VH Series pressure controls are ideal for use in high pressure and high shock systems. These pilot-operated poppet style valves provide fast response to circuit conditions.

Relief valves regulate pressure and provide circuit protection at pressures to 15,000 psi (1040 bar).

Unloading valves divert pump output to tank in response to pilot pressure signal.

Decompression valves reduce flow surges in high pressure systems. Excess flow is metered to tank, in response to an electrical or pressure signal to the valve control.

High transient flows in a circuit when a cylinder is reversed, for example, can cause directional valves not to shift. Metering the excess flow to tank before shifting the directional control valve prevents this problem.

These valves also reduce system decompression vibration and noise.

SIMPLIFIED CIRCUIT CONTROL

Models with optional vent control can be remotely actuated by an external signal. These valves use an integral Dynex VSTV seated control valve with solenoid, air or hydraulic actuator.

See “Valve Operation and Venting Functions” on page 2.

SUITABLE FOR SPECIAL FLUIDS

These valves can be used with some water-based, fire-resistant and other special fluids.

The properties of these special fluids include a combination of high or low viscosity with either high or low lubricity. They include water glycol, various military fluids, Skydrol and other phosphate ester fluids.

Contact the Dynex sales department for complete information.

HIGH PRESSURE APPLiCATIONS

High pressure capability and compatibility with special fluids make these valves ideal for use in metal processing hydrostatic lube or roll balance systems.

They are also well suited for development or production test-stands, aircraft ground support equipment, Hydroforming and other hydraulic presses, and other demanding applications.

SPECIFICATIONS

Rated Pressure

Model VHR Relief Valves:
Maximum 10,000 psi (700 bar) or 15,000 psi (1040 bar);
Model VHU Unloading Valves:
Maximum 7000 psi (490 bar) or 10,000 psi (700 bar), with pilot unloading pressure to 15,000 psi (1040 bar);
Model VHD Decompression Valves:
Maximum 10,000 psi (700 bar) or 15,000 psi (1040 bar);

Maximum Drain Port Pressure

(Optional Electric Vent)

Standard:
1000 psi (70 bar) dynamic,
3000 psi (210 bar) static;
High Pressure Drain “D” Option;
refer to model code, page 4:
3000 psi (210 bar) dynamic,
5000 psi (350 bar) static;

Rated Flow

Model VHR Relief and Model VHU Unloading Valves:
15 gpm (57 L/min) nominal,
30 gpm (114 L/min) maximum;
Model VHD Decompression Valves:
25 gpm (95 L/min) nominal,
30 gpm (114 L/min) maximum

Valve Adjustments

On relief or unloading valves, pressure is preset by turning the knurled knob adjustment clockwise to increase pressure.

On decompression valves, turning the internal hex adjustment counter-clockwise increases the flow rate metered to tank.
Valve Operation and Venting Functions

**BASIC OPERATION**
Relief valves are normally closed controls that regulate pressure to a desired preset maximum. Their most common use is to protect against excessive system pressure.

Unloading valves can divert pump output to tank in response to an external pilot signal. These valves are commonly used in “Hi-Lo” or accumulator unloading circuits. Maximum pilot pressure is 15,000 psi (1040 bar).

Decompression valves reduce flow surges in a circuit. The valves shift, in response to pilot pressure or an electrical signal, and meter excess flow to tank.

**VENTING FUNCTION**
These valves can include a venting function, unloading pump output during start-up or idle portions of a machine cycle.

Venting can be done in two ways:
First, venting can be remotely controlled by a separate control valve in the circuit. These circuits can use VH models with a remote vent port (“AV”, “BV” or “SV” option).

Subplate models can be ordered with the “Vent Port Blocked”, with venting done through the port in the mounting surface. Available on VHR and VHD models only.

Second, venting can be controlled by an integrally mounted Dynex VST vent valve. This option is available with solenoid, air or hydraulic actuator and either normally-open or normally-closed configurations.

**TYPICAL PERFORMANCE CURVES**
The curves are based on typical performance with the use of 100 SUS (20 cSt) petroleum-based fluid.

The pressure drop curve shows resistance to flow with the valve in a vented condition.

The VHU curves show the unloading and reset pressure ranges for models with either pressure option.

The VHD curves indicate the decompression settings. For example, in an 8000 psi (560 bar) system, turning the control 1/8 turn, or 45°, will meter about 17 gpm (64 L/min) to tank.
Application and Installation Data

APPLICATION NOTES
Mounting Position
Unrestricted for all models

Fluid Viscosity
Recommendations
50 to 1500 SUS (7 to 323 cSt) viscosity; -20° to 200° F (-29° to 93° C) temperature range.

Seals
Standard fluorocarbon (Viton® or Fluorel®). Options include Buna-N (nitrile) or EPR for use with some phosphate ester fluids. Contact the Dynex sales department for recommended operating conditions.

Filtration
Use filtration to provide fluid which meets ISO cleanliness level 19/17/14 (ISO Code 4406) or cleaner.

Weight (Mass)
Standard: 18 lb (8.2 kg); With Vent Valve: 24 lb (10.9 kg)

INSTALLATION & DIMENSIONS
Installation drawing dimensions are shown in inches (millimeters in parentheses) and are nominal.

As shown in gray, the relief function head can be rotated 90° counterclockwise, viewed from the control end (“R9” option). On VHD models, the decompression control head replaces the relief head.

Venting Options
VHD decompression valves must be vented for proper operation.

On other non-venting models, the remote vent port in the vent block is plugged.

The integral vent option uses a Dynex VSTV valve, shown printed in gray (solenoid valve shown as reference).

External Drain Port
Piping the external drain is mandatory for all models. There is no provision for internal drain.

Subplate Models
Subplate mounted relief and decompression valves can be vented through the vent port in the mounting surface.

Port o-rings are included with subplate models. Bolts must be ordered separately: .500-13 U.N.C. Threaded x .78 (19,9) Internal HEX.

The subplate kits include mounting bolts when ordering valves and subplates together, the valves are not mounted.

Subplate Mounted VHR Relief Valve, VHU Unloading Valve and VHD Decompression Head

<table>
<thead>
<tr>
<th>Item (Part Number)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subplate (PSO33-VHS-3/4-14 MP)</td>
<td>Side Ports, Medium Pressure Coned and Threaded&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Subplate (PSO33-VHS-BSPP-12)</td>
<td>Side Ports, G 3/4 (BSP)&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Bolt Kit (P33-BK)</td>
<td>(4) .500-13 U.N.C. Threaded x 3.00 Inches (76,2mm)</td>
</tr>
</tbody>
</table>

<sup>1</sup> High pressure “P” port used with Autoclave Medium Pressure, Butech M/P or equivalent fitting.
<sup>2</sup> Ports used with British Standard Pipe fitting.
Line Mounted VHR Relief, VHU Unloading Valve and VHD Decompression Head

### VHR — 10 L 2 — A — EO — 115HA — N — 1 0

**Valve Type**
- VHR — Relief Valve
- VHU — Unloading Valve
- VHD — Decompression Valve

**Pressure**
- 7 — 7000 psi (490 bar) Maximum
- 10 — 10 000 psi (700 bar) Maximum
- 15 — 15 000 psi (1040 bar) Maximum

1. Available with unloading valve only.
2. Not available with unloading valve.

**Valve Mounting**
- L — Line Mounted
- S — Subplate Mounted

### Flow
- 2 — Relief and Unloading: 15 gpm (57 L/min) nominal, 30 gpm (114 L/min) maximum; Decompression: 25 gpm (97 L/min) nominal, 30 gpm (114 L/min) maximum

### Function Options

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Code</td>
<td>Vent Port Blocked&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>AV</td>
<td>Vent Port, 1/4 High Pressure Coned and Threaded, 9/16-18 U.N.F.-2B&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>BV</td>
<td>Vent Port, G 1/4 (BSP)&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>SV</td>
<td>Vent Port (No. 4 S.A.E.)&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>EO</td>
<td>Electric Vent, Normally Open</td>
</tr>
<tr>
<td>EC</td>
<td>Electric Vent, Normally Closed</td>
</tr>
<tr>
<td>AC</td>
<td>Air Vent, Normally Open</td>
</tr>
<tr>
<td>N</td>
<td>Buna-N&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td>E</td>
<td>EPDM&lt;sup&gt;6&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

1. Not available with line mounted decompression valve.
2. Vent port used with Autoclave, Butech or equivalent fittings.
3. Vent port used with Electric or Hydraulic Vent functionalities.
4. Vent port used with Electric or Hydraulic Vent functionalities.
5. Not recommended for operation above 10 000 psi (700 bar).

### Design Number
- 1 — Unloading
- 2 — Relief and Decompression

### Seals
- No Code — Viton (Standard)
- N — Buna-N<sup>5</sup>
- E — EPDM<sup>6</sup>

1. Not available on Electric Vent models.

### Electric Vent Options
- PLUG-IN TERMINAL SOLENOIDS:
  - 115HA — Dual Frequency, 115/60, 110/50
  - 230HA — Dual Frequency, 230/60, 220/50
  - 12HD — Direct Current, 12 Volts
  - 24HD — Direct Current, 24 Volts

### Options:
- D — High Pressure Drain, Maximum: 3000 psi (210 bar) dynamic
- M — Hand Actuated Manual Override

### Port Sizes (Line Mounted Only)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pressure Port: 3/4 Medium Pressure Coned and Threaded (3/4-14 N.P.S.M.); Tank Port: No. 12 S.A.E.; Pilot Port (for unloading function): G 1/8 (BSP)&lt;sup&gt;7&lt;/sup&gt;</td>
</tr>
<tr>
<td>B</td>
<td>Pressure and Tank Port: G 3/4 (BSP); Pilot Port (for unloading function): G 1/8 (BSP)&lt;sup&gt;7&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

1. Pressure and pilot port (for unloading function) used with Autoclave, Butech or equivalent fittings.
2. Ports used with British Standard Pipe fittings. Not recommended for operation above 10 000 psi (700 bar).

Specifications shown were in effect when published. Since errors or omissions are possible, contact your sales representative for most current specifications before ordering. Dynex reserves the right to discontinue products or change designs at any time without incurring any obligation.

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