## Logic Elements

<table>
<thead>
<tr>
<th>Cartridge Type</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced Poppet, Normally Closed, Direct Operated, Pilot-to-open</td>
<td>100</td>
</tr>
<tr>
<td>Balanced Poppet, Normally Closed, Vent-to-operate</td>
<td>102</td>
</tr>
<tr>
<td>Balanced Poppet, Normally Closed, Pressure Adjustable</td>
<td>103</td>
</tr>
<tr>
<td>Balanced Poppet, Normally Open, Pilot-to-close</td>
<td>104</td>
</tr>
<tr>
<td>Balanced Poppet, Normally Open, Vent-to-operate</td>
<td>105</td>
</tr>
<tr>
<td>Balanced Poppet, Normally Open, Vent-to-operate, with Integral T-8A Control Cavity</td>
<td>106</td>
</tr>
<tr>
<td>Balanced Poppet, Normally Open, Pressure Adjustable</td>
<td>107</td>
</tr>
<tr>
<td>Balanced Poppet, Normally Closed, with Integral T-8A Control Cavity</td>
<td>109</td>
</tr>
<tr>
<td>Balanced Poppet, Pilot-to-close, Spring Biased Closed, with Position Indicating Switch</td>
<td>111</td>
</tr>
<tr>
<td>Balanced Poppet, Pilot-to-open, Spring Biased Closed</td>
<td>112</td>
</tr>
<tr>
<td>Unbalanced Poppet, Vent-to-open, with Integral T-8A Control Cavity</td>
<td>109</td>
</tr>
<tr>
<td>Unbalanced Poppet, Pilot-to-close, with Position Indicating Switch</td>
<td>110</td>
</tr>
<tr>
<td>Unbalanced Poppet, Pilot-to-open, Spring Biased Closed, with Position Indicating Switch</td>
<td>111</td>
</tr>
<tr>
<td>Normally Closed, Modulating Element, (Main Stage Relief and Bypass Compensator)</td>
<td>113</td>
</tr>
<tr>
<td>Normally Open, Modulating Element (Main Stage Reducing and Restrictive Compensator)</td>
<td>114</td>
</tr>
<tr>
<td>Bi-directional, Modulating Element, Normally Open</td>
<td>115</td>
</tr>
<tr>
<td>Bypass/Restrictive, Priority Modulating Element</td>
<td>116</td>
</tr>
</tbody>
</table>
Logic Elements

BALANCED POPPET, NORMALLY CLOSED, DIRECT OPERATED, PILOT-TO-OPEN

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0.3 cc/min.
- Minimum pilot pressure required to shift valve = DKDS, DKFS: 28 bar; DKHS, DKJS: 20 bar.
- Pilot passage into valve = DKDS, DKFS: 0.8 mm; DKHS, DKJS: 1.19 mm.
- Pilot volume displacement = DKDS: 0.16 cc; DKFS: 0.33 cc; DKHS: 0.82 cc; DKJS: 2.8 cc.
- Unique balanced construction provides predictable switching with 350 bar at both ports 1 and 2, with the external drain open and minimum pilot pressure at port 3.
- These valves are hydraulically balanced between port 1 and port 2.
- Port 1 and port 2 are fully sealed from port 3 and port 4. Ports 3 and 4 are positively sealed.
- Valve will reseat when the pilot pressure falls below 10 bar.
- Leakage rate between port 1 and port 2 is less than 0.3 cc/min. at 350 bar.
- Any back pressure at the drain port is directly additive to the required pilot pressure for reliable operation.

Performance Curves

- Flow vs. Pressure Differential
- Flow vs. Flow Rate

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Minimum Pilot Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 60 L/min.</td>
<td>Standard Pilot</td>
<td>DKDS, DKFS: 28 bar</td>
<td>Buna-N</td>
</tr>
<tr>
<td>F 120 L/min.</td>
<td></td>
<td>DKHS, DKJS: 20 bar</td>
<td>Viton</td>
</tr>
<tr>
<td>H 240 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J 480 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
**Logic Elements**

**BALANCED POPPET, NORMALLY CLOSED, VENT-TO-OPERATE**

![Diagram of Balanced Poppet Valve]

- **Nominal Capacity**
  - 60 L/min.
  - 120 L/min.
  - 240 L/min.
  - 480 L/min.

- **Topical Cartridge Model Code**
  - DKDR
  - DKFR
  - DKHR
  - DKJR

- **Cartridge Dimensions**
  - Cavity: a, b, c
  - Installation Torque (Nm)

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>DKDR – XHN</th>
<th>DKFR – XHN</th>
<th>DKHR – XHN</th>
<th>DKJR – XHN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T - 21A</td>
<td>T - 22A</td>
<td>T - 23A</td>
<td>T - 24A</td>
</tr>
<tr>
<td></td>
<td>35.0</td>
<td>35.0</td>
<td>46.2</td>
<td>63.5</td>
</tr>
<tr>
<td></td>
<td>22.2</td>
<td>28.6</td>
<td>31.8</td>
<td>41.3</td>
</tr>
<tr>
<td></td>
<td>45.2</td>
<td>50.8</td>
<td>62.7</td>
<td>80.3</td>
</tr>
<tr>
<td></td>
<td>45 - 50</td>
<td>60 - 70</td>
<td>200 - 215</td>
<td>465 - 500</td>
</tr>
</tbody>
</table>

- **Performance Curves**

**DKDR**

- Piloted Open Pressure Differential vs. Flow
- Pilot Pressure vs. Pilot Flow

**DKFR**

- Piloted Open Pressure Differential vs. Flow
- Pilot Pressure vs. Pilot Flow

**DKHR**

- Piloted Open Pressure Differential vs. Flow
- Pilot Pressure vs. Pilot Flow

**DKJR**

- Piloted Open Pressure Differential vs. Flow
- Pilot Pressure vs. Pilot Flow

- **Option Ordering Information**

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Minimum Pilot Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>X</td>
<td>DKDR, DKFR only:</td>
<td>N Buna-N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DKHR, DKJR:</td>
<td>V Viton</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 bar</td>
<td></td>
</tr>
</tbody>
</table>

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
OPTON ORDERING INFORMATION

**DK * R – 8 H**

- **Nominal Capacity**: D 60 L/min, F 120 L/min, H 240 L/min, J 480 L/min.
- **Control**: B with T-8A cavity in hex body for pilot operation, See pilot control section for alternate options.
- **Minimum Pilot Pressure**: DKDR-8, DKFR-8: only 28 bar, DKHR-8, DKJR-8: 20 bar.
- **Seal Material**: N Buna-N, V Viton.

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Logic Elements

FULLY CLOSED, PRESSURE ADJUSTABLE

Nominal Capacity Typical Cartridge Model Code
60 L/min. DKDP - LAN T - 21 A 35.0 22.2 79.0 82.6 84.8 45 - 50
120 L/min. DKFP - LAN T - 22 A 35.0 28.6 87.4 89.0 94.0 60 - 70
240 L/min. DKHP - LAN T - 23 A 46.2 31.8 100.1 101.1 105.9 200 - 215
480 L/min. DKJP - LAN T - 24 A 63.5 41.3 121.5 125.0 128.0 465 - 500

Pilot Volume Displacement = DKDP: 0.16 cc; DKFP: 0.33 cc; DKHP: 0.82 cc; DKJP: 2.8 cc.
Pilot passage into valve = DKDP, DKFP: 0.8 mm; DKHP, DKJP: 1.19 mm.
Minimum pilot pressure required to shift valve = DKDP, DKFP: 28 bar; DKHP, DKJP: 20 bar.

Leakage Rate between Port 1 and Port 2 is less than 0.3 cc/min. at 350 bar.
Port 1 and Port 2 are fully sealed from Port 3 and Port 4. Ports 3 and 4 are positively sealed.
Any back pressure at the drain port is directly additive to the valve setting.

OPTION ORDERING INFORMATION

DK * P - ***

Control**
L Standard Screw Adjustment
C* Tamper Resistant Factory Set
K Handknob with Lock Knob

DKDP, DKFP only:
A 28 - 210 bar
B 28 - 105 bar
W 28 - 315 bar

DKHP, DKJP:
A 20 - 210 bar
B 20 - 105 bar
W 20 - 315 bar

DK ** See page 178 for information on Control Options
DK * Special setting required. Specify at time of order.

DKDP - LAN
DKFP - LAN
DKHP - LAN
DKJP - LAN

Installatie Torque (Nm)

DKDP DKFP DKHP DKJP

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Logic Elements

BALANCED POPPET, NORMALLY OPEN, PILOT-TO-CLOSE

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cartridge Dimensions</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 L/min.</td>
<td>DODS – XHN</td>
<td>T - 21A</td>
<td>35.0 22.2 45.2</td>
</tr>
<tr>
<td>120 L/min.</td>
<td>DOFS – XHN</td>
<td>T - 22A</td>
<td>35.0 28.6 50.8</td>
</tr>
<tr>
<td>240 L/min.</td>
<td>DOHS – XHN</td>
<td>T - 23A</td>
<td>46.2 31.8 62.7</td>
</tr>
<tr>
<td>480 L/min.</td>
<td>DOJS – XHN</td>
<td>T - 24A</td>
<td>63.5 41.3 80.3</td>
</tr>
</tbody>
</table>

Performance Curves

DODS  DOFS  DOHS  DOJS

Fully Open Pressure Differential vs. Flow

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0.3 cc/min.
- Minimum pilot pressure required to shift valve = DODS, DOFS: 28 bar; DOHS, DOJS: 20 bar.
- Pilot passage into valve = DODS, DOFS: 0.8 mm; DOHS, DOJS: 1.19 mm.
- Pilot volume displacement = DODS: 0.16 cc; DOFS: 0.33 cc; DOHS: 0.82 cc; DOJS: 2.8 cc.
- Unique balanced construction provides predictable switching with 350 bar at both ports 1 and 2, with the external drain open and minimum pilot pressure at port 3.
- These valves are hydraulically balanced between port 1 and port 2.
- Port 1 and Port 2 are fully sealed from port 3 and port 4. Ports 3 and 4 are positively sealed.
- Valve will open when the pilot pressure falls below 10 bar.
- Leakage rate between port 1 and port 2 is less than 0.3 cc/min. at 350 bar.
- Any back pressure at the drain port is directly additive to the required pilot pressure for reliable operation.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Minimum Pilot Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Standard Pilot</td>
<td>DODS, DOFS only:</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F</td>
<td>X</td>
<td>H: 28 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>H</td>
<td></td>
<td>DOHS, DOJS only:</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td></td>
<td>H: 20 bar</td>
<td></td>
</tr>
</tbody>
</table>

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
LOGIC ELEMENTS

BALANCED POPPET, NORMALLY OPEN, VENT-TO-OPERATE

PORT 4 MAY BE EXTERNALLY CONNECTED TO A PILOT SWITCHING VALVE. THE PILOT VALVE SHOULD HAVE A LEAKAGE RATE OF LESS THAN 0.6 CC/MIN.

LEAKAGE RATE BETWEEN PORT 1 AND PORT 2 IS LESS THAN 0.3 CC/MIN. AT 350 BAR.

VALVE WILL OPEN WHEN THE PILOT PRESSURE FALLS BELOW 10 BAR OR WITH PORT 4 BLOCKED.

PORT 1 AND PORT 2 ARE FULLY SEALED FROM PORT 3 AND PORT 4. PORTS 3 AND 4 ARE POSITIVELY SEALED.

THESE VALVES ARE HYDRAULICALLY BALANCED BETWEEN PORT 1 AND PORT 2.

PORT 1 AND PORT 2 ARE FULLY SEALED FROM PORT 3 AND PORT 4. PORTS 3 AND 4 ARE POSITIVELY SEALED.

VALVE WILL OPEN WHEN THE PILOT PRESSURE FALLS BELOW 10 BAR OR WITH PORT 4 BLOCKED.

LEAKAGE RATE BETWEEN PORT 1 AND PORT 2 IS LESS THAN 0.3 CC/MIN. AT 350 BAR.

PORT 4 MAY BE EXTERNALLY CONNECTED TO A PILOT SWITCHING VALVE, THE PILOT VALVE SHOULD HAVE A LEAKAGE RATE OF LESS THAN 0.6 CC/MIN. AND BE ABLE TO SATISFY THE PILOT FLOW REQUIREMENTS. SUN MODEL DAA*-*** SOLENOID PILOT VALVE IS IDEAL FOR THIS APPLICATION.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Minimum Pilot Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 60 L/min.</td>
<td>X</td>
<td>DOFR, DOFR only:</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F 120 L/min.</td>
<td></td>
<td>DOHR, DOHR: 20 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>H 240 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J 480 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
The -8 control option allows a pilot control valve to be incorporated directly into the end of the cartridge via the T-8A cavity. These pilot control cartridges are sold separately and include solenoid, air pilot, and hydraulic pilot operation. See Pilot Control Cartridges on page 141.

### OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Minimum Pilot Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 60 L/min.</td>
<td>8 with T-8A cavity in hex body for pilot operation</td>
<td>DOJR-8 only: 28 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F 120 L/min.</td>
<td>8 with T-8A cavity in hex body for pilot operation</td>
<td>DOJR-8: 20 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>H 240 L/min.</td>
<td>See pilot control section for alternate options</td>
<td>DOJR-8: 20 bar</td>
<td></td>
</tr>
<tr>
<td>J 480 L/min.</td>
<td>See pilot control section for alternate options</td>
<td>DOJR-8: 20 bar</td>
<td></td>
</tr>
</tbody>
</table>

Visit [www.sunhydraulics.com](http://www.sunhydraulics.com) for current list pricing and complete technical information on all Sun products.
Logic Elements

**BALANCED POPPET, NORMALLY OPEN, PRESSURE ADJUSTABLE**

- **Drain**
  - BALANCED POPPET, NORMALLY OPEN, PRESSURE ADJUSTABLE
  - Any back pressure at the drain port is directly additive to the valve setting.
  - Leakage rate between port 1 and port 2 is less than 0.3 cc/min. at 350 bar.
  - Valve will open when the pilot pressure falls below 10 bar.
  - Port 1 and port 2 are fully sealed from port 3 and port 4. Ports 3 and 4 are positively sealed.
  - These valves are hydraulically balanced between port 1 and port 2.
  - Pilot volume displacement = DODP: 0.16 cc; DOFP: 0.33 cc; DOHP: 0.82 cc; DOJP: 2.8 cc.
  - Minimum pilot pressure required to shift valve = DODP, DOFP: 28 bar; DOHP, DOJP: 20 bar.
  - Maximum valve leakage at 24 cSt = 0.3 cc/min.
  - Maximum operating pressure = 350 bar.

**Pilot Volume Displacement**

- **Nominal Capacity**
  - DODP
  - DOFP
  - DOHP
  - DOJP

**Pilot Pressure vs. Pilot Flow**

- **Cartridge Dimensions**
  - **L C K**
  - 60 L/min. DODP – LAN T - 21 A 35.0 22.2 79.0 82.6 84.8 45 - 50
  - 120 L/min. DOFP – LAN T - 22 A 35.0 28.6 87.9 89.0 94.0 60 - 70
  - 240 L/min. DOHP – LAN T - 23 A 46.2 31.8 100.1 101.1 105.9 200 - 215
  - 480 L/min. DOJP – LAN T - 24 A 63.5 41.3 121.4 125.0 128.0 465 - 500

**OPTION ORDERING INFORMATION**

- **Nominal Capacity**
  - D 60 L/min.
  - F 120 L/min.
  - H 240 L/min.
  - J 480 L/min.

**Control**

- L Standard Screw Adjustment
- C Tamper Resistant Factory Set
- K Handknob with Lock Knob

**Adjustment Range**

- DODP, DOFP only:
  - A 28 - 210 bar
  - B 28 - 105 bar
  - W 28 - 315 bar

**Seal Material**

- N Buna-N
- V Viton

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Logic Elements

UNBALANCED POPPET, PILOT-TO-CLOSE AND VENT-TO-OPEN

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0.6 cc/min.
- Area ratio: A3 to A1 = 1.8:1; A3 to A2 = 2.25:1.
- Control orifice diameter = LOFA, LODB, LOFB, LODD, LOFD: 0.53 mm; LOHA, LOHB, LOHD: 0.9 mm.
- Pilot passage into valve = LOD*: 0.8 mm; LOF*: 0.9 mm; LOH*: 1.50 mm; LOJ*: 2.3 mm.
- Pilot volume displacement = LOD*: 0.66 cc; LOF*: 1.1 cc; LOH*: 4.1 cc; LOJ*: 6.9 cc.
- These valves are pressure responsive at all three ports, therefore it is essential to consider all aspects of system operation through a complete cycle. Pressure changes at any one port may cause a valve to switch from a closed to an open position, or vice versa. All possible pressure changes in the complete circuit must be considered to assure a safe, functional system design.

---

Performance Curves

- LOD*
- LOF*
- LOH*
- LOJ*

Full Open Pressure Drop

![Graphs showing full open pressure drop for LOD*, LOF*, LOH*, LOJ*]
Logic Elements

UNBALANCED POPPET, VENT-TO-OPEN, WITH INTEGRAL T-8A CONTROL CAVITY

The -8 control option allows a pilot control valve to be incorporated directly into the end of the cartridge via the T-8A cavity. These pilot control cartridges are sold separately and include solenoid and air pilot operation. See Pilot Control Cartridges on page 141.

Performance Curves

- Maximum operating pressure = 350 bar.
- Area ratio: A3 to A1 = 1.8:1; A3 to A2 = 2.25:1.
- Control orifice diameter = LOD*-8, LOF*-8: 0.53 mm, LOH*-8: 0.8 mm, LOJ*-8: 0.9 mm.
- Pilot volume displacement= LOD*-8: 0.66 cc; LOF*-8: 1.1 cc; LOH*-8: 4.1 cc.; LOJ*-8: 6.9 cc.
- These valves are pressure responsive at all three ports, therefore it is essential to consider all aspects of system operation through a complete cycle. Pressure changes at any one port may cause a valve to switch from a closed to an open position, or vice versa. All possible pressure changes in the complete circuit must be considered to assure a safe, functional system design.
- With the -8 control option, the main stage valve should first be installed to the correct torque value. The T-8A pilot control valve should then be installed into the main stage valve to its required torque value.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Version</th>
<th>Control</th>
<th>Cracking Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 L/min. D</td>
<td>A</td>
<td>T-8A Cavity</td>
<td>3.5 bar</td>
<td>Buna-N</td>
</tr>
<tr>
<td>200 L/min. F</td>
<td>B</td>
<td>Pilot valve</td>
<td>Pilot source from Port 1</td>
<td>Viton</td>
</tr>
<tr>
<td>380 L/min. H</td>
<td>D</td>
<td>to be ordered separately</td>
<td>from Port 2</td>
<td></td>
</tr>
<tr>
<td>760 L/min. J</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Logic Elements

UNBALANCED POPPET, PILOT-TO-CLOSE, SPRING BIASED OPEN
WITH POSITION INDICATING SWITCH

Performance Curves

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0.07 cc/min.
- Area Ratio: A3 to A1 = 1.8:1; A3 to A2 = 2.25:1.
- Pilot passage into valve = LOEC-Z, LOFC-Z: 0.9 mm; LOGC-Z, LOHC-Z: 1.50 mm.
- The position switch confirms that poppet is in the spring biased closed position.
- Switch specifications: supply voltage: 20-32 V DC; Maximum output load: \(\leq 400\) mA, duty ratio 100%.
- Turn on time: \(\leq 25\) ms.; Operating temperature range: -25 to 80° C. See the Sun website for complete switch specifications.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Version</th>
<th>Control</th>
<th>Cracking Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 45 L/min.</td>
<td>C</td>
<td>Z</td>
<td>D 3.5 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F 200 L/min.</td>
<td></td>
<td></td>
<td></td>
<td>V Viton</td>
</tr>
<tr>
<td>G 160 L/min.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H 380 L/min.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* See Sun website for complete Switch Specifications.

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Logic Elements

UNBALANCED POPPET, PILOT-TO-CLOSE, SPRING BIASED CLOSED WITH POSITION INDICATING SWITCH

Performance Curves

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0.07 cc/min.
- Area Ratio: A3 to A1 = 1.8:1; A3 to A2 = 2.25:1.
- Pilot passage into valve = LOFO-Z: 0.9 mm LOHO-Z: 1.50 mm.
- Pilot volume displacement = LOFO-Z: 1.1 cc; LOHO-Z: 4.1 cc.
- The position switch confirms that the valve is in the open position.
- Switch specifications: supply voltage: 20-32 V DC; Maximum output load: \( \leq 400 \) mA, duty ratio 100%.
- Turn on time: \( \leq \) 25 ms.; operating temperature range: -25 to 80° C. See the Sun website for complete switch specifications.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Version</th>
<th>Control</th>
<th>Cracking Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 200 L/min.</td>
<td>O</td>
<td>Z</td>
<td>D 3.5 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>H 380 L/min.</td>
<td></td>
<td></td>
<td></td>
<td>V Viton</td>
</tr>
</tbody>
</table>

*See Sun website for complete Switch Specifications.

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Logic Elements

UNBALANCED POPPET, PILOT-TO-OPEN, SPRING BIASED CLOSED

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0.6 cc/min. at 70 bar.
- Area ratio: A3 to A1 = 1.8:1; A3 to A2 = 2.25:1.
- Pilot passage into valve = LKDC: 0.8 mm; LKFC: 0.9 mm; LKHC: 1.50 mm; LKJC: 2.3 mm.
- Pilot volume displacement = LKDC: 0.33 cc; LKFC: 0.98 cc; LKHC: 2.5 cc; LKJC: 4.9 cc.
- These valves are pressure responsive at all three ports, therefore it is essential to consider all aspects of system operation through a complete cycle. Pressure changes at any one port may cause a valve to switch from a closed to an open position, or vice versa. All possible pressure changes in the complete circuit must be considered to assure a safe, functional system design.

Cartridge Dimensions

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 L/min.</td>
<td>LKDC – XDN</td>
<td>T - 11A</td>
<td>45 - 50</td>
</tr>
<tr>
<td>120 L/min.</td>
<td>LKFC – XDN</td>
<td>T - 2A</td>
<td>60 - 70</td>
</tr>
<tr>
<td>240 L/min.</td>
<td>LKHC – XDN</td>
<td>T - 17A</td>
<td>200 - 215</td>
</tr>
<tr>
<td>480 L/min.</td>
<td>LKJC – XDN</td>
<td>T - 19A</td>
<td>465 - 500</td>
</tr>
</tbody>
</table>

Performance Curves

LKDC  
LKFC  
LKHC  
LKJC

- **See page 178 for Control Options
- **Consult the Sun website for our most recent and complete information on the full Corrosion Resistant line of products.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Version</th>
<th>Control**</th>
<th>Minimum Pilot Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 60 L/min.</td>
<td>C</td>
<td>LK°C</td>
<td>D 3.5 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F 120 L/min.</td>
<td>X</td>
<td>X Not Adjustable</td>
<td></td>
<td>V Viton</td>
</tr>
<tr>
<td>H 240 L/min.</td>
<td>D</td>
<td>LKDC, LKFC only: Manual Release</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J 480 L/min.</td>
<td>T</td>
<td>L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

U.S. Patent # 4,795,129

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Logic Elements

NORMALLY CLOSED, MODULATING ELEMENT

- Maximum operating pressure = 350 bar.
- Control orifice diameter = LRBA, LRDA, LRFA: 0.4 mm; LRHA, LRJA: 0.53 mm.
- Control Pilot Flow = LRBA, LRDA, LRFA: 0.16 - 0.25 L/min.; LRHA, LRJA: 0.25 - 0.50 L/min.
- An optional tuning adjustment (L control) is offered to vary the pressure drop across the compensator to increase or decrease the flow. This option is only available with the D differential pressure range.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Version</th>
<th>Control**</th>
<th>Differential Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 30 L/min.</td>
<td>A Internal pilot, Pilot source from port 1 (mainstage relief element)</td>
<td>X Not Adjustable</td>
<td>D 3.5 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>D 60 L/min.</td>
<td>C External pilot, (bypass compensator)</td>
<td>L Tuning Adjustment</td>
<td>F 7.0 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>F 120 L/min.</td>
<td></td>
<td></td>
<td>G* 10.0 bar</td>
<td></td>
</tr>
<tr>
<td>H 240 L/min.</td>
<td></td>
<td></td>
<td>H 14.0 bar</td>
<td></td>
</tr>
<tr>
<td>J 480 L/min.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** See page 178 for information on Control Options

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.

Consult the Sun website for our most recent and complete information on the full Corrosion Resistant line of products.
### Logic Elements

**NORMALLY OPEN, MODULATING ELEMENT**

- Maximum operating pressure = 350 bar.
- Control Pilot Flow = LPBA, LPDA, LPFA: 0.16 - 0.25 L/min.; LPHA, LPJA: 0.25 - 0.50 L/min.
- Control Orifice Diameter = LPBA, LPDA, LPFA: 0.4 mm; LPHA, LPJA: 0.53 mm.
- An optional tuning adjustment (L control) is offered to vary the pressure drop across the compensator to increase or decrease the flow. **This option is only available with the D differential pressure range.**

#### OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Version</th>
<th>Control**</th>
<th>Differential Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 30 L/min.</td>
<td>A</td>
<td>X</td>
<td>D 3.5 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>D 60 L/min.</td>
<td>A</td>
<td>X</td>
<td>F 7.0 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>F 120 L/min.</td>
<td>C</td>
<td>L</td>
<td>G 10.0 bar</td>
<td></td>
</tr>
<tr>
<td>H 240 L/min.</td>
<td>C</td>
<td>L</td>
<td>H 14.0 bar</td>
<td></td>
</tr>
<tr>
<td>J 480 L/min.</td>
<td>C</td>
<td>L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** See page 178 for information on Control Options

---

Visit [www.sunhydraulics.com](http://www.sunhydraulics.com) for current list pricing and complete technical information on all Sun products.
Logic Elements

BI-DIRECTIONAL, MODULATING ELEMENT, NORMALLY OPEN

- Maximum operating pressure = 350 bar.
- All ports will accept 350 bar.
- These bi-directional, normally open, modulating elements, used with an external orifice, create a bi-directional, pressure compensated flow control.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Nominal Control Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 60 L/min.</td>
<td>X Not Adjustable</td>
<td>D 3.5 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F 120 L/min.</td>
<td></td>
<td>E 5 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>H 240 L/min.</td>
<td></td>
<td>F 7 bar</td>
<td></td>
</tr>
</tbody>
</table>

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Logic Elements

BYPASS/RESTRICTIVE, PRIORITY MODULATING ELEMENT

- Maximum operating pressure = 350 bar.
- Bypass flow is not available until priority flow requirements are satisfied.
- Bypass pressure at port 4 can be higher than pressure at control port 2.
- Priority flow can be turned off with a pilot sized solenoid valve on port 1.

### OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Differential Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 60 L/min.</td>
<td>X Not Adjustable</td>
<td>E 5 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F 120 L/min.</td>
<td></td>
<td>F 7 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>H 240 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J 480 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.