General Description

Series D*1FS proportional directional control valves are high performance, two stage pilot operated solenoid valves with electronic spool position feedback. Valves are controlled by ‘PWD’ Series DIN electronics. Valves are available in sizes NG10 (CETOP 5), NG16 (CETOP 7), NG25 (CETOP 8) and NG32 (CETOP 10).

D*1FS valve performance is characterized by high resolution flow control, repeatability and good dynamic performance. Typical applications include precise and reproducible control of actuator speed in rapid / slow speed profiling, and smooth acceleration and deceleration performance.

Performance Curve

Flow Characteristics
at 5 Bar (72.5 PSI) per metering edge

![Flow Curve Graph](image)

<table>
<thead>
<tr>
<th>Command Signal (%)</th>
<th>% of Nominal Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Features

- Spool position feedback.
- High Frequency response.
- Spring centered main stage spool.
- LED functional diagnostic indicator.
- Wide selection of spool options, and flow capacity.
- 2:1 ratio, and Regeneration spool options.

Specifications

<table>
<thead>
<tr>
<th>Interface DIN</th>
<th>NG10 (CETOP 5)</th>
<th>NG16 (CETOP 7)</th>
<th>NG25 (CETOP 8)</th>
<th>NG32 (CETOP 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rating</td>
<td>LPM (GPM)</td>
<td>LPM (GPM)</td>
<td>LPM (GPM)</td>
<td>LPM (GPM)</td>
</tr>
<tr>
<td>@10 Bar (150 PSI) ∆p (P → A, B → T)</td>
<td>45 (12)</td>
<td>120 (32)</td>
<td>300/400 (79/106)</td>
<td>1000 (264)</td>
</tr>
<tr>
<td>Maximum Flow</td>
<td>389@ 1500 PSID</td>
<td>1208@ 2700 PSID</td>
<td>193@ 1500 PSID</td>
<td></td>
</tr>
<tr>
<td>Step Response</td>
<td>ms</td>
<td>ms</td>
<td>ms</td>
<td>ms</td>
</tr>
<tr>
<td>(time to reach 90% of a 100% step command)</td>
<td>35</td>
<td>60</td>
<td>80</td>
<td>200</td>
</tr>
</tbody>
</table>

- Repeatability % <0.5
- Hysteresis % <0.5
- Pilot Flow Continuous LPM (GPM) <1.2 (0.3)
- Operating Pressure
  - Port P, A, B Bar (PSI) | 345 (5000) max. |
  - Port P, internal pilot | 20 (290) min.  |
  - Port T, internal drain | 10 (150) max.  |
  - Port T, external drain | 345 (5000) max. |
  - Port X, pilot drain | 10 (150) max.  |
  - Port X, external pilot | 20-345 (290-5000) |
- Fluid Viscosity, Recommended 80 – 1000 SSU
- Fluid Cleanliness Level ISO Class 16/13
- Fluid Temperature, Recommended 0°C to +60°C (+32°F to +140°F)
- Ambient Operating Temperature -20°C to +60°C (-4°F to +140°F)
- Electronic Driver Boards (refer to electronics section) PWD Series Drivers
- Mating Connector
  - Solenoid (DIN 43650) Part #692914 (black)
  - LVDT (M12, 5 pin) Part #692915 (gray) included w/valve
- Environmental Protection Class NEMA 1 (IP54)

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

www.comoso.com
### Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>NG10/CETOP 5</td>
</tr>
<tr>
<td>4</td>
<td>NG16/CETOP 7</td>
</tr>
<tr>
<td>8</td>
<td>NG25/CETOP 8</td>
</tr>
<tr>
<td>9</td>
<td>NG25/CETOP 8</td>
</tr>
<tr>
<td>11</td>
<td>NG32/CETOP 10</td>
</tr>
</tbody>
</table>

*1 with enlarged ∅ 32mm ports

### V-Notch Spool Options - Spool Type and Flow Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool Type</th>
<th>Flow: LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>D31</td>
</tr>
<tr>
<td>E01</td>
<td>B31</td>
<td>B</td>
</tr>
<tr>
<td>E02</td>
<td>B32</td>
<td>C</td>
</tr>
</tbody>
</table>

2) Reduced flow rate on port B, nominal flow at port A
Code A* for spool Q_b > Q_a optional

### Accessories

Refer to the Accessories section for bolt kits, subplates, connectors.

### Driver Cards

Refer to the Electronics section for driver cards and support electronics.

### Mounting Interface

Refer to Mounting Interface Dimensions in the Proportional Directional Valve Section of this catalog.

### Design Series

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
</table>
| W    | Socket connector DIN 43650 without plugs

### Code Description

- **N**: Nitrile
- **V**: Fluorocarbon

### Pilot Drain

- **L**: 6 VDC
- **X**: 16 VDC

* For use with “EW” driver card

### Code Description

- **0**: Std., no accessories
- **2**: Pilot pressure reducer

### Weight:

- D31FS: 7.1 kg (15.7 lbs.)
- D41FS: 10.8 kg (23.8 lbs.)
- D81/91FS: 19.0 kg (41.9 lbs.)
Wiring

Solenoid Coil

1 = coil connection
2 = coil connection
PE = ground potential

Spool position sensor (LVDT)

1 = output, spool position
2 = supply (+24V)
3 = GND (0V)
4 = not used
5 = protective ground

Pilot Connection

D31FS

P T
M6 M6 M6 M6
DIN906 DIN906 DIN906 DIN906
A 1/16 NPTF B 1/16 NPTF

D41FS

P T
M6 M6 M6 M6
DIN906 DIN906 DIN906 DIN906
B 1/16 NPTF

D91FS

P T
M6 M6 M6 M6
DIN906 DIN906 DIN906 DIN906
B 1/16 NPTF

D111FS

P T
C 1/16 NPTF B 1/16 NPTF A 1/8 NPTF D 1/8 NPTF

Solenoid Coil Spool position sensor (LVDT)

www.comoso.com
D31FS
Inch equivalents for millimeter dimensions are shown in (**)

D41FS
Inch equivalents for millimeter dimensions are shown in (**)

Order plugs separately.
Dimensions

D81FS and D91FS
Inch equivalents for millimeter dimensions are shown in (**)

D111FS
Inch equivalents for millimeter dimensions are shown in (**)

Order plugs separately.