General Description
Series D1FP direct operated control NG6 (CETOP 3) valve features extremely high dynamics combined with maximum flow. It is used for high accuracy in positioning of a hydraulic axis, and for controlling force and velocity.

Driven by the new patented VCD® actuator, the D1FP reaches the frequency response of servovalves. Compared with solenoid driven valves, the D1FP can also be used in applications with pressure drops up to 350 Bar (5075 PSI) across the valve. Because of the high flow capability the D1FP can be a substitute for NG10 valves in some cases.

At power-down the spool moves in a defined position. All common input signals are available.

Features
- Servovalve dynamics: -3dB/350Hz at ±5% input signal
- Full flow capacity up to 350 Bar (5075 PSI) pressure drop through the valve.
- Maximum tank pressure 350 Bar (5075 PSI) with external drain Y-port.
- High flow.
- Defined spool positioning in case of loss of electric power supply.
- Defined spool positioning at power-down.
- Onboard electronics.
### Proportional Directional Control Valves

#### Series D1FP

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool/Spool Position on Power Down</th>
<th>Flow LPM (GPM) at ∆p 35 Bar (508 PSI) per metering edge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Zerolap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E50M 40 (10.6) / E50H 25 (6.6) / E50G 16 (4.2) / E50F 12 (3.2) / E50C 6 (1.6) / E50B 3 (0.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B60M 40 (10.6) / B60H 25 (6.6) / B60G 16 (4.2) / B60F 12 (3.2) / B60C 6 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Underlap approximately -0.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E55M 40 (10.6) / E55H 25 (6.6) / E55G 16 (4.2) / E55F 12 (3.2) / E55C 6 (1.6) / E55B 3 (0.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overlap 25%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E01M 40 (10.6) / E01H 25 (6.6) / E01G 16 (4.2) / E01F 12 (3.2) / E01C 6 (1.6) / E01B 3 (0.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B31M 40 (10.6) / B31H 25 (6.6) / B31G 16 (4.2) / B31F 12 (3.2) / B31C 6 (1.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E02M 40 (10.6) / E02H 25 (6.6) / E02G 16 (4.2) / E02F 12 (3.2) / E02C 6 (1.6) / E02B 3 (0.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B32M 40 (10.6) / B32H 25 (6.6) / B32G 16 (4.2) / B32F 12 (3.2) / B32C 6 (1.6)</td>
</tr>
</tbody>
</table>

1) On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A → T resp. B → T with pressure drops above 120 Bar (1740 PSI) or contamination in the hydraulic fluid.

2) Approximately 10% opening, only available with zerolap spools and underlap spools.

3) Only available with overlap spools.

4) Needs to be removed at tank pressure >35 Bar (507.5 PSI).

5) Flow direction P → A with Pin D > Pin E.

6) Not for flow code M.

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**Bolt Kit:**

- BK209 (4) 10-24x1.25
- BK375 (4) M5x30

**Weight:** 5.0 kg (11.0 lbs.)
### General

**Design**
Direct operated proportional DC valve

**Actuation**
VCD® actuator

**Size**
NG6 / CETOP 3 / NFPA D03

**Mounting Interface**
DIN 24340 / ISO 4401 / CETOP RP121 / NFPA

**Mounting Position**
Unrestricted

**Ambient Temperature**
-20...+50; (-4°F...+122°F)

**MTTFD Value**
75 [years]

**Vibration Resistance**
10 Sinus 5...2000 Hz acc. IEC 68-2-6
30 Random noise 20...2000 Hz acc. IEC 68-2-36
15 Shock acc. IEC 68-2-27

### Hydraulic

**Maximum Operating Pressure**
Ports P, A, B 350 Bar (5075 PSI)
Port T max. 35 Bar (508 PSI), port Y max. 35 Bar (508 PSI) ¹

**Fluid Temperature**
-20...+60; (-4°F...+140°F)

**Viscosity**

<table>
<thead>
<tr>
<th>Permitted [cSt] / [mm²/s]</th>
<th>Recommended [cSt] / [mm²/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>20...380 (93...1761 SSU)</td>
<td>30...80 (139...371 SSU)</td>
</tr>
</tbody>
</table>

**Nominal Flow at ∆p=35 Bar (508 PSI) per Control Edge**

<table>
<thead>
<tr>
<th>Flow Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 LPM (0.08 GPM) / 6 LPM (1.6 GPM) / 12 LPM (3.2 GPM) / 25 LPM (6.6 GPM) / 40 LPM (10.6 GPM)</td>
</tr>
</tbody>
</table>

**Flow Maximum**
90 LPM (23.8 GPM) at ∆p=350 Bar (5075 PSI) over two control edges

**Leakage at 100 Bar (1450 PSI)**
<400 (zerolapped spool); <50 (overlapped spool)

### Static / Dynamic

**Step Response at 100% Step**
<3.5 [ms]

**Frequency Response (+5% signal)**
350 (amplitude ratio -3dB), 350 (phase lag -90°)

**Hysteresis**
<0.05 [%]

**Sensitivity**
<0.03 [%]

**Temperature Drift**
<0.025 [%/K]

### Electrical

**Duty Ratio**
100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible

**Protection Class**
IP65 in accordance with EN 60529 (plugged and mounted)

**Supply Voltage/Ripple**
DC 22...30, ripple <5% eff., surge free

**Current Consumption Maximum**
3.5 [A]

**Pre-Fusing**
4.0 medium lag

**Input Signal**

<table>
<thead>
<tr>
<th>Voltage [V]</th>
<th>Impedance [kOhm]</th>
<th>Current [mA]</th>
<th>Impedance [Ohm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10...0...-10, ripple &lt;0.01% eff., surge free, 0...+10V P-&gt;A</td>
<td>100</td>
<td>20...0...-20, ripple &lt;0.01% eff., surge free, 0...+20mA P-&gt;A</td>
<td>250</td>
</tr>
</tbody>
</table>

**Differential Input Maximum**

<table>
<thead>
<tr>
<th>Code 0 [V]</th>
<th>Code 5 / 7 [V]</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 for terminal D and E against PE</td>
<td>30 for terminal 4 and 5 against PE</td>
</tr>
</tbody>
</table>

**Enable Signal (Only Code 5 / 7)**
5...30, Ri = 9 kOhm

**Diagnostic Signal**
+10...0...-10 / +Ub, rated max. 5mA

**EMC**
EN61000-6-2 / EN61000-6-4

### Wiring Minimum

<table>
<thead>
<tr>
<th>Code 0 [mm²]</th>
<th>Code 5 [mm²]</th>
<th>Code 7 [mm²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>7x1.0 (AWG 18) overall braid shield</td>
<td>12x1.0 (AWG 20) overall braid shield</td>
<td>12x1.0 (AWG 18) overall braid shield</td>
</tr>
</tbody>
</table>

**Wiring Length Maximum**
50 (164 ft.)

¹) For applications with pT>35 Bar (508 PSI) the Y-port has to be connected and the plug in the Y-port has to be removed.

²) Flow rate for different ∆p per control edge: \[ Q_s = Q_{nom} \cdot \sqrt{\frac{\Delta p}{\Delta p_{nom}}} \]

³) Measured with load 100 Bar (1450 PSI) pressure drop/two control edges.
Proportional Directional Control Valves
Series D1FP

Performance Curves

Functional Limit
at 25%, 50%, 75% and 100% Command Signal

Spool Type E01/E50
Flow Curves
at Δp = 35 Bar (508 PSI) per metering edge

Spool Type B60
Flow Curves
at Δp = 35 Bar (508 PSI) per metering edge

Pressure Gain

Frequency Response
±5% Command Signal
±90% Command Signal

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA
Catalog HY14-2550/US
Proportional Directional Control Valves
Series D1FP

**Code 0**
6 + PE acc. to EN 175201-804

**Code 5**
11 + PE acc. to EN 175201-804

**Note:** When replacing another valve, verify Pin C is 0 V and not wired as an enable.

**Code 7**
6 + PE + Enable acc. to EN 175201-804
Inch equivalents for millimeter dimensions are shown in (**)

### Dimensions

<table>
<thead>
<tr>
<th>Surface Finish</th>
<th>Kit</th>
<th>Seal Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R_{\text{max}} = 6.3 )</td>
<td>BK375, BK209</td>
<td>Nitrile: SK-D1FP, Fluorocarbon: SK-D1FP-V for HFC Fluid: SK-D1FP-H</td>
</tr>
<tr>
<td>DIN 912 12.9</td>
<td>4x M5x30, 4x 10-24x1.25</td>
<td>7.6 Nm (5.6 lb-ft), ±15%</td>
</tr>
</tbody>
</table>

**Diagram:**

- Dimension A: 147.0 (5.79)
- Dimension B: 22.0 (0.87)
- Dimension C: 222.0 (8.74)
- Dimension D: 46.0 (1.81)
- Dimension E: 48.0 (1.89)
- Dimension F: 34.0 (1.34)
- Dimension G: 188.0 (7.40)