DYNEX
High Pressure Hydraulics

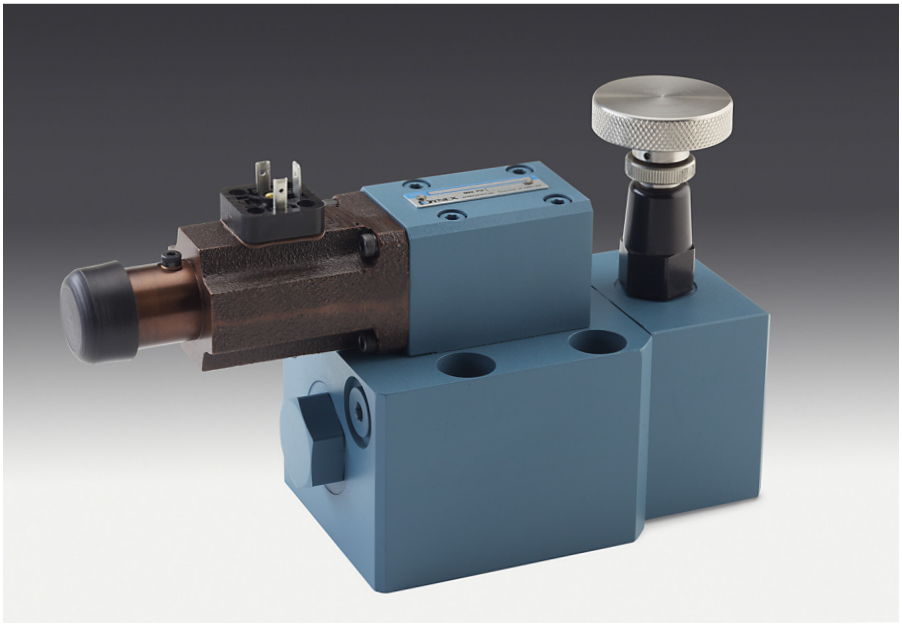
ENGINEERING SPECIFICATIONS

High Pressure Valves for Relief, Unloading and Decompression

VH SERIES
30 gpm (114 L/min)
7000 to 15000 psi (490 to 1400 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.

VH Series pressure controls are available in Relief, Unloading and Decompression models.



HIGH PRESSURE APPLICATIONS

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

PROPORTIONAL CONTROL

An electro-proportional solenoid option allows remote setting of the relief pressure via an electrical command signal.

Fluid Viscosity Recommendations

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

WIDE RANGE OF FLUID COMPATABILITY

These valves are compatible with conventional, low-viscosity, and some special fluids.

Contact the Sales department for specific information regarding use with water-based, fire-resistant and other special fluids.

Recommended Filtration

Use filtration to provide fluid which meets these ISO Code 4406 cleanliness values: 19/17/14.

Seals

Standard fluorocarbon (Viton® or Fluorel®). Options include Buna-N (nitrile) or EPR or use with some phosphate ester fluids.

Selection Table

Valve Type	Model	Max Pressure		Rated Flow		Max Flow		Mounting	Ex. Pilot	Ex. Drain①
		psi	bar	U.S. gpm	L/min	U.S. gpm	L/min			
Relief	VHR-10L2	10000	700	15	57	30	114	Line	NA	Optional
	VHR-15L2	15000	1040	15	57	30	114	Line	NA	Optional
	VHR-10S2	10000	700	15	57	30	114	Subplate	NA	Optional
	VHR-15S2	15000	1040	15	57	30	114	Subplate	NA	Optional
Unloading	VHU-7L2	7000	490	15	57	30	114	Line	Mandatory	Mandatory
	VHU-7S2	7000	490	15	57	30	114	Subplate	Mandatory	Mandatory
Decompression	VHD-10L2	10000	700	25	95	30	114	Line	NA	Optional
	VHD-15L2	15000	1040	25	95	30	114	Line	NA	Optional
	VHD-10S2	10000	700	25	95	30	114	Subplate	NA	Optional
	VHD-15S2	15000	1040	25	95	30	114	Subplate	NA	Optional

① *Drain port must be connected to tank for all VHR, VHU, and VHD models with VST vent valves.*

VALVE OPERATION

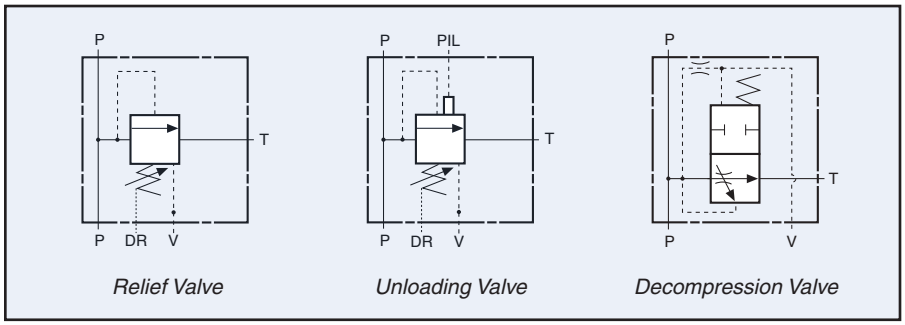
Basic Functions

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.

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.

Schematic – Manual Control



VENTING FUNCTION

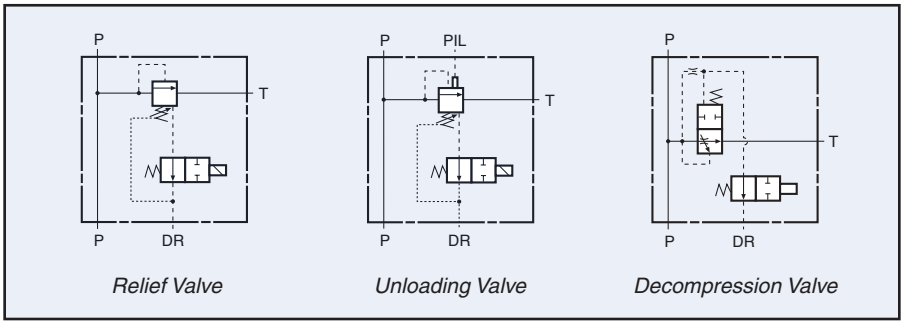
These valves can provide venting, unloading pump output during start-up or idle portions of a machine cycle.

Venting can be done in two ways.

First, venting can be achieved by a separate control valve in the circuit, with pilot pressure supplied to a remote vent port ("AV", "BV" or "SV" option). Subplate mounted relief and decompression valves can be vented through the vent port in the mounting surface.

Second, venting can be achieved by an integrally mounted Dynex model VSTV seated vent valve. To specify, refer to the installation drawings on page 5 and *Typical Model Code* on page 6.

Schematic – Electric Vent Function (Normally-Open)



ELECTRIC VENT SPECIFICATIONS

Electric Vent Drain Port Pressure

Maximum Pressure, Standard Models:
1000 psi (70 bar) dynamic.
3000 psi (210 bar) static.

Electrical Connections

Plug-In-Terminal Solenoids fit Deutsch DT04-2P Connector, or DIN 43650 Form A (Hirschmann Type) Connector.

Solenoid Electrical Data

Solenoid Type①	Volts	Frequency (Hz)②	Coil Resistance (Ohms) at +77° F (+25°C)	Power (Watts)
AC Standard	24AC	60	10.45 - 11.55	36
	115AC	60	250 - 276	36
	230AC	60	–	36
DC Standard	12DC	–	3.8 - 4.2	36
	24DC	–	15.1 - 16.9	36
	125DC	–	368 - 408	36

① *See "Typical Model Code" on page 6 for connector options.*
② *Information shown is for 60Hz models only. At other frequencies the coil characteristics must be revised.*

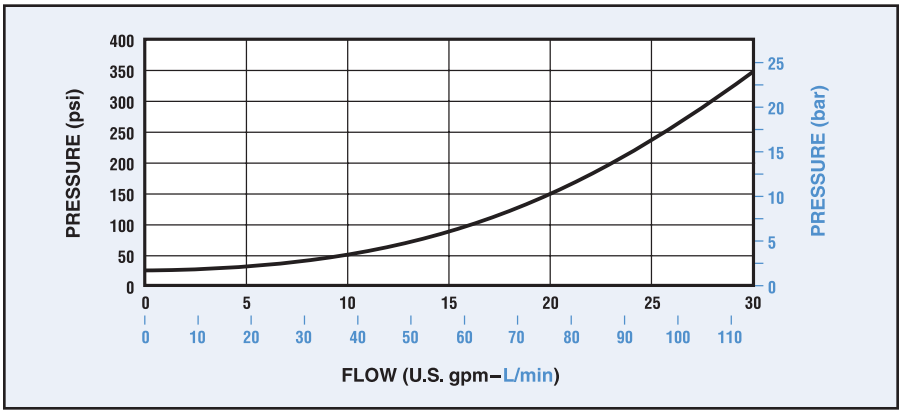
TYPICAL PERFORMANCE CURVES

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

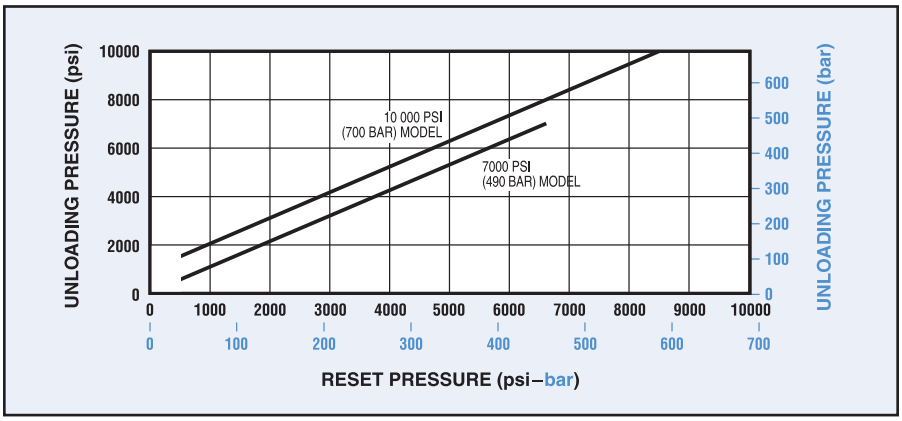
The VHU curves show the unloading and reset pressure ranges for models with either pressure option.

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.

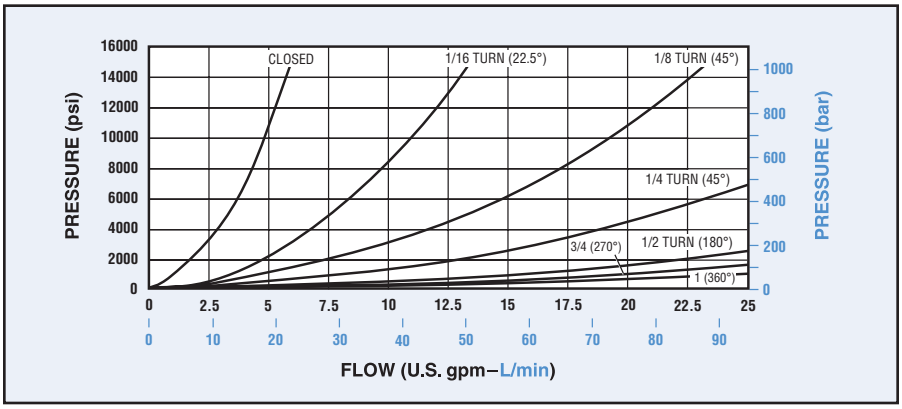
Model VHR, VHU and VHD Vented Pressure Drop (ΔP)



Model VHU Unloading vs. Reset Pressure



Model VHD Decompression Control Settings



Curves are based on 100 SUS (20cSt) petroleum-based fluid at 120°F (50°C).

PROPORTIONAL VALVE OPERATION

Valve Adjustments

The manual handwheel is used to set the maximum pressure (*clockwise* to increase).

An electrical signal dictates the pressure setting between maximum and minimum value.

Minimum pressure depends on flow rate through the value and can be found on *Vented Pressure Drop* curve on page 3.

Electrical Data:

Pressure can be set proportional to a variable electrical signal:

10 VDC, 0 to 2.25 Amp, or
24 VDC, 0 to 0.95 Amp.

10 VDC Input Current: 2.25 Amp max.
24 VDC Input Current: 0.95 Amp max.

Coil Resistance:

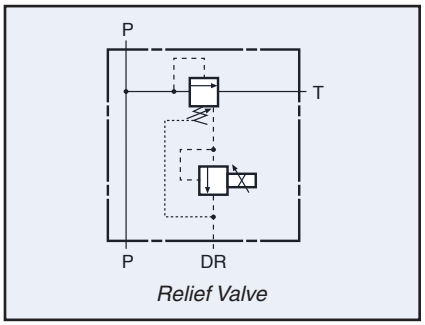
10 VDC: 4.45 Ω ±5% at 20° C.
24 VDC: 24.28 Ω ±5% at 20° C.

Dither: 140 Hz (recommended starting).

Electrical Connection: DIN 43650 Form A (Hirshmann Type) Connector.

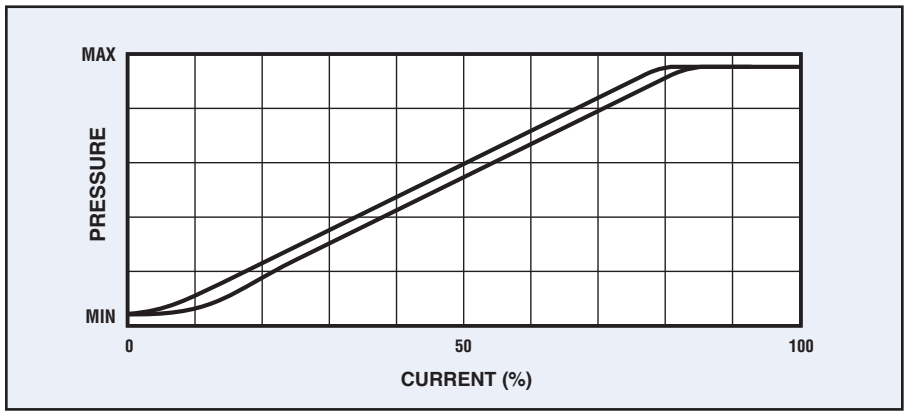
Max Tank Pressure: 2500 psi (172 bar).

Schematic – Proportional Control



Relief Valve

Model VHR Pressure Control Response



MOUNTING SURFACE & SUBPLATES

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

Subplate Models

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

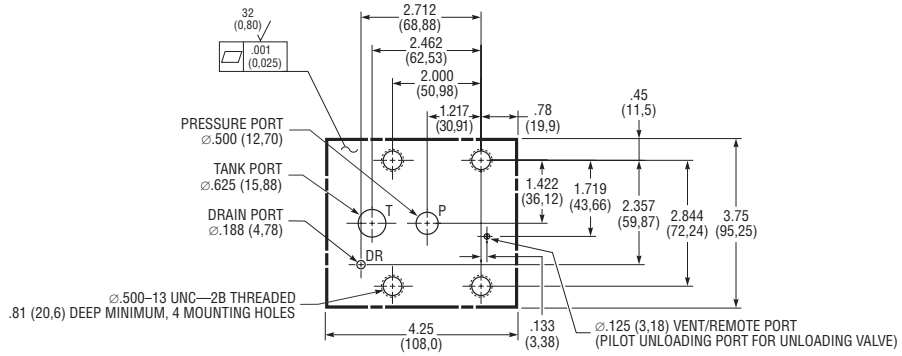
The subplate kits include mounting bolts. When ordering valves and subplates together, the valves are not mounted.

Subplate and Bolt Kits

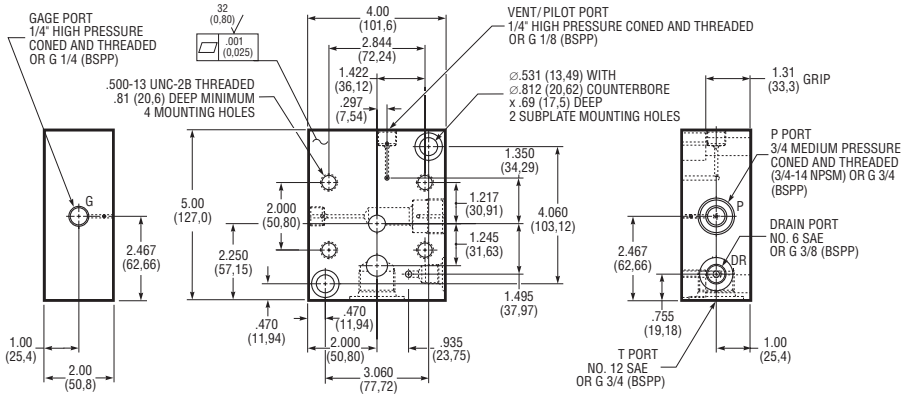
Item (Part Number)	Description
Subplate (PSO33-VHS-.75-14MP)	Side Ports 3/4" Medium Pressure Coned and Threaded①
Subplate (PSO33-VHS-BSP-12)	Side Ports, G 3/4 (BSPP)②
Bolt Kit (P33-BK)	(4) .500-13 UNC Threaded x 3.00 Inches (76,2 mm)

① *Pressure port uses Medium Pressure Coned and Threaded (Autoclave, Butech or equivalent fittings).*

② *Ports use British Standard Pipe Parallel fitting.*



Minimum Mounting Surface



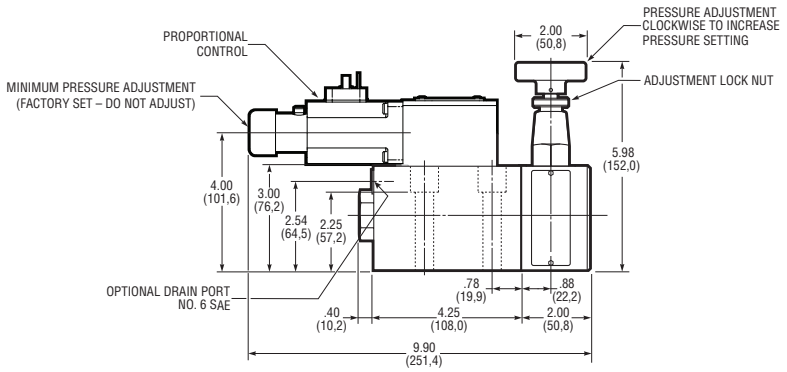
PSO33-VHS-.75-14MP or PSO33-VHS-BSP-12 Subplate

INSTALLATION GUIDELINES

Note that the relief pressure adjustment can be repositioned by rotating the head 90° *counter-clockwise*, viewed from the control end ("R9" option).

On non-venting models, the remote vent port in the vent block on top of the valve is plugged. This is standard, with "No Code" required when ordering.

Decompression valves must be vented for proper operation. Connecting the external drain is mandatory for all models. There is no provision for internal drain.



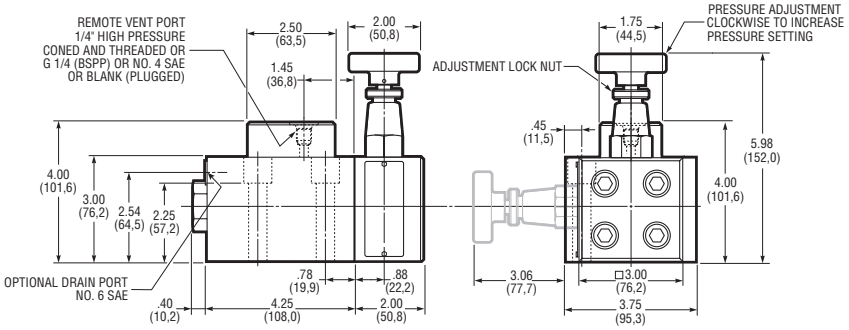
Subplate Mounted VH Series Valve with Proportional Control

INSTALLATION & DIMENSIONS

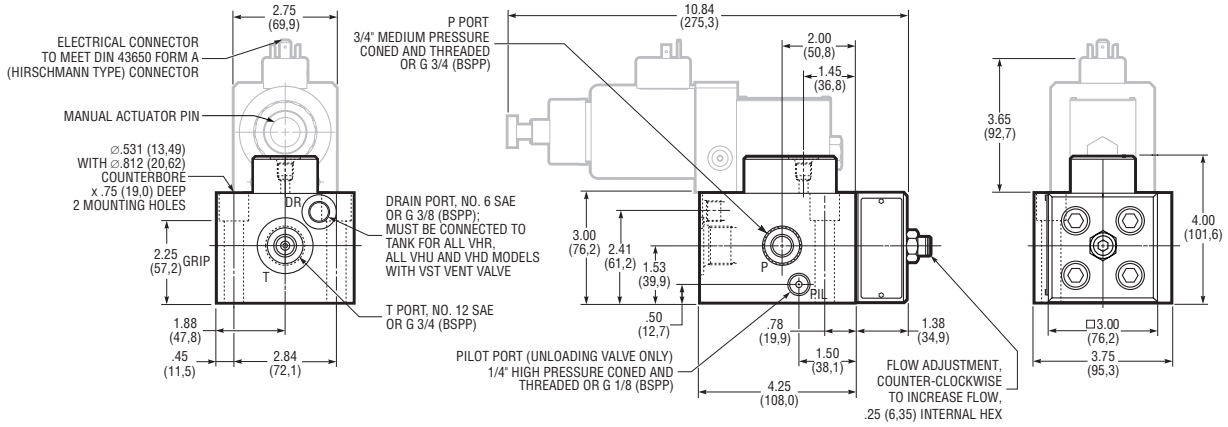
Note: Installation drawing dimensions are shown in inches (millimeters in parentheses) and are nominal.

Weight (Mass)

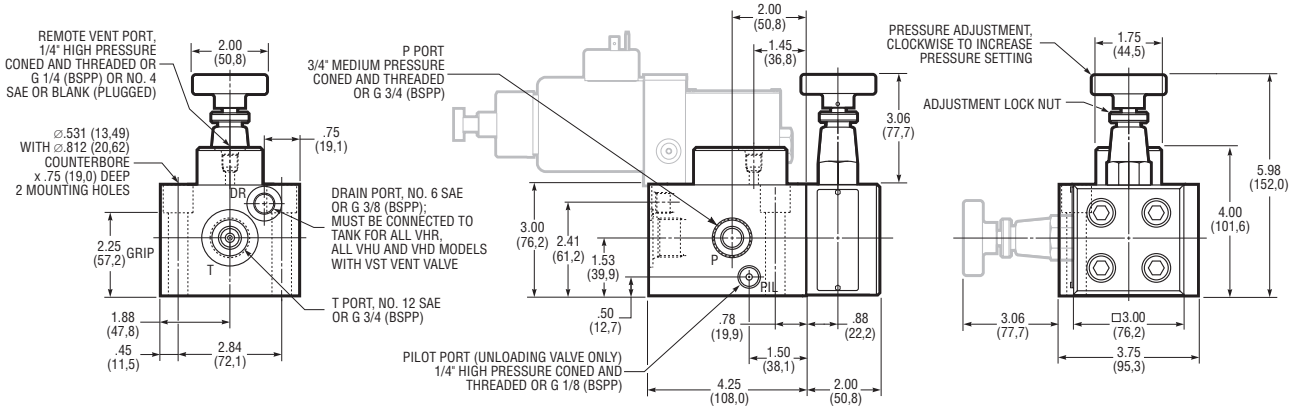
Standard: 18 lb (8,2 kg);
With Vent Valve: 24 lb (10,9 kg).



Subplate Mounted VH Series Relief/Unloading Models



Line Connected VH Series Decompression Valve



Line Connected VH Series Relief/Unloading Models

TYPICAL MODEL CODE

VHR – 7 L 2 – A – AV – 115DA – R9 – E – 2 0

Valve Type	
VHR	Relief Valve
VHU	Unloading Valve
VHD	Decompression Valve

Pressure (Maximum)	
7	7000 psi (490 bar)①
10	10000 psi (700 bar)②
15	15000 psi (1040 bar)②

① *Available with Unloading Valve only.*
② *Not available with Unloading Valve.*

Valve Mounting	
L	Line Mounted①
S	Subplate Mounted

① *Port type must be specified in Model Code.*

Valve Flow	
2	Relief and Unloading: 15 gpm (57 L/min) nominal, 30 gpm (114 L/min) maximum Decompression: 25 gpm (95 L/min) nominal, 30 gpm (114 L/min) maximum

Port Type (Line Mounted Only)	
A	Medium Pressure Coned and Threaded①
B	British Standard Parallel Pipe (BSPP)②

① *Pressure port uses Medium Pressure Coned and Threaded (Autoclave, Butech or equivalent fittings). Pilot port (for unloading function) uses High Pressure Coned and Threaded (Autoclave, Butech or equivalent fittings).*
② *Pressure and pilot ports (for unloading function) use British Standard Pipe Parallel fittings. Not recommended for operation above 10000 psi (700 bar).*

Function Options	
No Code	Vent Port Blocked①
AV	Vent Port, 1/4 High Pressure Coned and Threaded, 9/16-18 UNF-2B②③
BV	Vent Port, G 1/4 (BSPP)③④
SV	Vent Port (No. 4 SAE)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
E10	Proportional, 10 VDC⑦
E24	Proportional, 24 VDC⑦

① *Not available with Line Mounted Decompression Valve.*
② *Vent port uses Autoclave, Butech or equivalent fittings.*
③ *Vent port in body not available with Electric, Air or Hydraulic Vent functions.*
④ *Vent port uses British Standard Pipe Parallel fittings. Not recommended for operation above 10000 psi (700 bar).*
⑤ *Not recommended for operation above 8000 psi (560 bar).*
⑥ *Available with Relief Valve function only.*
⑦ *Fits DIN 43650 Form A (Hirschmann Type) Connector.*

Electric Vent Options			
*AC Solenoids Deutsch Connector:*①		*DC Solenoids Deutsch Connector:*①	
115DA	115V/60Hz, 110V/50Hz	**12DD**	12VDC
230DA	230V/60Hz, 220V/50Hz	**24DD**	24VDC
24DA	24V/60Hz, 24V/50Hz	**125DD**	125VDC
*AC Solenoids DIN Connector:*②		*DC Solenoids DIN Connector:*②	
115HA	115V/60Hz, 110V/50Hz	**12HD**	12VDC
230HA	230V/60Hz, 220/50Hz	**24HD**	24VDC

① *Fits Deutsch DT04-2P Connector.*
② *Fits DIN 43650 Form A (Hirschmann Type) Connector.*

Seals	
No Code	Fluorocarbon (Viton® or Fluorel®) Standard
E	EPR (Ethylene-Propylene Rubber)

General Options	
No Code	Standard
R9	Control Head Rotated 90°①

① *Available with Relief Valve function only.*

Design Number	
2	Unloading
3	Relief and Decompression

Modification Number

Specifications shown were in effect when printed. Since errors or omissions are possible, contact your Sales representative or the Sales department for the 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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