Applications

The cushion lock circuit is used to control the acceleration, and deceleration of reciprocating or rotary reversing circuits. Most slewing type circuits have inertia loads and it is important that there is a facility to ensure that during operation there is good control of the motion. The cushion lock provides this type of control using counterbalance valves as both a relief for acceleration and providing a braking resistance during deceleration.

Sun offers four basic types of cushion lock valves:

1. The basic dual counterbalance valve assembly with the check valves in supply lines and separate tank return line.
2. The basic assembly as above but with a shuttle valve to release a spring-applied mechanical brake.
3. The assembly that incorporates the same features as version 1. but with additional anti-cavitation check valves from the external tank line to the service lines.
4. The assembly as in version 3. but with a shuttle valve to release a spring-applied mechanical brake.

Design Concepts and Features

The use of counterbalance valves provides smooth control of the motion because the valves are modulating load control valves. The valves are also seated so provide good load locking capability, although on most motor applications a mechanical brake supplements this because there is always leakage across the motor.

A wide range of pilot ratios and pressure ratings are available for the counterbalance valves to enable the most suitable valves to be selected for the application.

The check valves used for anti-cavitation have low cracking pressure of 0.4 bar to create the least resistance. The valves are also available in CETOP sandwiches or could be made in custom manifolds to suit a particular application.
Standard Assemblies: Cushion Lock Valves

DUAL LOAD CONTROL APPLICATIONS (TWO CAVITY WITH CHECKS)

PILOT RATIOS
1.5:1, 2:1, 2.3:1, 3:1, 4.5:1, 10:1

0-60 L/min. Cavity T-11A

Port | Part | Assembly Model Code
--- | --- | ---
C1 | C2 | Part T
5/8” BSPP | 1/2” BSPP | CBC-L’N-EMU
1/2” BSPP | 1/2” BSPP | CBC-L’N-EMU

*Add modifier /S to order SG Iron for pressure rating over 210 bar.

0-120 L/min. Cavity T-2A

Port | Part | Assembly Model Code
--- | --- | ---
C1 | C2 | Part T
1/2” BSPP | 3/4” BSPP | CBE-L’N-BMV
3/4” BSPP | 3/4” BSPP | CBE-L’N-BMW

*Add modifier /S to order SG Iron for pressure rating over 210 bar.

NOTES: Page 50 for cartridge model CB**-*** and page 102 for CX*D-*** shows performance curves, technical tips, and options. See page vii for technical information about line mount bodies including SAE flange pattern specifications. Consult the Sun Factory for other port sizes available in the bodies shown above. Go to www.sunhydraulics.com for more product information.
Standard Assemblies: Cushion Lock Valves

DUAL LOAD CONTROL APPLICATIONS
(TWO CAVITY WITH CHECKS)

PILOT RATIOS
1.5:1, 2:1, 2.3:1, 3:1, 4.5:1, 10:1

0-240 L/min.  Cavity T-17A

![Diagram of Cavity T-17A]

<table>
<thead>
<tr>
<th>Ports</th>
<th>Part T</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V1, V2</td>
<td>0-240 L/min.</td>
<td>CBG*-L/N-HMX</td>
</tr>
<tr>
<td>C1, C2, V1, V2</td>
<td>0-240 L/min.</td>
<td>CBG*-L/N-HMY</td>
</tr>
</tbody>
</table>

*Add modifier /S to order for pressure rating over 0-240 L/min.

Ductile Iron for pressure rating over 0-240 L/min.

0-480 L/min.  Cavity T-19A

![Diagram of Cavity T-19A]

<table>
<thead>
<tr>
<th>Ports</th>
<th>Part T</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V1, V2</td>
<td>0-480 L/min.</td>
<td>YCJD-L/N-AR/M</td>
</tr>
<tr>
<td>C1, C2, V1, V2</td>
<td>0-480 L/min.</td>
<td>YCJD-L/N-GR/M</td>
</tr>
<tr>
<td>C1, C2, V1, V2</td>
<td>0-480 L/min.</td>
<td>YCJD-L/N-HR/M</td>
</tr>
</tbody>
</table>

*Add modifier /T to order for pressure rating over 0-480 L/min.

SG Iron for pressure rating over 0-480 L/min.

NOTES: Page 50 for cartridge model CB**-*** and page 102 for CX*D-*** shows performance curves, technical tips, and options. See page vii for technical information about line mount bodies including SAE flange pattern specifications. Consult the Sun Factory for other port sizes available in the bodies shown above. Go to www.sunhydraulics.com for more product information.
Standard Assemblies: Cushion Lock Valves

DUAL LOAD CONTROL APPLICATIONS
(TWO CAVITY WITH CHECKS AND SHUTTLE)

PILOT RATIOS
1.5:1, 2:1, 2.3:1, 3:1, 4.5:1, 10:1

<table>
<thead>
<tr>
<th>Ports</th>
<th>Part T</th>
<th>Part S</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V1, V2</td>
<td>1/2&quot; BSPP</td>
<td>1/4&quot; BSPP</td>
<td>CBC-L/N-ENU</td>
</tr>
<tr>
<td>1/2&quot; BSPP</td>
<td>1/4&quot; BSPP</td>
<td>CBC-L/N-MNU</td>
<td></td>
</tr>
</tbody>
</table>

0-60 L/min. Cavity T-11A

*Add modifier /S to order SG Iron for pressure rating over 210 bar.

<table>
<thead>
<tr>
<th>Ports</th>
<th>Part T</th>
<th>Part S</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V1, V2</td>
<td>1/2&quot; BSPP</td>
<td>3/4&quot; BSPP</td>
<td>CBE-L/N-BNV</td>
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<tr>
<td>3/4&quot; BSPP</td>
<td>1/4&quot; BSPP</td>
<td>CBE-L/N-BNV</td>
<td></td>
</tr>
</tbody>
</table>

0-120 L/min. Cavity T-2A

*Add modifier /S to order SG Iron for pressure rating over 210 bar.

NOTES: Page 50 for cartridge model CB**-*** and page 102 for CX*D-*** shows performance curves, technical tips, and options. See page vii for technical information about line mount bodies including SAE flange pattern specifications. Consult the Sun Factory for other port sizes available in the bodies shown above. Go to www.sunhydraulics.com for more product information.
Standard Assemblies: Cushion Lock Valves

DUAL LOAD CONTROL APPLICATIONS (TWO CAVITY WITH CHECKS WITH SHUTTLE)

PILOT RATIOS
1.5:1, 2:1, 2.3:1, 3:1, 4.5:1, 10:1

**0-240 L/min. Cavity T-17A**

### Parts
- **Port C1**: 1” BSPP
- **Port C2**: 1 1/4” BSPP
- **Port V1**: 1/4” BSPP
- **Port V2**: 1/4” BSPP
- **Port T**: 1” BSPP

### Assembly Model Code
CBG*-L*N-HNX

### Model Code
- CBG*-L*N-HNX

### Pilot Ratios
- 1.5:1
- 2:1
- 2.3:1
- 3:1
- 4.5:1
- 10:1

### Ports
- C1, C2, V1, V2, T

### Mounting Holes
- 13.5 diameter through hole 2 places.

### Maximum Flow Rate
- 0-240 L/min

### Maximum Pressure
- 63.5 bar

### Notes
- Add modifier S to order Ductile Iron for pressure rating over 210 bar.

**0-480 L/min. Cavity T-19A**

### Parts
- **Port C1**: 1 1/2” SAE C61
- **Port C2**: 1 1/2” SAE C61
- **Port V1**: 1/4” BSPP
- **Port V2**: 1/4” BSPP
- **Port T**: 1 1/2” SAE C61

### Assembly Model Code
YCJH-L*N-AR/M

### Model Code
- YCJH-L*N-AR/M
- YCJH-L*N-GR/M
- YCJH-L*N-HR/M

### Pilot Ratios
- 3:1
- 4.5:1
- 10:1

### Notes
- Add modifier T to order SG Iron for pressure rating over 210 bar.

**NOTES:** Page 50 for cartridge model CB**-*** and page 102 for CX*D-*** shows performance curves, technical tips, and options. See page vii for technical information about line mount bodies including SAE flange pattern specifications. Consult the Sun Factory for other port sizes available in the bodies shown above. Go to www.sunhydraulics.com for more product information.
Standard Assemblies: Cushion Lock Valves

DUAL LOAD CONTROL APPLICATIONS
(TWO CAVITY WITH ANTI-CAVITATION CHECKS)

PILOT RATIOS
1.5:1, 2:1, 2.3:1, 3:1, 4.5:1, 10:1

0-60 L/min. Cavity T-11A

Ports
C1, C2, V1, V2
Port T
Assembly
Model Code*

<table>
<thead>
<tr>
<th>Parts</th>
<th>Assembly</th>
<th>Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot; BSPP</td>
<td>CBC*-L*N-EPU</td>
<td></td>
</tr>
<tr>
<td>1/2&quot; BSPP</td>
<td>CBC*-L*N-EPV</td>
<td></td>
</tr>
</tbody>
</table>

*Add modifier /S to order SG Iron for pressure rating over 210 bar.

0-120 L/min. Cavity T-2A

Ports
C1, C2, V1, V2
Port T
Assembly
Model Code*

<table>
<thead>
<tr>
<th>Parts</th>
<th>Assembly</th>
<th>Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; BSPP</td>
<td>CBE*-L*N-BPV</td>
<td></td>
</tr>
<tr>
<td>3/4&quot; BSPP</td>
<td>CBE*-L*N-BPW</td>
<td></td>
</tr>
</tbody>
</table>

*Add modifier /S to order SG Iron for pressure rating over 210 bar.

NOTES: Page 50 for cartridge model CB**-*** and page 102 for CX*D-*** shows performance curves, technical tips, and options. See page vii for technical information about line mount bodies including SAE flange pattern specifications. Consult the Sun Factory for other port sizes available in the bodies shown above. Go to www.sunhydraulics.com for more product information.
Standard Assemblies: Cushion Lock Valves

DUAL LOAD CONTROL APPLICATIONS
(TWO CAVITY WITH ANTI-CAVITATION CHECKS)

PILOT RATIOS
1.5:1, 2:1, 2.3:1, 3:1, 4.5:1, 10:1

0-240 L/min. Cavity T-17A

<table>
<thead>
<tr>
<th>Ports</th>
<th>Part T</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V1, V2</td>
<td>1&quot; BSPP</td>
<td>CBG-L’N-HPX</td>
</tr>
<tr>
<td>C1, C2, V1, V2</td>
<td>1 1/4&quot; BSPP</td>
<td>CBG-L’N-HPY</td>
</tr>
</tbody>
</table>

*Add modifier S to order Ductile Iron for pressure rating over.

Cushion Lock Valves

0-480 L/min. Cavity T-19A

<table>
<thead>
<tr>
<th>Ports</th>
<th>Part T</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V1, V2</td>
<td>1 1/2&quot; SAE C61</td>
<td>YCJE-L’N-AR/M</td>
</tr>
<tr>
<td>C1, C2, V1, V2</td>
<td>1 1/2&quot; SAE C61</td>
<td>YCJE-L’N-GR/M</td>
</tr>
<tr>
<td>C1, C2, V1, V2</td>
<td>1 1/2&quot; SAE C61</td>
<td>YCJE-L’N-HR/M</td>
</tr>
</tbody>
</table>

*Add modifier T to order SG Iron for pressure rating over 210 bar.

NOTES:
Page 50 for cartridge model CB**,*** and page 102 for CX*D,** shows performance curves, technical tips, and options.
See page vii for technical information about line mount bodies including SAE flange pattern specifications.
Consult the Sun Factory for other port sizes available in the bodies shown above.
Go to www.sunhydraulics.com for more product information.
Standard Assemblies: Cushion Lock Valves

DUAL LOAD CONTROL APPLICATIONS
(TWO CAVITY WITH ANTI-CAVITATION CHECKS AND SHUTTLE)

PILOT RATIOS
1.5:1, 2:1, 2.3:1, 3:1, 4.5:1, 10:1

0-60 L/min. Cavity T-11A

<table>
<thead>
<tr>
<th>Parts</th>
<th>Port F</th>
<th>Port S</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V2, V1</td>
<td>3/8” BSPP</td>
<td>3/4” BSPP</td>
<td>CBC*-L*N-EQU</td>
</tr>
<tr>
<td>1/2” BSPP</td>
<td>1/4” BSPP</td>
<td>CBC*-L*N-EQV</td>
<td></td>
</tr>
</tbody>
</table>

*Add modifier /S to order SG Iron for pressure rating over 210 bar.

0-120 L/min. Cavity T-2A

<table>
<thead>
<tr>
<th>Parts</th>
<th>Port F</th>
<th>Port S</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V2, V1</td>
<td>1/2” BSPP</td>
<td>3/4” BSPP</td>
<td>CBE*-L*N-BQV</td>
</tr>
<tr>
<td>3/4” BSPP</td>
<td>1/4” BSPP</td>
<td>CBE*-L*N-BQW</td>
<td></td>
</tr>
</tbody>
</table>

*Add modifier /S to order SG Iron for pressure rating over 210 bar.

NOTES: Page 50 for cartridge model CB**-*** and page 102 for CX*D-*** shows performance curves, technical tips, and options. Consult the Sun Factory for other port sizes available in the bodies shown above. Go to www.sunhydraulics.com for more product information.
Standard Assemblies: Cushion Lock Valves

DUAL LOAD CONTROL APPLICATIONS
(TWO CAVITY WITH ANTI-CAVITATION CHECKS AND SHUTTLE)

**PILOT RATIOS**
1.5:1, 2:1, 2.3:1, 3:1, 4.5:1, 10:1

### 0-240 L/min. Cavity T-17A

<table>
<thead>
<tr>
<th>Parts</th>
<th>Port T</th>
<th>Port S</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V1, V2</td>
<td>1 1/4&quot; BSPP</td>
<td>1/4&quot; BSPP</td>
<td>CBG*-L*N-HQX</td>
</tr>
</tbody>
</table>

### 0-480 L/min. Cavity T-19A

<table>
<thead>
<tr>
<th>Parts</th>
<th>Port T</th>
<th>Port S</th>
<th>Assembly Model Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C2, V1, V2</td>
<td>1 1/2&quot; SAE C61</td>
<td>1/4&quot; BSPP</td>
<td>YCJG-L*N-AR/M</td>
</tr>
</tbody>
</table>

*Add modifier S to order Ductile Iron for pressure rating over .

### NOTES:
- Page 50 for cartridge model CB**-*** and page 102 for CX*D-*** shows performance curves, technical tips, and options.
- See page vii for technical information about line mount bodies including SAE flange pattern specifications.
- Consult the Sun Factory for other port sizes available in the bodies shown above.
- Go to www.sunhydraulics.com for more product information.