qualified for 1 million cycles at 350 bar [5075 psi] test pressure

Standard Circuit Design
Parallel circuit, closed center load sensing, inlet pressure compensated

Actuation Options
• Hydraulic
• Electrohydraulic Proportional

Features and Benefits

Precise Control
• EH proportional
  – With or without manual handle back-up
  – Can be used on/off
• Hydraulic pilot

Energy Efficiency
• Load sensing circuit design

Versatile Design
• Sectional design
  – 1-8 sections
  – Spool type, flow and actuation options
• Work ports accept Eaton’s Vickers® SiCV cartridges
  – C-10-2 cavities
  – Section pressure limitation available

Inlet Options
• Unload/relief for fixed displacement pump systems
• Load sensing for variable-displacement flow compensated pumps

Eaton F(x)® Compliant
• Control F(x)™ Software
• EFX, and SFX Controllers

Electrical

General Information


Model Code – Valve Section

** Load Sensing Proportional Valve CML60 –
- Actuation
  E0 – Electrohydraulic
  H0 – Hydraulic
  EM – Electrohydraulic w/ manual override
  HM – Hydraulic w/ manual override

** Ports
B – 1/2 BSP
D – Direct port STC, -8
M – ISO 6149 metric, M18
S – SAE, -8
T – SAE, -10

** Port A Relief Valve
00 – No cavities
P1 – Plugged
C1 – Check Valve
L1 – LS Relief Valve (opposite port coding must be the same)
F1 – Relief Valve, Direct Acting, Poppet Type, Fixed Relief (RV1-10-F-0-30/*-00) (standard for 3000 psi and below)
S1 – Relief Valve, Direct Acting, Poppet Type, Screw Adjustable Relief (RV1-10-S-0-30/*-00)
A1 – Relief Valve, Direct Acting, Poppet Type, Fixed Relief (RV1-10-I-0-30/*-00)
F2 – Relief Valve, Pilot Operated, Fixed Relief (RV5-10-F-0-50/*-00) (standard for 3000-4000 psi)
S2 – Relief Valve, Pilot Operated, Screw Adjustable Relief (RV5-10-S-0-50/*-00)
A2 – Relief Valve, Pilot Operated, Internal Adjustable Relief (RV5-10-I-0-50/*-00)

** Pressure setting for Port A
Check valve crack pressure in psi (OR) relief valve nominal setting pressure in psi; available in 50 psi increments from 500 to 4350 psi depending on type.
Coded as in the following examples:
005 – 5 psi Anti-Cav Check
050 – Relief pressure, 500 psi (72.4 BAR) MIN
435 – Relief pressure, 4350 psi (300 BAR) MAX

** Port B Relief Valve
00 – No cavities
P1 – Plugged
C1 – Check Valve
L1 – LS Relief Valve (opposite port coding must be the same)
F1 – Relief Valve, Direct Acting, Poppet Type, Fixed Relief (RV1-10-F-0-30/*-00) (standard for 3000 psi and below)
S1 – Relief Valve, Direct Acting, Poppet Type, Screw Adjustable Relief (RV1-10-S-0-30/*-00)
A1 – Relief Valve, Direct Acting, Poppet Type, Internal Adjustable Relief (RV1-10-I-0-30/*-00)
F2 – Relief Valve, Pilot Operated, Fixed Relief (RV5-10-F-0-50/*-00) (standard for 3000-4000 psi)
S2 – Relief Valve, Pilot Operated, Screw Adjustable Relief (RV5-10-S-0-50/*-00)
A2 – Relief Valve, Pilot Operated, Internal Adjustable Relief (RV5-10-I-0-50/*-00)

** Port B Pressure Setting
Check valve crack pressure in psi (OR) relief valve nominal setting pressure in psi; available in 50 psi increments from 500 to 4350 psi depending on type.
Coded as in the following examples:
005 – 5 psi Anti-Cav Check
050 – Relief pressure, 500 psi (72.4 BAR)
435 – Relief pressure, 4350 psi (300 BAR)

** Spool Type
D – 4 way cylinder
H – 4 way motor

** Spool Flow Rate
05 – 5 lpm
10 – 10 lpm
15 – 15 lpm
30 – 30 lpm
45 – 45 lpm
60 – 60 lpm

** Compensator
N – Noncompensated
C – Inlet pressure compensated

** Build Type (Determined by viewing the valve stack from the end cover)
R – RH Build. Port A is on the right. Manual override handle, if present, is on the right.
L – LH Build (non-standard). Port A is on the left. Manual override handle, if present, is on the left.

** Coil Voltage
G – 12 Vdc
H – 24 Vdc
0 – No Coil

** Coil Connector
D – Deutsch
Y – Amp Jr
L – Lead Wires
0 – No Coil

** Wire Lead Length
0 – No Lead Wire
N – Integrated Connector (Deutsch and Amp Jr. B – Wire Lead length 24 inch (Standard)

** Special Features
00 – None
10 – Design Level

** Design Level
10 – Design Level
## CML60 Assembly

### Number of Sections
- 1 – 1 Section
- 2 – 2 Sections
- 3 – 3 Sections
- 4 – 4 Sections
- 5 – 5 Sections
- 6 – 6 Sections
- 7 – 7 Sections
- 8 – 8 Sections

### Inlet Module Options

#### Port Location
- C – Open Center Unload Top Ported
- S – Load Sensing Side Ported
- T – Load Sensing Top Ported
- R – Load Sensing Top Ports w/ Relief

#### Port Options
- **S**1 – P port SAE-8, T port SAE-10 (with OC or LS top and side ported)
- **S**2 – P port SAE-10, T port SAE-12 (LS side ported or LS top ported with full system relief)
- M1 – P port M18, T port M22
- B1 – P port 1/2 BSP, T port 3/4 BSP
- B2 – P port 3/4 BSP, T port 3/4 BSP
- D1 – P port STC-8, T port STC-10

### Relief Type
- **0** – No relief
- **L** – Load sense relief
- **S** – System direct acting relief, screw adjustable, (RV8-10-S) (standard)
- **A** – System direct acting relief, internal adjustable (RV8-10-I)
- **F** – System direct acting relief, fixed (RV8-10-F)

### Pressure Setting Range
- **0** – No relief
- **L** – Pressure range 17-175 bar (250-2500 psi)
- **H** – Pressure range 38-350 bar (550-5000 psi)

### Relief Pressure Setting
Nominal relief valve setting, available in increments of 50 psi (3.5 bar) and coded as in the following examples:
- **000** – no relief setting
- **100** – Relief pressure, 1000 psi (68.9 BAR)
- **405** – Relief pressure, 4050 psi (280 BAR)

### Valve Sections

#### Abbreviated Code

#### Relief Type
- **0** – No relief
- **L** – Load sense relief
- **S** – System direct acting relief, screw adjustable, (RV8-10-S) (standard)
- **A** – System direct acting relief, internal adjustable (RV8-10-I)
- **F** – System direct acting relief, fixed (RV8-10-F)

#### Pressure Setting Range
- **0** – No relief
- **L** – Pressure range 17-175 bar (250-2500 psi)
- **H** – Pressure range 38-350 bar (550-5000 psi)

### Relief Pressure Setting
Nominal relief valve setting, available in increments of 50 psi (3.5 bar) and coded as in the following examples:
- **000** – no relief setting
- **100** – Relief pressure, 1000 psi (68.9 BAR)
- **405** – Relief pressure, 4050 psi (280 BAR)

### Paint/Coating
- **00** – no paint
- **0A** – Red oxide primer
- **CD** – Eaton blue
- **AU** – Std. flat black
- **0K** – Green
- **BN** – Tan
- **CC** – Yellow
- Other colors available upon request

### Special Features
- **00** – None

### Design Level
- **10** – Design Level
### Specifications and Performance

<table>
<thead>
<tr>
<th><strong>CML60 Proportional Load Sensing Valve</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated Fatigue Pressure</strong></td>
<td><strong>Inlet</strong> 280 bar [4050 psi]</td>
</tr>
<tr>
<td><strong>Maximum Pressure</strong></td>
<td><strong>Inlet</strong> 325 bar [4700 psi]</td>
</tr>
<tr>
<td><strong>Rated Inlet Flow</strong></td>
<td>100 lpm [26.3 gpm]</td>
</tr>
<tr>
<td><strong>Fluid Cleanliness and Viscosity</strong></td>
<td>See Hydraulic Fluid Recommendations bulletin 03-401</td>
</tr>
<tr>
<td><strong>Maximum Fluid Temperature</strong></td>
<td>107°C [225°F]</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>Sectional</td>
</tr>
<tr>
<td><strong>Work Sections</strong></td>
<td>1-8</td>
</tr>
<tr>
<td><strong>Maximum Leakage, Cylinder Workport to Tank</strong></td>
<td>20 cc/min @ 69 bar [1000 psi]</td>
</tr>
<tr>
<td><strong>Port Types</strong></td>
<td>SAE o-ring</td>
</tr>
<tr>
<td></td>
<td>ISO 6149 Metric</td>
</tr>
<tr>
<td></td>
<td>BSP</td>
</tr>
<tr>
<td></td>
<td>Direct port STC</td>
</tr>
<tr>
<td><strong>Inlet Section Options</strong></td>
<td>Unload/relief for fixed displacement pump systems</td>
</tr>
<tr>
<td></td>
<td>Load sensing inlet</td>
</tr>
<tr>
<td><strong>Work Section Options</strong></td>
<td>Accept Eaton SiCV cartridges</td>
</tr>
<tr>
<td></td>
<td>C-10-2 cavities - work port on port 1, tank on port 2</td>
</tr>
<tr>
<td><strong>Spools</strong></td>
<td>4 way cylinder (work ports closed in neutral)</td>
</tr>
<tr>
<td></td>
<td>4 way motor (work ports closed in neutral)</td>
</tr>
<tr>
<td></td>
<td>Maximum flows, 5 to 60 lpm</td>
</tr>
<tr>
<td></td>
<td>Adjustable Travel Stops</td>
</tr>
<tr>
<td><strong>Actuation</strong></td>
<td>Electrohydraulic</td>
</tr>
<tr>
<td></td>
<td>Hydraulic</td>
</tr>
<tr>
<td></td>
<td>Electrohydraulic w/ manual override</td>
</tr>
<tr>
<td></td>
<td>Hydraulic w/ manual override</td>
</tr>
<tr>
<td><strong>Outlet Section Options</strong></td>
<td>EH with external pilot supply port and integral pressure reducing valve</td>
</tr>
<tr>
<td></td>
<td>Plain (for hydraulic pilot)</td>
</tr>
<tr>
<td></td>
<td>Integral pressure reducing valve for EH pilot supply</td>
</tr>
<tr>
<td><strong>EH Pilot Coil Voltages</strong></td>
<td>12 Volt DC, 1500 mA current max</td>
</tr>
<tr>
<td></td>
<td>24 Volt DC, 750 mA current max</td>
</tr>
<tr>
<td><strong>EH Pilot Coil Terminations</strong></td>
<td>Integral Deutsch DT04-2P</td>
</tr>
<tr>
<td></td>
<td>Integral Amp Jr.</td>
</tr>
<tr>
<td></td>
<td>Dual Leadwires</td>
</tr>
<tr>
<td><strong>Mounting Options</strong></td>
<td>Stamped mounting plate</td>
</tr>
<tr>
<td></td>
<td>Mounting attitude unrestricted</td>
</tr>
<tr>
<td><strong>Electrohydraulic interface</strong></td>
<td>Eaton F(x) compliant, EFx, and SFX Controllers</td>
</tr>
</tbody>
</table>
Cylinder Spools

The same configurations are also available with motor spools (work ports open to tank in neutral).

[Diagram of cylinder spools with various configurations: w/o reliefs, w/ work port reliefs, w/ load sense relief, w/ manual override]
Cylinder Spools

The same configurations are also available with motor spools (work ports open to tank in neutral).
Performance Data

**CML60 Flow vs Current**

Maximum flow ± 5% of rated flow.
Cracking current ± 0.25 mA.
Hysteresis <20%

**CML60 Flow vs Pressure**

Maximum flow ± 5% of rated flow.
Cracking pressure ± 0.5 bar (± 7 psig)
Hysteresis <20%
Inlet and End Cover Schematics
Hydraulic and Electrohydraulic

Load Sensing Inlet w/ Full Relief

Load Sensing Inlet

Open Center Inlet w/ LS Relief

Electrohydraulic Endcover

Hydraulic Endcover

Open Center Inlet & Hydraulic Endcover

Load Sense Inlet w/Full Relief & Hydraulic Endcover

Load Sense Inlet w/Full Relief & Electrohydraulic Endcover

Load Sense Inlet & Hydraulic Endcover

Load Sense Inlet & Electrohydraulic Endcover
Valve Bank
Schematic Examples

Electrohydraulic Load Sense
Valve Bank Example

Hydraulic Open Center Valve
Bank Example
**Table 1**

<table>
<thead>
<tr>
<th>No. of Center Sections</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension “A” (mm)</td>
<td>38</td>
<td>76</td>
<td>114</td>
<td>152</td>
<td>190</td>
<td>228</td>
<td>266</td>
<td>304</td>
</tr>
<tr>
<td>Dimension “A” (in)</td>
<td>1.5</td>
<td>3.0</td>
<td>4.5</td>
<td>6.0</td>
<td>7.5</td>
<td>9.0</td>
<td>10.5</td>
<td>12.0</td>
</tr>
</tbody>
</table>

**Table 2**

For Open Center Inlet Only

<table>
<thead>
<tr>
<th>P-Port</th>
<th>Tightening Torque</th>
<th>T-Port</th>
<th>Tightening Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE-10</td>
<td>42-46 N-m (30-35 ft-lb)</td>
<td>SAE-12</td>
<td>88-100 N-m (65-75 ft-lb)</td>
</tr>
<tr>
<td>SAE-8</td>
<td>34-41 N-m (25-30 ft-lb)</td>
<td>SAE-10</td>
<td>68-75 N-m (50-55 ft-lb)</td>
</tr>
<tr>
<td>M18</td>
<td>42-46 N-m (30-35 ft-lb)</td>
<td>M22</td>
<td>68-75 N-m (50-55 ft-lb)</td>
</tr>
</tbody>
</table>
Section Installation Dimensions

Hydraulic Section Installation Dimensions Minimum Envelope

Note:
Dimensions are in mm

![Diagram of hydraulic section installation dimensions](image-url)
Electrohydraulic Section
Installation Dimensions
Maximum Envelope

Note:
Dimensions are in mm