

High Pressure Relief, Unloading And Decompression Valves

VH SERIES
30 gpm (114 L/min)
7000 to 15 000 psi (490 to 1040 bar)

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.



Subplate Mounted VH Series Relief Valve with Electric Vent Option

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

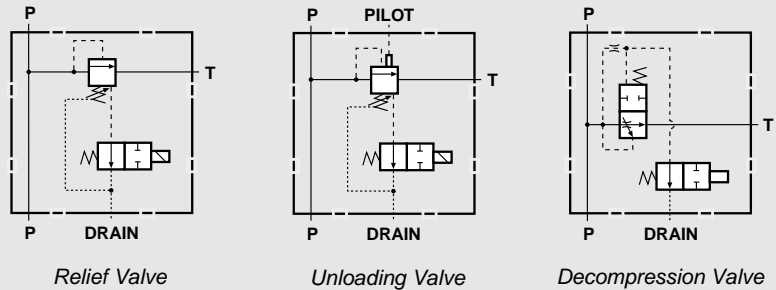
The curves are based on typical performance with the use of 100 SUS (20 cSt) petroleum-based fluid.

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

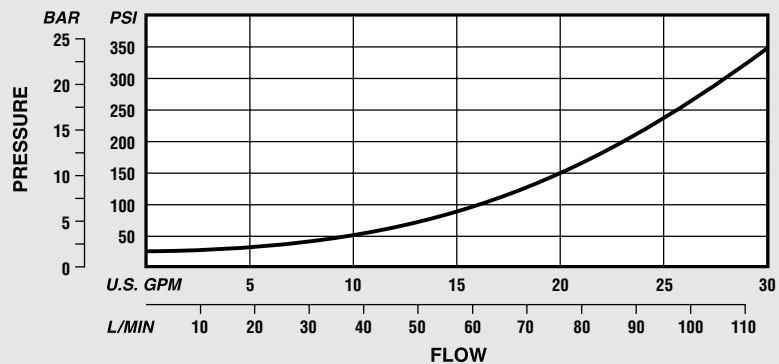
The VHU curves show the unloading and reset pressure ranges for models with either pressure option.

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.

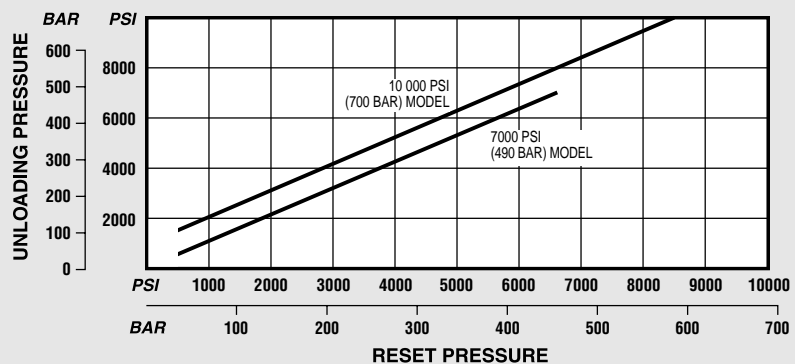
NORMALLY-OPEN ELECTRIC VENT FUNCTION (Line Mounted Valves Shown)



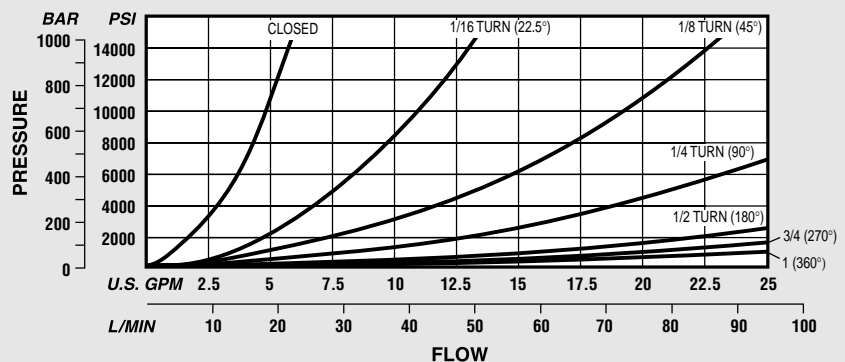
MODEL VHR, VHU AND VHD VENTED PRESSURE DROP (ΔP)



MODEL VHU UNLOADING VS. RESET PRESSURE



MODEL VHD DECOMPRESSION CONTROL SETTINGS



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° counter-clockwise, 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.

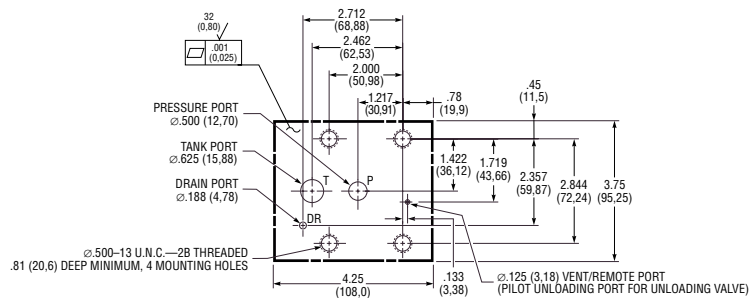
Port o-rings are included with subplate models. Bolts must be ordered separately: .500-13 U.N.C. Threaded x 3.00 inches (76,2 mm), grade 8 or better; four required. Recommended mounting torque is 130 lb-ft (176 N·m).

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

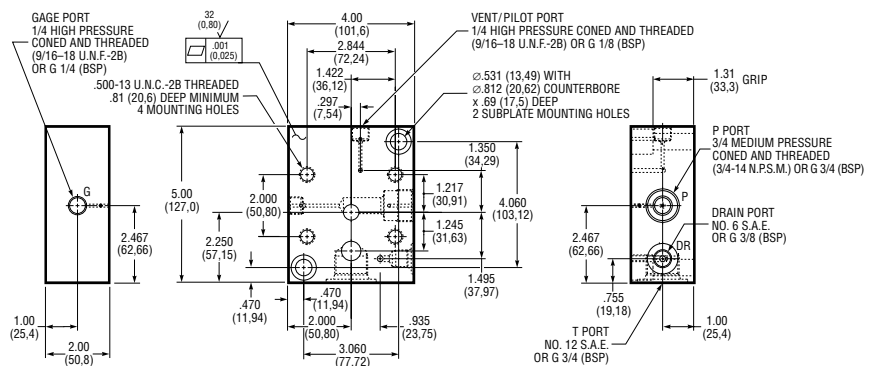
SUBPLATE AND BOLT KITS

Item (Part Number)	Description
Subplate (PSO33-VHS-3/4-14 MP)	Side Ports, 3/4-14 N.P.S.M. Medium Pressure Coned and Threaded ^①
Subplate (PSO33-VHS-BSPP-12)	Side Ports, G 3/4 (BSP) ^②
Bolt Kit (P33-BK)	(4) .500-13 U.N.C. Threaded x 3.00 Inches (76,2mm)

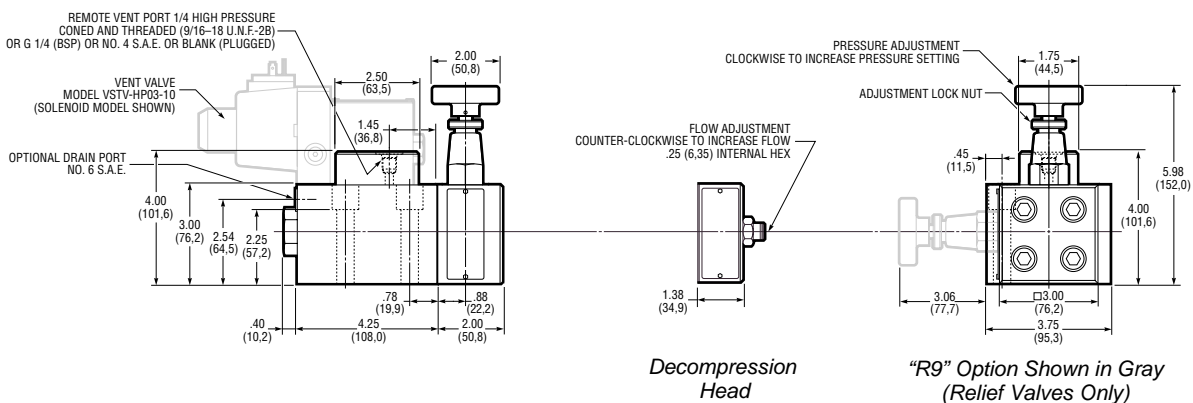
- ① High pressure "P" port used with Autoclave Medium Pressure, Butech M/P or equivalent fitting.
- ② Ports used with British Standard Pipe fitting.



Minimum Mounting Surface



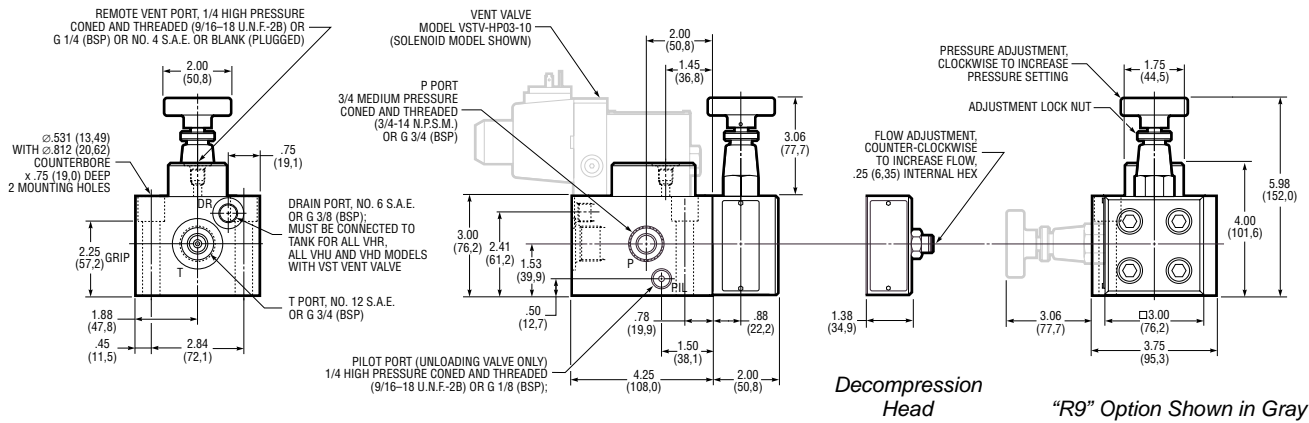
PSO33-VHS-3/4-14 MP or PSO33-VHS-BSPP-12 Subplate



Decompression Head

"R9" Option Shown in Gray (Relief Valves Only)

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



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

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

<p>Valve Type</p> <p>VHR — Relief Valve VHU — Unloading Valve VHD — Decompression Valve</p>	<p>Function Options</p> <p>No Code — Vent Port Blocked^① AV — Vent Port, 1/4 High Pressure Coned and Threaded, 9/16-18 U.N.F.-2B^{②③} BV — Vent Port, G 1/4 (BSP)^{③④} SV — Vent Port (No. 4 S.A.E.)^{③⑤} EO — Electric Vent, Normally Open EC — Electric Vent, Normally Closed AO — Air Vent, Normally Open AC — Air Vent, Normally Closed HO — Hydraulic Vent, Normally Open HC — Hydraulic Vent, Normally Closed R9 — Control Head Rotated Counter-Clockwise 90° (9 o'clock position)^⑥</p>	<p>Design Number</p> <p>1 — Unloading 2 — Relief and Decompression</p>
<p>Pressure</p> <p>7 — 7 000 psi (490 bar) Maximum^① 10 — 10 000 psi (700 bar) Maximum 15 — 15 000 psi (1040 bar) Maximum^②</p>	<p>Port Sizes (Line Mounted Only)</p> <p>A — 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): 1/4 High Pressure Coned and Threaded (9/16-18 U.N.F.-2B)^① B — Pressure and Tank Port: G 3/4 (BSP); Pilot Port (for unloading function): G 1/8 (BSP)^②</p>	<p>Modification Number</p> <p>No Code — Viton (Standard) N — Buna-N^① E — EPR^①</p>
<p>Valve Mounting</p> <p>L — Line Mounted^① S — Subplate Mounted</p>	<p>Flow</p> <p>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</p>	<p>Electric Vent Options</p> <p>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</p> <p>OPTIONS: D — High Pressure Drain, Maximum: 3000 psi (210 bar) dynamic, 5000 psi (350 bar) static M — Hand Actuated Manual Override</p>

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

① Not available with line mounted decompression valve.
② Vent port used with Autoclave, Butech or equivalent fittings.
③ Vent port in body not available with Electric, Air or Hydraulic Vent functions.
④ Vent port used with British Standard Pipe fittings. Not recommended for operation above 10 000 psi (700 bar).
⑤ Not recommended for operation above 8000 psi (560 bar).
⑥ Available with relief valve function only.

① Not available on Electric Vent models. Contact the Dynex sales department for complete ordering information.

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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