FEATURES

• **High Performance:** R6V valves are designed for a maximum pressure of 350 bar and a flow capacity up to 650 l/min.

• **Sensitive Control:** The DENISON poppet design delivers the minimum possible friction, superior hysteresis and optimum response to changes in operating conditions.

• **Wide Selection:** The R6V series of pilot operated pressure relief valves is available with mechanical and proportional adjustment, with external or onboard electronics and with a vent function for circulation at minimum pressure.

• **Standardized Mounting:** Mounting configurations for R6V Pressure Controls are in accordance with international standards, and conform to ISO 6264 (DIN 24340 Form E).

SYMBOL

Example: R6V06

Example: R6V06 Proportional function with Mechanical Pressure Adjustment
GENERAL

Denison R6V pressure relief valves are pilot operated controls consisting of two sections. A high flow poppet type seat valve as main stage and a mechanical or proportional pilot stage.

The mechanical version can optionally be supplied with a vent function (vent valve 4D01) to allow circulation at minimum pressure.

The proportional version is available with external or onboard electronics. The connector is a 6-pole+PE type conform to DIN 43563 – standard for most valves with onboard electronics. A mechanical maximum pressure stage is optional.

OPERATION

The system pressure in Port A is applied, via an orifice in X, to the pilot valve, the proportional valve (where present), and to the top surface of the main poppet. The hydraulically balanced main poppet is held against the seat by the main spring. In this state there is no flow through the valve.

The adjusted spring force acting on the pilot cone determines the relief pressure. If the pressure in Port A exceeds the set point, the pilot cone is lifted from its seat, releasing a small pilot flow to tank.¹)

The flow through the control orifice in X creates a pressure drop which limits the pressure at the top of the main poppet to the set point.

The higher system pressure in Port A now lifts the main poppet off its seat and allows flow to Port B.

In the resulting float position only enough flow is passed from Port A to Port B to maintain the inlet pressure in Port A at the set point.

When the pressure in Port A falls below the set point, the hydraulic balance on the main poppet is restored. The main spring then forces the main poppet to close.

The pilot drain chamber/proportional drain chamber is normally connected to Port B. Alternative external drain through the Y-port is available.

¹) The proportional function varies the pressure applied to the top of the main poppet, in proportion to the current input to the solenoid. The setting of the optional mechanical stage determines the maximum pressure and should be approximately 10% higher than the max. adjustable pressure of the proportional section.
GENERAL
- Type of unit: Pilot operated pressure relief
- Design: Poppet type
- Type of mounting: Subplate mounting
- Port sizes: 3/8", 1", 1¼"
- Mounting position: optional
- Direction of flow: A → B
- Ambient temperature range: -20°C . . . +50°C
- Suitability for special working conditions: Consult DENISON

HYDRAULIC CHARACTERISTICS
- Operating pressure range
  - inlet (port A): 0 . . . 350 bar
  - outlet (port B): 0 . . . 350 bar
  (for >30 bar Y must be external)
  - port X: 0 . . . 350 bar
  - port Y: 0 . . . 30 bar
- Pressure setting range: $p_{\text{min}}$ . . . 350 bar (see page 7)
- Max. flow: 220 l/min, R6V03 (3/8")
  500 l/min, R6V06 (1")
  650 l/min, R6V10 (1¼")
- Fluid: Petroleum base anti-wear fluids (covered by DENISON HF-0 and HF-2 specification).
  Such as mineral oil according to DIN 51524/25. Maximum catalogue ratings and performance data are based on operation with these fluids.
- Fluid temperature range: -20°C . . . +80°C
- Viscosity range: 10 . . . 650 cSt
- Recommended operating viscosity: 30 cSt
- Contamination level: Max. permissible contamination level according to NAS 1638 Class 8 (Class 9 for 15 micron and smaller) or ISO 17/14

TYPE OF ADJUSTMENT
- Manual: Hand wheel, set screw
- Electric (vent valve 4D01): by solenoid
- Nominal voltage: Refer to ordering code (see page 5)
- Permissible voltage difference: + 5 % . . . – 10 %
- Max. coil temperature (temperature class H): +180°C
- Type of current: Alternating current (AC)
  Direct current (DC)
- Input power: 31 W (for AC)
- Holding: 78 VA (for AC)
- Inrush: 264 VA (for AC)
- Relative operating period: 100 %
- Type of protection: IP 65

Electric proportional
- Max. coil temperature (temperature class H): +180°C
- Type of protection (DIN 40050): IP 65
- Relative operating period: 100 %
- Maximum current: 2500 mA
- Coil resistance at 20°C: 4 Ω
ORDERING CODE MECHANICAL CONTROL

Model Number: R6V

1. Series
   R6V = Pressure Relief Valve

2. Size
   03 = 3/8"
   06 = 1"
   10 = 1 1/4"

3. Max. Pressure
   5 = 350 bar

4. Body Mounting
   7 = Y port SAE-4 (7/16"-20 UNF)
   9 = Y port G 1/8"

5. Pressure Setting Range
   1 = 105 bar
   3 = 210 bar
   5 = 350 bar

6. Type of Control
   1 = Hand knob 32 mm dia. (standard)
   3 = Acorn nut with lead seal
   4 = Adjusting device with key lock

7. Drain Line
   0 = internal
   2 = external out main body (Y port)

8. Vent Valve Function
   09 = with manual override
   10 = without manual override
   11 = with manual override
   12 = without manual override
   Solenoid de-energized: open to tank
   Solenoid energized: vent line blocked
   Solenoid de-energized: vent line block
   Solenoid energized: open to tank

9. Solenoid Voltage and Current
   W01 = 115 V / 60 Hz
   W02 = 230 V / 60 Hz
   W06 = 115 V / 50 Hz
   W07 = 230 V / 50 Hz
   AC
   G0R = 12 V
   G0Q = 24 V
   G0H = 48 V
   DC

10. Design Letter

11. Seal Class
   1 = NBR (Buna N) Standard
   5 = FPM (Viton®)

12. Modifications
   VFM = Soft shift spool for vent function, medium shifting time
   VFS = Soft shift spool for vent function, slow shifting time
   Bi1 = Dual Pressure Valve with 7 ... 105 bar low pressure range*
   Bi3 = Dual Pressure Valve with 7 ... 210 bar (140 bar for AC) low pressure range*
   * High pressure range determined under 5.
<table>
<thead>
<tr>
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<th>R6V</th>
<th>1</th>
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<th>3</th>
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</table>
CURVES PROPORTIONAL CONTROL

External electronics

Onboard electronics with linearisation

P/Q performance curves 1)

Minimum pressure curves 1)

1) The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.
R6V03 (3/8") SUBLATE MOUNTING

Weight: 4.5 kg

<table>
<thead>
<tr>
<th>Ports</th>
<th>Function</th>
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<tbody>
<tr>
<td>A</td>
<td>Pressure (inlet)</td>
</tr>
<tr>
<td>B</td>
<td>Tank (outlet)</td>
</tr>
<tr>
<td>X</td>
<td>Remote control or</td>
</tr>
<tr>
<td></td>
<td>Vent connection</td>
</tr>
<tr>
<td>Y</td>
<td>External drain</td>
</tr>
</tbody>
</table>

Block mounting face
Flatness 0.01 mm / 100 mm length
Surface finish CLA 1.27 µm

SUBPLATE

Weight: 3.9 kg

Model No. | Order No. | Port sizes | 4 Mounting screws* (Torque ... Nm) |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>SS-B-08-G-150</td>
<td>S26-98590-0</td>
<td>G 3/4</td>
<td>G 1/4</td>
</tr>
</tbody>
</table>

* Mounting screws are included in subplate order.
For valves ordered without subplate, mounting screws must be ordered separately.
SUBPLATE

Weight: 8.0 kg

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Order No.</th>
<th>Port sizes</th>
<th>4 Mounting screws* (Torque … Nm)</th>
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</thead>
<tbody>
<tr>
<td>SS-B-16-G-151</td>
<td>S26-98591-0</td>
<td>G1 1/4 G 1/4</td>
<td>M16x85 DIN912-12.9 361-14294-8 281 Nm</td>
</tr>
</tbody>
</table>

* Mounting screws are included in subplate order.
For valves ordered without subplate, mounting screws must be ordered separately.
**R6V10 (1 1/4") SUBPLATE MOUNTING**

Weight: 7.8 kg

<table>
<thead>
<tr>
<th>Ports</th>
<th>Function</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Pressure (inlet)</td>
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<tr>
<td>B</td>
<td>Tank (outlet)</td>
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<tr>
<td>X</td>
<td>Remote control or Vent connection</td>
</tr>
<tr>
<td>Y</td>
<td>External drain</td>
</tr>
</tbody>
</table>

**Block mounting face**
- Flatness 0.01 mm / 100 mm length
- Surface finish CLA 1.27 µm

**ports**
- **A** Pressure (inlet)
- **B** Tank (outlet)
- **X** Remote control or Vent connection
- **Y** External drain

**SUBPLATE**

Weight: 18.6 kg

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<th>Model No.</th>
<th>Order No.</th>
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<th>4 Mounting screws* (Torque ... Nm)</th>
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<td>S26-38592-0</td>
<td>G 1 1/2</td>
<td>G 1/4</td>
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</table>

* Mounting screws are included in subplate order. For valves ordered without subplate, mounting screws must be ordered separately.
VENT FUNCTION (4D01), ADDITIONAL TYPES OF CONTROL

Weight (4D01): 1.4 kg

Plug-in connector ISO 4400

Manual override

SYMBOLS

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<tr>
<th>Code</th>
<th>Internally drained</th>
<th>Externally drained</th>
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<tr>
<td>11/12</td>
<td><img src="#" alt="Diagram" /></td>
<td><img src="#" alt="Diagram" /></td>
</tr>
</tbody>
</table>

ADDITIONAL TYPES OF CONTROL

**TYPE OF CONTROL-CODE 3**
Acorn nut with seal

**TYPE OF CONTROL-CODE 4**
Adjusting device with key lock.
Key must be ordered separately.
Order-no. 700-70619-8
**VERSION WITH PROPORTIONAL FUNCTION**

**Version with external electronics**

Weight:  
- size 03 = 5.2 kg  
- size 06 = 6.4 kg  
- size 10 = 8.3 kg

**Recommended Proportional Amplifier**

- Digital, E-Module  
- PCD00-A-400 (see catalogue PARKER HY11-2500)  
- Analogue, Euro Card  
- EC01 A1O, Order no. 701-00600-8 (see catalogue DENISON 9-EN 6010)

**Version with onboard electronics**

Weight:  
- size 03 = 5.4 kg  
- size 06 = 6.6 kg  
- size 10 = 8.5 kg

**Important:**
On initial start up and after long shut down periods bleed air from this plug.
The proportional amplifier located on top of the valve is specially adapted to control proportional pressure relief valves type R6V. The pressure versus command signal characteristic is electronically linearized (see curves page 8).

The amplifier has a reverse polarity protection and one short circuit protected WM-output stage with max. current limit.

Electronics for two different types of command signals are available – see ordering code on page 6 and below.

The ramp up/down potentiometers can be adjusted after removing the top.

The valves in combination with the electronics are factory set and sealed.

The main board is equipped with a diagnostic LED to display the operational conditions.

**Characteristics – Proportional Amplifiers**

- Supply voltage
  - nominal 24 V DC
  - smoothed battery voltage 18...32 V DC
- Reference voltage from amplifier ± 10 V (± 0.5%) @ 10 mA stabilised
- Current consumption I_{nom} approx. 2.0 A at 100% command signal (140 mA quiescent)
- Short circuit protection for the solenoid
- Command signals 0...+10 V, 200 kΩ input impedance (Pin 2)
  4...20 mA, 100 Ω input impedance (Pin 2)
  (4...20 mA command = 0...100% current at the solenoid)
- Potentiometer for
  - ramp up up to 10s ± 20% (1...50 V/s)
  - ramp down up to 10s ± 20% (1...50 V/s)
- PWM 190 Hz ± 10%
- Diagnostic LED green: power on + solenoid de-energised (command signal setting zero)
  yellow: power on + solenoid energised (with increasing command signal)
- Wiring due to EMC shielded cables are required

**Connector wiring diagram**
1) This setting is factory set and sealed. Breaking the seal voids any claim for optimum reproducibility from valve to valve.

Details of potentiometers and connector

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Plug-in Connector
6pole+PE type conform to ISO 43563
Ordering No. 167-01127-8

7/15°-20
UNEF-26
7pin

Block diagram