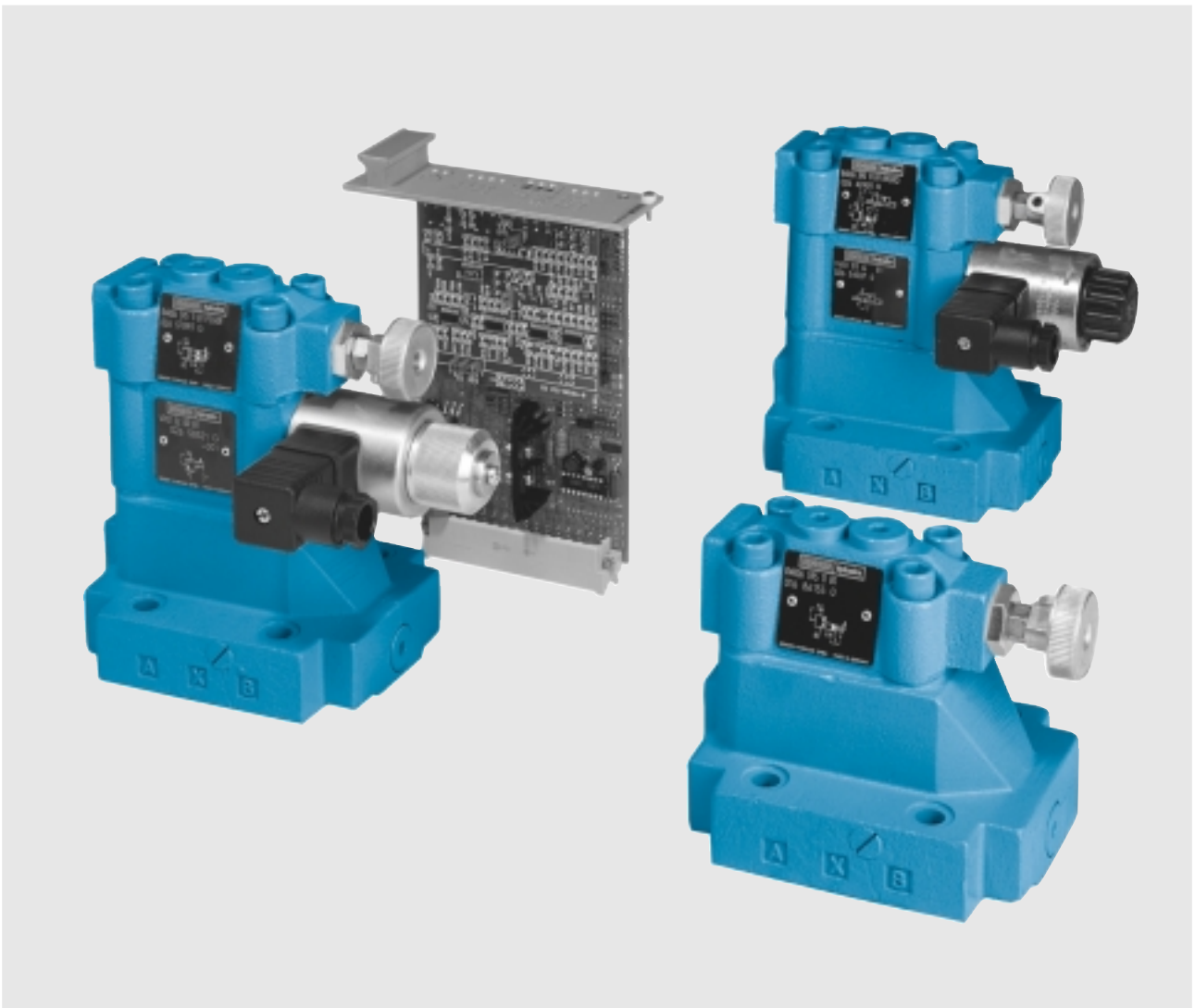


# DENISON HYDRAULICS

## Pressure Reducer Valve R4R

### Proportional Pressure Reducer Valve R4R...P2



Publ. 3-EN 2700-B, replaces 3-EN 2700-A

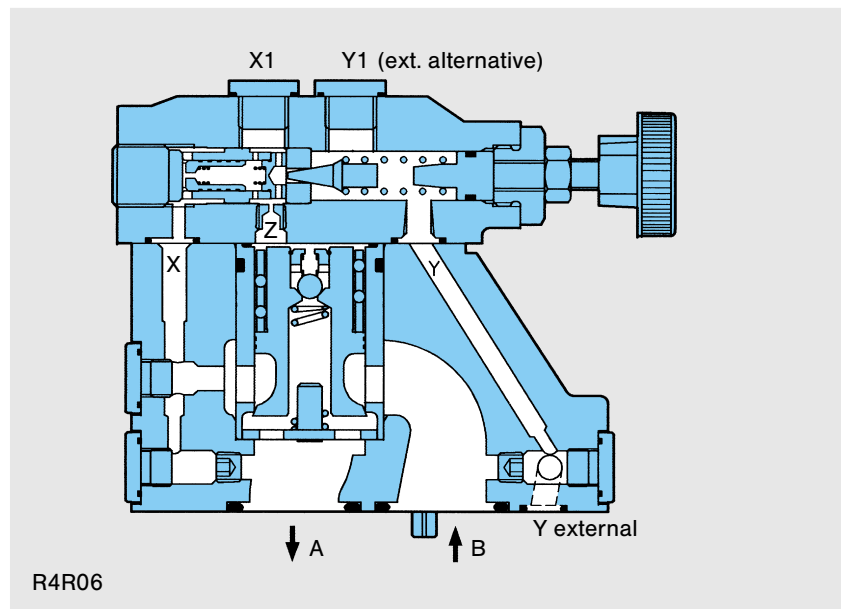
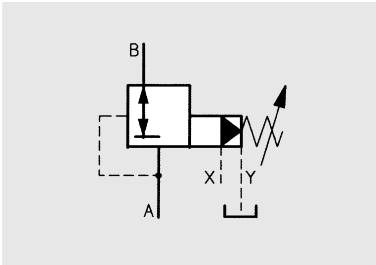
**DENISON** Hydraulics

## FEATURES, SYMBOL

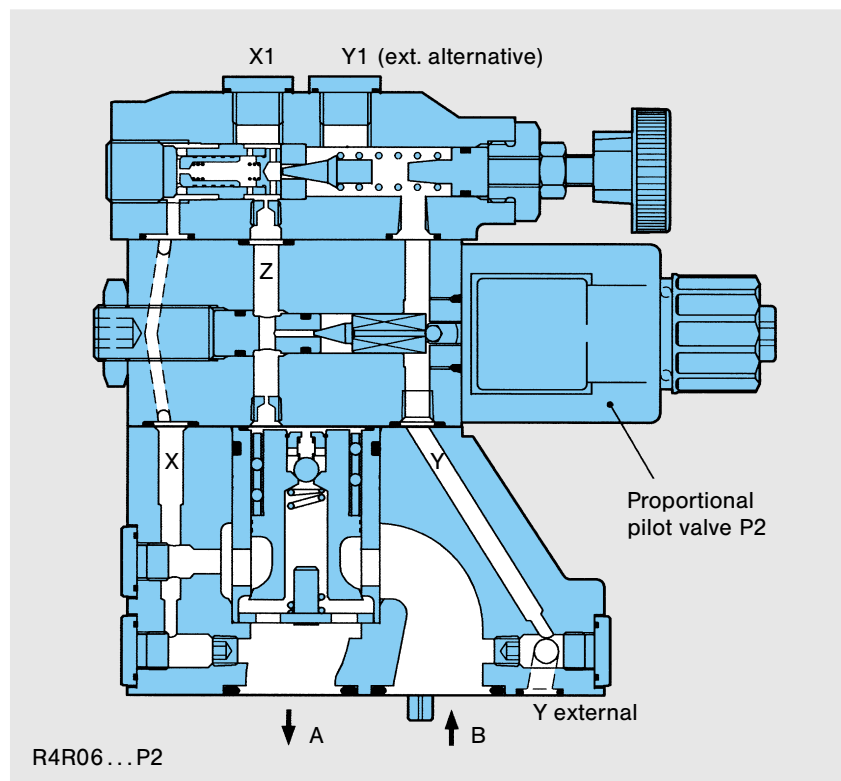
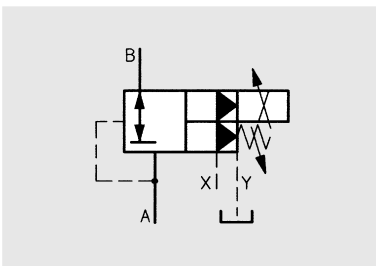
### FEATURES

- **High Performance:** R4 valves are designed for a maximum pressure of 350 bar and a flow capacity ranging from 90 l/min ( $3/8''$ ) to 600 l/min ( $1\ 1/4''$ ).
- **Sensitive Control:** The DENISON poppet design delivers the minimum possible friction, superior hysteresis and optimum response to changes in operating conditions.
- **Wide Selection:** In addition to the various mounting options for the main valve body, or as cartridge for manifold applications, the ordering code offers a range of control options for valves and accessories. A solenoid vent valve is available (VV01).
- **Standardized Mounting:** Mounting configurations for R4 Pressure Controls are in accordance with international standards, and conform to CETOP-RP 121 H, ISO6264. Vent valve option allows for remote pressure control.

### SYMBOL R4R



### SYMBOL R4R...P2



## DESCRIPTION

### GENERAL

DENISON Pressure Valves are pilot operated controls consisting of two or three sections; either a high flow, poppet type seat valve section controlled by the low flow, adjustable pilot mounted on top or in the case of the Proportional Pressure Reducer Valve, the proportional section P2 sandwiched between the pilot stage and the main body.

R4R Reducer Valves are used to control the pressure in the secondary part of a hydraulic circuit, and to maintain this pressure as set by the control knob on the pilot, or according to the current input on the R4R...P2.

The R4R can be vented electrically by means of an optional vent valve, VV01. This valve is mounted between the pilot valve and the main body.

With the DENISON combined Seat Valve and Pilot design, and the range of springs available, it is possible to achieve extremely precise pressure setting.

All valve components are subject to rigorous quality control, based on international standards, thus permitting worldwide operation and interchangeable spare parts.

### OPERATION

With the secondary Port A unpressurized, the system pressure in Port B is applied to the mini flow control valve of the pilot valve, to the pilot cone and seat (where present also to the cone of the proportional pilot valve), and to the top surface Z of the main poppet, which is held against the seat from the bottom side by the comparatively weak spring force.

Below the setting pressure the pressure on Z lifts the main poppet downwards off its seat and allows flow from Port B to Port A.

If the pressure in A exceeds the set point, the pressure in Z increases also to the setting pressure and the pilot cone is lifted from its seat, releasing a small pilot flow to tank<sup>1)</sup>.

This allows the pressure at the top of the main poppet to remain at the set point.

In the resulting float position only enough flow is passed from B to A to maintain the outlet pressure in A, as determined by the pilot head setting.

If and when the pressure in the secondary Port A equals the pilot stage setting, the main poppet closes. The small check valve in the main poppet prevents the secondary system from exceeding the pilot setting by allowing excess pressure to drain. This relief function has a very limited flow capacity up to 5 l/min.

<sup>1)</sup> The proportional valve P2 varies the pressure applied to the top of the main poppet, in proportion to the current input to the solenoid.

The manual setting of the pilot stage determines the maximum pressure and should be approximately 10% higher than the max. adjustable pressure of the proportional section (see also page 12).

## TECHNICAL DATA

### GENERAL

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Design</li> <li>• Type of mounting</li> </ul>  | <ul style="list-style-type: none"> <li>Poppet type</li> <li>Threaded body</li> <li>Subplate mounting</li> <li>Cartridge</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Port sizes</li> <li>• Mounting position</li> <li>• Direction of flow</li> <li>• Ambient temperature range</li> <li>• Suitability for special working conditions</li> </ul> | <ul style="list-style-type: none"> <li><math>\frac{3}{8}</math>" , <math>\frac{3}{4}</math>" , <math>1\frac{1}{4}</math>" nominal</li> <li>optional</li> <li>B→A</li> <li>– 20 ... + 60 °C</li> <li>Consult DENISON</li> </ul> |

### HYDRAULIC CHARACTERISTICS

- |   |  |                           |                            |                           |                            |  |          |           |           |  |          |           |           |
|---|--|---------------------------|----------------------------|---------------------------|----------------------------|--|----------|-----------|-----------|--|----------|-----------|-----------|
| <ul style="list-style-type: none"> <li>• Operating pressure range                             <ul style="list-style-type: none"> <li>– inlet (port B primary)</li> <li>– outlet (port A secondary)</li> <li>– port X</li> <li>– port Y, Y1</li> </ul> </li> <li>• Pressure setting range</li> </ul> | <ul style="list-style-type: none"> <li>0 ... 350 bar</li> <li>0 ... 350 bar</li> <li>0 ... 350 bar</li> <li>without pressure to tank</li> <li>4 ... 350 bar</li> </ul>   |                           |                            |                           |                            |  |          |           |           |  |          |           |           |
| <ul style="list-style-type: none"> <li>• Nominal flow</li> <li>• Max. flow</li> </ul>   | <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">R4R03 (<math>\frac{3}{8}</math>" )</td> <td style="width: 33%; text-align: center;">R4R06 (<math>\frac{3}{4}</math>" )</td> <td style="width: 33%; text-align: center;">R4R10 (<math>1\frac{1}{4}</math>" )</td> </tr> <tr> <td></td> <td style="text-align: center;">60 l/min</td> <td style="text-align: center;">200 l/min</td> <td style="text-align: center;">450 l/min</td> </tr> <tr> <td></td> <td style="text-align: center;">90 l/min</td> <td style="text-align: center;">300 l/min</td> <td style="text-align: center;">600 l/min</td> </tr> </table> |                           | R4R03 ( $\frac{3}{8}$ " )  | R4R06 ( $\frac{3}{4}$ " ) | R4R10 ( $1\frac{1}{4}$ " ) |  | 60 l/min | 200 l/min | 450 l/min |  | 90 l/min | 300 l/min | 600 l/min |
|   | R4R03 ( $\frac{3}{8}$ " )  | R4R06 ( $\frac{3}{4}$ " ) | R4R10 ( $1\frac{1}{4}$ " ) |                           |                            |  |          |           |           |  |          |           |           |
|   | 60 l/min   | 200 l/min                 | 450 l/min                  |                           |                            |  |          |           |           |  |          |           |           |
|   | 90 l/min   | 300 l/min                 | 600 l/min                  |                           |                            |  |          |           |           |  |          |           |           |
| <ul style="list-style-type: none"> <li>• Fluid</li> </ul>   | <ul style="list-style-type: none"> <li>Mineral oil according to DIN 51524/25 (other fluids on request)</li> </ul>  |                           |                            |                           |                            |  |          |           |           |  |          |           |           |
| <ul style="list-style-type: none"> <li>• Fluid temperature range</li> <li>• Viscosity range</li> <li>• Recommended operating viscosity</li> <li>• Contamination level</li> </ul>  | <ul style="list-style-type: none"> <li>– 18 ... + 80 °C</li> <li>10 ... 650 cSt</li> <li>30 cSt</li> <li>Max. permissible contamination level according to NAS 1638 Class 8 (Class 9 for 15 micron and smaller) or ISO 17/14</li> </ul>  |                           |                            |                           |                            |  |          |           |           |  |          |           |           |

### TYPE OF ADJUSTMENT

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• <b>Manual</b></li> <li>• Rotation</li> <li>• Operating torque</li> <li>• <b>Electric</b> (Vent valve VV01)</li> <li>• Nominal voltage</li> <li>• Permissible voltage difference</li> <li>• Max. coil temperature</li> <li>• Type of current</li> </ul> | <ul style="list-style-type: none"> <li>Handwheel</li> <li>3.75 rev.</li> <li>0.72 Nm</li> <li>by solenoid</li> <li>Refer to ordering code page 5</li> <li>+ 5 % ... – 10 %</li> <li>+ 180 °C (temperature class H)</li> <li>Alternating current (AC)</li> <li>Direct current (DC)</li> </ul> |
| <ul style="list-style-type: none"> <li>• Input power</li> <li>• Holding</li> <li>• Inrush</li> <li>• Relative operating period</li> <li>• Type of protection</li> <li>• <b>Electric proportional</b> (pilot stage P2)</li> </ul>  | <ul style="list-style-type: none"> <li>31 W</li> <li>78 VA</li> <li>264 VA</li> <li>100 %</li> <li>IP 65</li> <li>0 ... 2.5 A</li> <li>(refer to publication 3-EN 2200)</li> </ul>   |

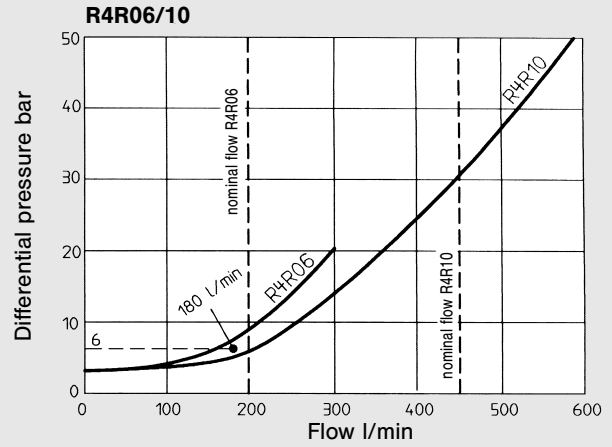
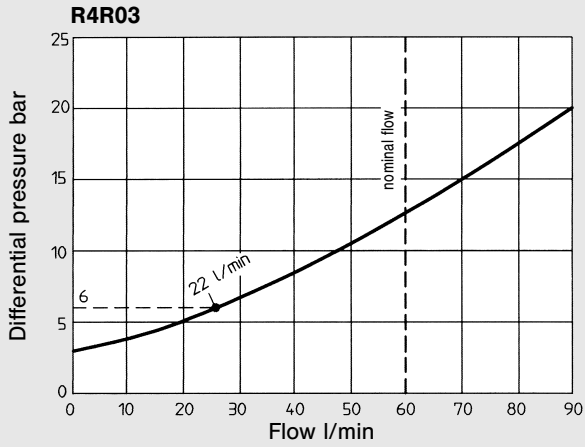
**If the performance characteristics outlined above do not meet your requirements, please consult your local DENISON Office.**

## ORDERING CODE

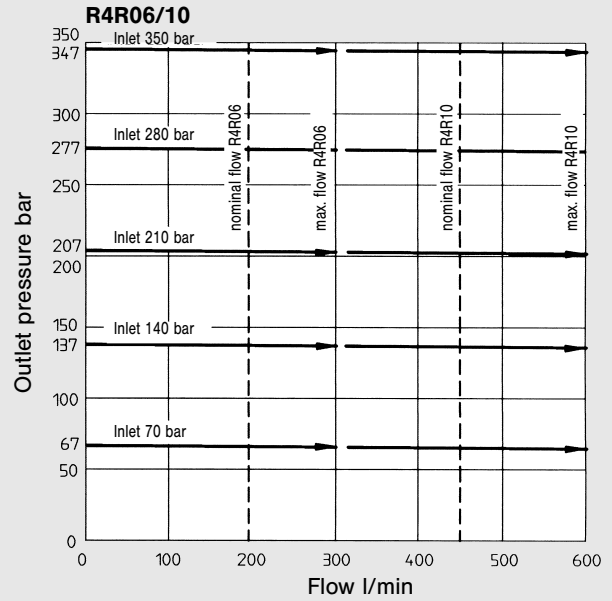
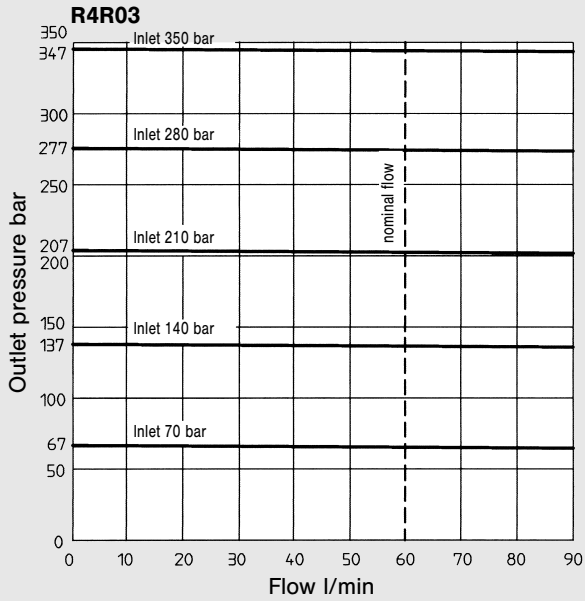
	<b>R4R</b> ..    -    .    .    -    .    .    -    .    -    ..    -    ...    - <b>B</b> .    -    .
	<div style="border: 1px dashed black; padding: 2px; width: fit-content; margin: 0 auto;">         omit for version without VV01 &amp; without P2       </div>
	<div style="display: flex; justify-content: space-around; font-size: small;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span><span>6</span><span>7</span><span>8</span><span>9</span><span>10</span><span>11</span><span>12</span><span>13</span> </div>
<p><b>1 Series</b> _____ R4R = Pressure Reducer Valve</p> <p><b>2 Size</b> _____ 03 = 3/8" 06 = 3/4" 10 = 1 1/4"</p> <p><b>3 Max. Pressure</b> _____ 0 = for cartridges only } 350 bar 5 = for body valves only }</p> <p><b>4 Body Mounting</b> _____ Cartridge with pilot valve: G = X1 + Y1 ports = G 1/4" E = X1 + Y1 ports = SAE-4 (7/16"-20 UNF) Subplate mounting: 9 = X1 + Y1 ports = G 1/4" 7 = X1 + Y1 ports = SAE-4 (7/16"-20 UNF) Threaded body: D = R4R06 = G 3/4"; L-body; X1 + Y1 ports = G 1/4" B = R4R06 = SAE-12; L-body; X1 + Y1 ports = SAE-4 (7/16"-20 UNF)</p> <p><b>5 Pressure Setting Range</b> _____ 1 = 4...105 bar 3 = 4...210 bar 5 = 4...350 bar</p> <p><b>6 Type of Control</b> _____ 1 = Hand knob 32 mm dia. 2 = Hand knob 50 mm dia. (not for version with vent valve VV01 or P2) 3 = Acorn nut with lead seal 4 = Adjusting device with key lock, key order no. 700-70619-8</p> <p><b>7 Drain Line</b> _____ 1 = external from the subplate or manifold (Y). 2 = external from the pilot head (Y1)</p> <p><b>8 3-Way Vent Valve VV01</b> _____ 09 = with manual override } Solenoid de-energized: open to tank 10 = without manual override } Solenoid energized: vent line blocked 11 = with manual override } Solenoid de-energized: vent line blocked 12 = without manual override } Solenoid energized: open to tank</p> <p><b>9 P2 = Electric Proportional Pressure Control (12 V DC only)</b> _____</p> <p><b>10 Solenoid Voltage and Current</b> _____ W01 = 115 V / 60 Hz } W02 = 230 V / 60 Hz } AC W06 = 115 V / 50 Hz } W07 = 230 V / 50 Hz } 1) G0R = 12 V } G0Q = 24 V } DC G0H = 48 V } 1) R4R with P2 = P2-G0R only</p> <p><b>11 Design Letter</b> _____</p> <p><b>12 Seal Class</b> _____ 1 = NBR (Buna N) Standard 4 = EPDM 5 = FPM (Viton®)</p> <p><b>13 Modifications</b> _____</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p><b>1 Series</b> _____ R4R = Pressure Reducer Valve</p> <p><b>2 Size</b> _____ 03 = 3/8" 06 = 3/4" 10 = 1 1/4"</p> <p><b>3 Max. Pressure</b> _____ 0 = for cartridges only } 350 bar 5 = for body valves only }</p> <p><b>4 Body Mounting</b> _____ Cartridge with pilot valve: G = X1 + Y1 ports = G 1/4" E = X1 + Y1 ports = SAE-4 (7/16"-20 UNF) Subplate mounting: 9 = X1 + Y1 ports = G 1/4" 7 = X1 + Y1 ports = SAE-4 (7/16"-20 UNF) Threaded body: D = R4R06 = G 3/4"; L-body; X1 + Y1 ports = G 1/4" B = R4R06 = SAE-12; L-body; X1 + Y1 ports = SAE-4 (7/16"-20 UNF)</p> <p><b>5 Pressure Setting Range</b> _____ 1 = 4...105 bar 3 = 4...210 bar 5 = 4...350 bar</p> <p><b>6 Type of Control</b> _____ 1 = Hand knob 32 mm dia. 2 = Hand knob 50 mm dia. (not for version with vent valve VV01 or P2) 3 = Acorn nut with lead seal 4 = Adjusting device with key lock, key order no. 700-70619-8</p> <p><b>7 Drain Line</b> _____ 1 = external from the subplate or manifold (Y). 2 = external from the pilot head (Y1)</p> <p><b>8 3-Way Vent Valve VV01</b> _____ 09 = with manual override } Solenoid de-energized: open to tank 10 = without manual override } Solenoid energized: vent line blocked 11 = with manual override } Solenoid de-energized: vent line blocked 12 = without manual override } Solenoid energized: open to tank</p> <p><b>9 P2 = Electric Proportional Pressure Control (12 V DC only)</b> _____</p> <p><b>10 Solenoid Voltage and Current</b> _____ W01 = 115 V / 60 Hz } W02 = 230 V / 60 Hz } AC W06 = 115 V / 50 Hz } W07 = 230 V / 50 Hz } 1) G0R = 12 V } G0Q = 24 V } DC G0H = 48 V } 1) R4R with P2 = P2-G0R only</p> <p><b>11 Design Letter</b> _____</p> <p><b>12 Seal Class</b> _____ 1 = NBR (Buna N) Standard 4 = EPDM 5 = FPM (Viton®)</p> <p><b>13 Modifications</b> _____</p> </div>

# CURVES

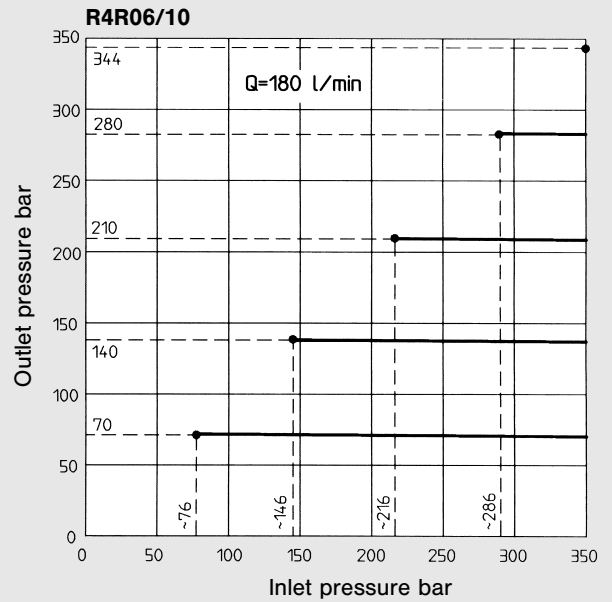
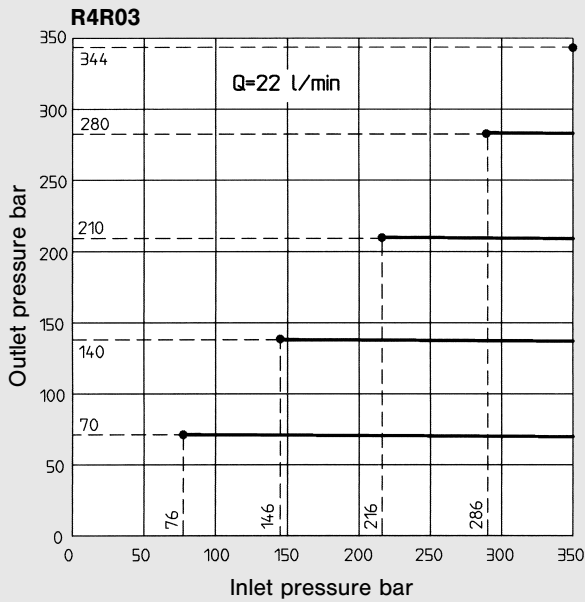
**Minimum differential pressure between inlet & outlet pressure at various flow rates**



**Variation in outlet pressure for variation in flow rate**



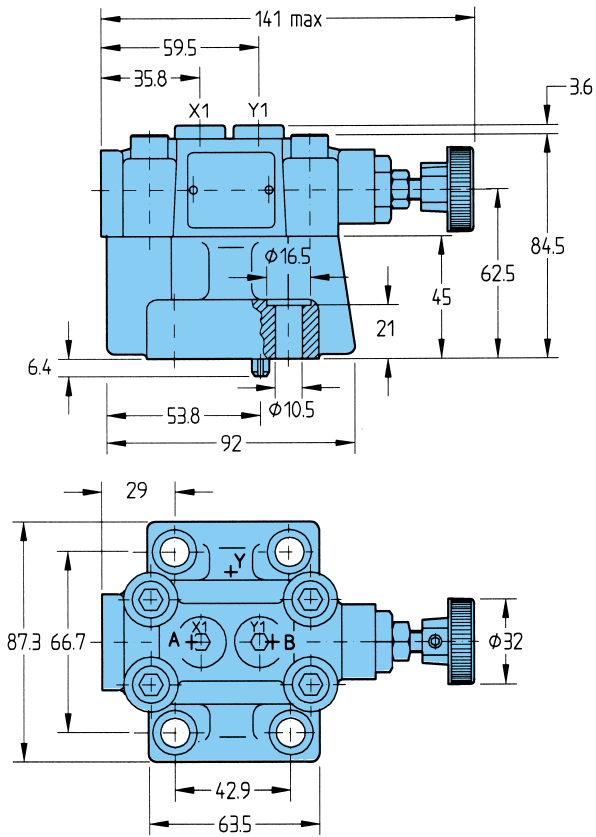
**The effect of inlet pressure variation on outlet pressure setting**





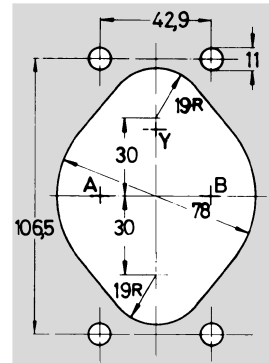
## R4R03 (3/8") SUBPLATE MOUNTING

Weight: 2.7 kg



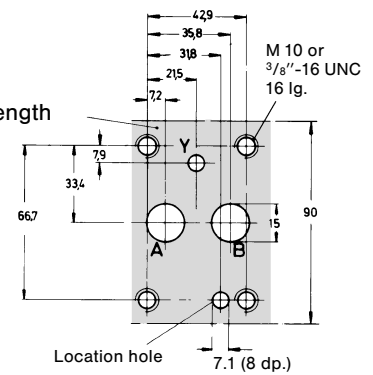
Ports	Function
B	Pressure (inlet)
A	Pressure (outlet)
X1	Remote control or vent connection
Y, Y1	external drain

### Panel opening



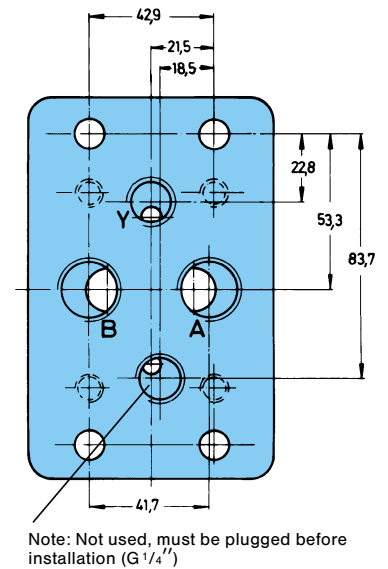
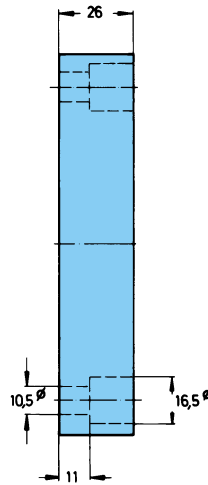
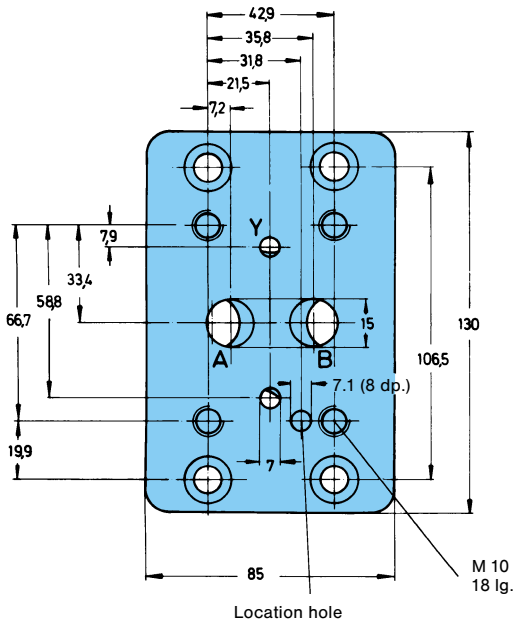
### Block mounting face

Flatness 0.01 mm / 100 mm length  
Surface finish CLA 1.27 µm



### SUBPLATE

Weight: 2 kg



Model No.	Order No.	Port sizes		4 Mounting screws* (Torque 68 Nm)		
		A + B	Y	Dimension	Order No.	min. tensile strength
SS-B-08-G 113	S16-63124-0	G 1/2"	G 1/4"	M 10 x 35 DIN 912-12.9	700-70039-8	at p ≤ 210 bar = 100 daN/mm <sup>2</sup> at p > 210 bar = 120 daN/mm <sup>2</sup>

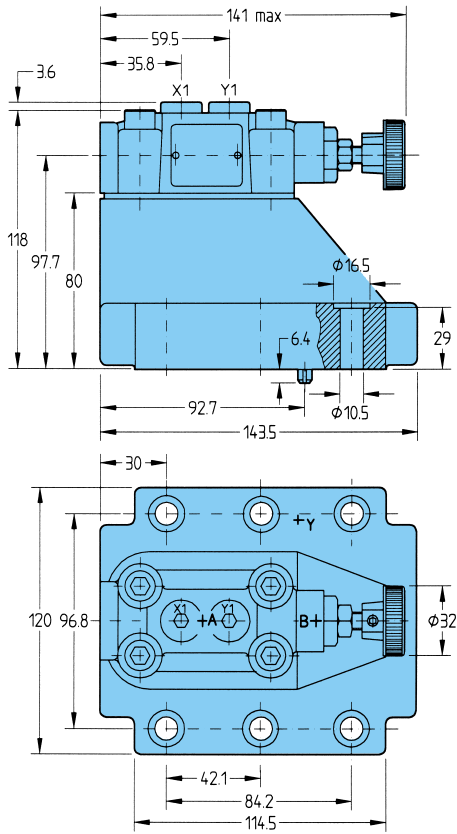
\* Mounting screws are included in subplate order.  
For valves ordered without subplate, mounting screws must be ordered separately.





## R4R10 (1 1/4") SUBPLATE MOUNTING

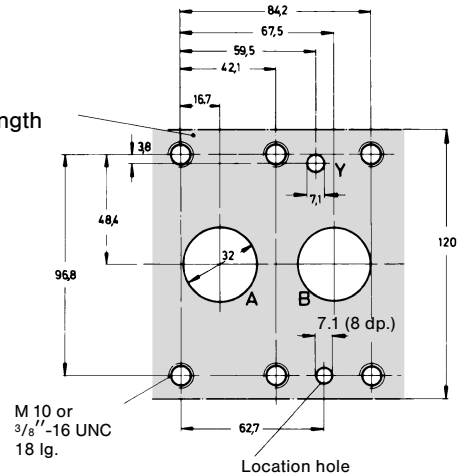
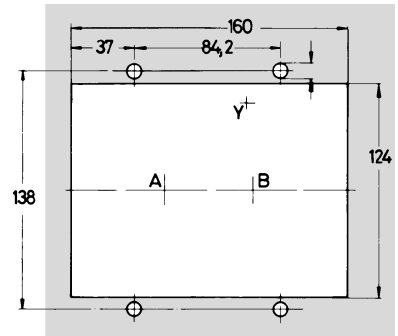
Weight: 6 kg



Ports	Function
B	Pressure (inlet)
A	Pressure (outlet)
X1	Remote control or vent connection
Y, Y1	external drain

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

Panel opening

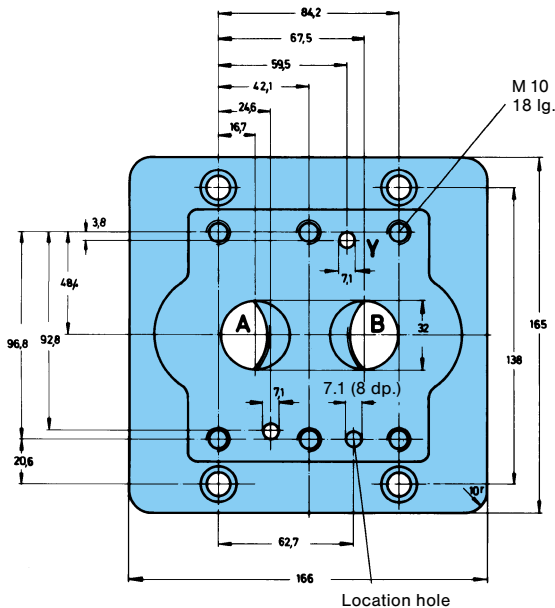


M 10 or 3/8"-16 UNC 18 lg.

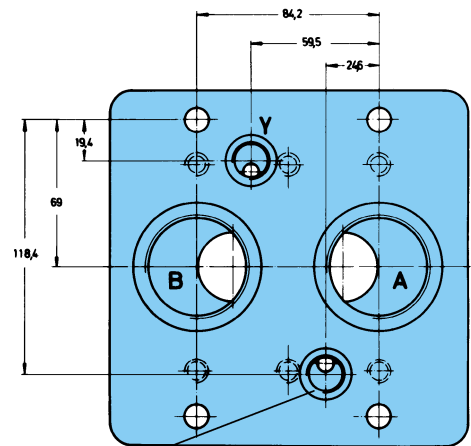
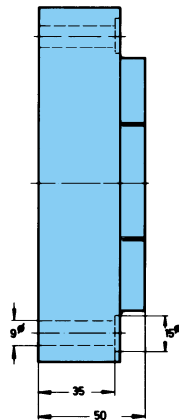
Location hole

## SUBPLATE

Weight: 8.5 kg



Location hole



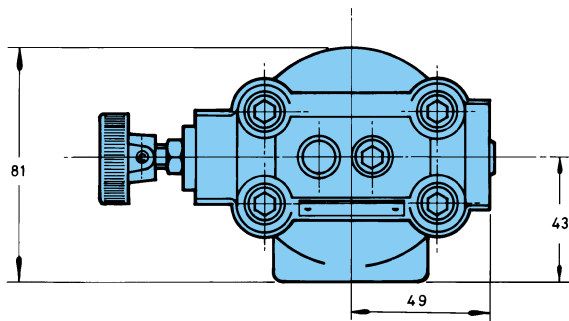
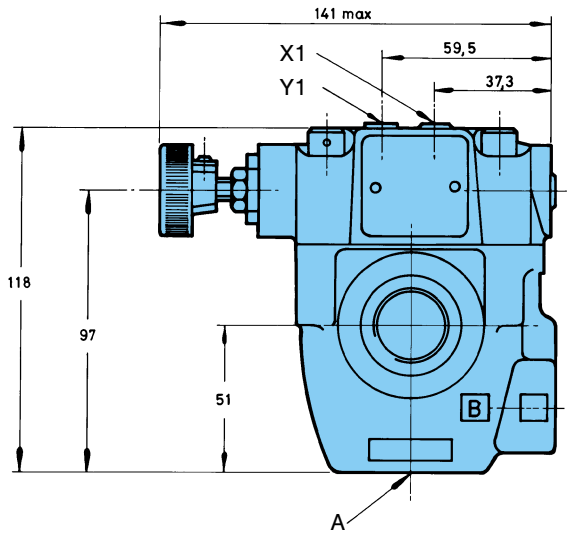
Note: Not used, must be plugged before installation (G 1/4")

Model No.	Order No.	Port sizes		6 Mounting screws* (Torque 68 Nm)		
		A + B	Y	Dimension	Order No.	min. tensile strength
SS-B-24-G 117	S16-39197-0	G 1 1/2"	G 1/4"	M 10 x 45 DIN 912-12.9	700-71602-8	at p ≤ 210 bar = 100 daN/mm <sup>2</sup> at p > 210 bar = 120 daN/mm <sup>2</sup>

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

## R4R06 (3/4") THREADED BODY

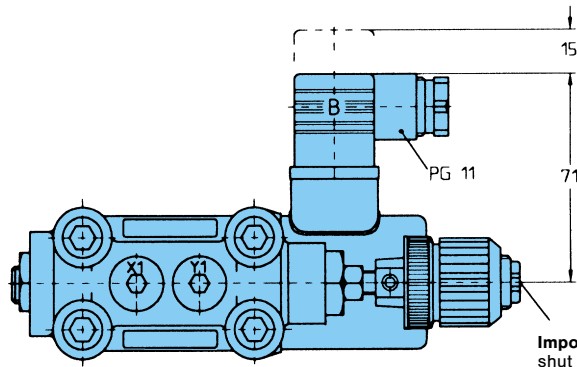
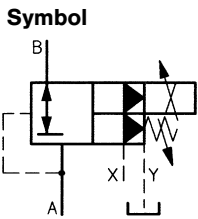
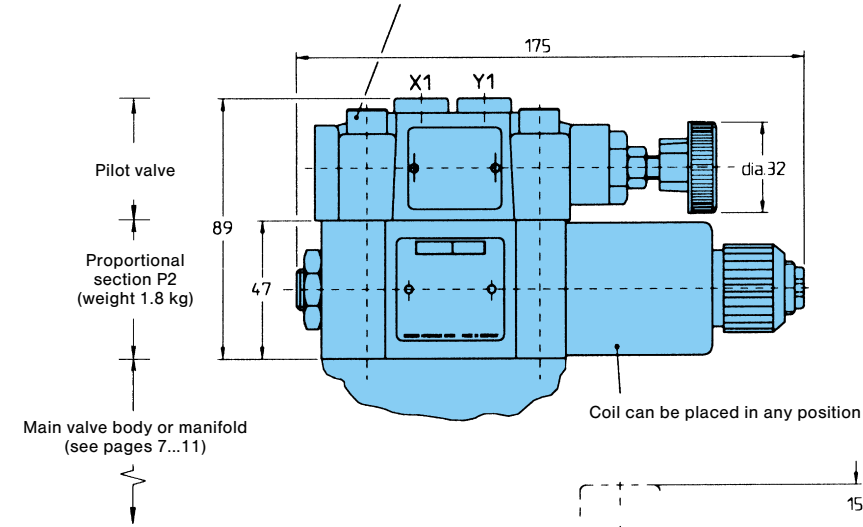
Weight: 3.3 kg



Ports	Function	Port Sizes
B	Pressure (inlet)	G 3/4" or SAE-12 (1 1/16"-12 UN)
A	Pressure (outlet)	G 3/4" or SAE-12 (1 1/16"-12 UN)
X1	ext. remote control or vent connection	G 1/4" or SAE- 4 (7/16"-20 UNF)
Y1	external drain	G 1/4" or SAE- 4 (7/16"-20 UNF)

## PROPORTIONAL PRESSURE REDUCER VALVE R4R...P2

Screws for additional proportional section installation  
 4 x 3/8"-24 UNF x 3 1/2" lg., order no. 359-15340-0.



### Drain Line

The pilot drain port must be connected to a stable low pressure tank line. Pressure variations in the drain port should be avoided.

- a) external from the pilot head (Y1) with threaded body.
- b) external from the pilot head (Y1) or from the subplate (Y) (with subplate body).

Distance required to remove plug-in connector.  
 Plug-in connector supplied as standard.

**Important:** On initial start up and after long shut down periods bleed air from this plug.

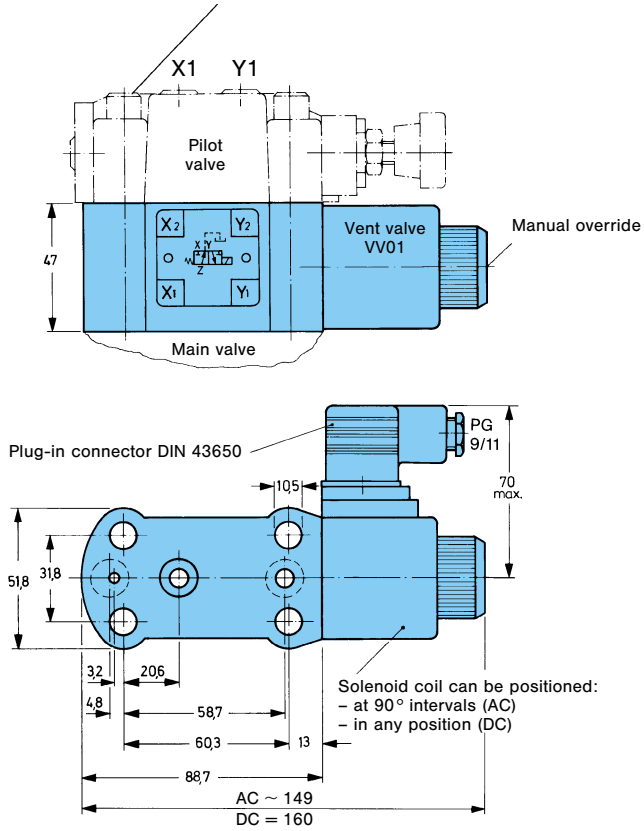
### Note:

For full details of the proportional section refer to bulletin 3-EN 2200.  
 For additional installation with pilot operated control valves please consult DENISON.

## VERSION WITH VENT VALVE VV01

Weight (VV01): 1.7 kg

Screws for additional vent valve installation  
 4 x 3/8"-24 UNF x 3 1/2" lg., order no. 359-15340-0.



**Symbols:**

R4R Reducer Valve with Vent Valve VV01

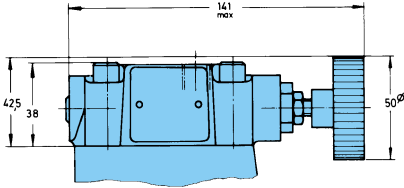
Code	External Drain
11 or 12	
09 or 10	

**Note:**

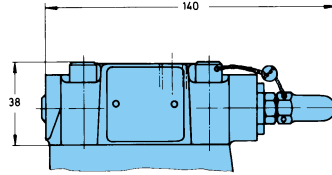
For full details of the vent valve VV01 refer to bulletin 3-EN 215.

## ADDITIONAL TYPES OF CONTROL

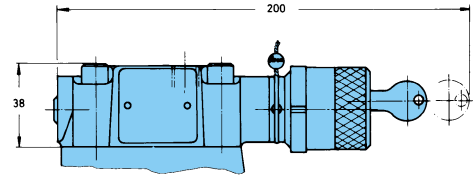
**Type of Control-Code 2**  
Hand knob 50 mm dia.  
(not for version with  
vent valve VV01 or P2)



**Type of Control-Code 3**  
Acorn nut with lead seal



**Type of Control-Code 4**  
Adjusting device with key lock.  
Key must be ordered separately,  
order-no. 700-70619-8



The product described is subject to continual development and the manufacturer reserves the right to change the specifications without notice.