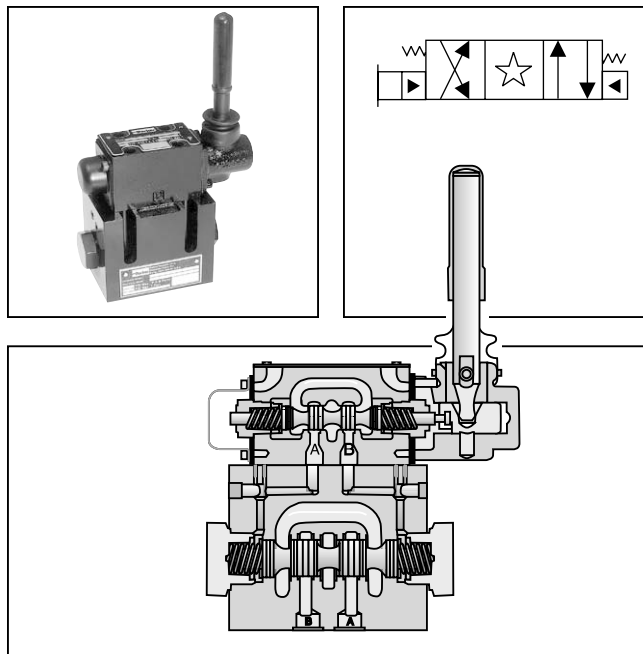


### General Description

Series D31\*L directional control valves are 5-chamber, pilot operated, lever controlled valves. The valves are suitable for manifold or subplate mounting.

### Features

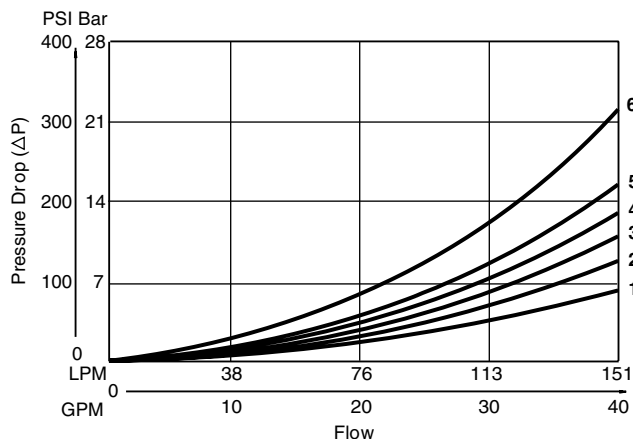
- **World design** – Available worldwide.
- **Mounting bolts below center line of spool** – Minimizes spool binding.
- **Five chamber style** – Eliminates pressure spikes in tubes, increasing valve life.
- **High pressure and flow ratings** – Increased performance options in a compact valve.



### Specifications

<b>Mounting Pattern</b>	NFPA D05H, CETOP 5 NFPA D05HE, CETOP 5H
<b>Maximum Operating Pressure</b>	345 Bar (5000 PSI) "T" Port (tank): 34 Bar (500 PSI) With External Drain 207 Bar (3000 PSI)
<b>Maximum Flow</b>	See Switching Limits Charts
<b>Pilot Pressure</b>	Oil Min: 6.9 Bar (100 PSI) Oil Max: 345 Bar (5000 PSI)
<b>Maximum Drain Pressure</b>	34 Bar (500 PSI)
<b>Response Time</b>	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

### Pressure Drop Chart



VISCOSITY CORRECTION FACTOR							
Viscosity (SSU)	75	150	200	250	300	350	400
% of ΔP (Approx.)	93	111	119	126	132	137	141

Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change as per chart.

### D31VL Pressure Drop Reference Chart -- Curve Number

Spool No.	Shifted				Center Condition							
	P-A	P-B	B-T	A-T	(P-T)	(B-A)	(A-B)	(P-A)	(P-B)	(A-T)	(B-T)	
1	3	3	2	1	-	-	-	-	-	-	-	
2	3	3	1	1	3	3	3	4	4	1	1	
4	3	3	1	1	-	-	-	-	-	1	1	
9	3	3	1	1	6	-	-	-	-	-	-	
20	5	4	2	2	-	-	-	-	-	-	-	
30	4	3	1	1	-	-	-	-	-	-	-	

### D31VL Pressure Drop vs. Flow

The chart to the left provides the flow vs. pressure drop curve reference for the D31VL Series valves by spool type.

#### Example:

Find the pressure drop at 76 LPM (20 GPM) for a D31VL with a number 1 spool. To the right of spool number 1, locate the number 3 in the P-A column, and 2 in the B-T column.

Using the top graph, locate curves 2 and 3 and read the pressure drop values. Total pressure drop through the valve is the sum of the two values.



**Ordering Information**

<b>D</b>	Basic Valve	<b>L</b>	Lever Operated Pilot	Spool	Style	Pilot Supply and Drain	Seal Compound	Variations	Design Series																																																																											
<p>Directional Control Valve</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>31D</td> <td>NFPA D05HE, CETOP 5H (ISO)</td> </tr> <tr> <td>31V</td> <td>NFPA D05H, CETOP 5</td> </tr> </tbody> </table>		Code	Description	31D	NFPA D05HE, CETOP 5H (ISO)	31V	NFPA D05H, CETOP 5	<p>Lever Operated Pilot</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Symbol</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> </tr> <tr> <td>2</td> <td></td> </tr> <tr> <td>4</td> <td></td> </tr> <tr> <td>8** &amp; 9*</td> <td></td> </tr> <tr> <td>20**</td> <td></td> </tr> <tr> <td>30*</td> <td></td> </tr> </tbody> </table> <p>* 9 and 30 spools have open crossover.                  ** 8 and 20 spool has closed crossover.</p>		Code	Symbol	1		2		4		8** & 9*		20**		30*		<p>Style</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Int. pilot/Ext. drain</td> </tr> <tr> <td>2</td> <td>Ext. pilot/Ext. drain</td> </tr> <tr> <td>4#</td> <td>Int. pilot/Int. drain</td> </tr> <tr> <td>5</td> <td>Ext. pilot/Int. drain</td> </tr> </tbody> </table> <p># Not available with 2, 8 &amp; 9 spools.</p>		Code	Description	1	Int. pilot/Ext. drain	2	Ext. pilot/Ext. drain	4#	Int. pilot/Int. drain	5	Ext. pilot/Int. drain	<p>Pilot Supply and Drain</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N</td> <td>Nitrile</td> </tr> <tr> <td>V</td> <td>Fluorocarbon</td> </tr> </tbody> </table>		Code	Description	N	Nitrile	V	Fluorocarbon	<p>Seal Compound</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Omit</td> <td>Standard</td> </tr> <tr> <td>7</td> <td>Pilot choke – meter out</td> </tr> <tr> <td>60</td> <td>Pilot choke – meter in</td> </tr> <tr> <td>8</td> <td>Stroke adj. 'B'</td> </tr> <tr> <td>9</td> <td>Stroke adj. 'A'</td> </tr> <tr> <td>89</td> <td>Stroke adj. 'A' &amp; 'B'</td> </tr> </tbody> </table>		Code	Description	Omit	Standard	7	Pilot choke – meter out	60	Pilot choke – meter in	8	Stroke adj. 'B'	9	Stroke adj. 'A'	89	Stroke adj. 'A' & 'B'	<p>Variations</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> <th>Symbol</th> </tr> </thead> <tbody> <tr> <td>B†</td> <td>Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.</td> <td></td> </tr> <tr> <td>C</td> <td>DbL. operator, 3 position, spring centered.</td> <td></td> </tr> <tr> <td>D†</td> <td>DbL. operator, 2 position, detent.</td> <td></td> </tr> <tr> <td>E</td> <td>Sgl. operator, 2 position, spring centered. P to B and A to T in shifted position.</td> <td></td> </tr> <tr> <td>H†</td> <td>Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.</td> <td></td> </tr> <tr> <td>K</td> <td>Sgl. operator, 2 position. Spring centered. P to A and B to T in shifted position.</td> <td></td> </tr> </tbody> </table> <p>† Only spools 20 and 30.                  This condition varies with spool code.</p>		Code	Description	Symbol	B†	Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.		C	DbL. operator, 3 position, spring centered.		D†	DbL. operator, 2 position, detent.		E	Sgl. operator, 2 position, spring centered. P to B and A to T in shifted position.		H†	Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.		K	Sgl. operator, 2 position. Spring centered. P to A and B to T in shifted position.		<p>Design Series</p> <p>NOTE: Not required when ordering.</p>	
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Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #8 and #9 spool. See installation information for details.

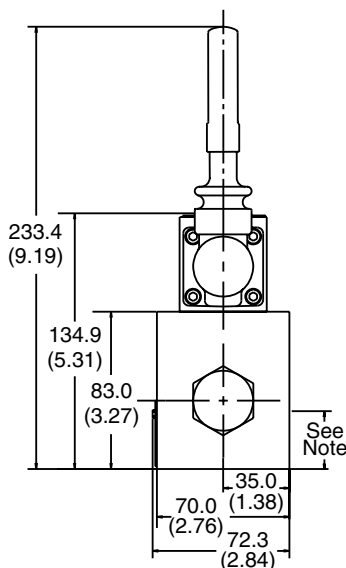
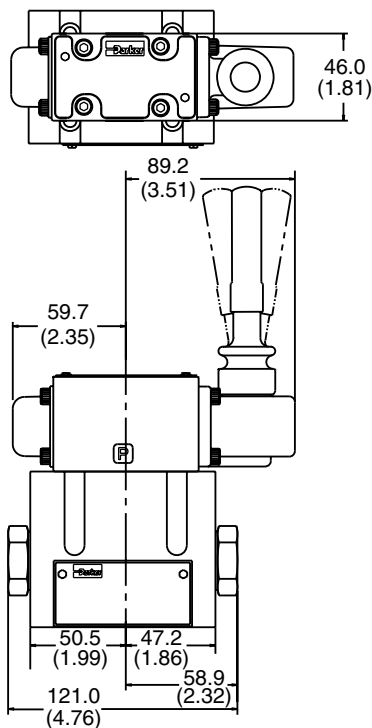
**Valve Weight:** 5.4 kg (12.0 lbs.)  
**Standard Bolt Kit:** BK98  
**Metric Bolt Kit:** BKM98

**Bold: Designates Tier I products and options.**

**Non-Bold: Designates Tier II products and options. These products will have longer lead times.**

**Dimensions – Lever Operated**

Inch equivalents for millimeter dimensions are shown in (\*\*)



**Note:** 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.