## Relief Cartridge Valves

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<td>22</td>
</tr>
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<td>23</td>
</tr>
</tbody>
</table>
Relief Valves

PILOT OPERATED, BALANCED PISTON

Full Adjustment 5 Turns

Performance Curves

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = RPCC, RPEC: 30 cc/min. at 70 bar; RPGC: 50 cc/min. at 70 bar; RPIC: 65 cc/min. at 70 bar; RPKC: 80 cc/min. at 70 bar.
- Typical response time 10 ms.
- Factory pressure settings established at 15 L/min.
- Will accept maximum pressure at Port 2.
- Back pressure on the tank port (port 2) is directly additive at a 1:1 ratio to the valve setting.

OPTION ORDERING INFORMATION

- ** Nominal Capacity: **
  - C 45 L/min.
  - E 95 L/min.
  - G 200 L/min.
  - I 380 L/min.
  - K 760 L/min.

- ** Control:**
  - L Standard Screw Adjustment
  - C* Tamper Resistant Factory Set
  - K Handknob with Lock Knob
  - RPEC, RPIC only:
    - O Handknob with Panel Mount

- ** Adjustment Range:**
  - **RPCC only:**
    - A 5 - 210 bar
    - B 5 - 105 bar
    - C 3 - 420 bar
    - N 5 - 55 bar
    - Q 5 - 25 bar
    - W 5 - 315 bar
  - **RPEC, RPGC, RPIC, RPKC only:**
    - A 3 - 210 bar
    - B 3 - 105 bar
    - C 10.5 - 420 bar
    - N 4 - 55 bar
    - Q 4 - 25 bar
    - W 10.5 - 315 bar

- ** Seal Material:**
  - N Buna-N
  - V Viton

- ** See page 178 for information on Control Options.**

Customer specified special setting stamped on hex.

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

**DIRECT ACTING AND DIRECT ACTING, NON-ADJUSTABLE**

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at reseat = 0.7 cc/min.
- Typical response time 2 ms.
- Factory pressure settings established at 15 L/min.
- Typical pressure rise = 2 ms.
- Maximum valve leakage at reseat = 0.7 cc/min.
- Maximum operating pressure = 350 bar.
- Will accept maximum pressure at Port 2.
- Back pressure on the tank port (Port 2) is directly additive at a 1:1 ratio to the valve setting.
- Will accept maximum pressure at Port 2.
- The seals on the adjust screw are exposed to system pressure which means this valve can only be adjusted when the pressure is removed. The setting procedure is; check the setting, remove the pressure, adjust the valve, check the new setting.
- Will accept maximum pressure at Port 2.
- The spring range where the desired relief setting is approximately mid-range between the minimum and maximum pressure to ensure maximum valve repeatability.

**OPTION ORDERING INFORMATION**

**Nominal Capacity**

- **B** 45 L/min.
- **D** 95 L/min.
- **F** 200 L/min.
- **H** 380 L/min.
- **J** 760 L/min.

**Control**

- **L** Standard Screw Adjustment
- **C** Tamper Resistant Factory Set
- **D** RDJA, RDFA only: Non-Adjustable
- **N** RDJA-3, RDFA-3 only available with A, C, D ranges.

**Adjustment Range**

- **A** 35 - 210 bar
- **B** 20 - 105 bar
- **C** 70 - 420 bar
- **D** 14 - 55 bar
- **E** 10 - 28 bar
- **F** Standard set at 7 bar
- **S** Standard set at 7 bar
- **W** Standard set at 70 bar

**Seal Material**

- **N** Buna-N
- **V** Viton

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

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

DIRECT ACTING, CE MARKED

The CE marked valve is a safety valve that meets the requirements of the European Directive for Pressurized Devices (PED) 97/23/EC.

Each delivery contains a TüV approval, which is a certification of the excess operating pressure and the approved flow, an EC declaration of conformity, and an instructional manual. See Sun website for further information.

- Maximum valve leakage at reseat = 0,7 cc/min.
- Reseat = > 90% of set pressure.
- Typical response time 2 ms.
- Pressure setting from 100 bar up to 422 bar are approved and certified by TüV.
- Will accept maximum pressure at port 2; suitable for use in cross-port relief circuits.
- Back pressure on the tank port (port 2) is additive to the valve setting at a 1:1 ratio.

### Performance Curves

#### Permissible Operating Range

- **RDDT**
- **RDFT**

### Cartridge Dimensions

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a (mm)</th>
<th>b (mm)</th>
<th>c (mm)</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 L/min.</td>
<td>RDDT – QAN T - 10A</td>
<td>40.0</td>
<td>22.2</td>
<td>65.0</td>
<td>45 - 50</td>
<td></td>
</tr>
<tr>
<td>79 L/min.</td>
<td>RDFT – QAN T - 3A</td>
<td>47.8</td>
<td>28.6</td>
<td>70.4</td>
<td>60 - 70</td>
<td></td>
</tr>
</tbody>
</table>

### OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Adjustment Range</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 75 L/min.</td>
<td>Q * Capped and Lockwire</td>
<td>RRDT: A 100 - 210 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F 79 L/min.</td>
<td>* Special setting required. Specify at time of order.</td>
<td>RRDT: A 100 - 209 bar, B 60 - 105 bar, C 210 - 420 bar</td>
<td>V Viton</td>
</tr>
</tbody>
</table>

U.S. Patent #4,742,846

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

**DIRECT ACTING, PILOT CAPACITY**

- **Maximum operating pressure =** 350 bar.
- **Maximum valve leakage at** reseat at 24 cSt = RBAC, RBAA: 0.4 cc/min.; RBAE: 1 cc/min.
- **Typical response time** 2 ms.
- **Back pressure on** the tank port (port 2) is directly additive to the pressure setting at port 1 (inlet) at a 1:1 ratio to the valve setting.
- **RBAE**: Utilizes the Sun T-8A, 2 port cavity making it the ideal choice to use in conjunction with Sun’s main stage pilot or vent-to-operate cartridges. Separate pilot lines are eliminated and only one cavity needs to be machined to accommodate both the control and primary function. Note: All 2-position, 2-way pilot stage control cartridges utilize the same cavity and are physically interchangeable. Functionality is the only consideration.

---

**OPTION ORDERING INFORMATION**

- **Nominal Capacity**
  - AC 1 L/min.
  - AA 2 L/min.
  - AE 10 L/min.

- **Control**
  - L Standard Screw Adjustment
  - C Tamper Resistant with Lock Knob
  - K Handknob
  - O Handknob with Panel Mount

- **Adjustment Range**
  - A 1.7 - 210 bar
  - B 1.7 - 105 bar
  - C 1.7 - 420 bar
  - D 1.7 - 55 bar
  - E 1.7 - 25 bar
  - W 1.7 - 315 bar

- **Seal Material**
  - N Buna-N
  - V Viton

*Special setting required. Specify at time of order.*

**See page 178 for information on Control Options**

Customer specified special setting stamped on hex.

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Relief Valves

PILOT OPERATED, BALANCED POPPET

- Full Adjustment 5 Turns
- Locating Shoulder
- Inlet (1)
- Outlet (2)

Performance Curves

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at reseat = RPES: 0.7 cc/min.; RPGS, RPIS, RPKS: 2.1 cc/min.
- Typical response time 2 ms.
- Factory pressure settings established at 15 L/min.
- Will accept maximum pressure at port 2; suitable for use in cross-port relief circuits.
- Back pressure on the tank port (port 2) is directly additive at a 1:1 ratio to the valve setting.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Cartridge Dimensions</th>
<th>Cartridge Model Code</th>
<th>Capacity</th>
<th>Cavity</th>
<th>Typical Flow</th>
<th>Torque (Nm)</th>
<th>Nominal Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>95 L/min.</td>
<td>RPES – LAN</td>
<td>T - 10A</td>
<td>40 - 50</td>
<td>39.6</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 L/min.</td>
<td>RPGS – LAN</td>
<td>T - 3A</td>
<td>60 - 70</td>
<td>47.8</td>
<td>28.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>380 L/min.</td>
<td>RPIS – LAN</td>
<td>T - 16A</td>
<td>200 - 215</td>
<td>62.0</td>
<td>31.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>760 L/min.</td>
<td>RPKS – LAN</td>
<td>T - 18A</td>
<td>465 - 500</td>
<td>79.5</td>
<td>41.3</td>
</tr>
</tbody>
</table>

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

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

PILOT OPERATED, BALANCED POPPET, SOFT

- Maximum operating pressure = 350 bar.
- Control pilot flow = 0.16 to 0.41 L/min.
- Pressure Ramp Up Time = RPET: 200 ms., RPGT: 300 ms., RPIT: 400 ms., RPIC: 500 ms.
- Factory pressure settings established at 15 L/min.
- Will accept maximum pressure at Port 2.
- When pressure at the inlet (port 1) exceeds the threshold setting, the valve opens to tank (port 2). The pilot section moves forward at a steady rate, increasing the setting by compressing the pilot spring. Maximum setting is achieved when the pilot section reaches a mechanical stop.

## OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control**</th>
<th>Adjustment Range</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 95 L/min.</td>
<td>C Tamper Resistant Factory Set</td>
<td>A 140 - 210 bar Standard set at 140 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>G 200 L/min.</td>
<td>L Standard Screw Adjustment</td>
<td>C 315 - 420 bar Standard set at 315 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>I 380 L/min.</td>
<td>* Special setting required. Specify at time of order.</td>
<td>W 210-315 bar Standard set at 210 bar</td>
<td></td>
</tr>
<tr>
<td>K 760 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** See page 178 for information on Control Options

Customer specified special setting stamped on hex.

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

PILOT OPERATED, KICK-DOWN, BALANCED PISTON

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = RQCB, RQEB: 30 cc/min. at 70 bar; RQGB: 49.2 cc/min. at 70 bar; RQIB: 65.5 cc/min. at 70 bar; RQKB: 81.9 cc/min. at 70 bar.
- Typical response time 25 ms.
- Factory pressure settings established at kick down point.
- Flow through cartridge must cease to reset valve.
- Back pressure on the tank port (port 2) is directly additive to the valve setting at a 1:1 ratio.

**OPTION ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control**</th>
<th>Adjustment Range</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 45 L/min.</td>
<td>L Standard Screw Adjustment</td>
<td>RQCB only: A 5 - 210 bar, B 5 - 105 bar, C 5 - 420 bar, N 5 - 55 bar, G 5 - 25 bar, W 5 - 315 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>E 95 L/min.</td>
<td>C** Tamper Resistant Factory Set</td>
<td>RQEB, RQGB, RQIB, RQKB only: A 7 - 210 bar, B 7 - 105 bar, C 7 - 420 bar, N 7 - 55 bar, G 7 - 25 bar, W 7 - 315 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>G 200 L/min.</td>
<td>K Handknob with Lock Knob</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I 380 L/min.</td>
<td>* Special setting required. Specify at time of order.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K 760 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** See page 178 for information on Control Options
Customer specified special setting stamped on hex.

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

PILOT OPERATED, BALANCED PISTON, AIR CONTROLLED

- Pilot ratio, air to hydraulic = 20:1.
- Maximum air pressure = 10.5 bar.
- Maximum operating pressure = 140 bar.
- Maximum valve leakage at 24 cSt = RPGD: 50 cc/min. at 70 bar; RPID: 65 cc/min. at 70 bar; RPKD: 80 cc/min. at 70 bar.
- Typical response time 10 ms.
- Will accept maximum pressure at Port 2; suitable for use in cross-port relief circuits.

Performance Curves

- Typical Pressure Rise

### Cartridge Dimensions

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>A</th>
<th>B</th>
<th>Installation Torque (Nøm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 L/min.</td>
<td>RPGD – ABN</td>
<td>T - 3A</td>
<td>47.8</td>
<td>28.6</td>
<td>33.3</td>
<td>—</td>
<td>60 - 70</td>
<td></td>
</tr>
<tr>
<td>380 L/min.</td>
<td>RPID – BBN</td>
<td>T - 16A</td>
<td>62.0</td>
<td>31.8</td>
<td>—</td>
<td>41.1</td>
<td>200 - 215</td>
<td></td>
</tr>
<tr>
<td>760 L/min.</td>
<td>RPKD – BBN</td>
<td>T - 18A</td>
<td>79.5</td>
<td>41.3</td>
<td>—</td>
<td>50.8</td>
<td>465 - 500</td>
<td></td>
</tr>
</tbody>
</table>

### OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Adjustment Range</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 200 L/min.</td>
<td>RPGD only:</td>
<td>B 3.5 - 105 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>I 380 L/min.</td>
<td>1/4” NPTF Pilot Port at end of Cartridge*</td>
<td>I 1 - 70 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>K 760 L/min.</td>
<td>RPID, RPKD only:</td>
<td>B 3.5 - 105 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>External SAE-4 Pilot Port at end of Cartridge*</td>
<td>J 2 - 105 bar</td>
<td></td>
</tr>
</tbody>
</table>

*Maximum air pilot pressure should not exceed 10 bar.

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Relief Valves, Electro-Proportional

ELECTRO-PROPORTIONAL, PILOT CAPACITY

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at reseat = 25 cc/min.
- Hysteresis with dither <4% and with DC input <8%.
- Linearity with dither <2% and repeatability with dither <2%.
- Recommended dither frequency = 140 Hz.
- Low leakage at levels in the closed position. Reseat occurs at 85% of cracking pressure.
- For optimum performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.
- The L control allows one to manually adjust the valve in case of an electrical failure. The L control also allows one to offset the pressure range. For instance, if an A range valve is mechanically offset to a setting of 105 bar, the new maximum will be 310 bar.
- This electro-proportional cartridge utilizes the Sun T-8A, 2 port cavity making it the ideal choice to use in conjunction with Sun’s main stage pilot or vent-to-operate cartridges. Separate pilot lines are eliminated and only one cavity needs to be machined to accommodate both the control and primary function. Note: All 2 port pilot stage control cartridges utilize the same cavity and are physically interchangeable. Functionality is the only consideration.
- A wide variety of coil termination and voltage options are available. See the Sun website: Products: Accessories: Coils.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control*</th>
<th>Adjustment Range</th>
<th>Coil Options**</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 1 L/min.</td>
<td>X</td>
<td>A 20 - 210 bar</td>
<td>See page 188: Coil option information for Electro-Proportional Cartridges.</td>
</tr>
<tr>
<td></td>
<td>M Manual Override</td>
<td>B 10.5 - 105 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L Manual Override Adjustable</td>
<td>D 3.5 - 50 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T Tuning Adjustment</td>
<td>W 35 - 350 bar</td>
<td></td>
</tr>
</tbody>
</table>

- See page 178 for information on Control Options

<table>
<thead>
<tr>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Buna-N</td>
</tr>
<tr>
<td>V Viton</td>
</tr>
</tbody>
</table>

** Consult the Sun website for complete information on Spool Configurations, the full line of Coil Options and Embedded Amplifier Coils/Controllers.

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
ELECTRO-PROPORTIONAL, PILOT CAPACITY, HIGH PRESSURE SETTING WITH NO COMMAND, INVERSE FUNCTION

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at reseat = 25 cc/min.
- Hysteresis with dither <4% and with DC input <8%.
- Linearity with dither <2% and repeatability with dither <2%.
- Recommended dither frequency = 140 Hz.
- Low leakage at levels in the closed position. Reseat occurs at 85% of cracking pressure.
- For optimum performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.
- This electro-proportional cartridge utilizes the Sun T-8A, 2 port cavity making it the ideal choice to use in conjunction with Sun’s main stage pilot or vent-to-operate cartridges. Separate pilot lines are eliminated and only one cavity needs to be machined to accommodate both the control and primary function. Note: All 2 port pilot stage control cartridges utilize the same cavity and are physically interchangeable. Functionality is the only consideration.
- Desired de-energized pressure, within the adjustment range must be specified when ordered.
- A wide variety of coil termination and voltage options are available. See the Sun website: Products: Accessories: Coils.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Adjustment Range*</th>
<th>Seal Material</th>
<th>Coil Options**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 L/min.</td>
<td>X* No Manual Override</td>
<td>A 210 - 105 bar</td>
<td>N Buna-N</td>
<td>See page 188: Coil option information for Electro-Proportional Cartridges.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 105 - 55 bar</td>
<td>V Viton</td>
<td>** Consult the Sun website for complete information on Spool Configurations, the full line of Coil Options and Embedded Amplifier Coils/Controllers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D 55 - 20 bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>W 315 - 210 bar</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Special setting required. Specify at time of order.
** Customer is required to specify setting within the selected spring range.

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
Relief Valves, Electro-Proportional

PILOT OPERATED, BALANCED PISTON, MAIN STAGE WITH INTEGRAL T-8A CONTROL CAVITY

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

### Performance Curves

- **RPEC-8**
  - Pressure vs. Flow with T-8A Pilot Stage Installed
  - Pressure vs. Command with T-8A Pilot Stage (RBAP-MAN) Installed
- **RPGC-8**
  - Pressure vs. Flow with T-8A Pilot Stage Installed
- **RPIC-8**
  - Pressure vs. Flow with T-8A Pilot Stage Installed
- **RPKC-8**
  - Pressure vs. Flow with T-8A Pilot Stage Installed

- Maximum operating pressure = 350 bar.
- Control pilot flow = RPEC-8: 0.11 to 0.16 L/min.; RPGC-8: 0.16 to 0.25 L/min.; RPIC-8: 0.25 to 0.33 L/min.; RPKC-8: 0.25 to 0.33 L/min.
- Main stage leakage at 24 cSt = RPEC-8: 50 cc/min. at 70 bar; RPGC-8: 50 cc/min. at 70 bar; RPIC-8: 65 cc/min. at 70 bar; RPKC-8: 80 cc/min. at 70 bar.
- Will accept maximum pressure at Port 2; suitable for use in cross-port relief circuits.
- Back pressure on the tank port (port 2) is directly additive to the valve setting at a 1:1 ratio.
- 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>Control</th>
<th>Minimum Control Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 95 L/min.</td>
<td>8 T-8A Cavity in hex body for pilot operation</td>
<td>D 1.7 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>G 200 L/min.</td>
<td></td>
<td>W 7 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>I 380 L/min.</td>
<td></td>
<td>W 7 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>K 760 L/min.</td>
<td></td>
<td>W 7 bar</td>
<td>V Viton</td>
</tr>
</tbody>
</table>

Visit [www.sunhydraulics.com](http://www.sunhydraulics.com) for current list pricing and complete technical information on all Sun products.
Relief Valves, Electro-Proportional

PILOT OPERATED, BALANCED POPPET, MAIN STAGE WITH INTEGRAL T-8A CONTROL CAVITY

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

### Performance Curves

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 L/min.</td>
<td>RPES – 8WN</td>
<td>T - 10A</td>
<td>39.6</td>
<td>22.2</td>
<td>19.0</td>
<td>40 - 50</td>
</tr>
<tr>
<td>200 L/min.</td>
<td>RPES – 8WN</td>
<td>T - 3A</td>
<td>47.8</td>
<td>28.6</td>
<td>17.5</td>
<td>60 - 70</td>
</tr>
<tr>
<td>380 L/min.</td>
<td>RPIS – 8WN</td>
<td>T - 16A</td>
<td>62.0</td>
<td>31.8</td>
<td>24.6</td>
<td>200 - 215</td>
</tr>
<tr>
<td>760 L/min.</td>
<td>RPKS – 8WN</td>
<td>T - 18A</td>
<td>79.2</td>
<td>41.3</td>
<td>30.0</td>
<td>465 - 500</td>
</tr>
</tbody>
</table>

### Performance Curves

- Maximum operating pressure = 350 bar.
- Control pilot flow = RPES-8: 0,16 to 0,41 L/min.; RPGS-8: 0,16 to 0,25 L/min.; RPIS-8, RPKS-8: 0,25 to 0,33 L/min.
- Main stage leakage at 10% reseal = 0,7 cc/min.
- Typical response time 2 ms.
- Will accept maximum pressure at Port 2; suitable for use in cross-port relief circuits.
- Back pressure on the tank port (port 2) is directly additive to the valve setting at a 1:1 ratio.
- 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>Control</th>
<th>Minimum Control Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 95 L/min.</td>
<td>8 T-8A Cavity in hex body for pilot operation</td>
<td>B 3,5 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>G 200 L/min.</td>
<td>8 T-8A Cavity in hex body for pilot operation</td>
<td>W 7 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>I 380 L/min.</td>
<td>Pilot valve to be ordered separately</td>
<td>D 1,7 bar</td>
<td>RPES-8 only:</td>
</tr>
<tr>
<td>K 760 L/min.</td>
<td>8 T-8A Cavity in hex body for pilot operation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Relief Valves

PILOT OPERATED, BALANCED PISTON, VENTABLE

Full Adjustment 5 Turns

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = RVBA, RVCA; 30 cc/min. at 70 bar; RVEA: 50 cc/min. at 70 bar; RVGA: 65 cc/min. at 70 bar; RVIA: 80 cc/min. at 70 bar.
- Typical response time 10 ms.
- Control pilot flow = RVBA, RVCA: 0.11 to 0.16 L/min.; RVEA: 0.16 to 0.25 L/min.; RVGA, RVIA: 0.25 to 0.33 L/min.
- A remote pilot relief on port 3 (vent) will control the valve below its own setting.
- Factory pressure setting established at 15 L/min.
- Control pilot flow = RVBA, RVCA: 0.11 to 0.16 L/min.; RVEA: 0.16 to 0.25 L/min.; RVGA, RVIA: 0.25 to 0.33 L/min.
- Typical pressure rise 10 ms.
- Will accept maximum pressure at port 2; suitable for use in cross-port relief circuits. If used in cross-port relief circuits, consider spool leakage.
- Back pressure on the tank port (port 2) is directly additive to the valve setting at a 1:1 ratio.

OPTION ORDERING INFORMATION

Nominal Capacity

B 90 L/min.
C 60 L/min.
E 120 L/min.
G 240 L/min.
I 480 L/min.

Control**

L Standard Screw Adjustment
C** Tamper Resistant Factory Set
K Handknob with Lock Knob
RVCA, RVEA only:
O Handknob with Panel Mount

*Special setting required. Specify at time of order.

Adjustment Range

RVBA only:
A 5 - 210 bar Standard set at 70 bar
B 5 - 105 bar Standard set at 70 bar
C 5 - 420 bar Standard set at 70 bar
N 5 - 55 bar Standard set at 28 bar
G 5 - 25 bar Standard set at 14 bar
W 5 - 315 bar Standard set at 70 bar

RVCA, RVEA, RVGA, RVIA only:
A 7 - 210 bar Standard set at 70 bar
B 5.5 - 105 bar Standard set at 70 bar
C 10 - 420 bar Standard set at 70 bar
D 1.7 - 55 bar Standard set at 28 bar
E 1.7 - 28 bar Standard set at 14 bar
W 10 - 315 bar Standard set at 70 bar

Seal Material

N Buna-N
V Viton

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

** See page 178 for information on Control Options

Customer specified special setting stamped on hex.

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Relief Valves

PILOT OPERATED, BALANCED POPPET, VENTABLE

Performance Curves

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 90% reset = RVCS: 2 cc/min at 70 bar; RVES, RVGS, RVIS: 0.7 cc/min at 70 bar.
- Typical response 2 ms.
- Control pilot flow = RVCS: 0.11 to 0.16 L/min.; RVES, RVGS, RVIS: 0.25 to 0.33 L/min.
- Factory pressure setting established at 15 L/min.
- Will accept maximum pressure at port 2; suitable for use in cross-port relief circuits.
- A remote pilot relief on port 3 (vent) will control the valve below its own setting.
- Back pressure on the tank port (port 2) is directly additive to the valve setting at a 1:1 ratio.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control**</th>
<th>Adjustment Range</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 60 L/min.</td>
<td>A- Tamper Resistant Factory Set</td>
<td>7 - 210 bar Standard set at 70 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>E 95 L/min.</td>
<td>B - Handknob with Lock Knob</td>
<td>3.5 - 105 bar Standard set at 70 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>G 200 L/min.</td>
<td>C - Standard Screw Adjustment</td>
<td>10.5 - 420 bar Standard set at 70 bar</td>
<td></td>
</tr>
<tr>
<td>I 480 L/min.</td>
<td>D - Special setting required. Specify at time of order.</td>
<td>N 4 - 55 bar Standard set at 70 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>** See page 178 for information on Control Options</td>
<td>Q 4 - 25 bar Standard set at 25 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Customer specified special setting stamped on hex.</td>
<td>W 10.5 - 315 bar Standard set at 70 bar</td>
<td></td>
</tr>
</tbody>
</table>

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

PILOT OPERATED, BALANCED POPPET, VENTABLE, SOFT

Full Adjustment 4.5 Torns

Performance Curves

- Maximum operating pressure = 350 bar.
- Control pilot flow = RVET: 0.16 to 0.41 L/min.; RVGT, RVIT: 0.25 to 0.33 L/min.
- Pressure ramp up time = RVET: 300 ms.; RVGT: 400 ms.; RVIT: 500 ms.
- Typical response time 2 ms.
- Factory pressure setting established at 15 L/min.
- Will accept maximum pressure at port 2; suitable for use in cross-port relief circuits.
- A remote pilot relief on port 3 (vent) will control the valve below its own setting.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control**</th>
<th>Adjustment Range</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 120 L/min.</td>
<td>C Tamper Resistant Factory Set</td>
<td>A 35 - 210 bar Standard set at 70 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>G 240 L/min.</td>
<td>L Standard Screw Adjustment</td>
<td>B 35 - 105 bar Standard set at 70 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>I 480 L/min.</td>
<td>* Special setting required. Specify at time of order. ** See page 178 for information on Control Options</td>
<td>C 70 - 420 bar Standard set at 70 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>** Customer specified special setting stamped on hex.</td>
<td>W 70 - 315 bar Standard set at 70 bar</td>
<td></td>
</tr>
</tbody>
</table>

Visit www.sunhydraulics.com for current list pricing and complete technical information on all Sun products.
BYPASS COMPENSATOR WITH RELIEF FUNCTION, NORMALLY CLOSED

The X axis of the performance curves shows the system pressure. The Y axis of the performance curves indicates the pressure differential that the valve creates across the control orifice. The curves represent various bypass flows (pump flow minus control flow). The capacities listed and performance of these valves are determined by the bypass flow. The control flow is not a factor.

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = RVBB, RVCB: 30 cc/min. at 70 bar; RVEB: 50 cc/min. at 70 bar; RVGB: 65 cc/min. at 70 bar; RVIB: 80 cc/min. at 70 bar.
- Typical response time 10 ms.
- Factory pressure setting established at 15 L/min.
- Back pressure on the tank port (port 2) is directly additive to the valve setting at a 1:1 ratio.
- Compensating pressure for all ranges is 8 bar.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control**</th>
<th>Adjustment Range</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 20 L/min.</td>
<td>L Standard Screw</td>
<td>RVBB only: A 5 - 210 bar Standard set at 70 bar B 5 - 105 bar Standard set at 70 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>C 40 L/min.</td>
<td>C Tamper Resistant Factory Set</td>
<td>C 5 - 420 bar Standard set at 70 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>E 80 L/min.</td>
<td>K Handknob with Lock Knob</td>
<td>N 5 - 55 bar Standard set at 30 bar</td>
<td>Consult the Sun website for our most recent and complete information on the full Corrosion Resistant line of products.</td>
</tr>
<tr>
<td>G 160 L/min.</td>
<td>Special setting required. Specify at time of order.</td>
<td>Q 5 - 25 bar Standard set at 14 bar</td>
<td>** See page 178 for information on Control Options.</td>
</tr>
<tr>
<td>I 320 L/min.</td>
<td></td>
<td>W 5 - 315 bar Standard set at 70 bar</td>
<td>Customer specified special setting stamped on hex.</td>
</tr>
</tbody>
</table>

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

PILOT OPERATED, BALANCED PISTON, VENTABLE WITH EXTERNAL DRAIN

Full Adjustment 5 Turns

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>L</th>
<th>C</th>
<th>K</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 L/min.</td>
<td>RVCD – LAN</td>
<td>T - 21A</td>
<td>35.1</td>
<td>22.2</td>
<td>78.5</td>
<td>82.6</td>
<td>84.8</td>
<td>45 - 50</td>
<td></td>
</tr>
<tr>
<td>120 L/min.</td>
<td>RVED – LAN</td>
<td>T - 22A</td>
<td>35.1</td>
<td>28.6</td>
<td>87.4</td>
<td>89.0</td>
<td>93.7</td>
<td>60 - 70</td>
<td></td>
</tr>
<tr>
<td>240 L/min.</td>
<td>RVGD – LAN</td>
<td>T - 23A</td>
<td>46.0</td>
<td>31.8</td>
<td>99.8</td>
<td>101.3</td>
<td>106.4</td>
<td>200 - 215</td>
<td></td>
</tr>
<tr>
<td>480 L/min.</td>
<td>RVID – LAN</td>
<td>T - 24A</td>
<td>63.5</td>
<td>41.8</td>
<td>121.4</td>
<td>126.7</td>
<td>127.8</td>
<td>465 - 500</td>
<td></td>
</tr>
</tbody>
</table>

Nominal Control** Adjustment Range Seal Material
A 7 - 210 bar Standard set at 70 bar N Buna-N
L Standard Screw Adjustment V Viton
C 3.5 - 105 bar Standard set at 70 bar
C 10.5 - 420 bar Standard set at 70 bar
K Handknob with Lock Knob D 1.7 - 55 bar Standard set at 30 bar
with Lock Knob E 1.7 - 28 bar Standard set at 14 bar
G 60 L/min.
I Handknob with Lock Knob W 10.5 - 315 bar Standard set at 70 bar
** See page 178 for information on Control Options
Customer specified special setting stamped on hex.

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Relief Valves, Electro-Proportional

PILOT OPERATED, BALANCED PISTON, VENTABLE, DRAIN TO PORT 4, MAIN STAGE WITH INTEGRAL T-8A CONTROL CAVITY

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

### Performance Curves

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 L/min.</td>
<td>RVCD – 8WN</td>
<td>T - 21A</td>
<td>35,1</td>
<td>22,2</td>
<td>45,2</td>
<td>45 - 50</td>
</tr>
<tr>
<td>120 L/min.</td>
<td>RVED – 8WN</td>
<td>T - 22A</td>
<td>35,1</td>
<td>28,6</td>
<td>50,8</td>
<td>60 - 70</td>
</tr>
<tr>
<td>240 L/min.</td>
<td>RVGD – 8WN</td>
<td>T - 23A</td>
<td>46,0</td>
<td>31,8</td>
<td>65,8</td>
<td>200 - 215</td>
</tr>
<tr>
<td>480 L/min.</td>
<td>RVID – 8WN</td>
<td>T - 24A</td>
<td>63,5</td>
<td>41,3</td>
<td>80,3</td>
<td>465 - 500</td>
</tr>
</tbody>
</table>

- Maximum operating pressure = 350 bar.
- Main stage leakage at 24 cSt = RVCD-8: 30 cc/min. at 70 bar; RVED-8: 50 cc/min. at 70 bar; RVGD-8: 65 cc/min. at 70 bar; RVID-8: 80 cc/min. at 70 bar.
- Control pilot flow = RVCD-8: 0,11 to 0,16 L/min.; RVED-8: 0,16 to 0,25 L/min.; RVGD-8; RVID-8: 0,25 to 0,33 L/min.
- Typical response time 10 ms.
- Will accept maximum pressure at port 2; suitable for use in cross-port relief circuits.
- Pressure at port 4 is directly additive to the valve setting at a 1:1 ratio and should not exceed 350 bar.

### OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Minimum Control Pressure</th>
<th>Seal Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 60 L/min.</td>
<td>D 1,7 bar</td>
<td>W 7 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>E 120 L/min.</td>
<td>D 1,7 bar</td>
<td>W 7 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>G 240 L/min.</td>
<td>D 1,7 bar</td>
<td>W 7 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>I 480 L/min.</td>
<td>D 1,7 bar</td>
<td>W 7 bar</td>
<td>V Viton</td>
</tr>
</tbody>
</table>

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Benefits of Sun’s Soft Relief

- **Controlled rate of pressure rise means less dynamic stress for components.**
  - No pressure transients above setting.
  - Limited rate of force change.
  - Increases the life expectancy of hoses and other critical components in the circuit.

- **Uses a normally open pilot section to maintain a minimum threshold setting.**
  - A minimum threshold setting allows the valve to begin controlling the rate of pressure rise immediately from the vent pressure setting.
  - Incorporates a return spring to ensure a reliable reset.

See catalogue pages 11 (RP*T) and 20 (RV*T) for detailed information on relief cartridges with soft shift options.

Soft Shift option extended to Sun Solenoid Operated Directional Valves...

Sun’s small pilot solenoid valves are used to unload larger main-stage elements remotely, or by directly integrating the pilot valve into the main-stage element. In this latter approach, unique to Sun, 12 different pilot valves (proportional, solenoid, hydraulic and pneumatic) can be integrated into a variety of main-stage elements.

Most 2-position, 2-way screw-in cartridge pilot solenoid valves utilize a poppet style construction to satisfy low leakage requirements. Sun Hydraulics has adopted a different approach that utilizes a precision spool/sleeve design. Available in both 2-position, 2- and 3-way pilot solenoid cartridges, this approach produces leakage characteristics equivalent to poppet style designs.

Since control volumes in pilot circuits are typically small, the lower gain characteristics of spool valves produce a softer unload. To further extend the operating rate, Sun offers a soft shift option that adds an orifice in the valve’s armature to gain greater control of fluid displacement. Combining the benefits of a spool valve with the soft shift option extends shift times, which can reduce the hydraulic shock generated when unloading main-stage elements. Sun’s Soft Shift option is offered on all of its spool-type solenoid valves.

You will find additional information about the DTDA-S, DAAL-S, DLDA-S, DBAL-S, DMDA-S, DNDA-S on pages 132 through 138 in the Solenoid section of this catalogue.