



**Application**

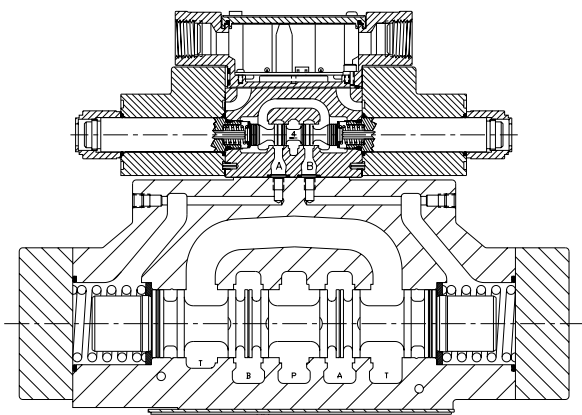
Parker D81 series hydraulic directional control valves are high performance, solenoid controlled, pilot operated, two-stage, 4-way valves. They are available in 2 or 3 position styles and are manifold mounted. These valves conform to NFPA's D08/CETOP 8 mounting pattern.

**Operation**

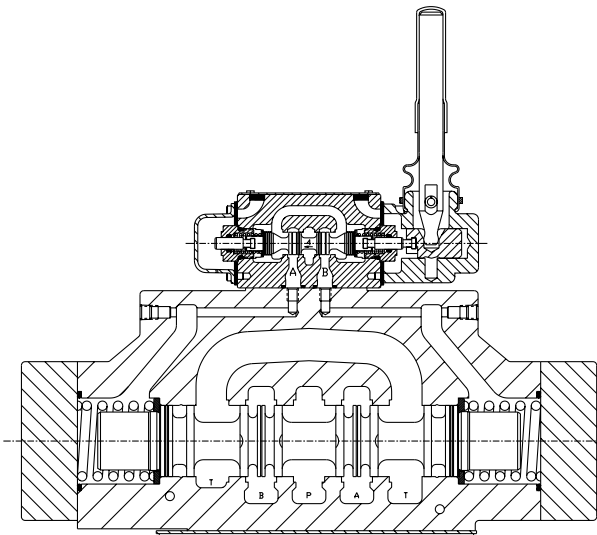
Parker's D81 series directional valves consist of a five chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

**Features**

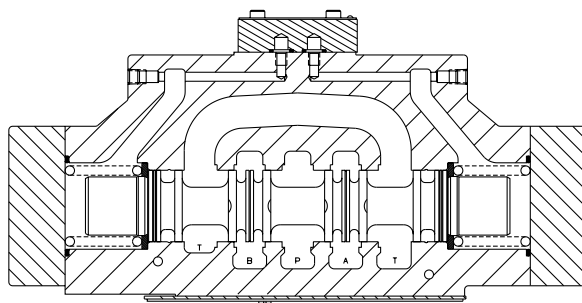
- Easy access mounting bolts.
- 350 Bar (5000 PSI) pressure rating.
- Flows to 622 L/M (160 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



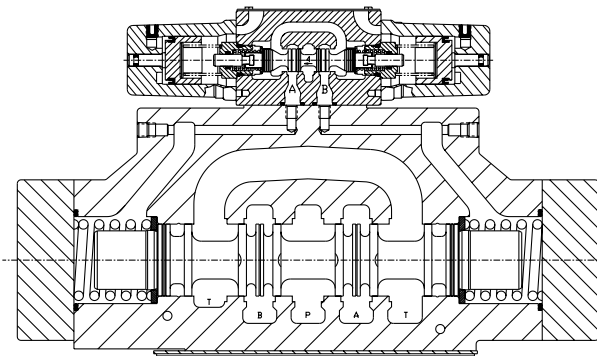
**D81VW Solenoid Operated Conduit Box Style**



**D81VL Lever Operated**



**D8P Oil Pilot Operated**



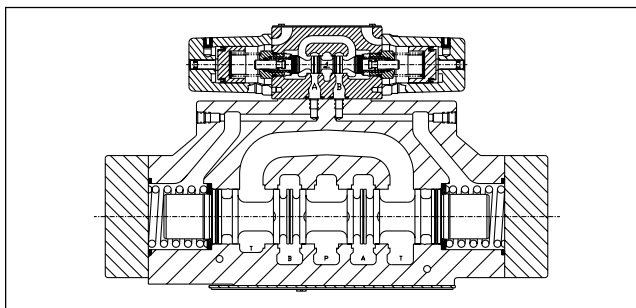
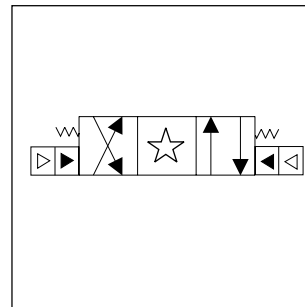
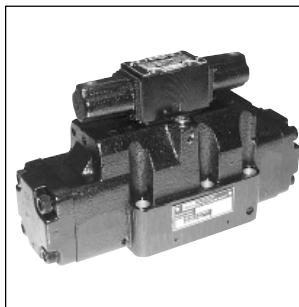
**D81VA Air Pilot Operated**

### General Description

The D81VA is a five-chamber, air pilot operated, directional control valve. It is available in 2 or 3-position styles. They are manifold or subplate mounted valves, which conform to NFPA's D08/CETOP 8 mounting pattern.

### Specifications

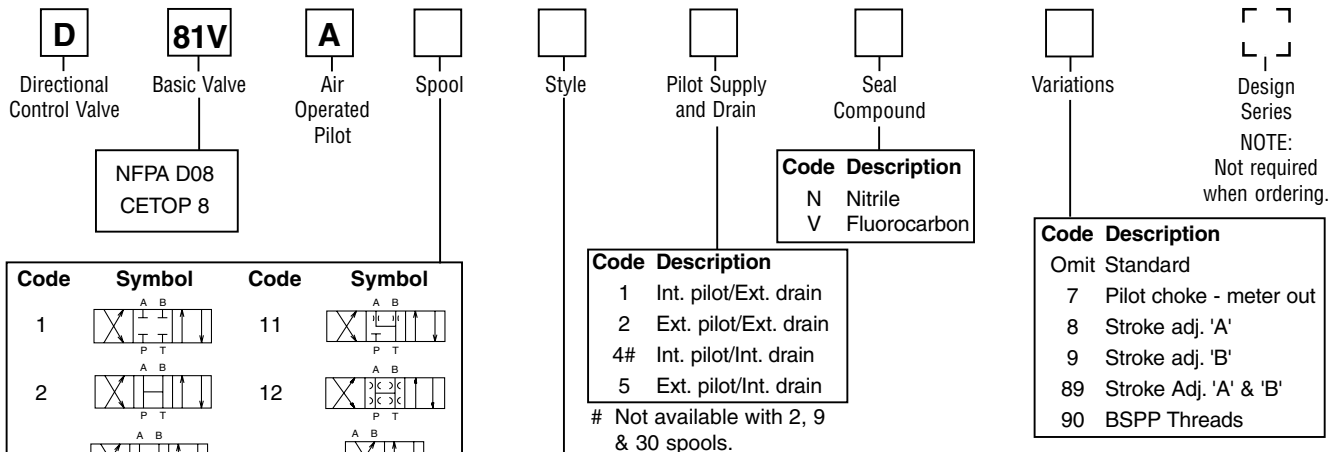
<b>Mounting Pattern</b>	NFPA D08, CETOP 8, NG25
<b>Maximum Operating Pressure</b>	350 Bar (5000 PSI) "T" Port (tank): 350 Bar (5000 PSI) With External Drain Only
<b>Maximum Flow</b>	See Switching Limit Charts
<b>Pilot Pressure</b>	Oil Min: 6.9 Bar (100 PSI) Oil Max: 350 Bar (5000 PSI) Air Min: 3.4 Bar (50 PSI) Air Max: 10.2 Bar (150 PSI)
<b>Max. Drain Pressure</b>	34 Bar (500 PSI)
<b>Shift Volume</b>	For complete shift (from center to end) requires a volume of 22.1 cc (1.35 in. <sup>3</sup> )
<b>Response Time</b>	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)



### Features

- Low pressure drop design.
- Fast response option available.
- Hardened spools provide long life.

### Ordering Information



Code	Symbol	Code	Symbol
1		11	
2		12	
4		20*	
9**		30**	

\* 20 spool has closed crossover.  
 \*\* 9 & 30 spools have open crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #9 spool. See installation information for details.

#### Valve Weight:

Single Operated 19.9 kg (43.9 lbs.)

Standard Bolt Kit: BK228

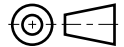
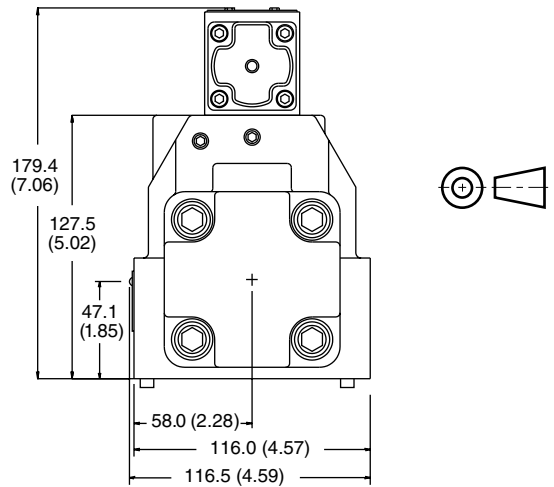
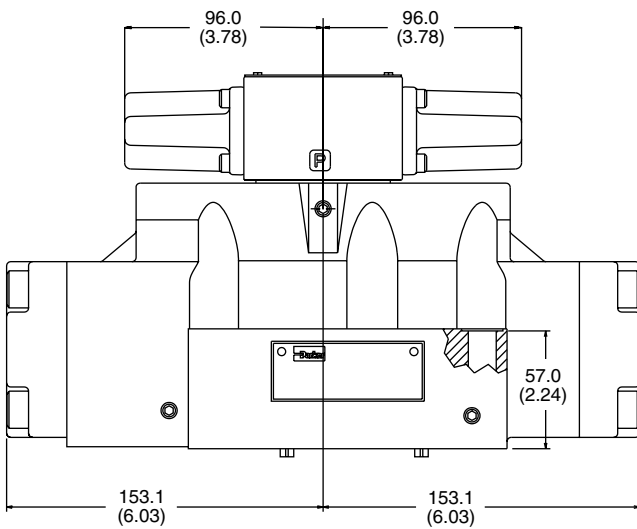
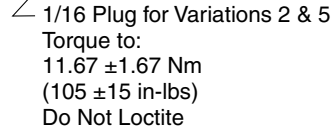
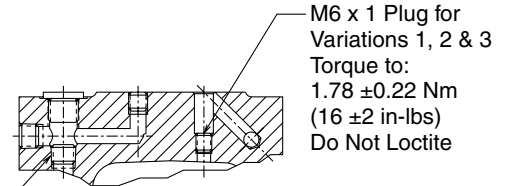
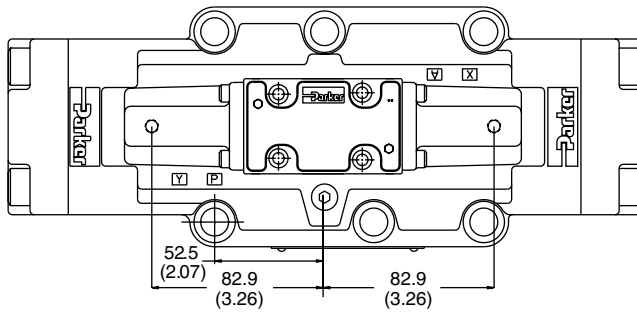
Code	Description	Symbol
B†	Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.	
C	Dbl. operator, 3 position, spring centered.	
D†	Dbl. operator, 2 position, detent.	
E	Sgl. operator, 2 position, spring centered. P to B and A to T when energized.	
H†	Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.	
K	Sgl. operator, 2 position. Spring centered. A side. P to A and B to T when energized.	

This condition varies with spool code.

† Available with 20 & 30 spools only.

**Air Operated**

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



**A**

FOR MAXIMUM VALVE RELIABILITY, ADHERE TO THE FOLLOWING INSTALLATION INFORMATION.

The following is important installation information which applies to all directional control valves described in this catalog.

### Mounting Position

Detent – Horizontal  
Spring Offset – Unrestricted  
Spring Centered – Unrestricted

### Fluid Recommendations

Premium quality hydraulic oil with a viscosity range between 150-250 SSU (32-54 cst.) At 100°F (38°C) is recommended. The absolute operating viscosity range is from 80-1000 SSU (16-220 cst.). Oil should have maximum anti-wear properties and rust and oxidation treatment.

### Fluids and Seals

Valves using synthetic, fire-resistant fluids require special seals. When phosphate esters or its blends are used, FLUOROCARBON seals are required. Water-glycol, water-in-oil emulsions and petroleum oil may be used with STANDARD seals.

### Filtration

For maximum valve and system component life, the system should be protected from contamination at a level not to exceed 125 particles greater than 10 microns per milliliter of fluid (SAE class 4/ISO 16/13).

### Silting

Silting can cause any sliding spool valve to stick and not spring return if held under pressure for long periods of time. The valve should be cycled periodically to prevent sticking.

### Special Installations

Consult your Parker representative for any application requiring the following:

- Pressure above rating
- Fluid other than those specified
- Oil temperature above 160°F (71.1°C)
- Flow path other than normal

### Mounting Patterns

Series	NFPA	Size
D81V*, D8P	D08	1"

### Torque Specifications

The recommended torque values for the bolts which mount the valve to the manifold or subplate are as follows: 135.6 Nm (100 ft-lbs).



**Series D81VW, D81VA, D81VL**

**Tank and Drain Line Surges**

If several valves are piped with a common tank or drain line, flow surges in the line may cause an unexpected spool shift. Detent style valves are most susceptible to this. Separate tank and drain lines should be piped in installations where line surges are expected.

**Electrical Characteristics (Detented Spool)**

Only a momentary energizing of the solenoid is necessary to shift and hold a detented spool. Minimum duration of the signal is 0.1 seconds for both AC and DC voltages. Spool position will be held provided the spool centerline is in a horizontal plane, and not shock or vibration is present to displace the spool.

**Electrical Failure or Loss of Pilot Pressure (D81VA)**

Should electric power fail or loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. Detented valves will stay in the last position held before power failure. If main flow does not fail or stop at the same time power fails, machine actuators may continue to function in an undesirable manner or sequence.

**Pilot/Drain Characteristics**

**Pilot Pressure:**

- 75 to 3000 PSI (5.1 to 207 Bar)
- 100 PSI (6.9 Bar) for spools 002, 007, 008, 009 & 012

**External:** An oil source sufficient to maintain minimum pilot pressure must be connected to the "X" port of the main body. When using the external pilot variation, a 1/16" pipe plug must be present in the main body pilot passage. (For details see Dimension pages.) This plug will be furnished in valves ordered with pilot code 2, 3, 5 or 6.

**Internal:** Flow is internally ported from the pressure port of the main valve body to the "P" port of the pilot valve. The pressure developed at the "P" port of the pilot valve must be 75 PSI (5.1 Bar) minimum at all times or 100 PSI (6.9 Bar) for spools 002, 007, 008, 009 & 012.

**Integral Check:** Valves using internal pilot and internal drain with an open center spool (spools 2, 7, 8 & 9) can be ordered with an integral check valve in the pressure port of the main valve codes 3 & 6. Pilot oil will be internally ported from the upstream side of this check to the "P" port of the pilot valve, ensuring sufficient pilot pressure. A 1/16" pipe plug will be present in the main body. The "X" port in the subplate must be plugged when using the integral check.

**Pilot Valve Drain:** Maximum pressure 1500 PSI (102 Bar), 3000 PSI (207 Bar) optional.

**External:** When using an external drain, a M6 x 1 x 6mm long set screw must be present in the main body drain passage. (For details see Dimension pages.) This plug will be furnished in valves ordered with drain code 1, 2 or 3.

Drain flow from the pilot valve is at the "Y" port of the main body and must be piped directly to tank. Maximum drain line pressure is 1500 PSI (102 Bar), 3000 PSI (207 Bar) optional. Any drain line back pressure is additive to the pilot pressure requirement.

**Internal:** Drain flow from the pilot valve is internally connected to the main valve tank port. Tank and drain pressure are then identical so tank line pressure should not exceed 1500 PSI (102 Bar), 3000 PSI (207 Bar) optional. Any tank line back pressure is also additive to the pilot pressure requirement. If flow surges (a cause of pressure surges) are anticipated in the tank line, an external drain variation is recommended. The "Y" port in the subplate must be plugged when using an internal drain.

**D81V\* Flow Paths**

Style Code	Description	No Solenoid/Operator Energized	Solenoid/Operator A Energized	Solenoid/Operator B Energized
B	Spring Offset	P→A and B→T	—	P→B and A→T
C	Spring Centered	Centered	P→A and B→T	P→B and A→T
D	Detented	Last Position Held	P→A and B→T	P→B and A→T
E	Spring Centered	Centered	—	P→B and A→T
F†	Spring Offset, Shift to Center	P→A and B→T	—	Centered
H	Spring Offset	P→B and A→T	P→A and B→T	—
K	Spring Centered	Centered	P→A and B→T	—
M†	Spring Offset, Shift to Center	P→B and A→T	Centered	—

† D81VW only.

**Series D8P**

**A**

**Tank and Drain Line Surges**

If several valves are piped with a common tank or drain line, flow surges in the line may cause an unexpected spool shift. Detent style valves are most susceptible to this. Separate tank and drain lines should be piped in installations where line surges are expected.

**Loss of Pilot Pressure**

Should a loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. No spring valves will stay in the last position held. If main hydraulic flow does simultaneously stop, machine actuators may continue to function in an undesirable manner or sequence.

**Pilot Drain Characteristics**

**Pilot Pressure:**

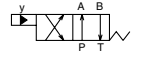

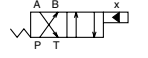
- 75 to 5000 PSI (5.1 to 350 Bar)
- 100 PSI (6.9 Bar) for spool configurations 2, 7, 8, 9 & 12

Direct pilot operated valves use the "X" and "Y" ports to supply pilot oil directly to the ends of the spool, providing spool shifting force. A block mounted on top of the valve body is internally cored to make the necessary connections. Thus when "X" is pressurized, "Y" is used as a drain; and when "Y" is pressurized, "X" becomes the drain.

Any back pressure in these lines when they are being used as a drain is additive to the pilot pressure requirement.

**Internal Drain:** On spring offset models, only the "X" port is pressurized, as the spring returns the spool to its at rest position. On these models, "Y" may be internally drained through the main tank passage in the valve.

**Flow Path/Pilot Pressure**

Style Code	Description	"X" & "Y" De-Pressurized	"X" Port Pressurized	"Y" Port Pressurized	Special Notes	Recommended Control Valve For Pilot Oil
B	Two Position Spring Offset	P→A, B→T	P→A, B→T	P→B, A→T	"X" Port may be pressurized to assist spring in returning spool to offset position (ext. only)	
C	Three Position Spring Centered	Center	P→A, B→T	P→B, A→T	Flow paths will be reversed on valves with tandem center (9) spools	
H	Two-Position Spring Offset	P→B, A→T	P→A, B→T	P→B, A→T	"Y" Port may be pressurized to assist spring in returning spool to offset position	

**Subplate Mounting**

**NFPA D08, CETOP 8 & NG25**



**Recommended Mounting Surface**

Surface must be flat within .102 mm (0.0004 inch) T.I.R and smooth within 812.8 micro-meters (32 micro-inch). Torque bolts to 135.6 Nm (100 ft-lbs).

**For maximum valve reliability, adhere to the following installation information.**

**Mounting Position**

Valve Type	Mounting Position
Detent (Solenoid)	Horizontal
Spring Offset	Unrestricted
Spring Centered	Unrestricted

**Mounting Pattern**

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

