<table>
<thead>
<tr>
<th>Series</th>
<th>Description</th>
<th>Direct operated</th>
<th>Pilot operated</th>
<th>Spool feedback</th>
<th>Integrated electronics</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1FT</td>
<td>Standard performance</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td></td>
<td>3-3</td>
</tr>
<tr>
<td>D*1FW</td>
<td></td>
<td>5</td>
<td>16</td>
<td>7</td>
<td></td>
<td>3-9</td>
</tr>
<tr>
<td>D*1FT</td>
<td></td>
<td>3</td>
<td>25</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WL<em>06</em></td>
<td>Standard performance, high repeatability</td>
<td>3</td>
<td></td>
<td></td>
<td>optional</td>
<td>3-19</td>
</tr>
<tr>
<td>WL<em>10</em></td>
<td>Standard performance, high repeatability</td>
<td>5</td>
<td></td>
<td></td>
<td>optional</td>
<td>3-27</td>
</tr>
<tr>
<td>D*1FS</td>
<td>High performance</td>
<td>10</td>
<td>16</td>
<td>8</td>
<td></td>
<td>3-33</td>
</tr>
<tr>
<td>D1FX</td>
<td></td>
<td>3</td>
<td>25</td>
<td>10</td>
<td></td>
<td>3-41</td>
</tr>
<tr>
<td>D1FH</td>
<td>Servo performance</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td></td>
<td>3-47</td>
</tr>
<tr>
<td>D*1FH</td>
<td></td>
<td>3</td>
<td>25</td>
<td>10</td>
<td></td>
<td>3-53</td>
</tr>
<tr>
<td>Accessories</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-63</td>
</tr>
<tr>
<td>Mounting patterns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-64</td>
</tr>
</tbody>
</table>

If you are interested in fast delivery, please follow this hint in our ordering codes when choosing your individual product:

**Bold letters = Short-term availability**
The D1FT directional control valve of the nominal size NG6 (CETOP 3) is a proportional valve providing variable flow rates. This valve is used with integrated control electronics. Typical applications are: soft switching via adjustable ramps for the reduction of hydraulic and mechanical shocks, electrically adjustable flow rates / speeds for automating machine functions.

**Technical features**
- Integrated control electronics with ramp adjustment
- Low leakage
- Progressive flow characteristics for sensitive adjustment of flow rate
- Spring centred spool
- Manual override
Direct Operated Proportional DC Valve

Series D1FT

Catalogue HY11-2500/UK

Ordering Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool type</th>
<th>Flow [l/min] at ∆p 5 bar per metering edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01C</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>E01F</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>E01H</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>E02C</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>E02F</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>E02H</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>B31F</td>
<td>0, 0, 0</td>
<td></td>
</tr>
<tr>
<td>B32F</td>
<td>15 / 7.5</td>
<td></td>
</tr>
</tbody>
</table>

Please order plug/s separately. See chapter 3 accessories.

Bold letters = Short-term availability

Code | Voltage |
---|---------|
F | Voltage input 0...±10V with reference output +10V / -10V |
G | Current input 0...±20mA |

Code | Style |
---|-------|
C | ![Style C](image) |
E | ![Style E](image) |
K | ![Style K](image) |
### Technical Data

**General**
- **Design:** Direct operated proportional DC valve with integrated power amplifier
- **Actuation:** Proportional solenoid
- **Mounting position:** Optional
- **Environmental temperature (°C):** -20 ... +60

**Hydraulics**
- **Pressure medium:** Hydraulic oil as per DIN 51 524 ... 535, other fluids by request
- **Viscosity, recommended [mm²/s]:**
  - max. admis. [mm²/s]:
    - 30 ... 80
    - 20 ... 380
- **Oil temperature (°C):** 0 ... 60
- **Filtration:** Permissible contamination class to achieve with filter of pressure medium as per NAS 1638
  - class 9
- **Main stage class X:** 15
- **Mounting pattern:** DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
- **Operating pressure [bar]:**
  - Port P, A, B, max. 350 bar
  - Port T max. 50 bar
- **Nominal size:** DIN 60 / CETOP 03 C F H
- **Type:**
  - C
  - F
  - H
- **Weight [kg]:** 2.5 2.5 2.5
- **Nominal flow at ∆p=5bar per metering edge [l/min]:** 7.5 15 20

**Static / Dynamic**
- **Hysteresis [%]:** < 8
- **Sensitivity [%]:** < 2
- **Response time t [ms]:** 100

**Integrated electronics (D*FT)**
- **Supply voltage [V]:** 14.5 ... 30
- **Power consumption [VA]:** 22
- **Current consumption max. [A]:** 2.8
- **Input signal:**
  - Voltage [V]: ±10
  - Impedance [kOhm]: 100
  - Current Impedance [Ω]: ≤20
- **Reference output (10mA max.) [V]:**
  - Pin C: +10
  - Pin F: -10
- **Ramp time [s]:** 0...3
- **Plug connector:** 6 + PE DIN 43563

---

**Catalogue HY11-2500/UK**

**Direct Operated Proportional DC Valve**

**Series D1FT**
Block diagram

Arrangement of the potentiometers
Flow characteristics

Spool Code E*
at $\Delta p$ 5bar per metering edge

Spool Code B*

Operating limits
100% command signal
Direct Operated Proportional DC Valve
Series D1FT

Dimensions

<table>
<thead>
<tr>
<th>Surface finish</th>
<th>Kit</th>
<th>NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK375</td>
<td>4x M5x30, DIN 912 12.9</td>
<td>8.1 Nm</td>
</tr>
</tbody>
</table>
The D*1FW / D*1FT pilot-operated proportional DC valves are available in NG10 (CETOP5), NG16 (CETOP7) and NG25 (CETOP8). These valves (D*1FW) are controlled electrically with the external power amplifiers PWD00A-400 or used as valves with integrated electronics (D*1FT).

Typical applications include reproducible control of actuator speed in rapid / slow speed profiling, and smooth acceleration and deceleration performance.

Technical features
- Low leakage
- Progressive flow characteristics for sensitive adjustment of flow rate
- Fail safe centre position
- Optional: centre position monitoring
- D*1FT version with integrated power amplifier with ramp adjustment

D31FW
**Ordering Code**

<table>
<thead>
<tr>
<th>Code</th>
<th>Nominal size</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>9†</td>
<td>NG25 / CETOP 8</td>
</tr>
</tbody>
</table>

* with enlarged connections Ø32mm

**Spool type**

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool type</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01</td>
<td>X</td>
</tr>
<tr>
<td>E02</td>
<td>X</td>
</tr>
<tr>
<td>B31</td>
<td>X</td>
</tr>
<tr>
<td>B32</td>
<td>X</td>
</tr>
</tbody>
</table>

**Flow [l/min] at Δp = 5bar per metering edge**

<table>
<thead>
<tr>
<th>Code</th>
<th>D31</th>
<th>D41</th>
<th>D91</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>75</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
<td>200</td>
<td>-</td>
</tr>
<tr>
<td>H</td>
<td>-</td>
<td>-</td>
<td>400</td>
</tr>
</tbody>
</table>

**Bold letters = Short-term availability**

Please order plug/s separately. See chapter 3 accessories.
Pilot Operated Proportional DC Valve
Series D*1FW / D*1FT

Ordering Code

**Code**

<table>
<thead>
<tr>
<th>Code</th>
<th>Nominal size</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>9†</td>
<td>NG25 / CETOP 8</td>
</tr>
</tbody>
</table>

† with enlarged connections Ø32mm

**Spool type**

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool type</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01</td>
<td></td>
</tr>
<tr>
<td>E02</td>
<td></td>
</tr>
<tr>
<td>B31</td>
<td></td>
</tr>
<tr>
<td>B32</td>
<td></td>
</tr>
</tbody>
</table>

**Flow (l/min) at Δp = 5bar per metering edge**

<table>
<thead>
<tr>
<th>Code</th>
<th>D31</th>
<th>D41</th>
<th>D91</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>75</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
<td>200</td>
<td>-</td>
</tr>
<tr>
<td>H</td>
<td>-</td>
<td>-</td>
<td>400</td>
</tr>
</tbody>
</table>

**Seal**

NBR (different seal compound by request)

**Pilot connection**

Electronic variation

**Electronic accessories**

**Valve accessories**

**Design series**

**Voltage input**

0...±10V, with reference output +10V/-10V

**Current input**

0...±20mA

**Code**

<table>
<thead>
<tr>
<th>Code</th>
<th>Valve accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Monitor switch</td>
</tr>
<tr>
<td>8</td>
<td>(plug included)</td>
</tr>
</tbody>
</table>

**Code**

<table>
<thead>
<tr>
<th>Code</th>
<th>Electronic variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Voltage input 0...±10V, with reference output +10V-10V</td>
</tr>
<tr>
<td>G</td>
<td>Current input 0...±20mA</td>
</tr>
</tbody>
</table>

**Code**

<table>
<thead>
<tr>
<th>Code</th>
<th>Inlet</th>
<th>Drain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>internal</td>
<td>external</td>
</tr>
<tr>
<td>2</td>
<td>external</td>
<td>external</td>
</tr>
<tr>
<td>4</td>
<td>internal</td>
<td>internal</td>
</tr>
<tr>
<td>5</td>
<td>external</td>
<td>internal</td>
</tr>
</tbody>
</table>

Please order plug/s separately.
See chapter 3 accessories.

**Bold letters = Short-term availability**
### Technical Data

#### General
- **Design**: Pilot-operated DC Valve with integrated power amplifier
- **Actuation**: Proportional solenoid
- **Mounting position**: Optional
- **Environmental temp. [°C]**: -20...60

#### Hydraulics
- **Pressure medium**: Hydraulic oil as per DIN 51 524 ... 535, other fluids by request
- **Viscosity, recommended [mm²/s]**: 30 ... 80
  - **max. admiss. [mm²/s]**: 20 ... 380
- **Pressure fluid temperature [°C]**: 0 ... 60
- **Filtration**:
  - Permissible contamination class of pressure medium as per NAS 1638...
  - $x = 75$
  - $x = 15$
- **Filtration damage level**:
  - Pilot stage: Class 7
  - Main stage: Class 9
- **Mounting pattern**: DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
- **Operating pressure [bar]**:
  - Port P, T, A, B, X max. 350 bar, Port Y max. 10 bar
  - Pilot stage: 20 - 350 (optimal dynamics at 50)
  - Pilot volume req. (constant) [l/min]: < 1.2
- **Nominal size DIN CETOP**: NG10 06, NG16 07, NG25 08
- **Weight [kg]**: 7.1, 10.8, 19
- **Nominal flow at Δp=5 bar per metering edge [l/min]**: 75, 200, 400
- **Drain (140 bar) [l/min]**: 0.1, 0.2, 0.6

#### Static / Dynamic
- **Hysteresis [%]**: < 5
- **Repeatability [%]**: < 1
- **Response time [ms]**: 60, 75, 100

#### Solenoid
- **Type**, **Protection class, DIN 40050**: Code L, IP 54
- **Nominal resistance [Ohm]**: 2.2
- **Nominal current (100%ED) [A]**: 2.5
- **Voltage [V]**: 6
- **Electrical connection**: EN 175301-803

#### Integrated electronics (D*1FT)
- **Supply voltage [V]**: 14.5...30
- **Power consumption [VA]**: 22
- **Input signal**:
  - **Polarity**: D against E positive corresponds to P-B, A-T, negative corresponds to P-A, B-T
  - **Voltage [V]**: ±10
  - **Impedance [kOhm]**: 100
  - **Current [mA]**: ±20
  - **Impedance [Ohm]**: 500
- **Reference output (10mA max.) [V]**: +10 / -10
- **Ramp time [s]**: 0...3
- **Plug**: 6 + PE DIN 43563

*inverse polarity by request*
Pilot Operated Proportional DC Valve
Series D*1FW / D*1FT

Electronics

Block diagram

Arrangement of the potentiometers
Flow characteristics
at \( \Delta p = 5 \text{bar per metering edge} \)

<table>
<thead>
<tr>
<th>Model</th>
<th>Spool code E*</th>
<th>Spool code B*</th>
</tr>
</thead>
<tbody>
<tr>
<td>D*1FW</td>
<td><img src="image1" alt="Characteristics Graph" /></td>
<td><img src="image2" alt="Characteristics Graph" /></td>
</tr>
<tr>
<td>D*1FT</td>
<td><img src="image3" alt="Characteristics Graph" /></td>
<td><img src="image4" alt="Characteristics Graph" /></td>
</tr>
</tbody>
</table>
## Pilot Operated Proportional DC Valve

### Series D*1FW / D*1FT

#### Dimensions

**Pilot connection**

<table>
<thead>
<tr>
<th>D31F*</th>
<th>D41F*</th>
<th>D91F*</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Pilot connection diagram D31F*" /></td>
<td><img src="image" alt="Pilot connection diagram D41F*" /></td>
<td><img src="image" alt="Pilot connection diagram D91F*" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pilot connection</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>D31F*</td>
<td><img src="image" alt="Table of Pilot connection D31F*" /></td>
<td><img src="image" alt="Diagram of Pilot connection D31F*" /></td>
</tr>
<tr>
<td>D41F*</td>
<td><img src="image" alt="Table of Pilot connection D41F*" /></td>
<td><img src="image" alt="Diagram of Pilot connection D41F*" /></td>
</tr>
<tr>
<td>D91F*</td>
<td><img src="image" alt="Table of Pilot connection D91F*" /></td>
<td><img src="image" alt="Diagram of Pilot connection D91F*" /></td>
</tr>
</tbody>
</table>
### Dimensions

**Pilot Operated Proportional DC Valve**

**Series D*1FW / D*1FT**

#### D31FW

**Surface finish**

<table>
<thead>
<tr>
<th>Kit</th>
<th>4x M6x40 DIN 912 12.9</th>
<th>13.6 Nm</th>
<th>SK-D31FW-N20</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR</td>
<td>BK385</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### D41FW

**Surface finish**

<table>
<thead>
<tr>
<th>Kit</th>
<th>2x M6x55 4x M10x60 DIN 912 12.9</th>
<th>13.6 Nm 65 Nm</th>
<th>SK-D41FW-N20</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR</td>
<td>BK320</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pilot Operated Proportional DC Valve
Series D*1FW / D*1FT

Catalogue HY11-2500/UK

Dimensions

**D91FW**

<table>
<thead>
<tr>
<th>Surface finish</th>
<th>Kit</th>
<th>NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR-6.3</td>
<td>BK360</td>
<td>SK-D91FW-N20</td>
</tr>
<tr>
<td></td>
<td>6 x M12x05</td>
<td>115 Nm</td>
</tr>
<tr>
<td></td>
<td>DIN 912 12.9</td>
<td></td>
</tr>
</tbody>
</table>

**D31FT**

<table>
<thead>
<tr>
<th>Surface finish</th>
<th>Kit</th>
<th>NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR-6.3</td>
<td>BK385</td>
<td>SK-D31FT-N30</td>
</tr>
<tr>
<td></td>
<td>4 x M6x40</td>
<td>13.6 Nm</td>
</tr>
<tr>
<td></td>
<td>DIN 912 12.9</td>
<td></td>
</tr>
</tbody>
</table>

---

Parker Hydraulics
Pilot Operated Proportional DC Valve
Series D*1FW / D*1FT

**D41FT**

Surface finish

<table>
<thead>
<tr>
<th>Kit</th>
<th>NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK320</td>
<td>SK-D41FT-N30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bk</th>
<th>Kit</th>
<th>Nbr</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6x55</td>
<td>13.6 Nm</td>
<td></td>
</tr>
<tr>
<td>M10x60</td>
<td>65 Nm</td>
<td></td>
</tr>
<tr>
<td>DIN 912 12.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**D91FT**

Surface finish

<table>
<thead>
<tr>
<th>Kit</th>
<th>NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK360</td>
<td>SK-D91FT-N20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bk</th>
<th>Kit</th>
<th>Nbr</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6x55</td>
<td>115 Nm</td>
<td></td>
</tr>
<tr>
<td>M10x60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN 912 12.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The WLL directional control valve series of the nominal size NG6 (CETOP3) provides variable flow rates. These valves are available with/without spool position feedback and electrically controlled by the external digital amplifier modules VRD350/355 or PWD00A-400.

Typical applications are:
- Exact and repeatable adjustment of flow rates, applications with rapid / slow speed profiles and the positioning of hydraulic drives.

Technical features
- Spool / sleeve design
- High reproducibility from valve to valve
- Low hysteresis
- Progressive flow characteristics for sensitive adjustment of flow rate
- Manual override
- Spool position feedback, optional
Direct Operated Proportional DC Valve

**Series WL*06*/

**Ordering Code**

- **W** DC valve
- **F** Series letter
- **L** Spool type
- **G09** Design series
- **3** Solenoid voltage (different voltage by request)
- **Code** Spool position feedback
- **Code** Style

### Code Style

<table>
<thead>
<tr>
<th>Code</th>
<th>Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>L43</td>
<td>[Diagram]</td>
</tr>
<tr>
<td>F42</td>
<td>[Diagram]</td>
</tr>
</tbody>
</table>

### Code Spool type Flow [l/min] at ∆p 5bar per metering edge

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool type</th>
<th>Flow [l/min] at ∆p 5bar per metering edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>G06P003</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>G06P006</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>G06P012</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>G06P020</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>K06P020</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>G06A006</td>
<td>6 / 3</td>
<td></td>
</tr>
<tr>
<td>G06A012</td>
<td>12 / 6</td>
<td></td>
</tr>
<tr>
<td>G06A020</td>
<td>20 / 10</td>
<td></td>
</tr>
<tr>
<td>K06A020</td>
<td>20 / 10</td>
<td></td>
</tr>
</tbody>
</table>

*Please order plug/s separately. See chapter 3 accessories.*

**Bold letters = Short-term availability**
### Technical Data

#### General
- **Design**: Direct operated proportional DC valve
- **Actuation**: Proportional solenoid
- **Mounting position**: Optional
- **Environmental temperature [°C]**: 20 ... +60

#### Hydraulics
- **Pressure fluid**: Hydraulic oil as per DIN 51 524 ... 535, other fluids by request
- **Viscosity, recommended [mm²/s]**: 30 ... 80
- **max. admiss. [mm²/s]**: 20 ... 380
- **Pressure fluid temperature [°C]**: 0 ... +60
- **Filtration**: Permitted contamination class of pressure medium as per NAS 1638
  - class 7 - 9: \( \beta_x = 75 \)
  - class 7 - 10: \( \beta_x = 10 \)
- **Mounting pattern**: DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
- **Operating pressure [bar]**: Port P, A, B, max. 315 bar, Port T max. 210 bar
- **Nominal size DIN NG06 CETOP**: 03
- **Weight [kg]**: 2.2 (2.5 with LVDT)
- **Nominal flow at \( \Delta p = 5 \text{ bar} \) per metering edge [l/min]**: 3, 6, 12 and 20
  - Drain [l/min]: see curves

#### Static / Dynamic
- **Code “K” without spool position feedback**
- **Hysteresis [%]**: \( \leq 4 \)
- **Threshold [%]**: 0.5
- **Sensitivity [%]**: \( \leq 0.3 \)
- **Response time t at 100% [ms]**: \( \leq 30 \)

- **Code “R” with spool position feedback**
- **Hysteresis [%]**: \( \leq 0.3 \)
- **Threshold [%]**: 0.2
- **Sensitivity [%]**: \( \leq 0.1 \)
- **Response time t at 100% [ms]**: \( \leq 20 \)

#### Solenoid
- **Type**: G09
- **Protection class DIN 40050**: IP 65
- **Power consumption [VA]**: 17
- **Nominal resistance [Ohm]**: 2.2
- **Nominal current (100%ED) [A]**: 2.7
- **Voltage [V]**: 9
- **Electrical connection, solenoid**: EN 175301-803
- **Elec. connection, pos. indicator**: M12 / 4pin
- **EMV conformity, pos. indicator**: EN 50081-2, EN 50082-1

#### Note
- Standard seal compound is NBR.

### Wiring
- **Solenoid coil**

  - **Feedback**
  - 1: output, actual spool position
  - 2: supply (+24V)
  - 3: GND (0V)
  - 4: not used
Flow characteristics
at \( \Delta p = 5 \text{bar per metering edge} \)

Spool code G06P* / K06P*

Dynamic response (WLL43G06* with power amplifier VRD350)
measured at: \( \pm 25\% \) amplitude, offset 50\%
Operation limits $Q = f(\Delta p)$

**WL*P003*K**

![Graph for WL*P003*K](image1)

**WL*P006*K**

![Graph for WL*P006*K](image2)

**WL*P012*K**

![Graph for WL*P012*K](image3)

**WL*P020*K**

![Graph for WL*P020*K](image4)
Characteristic Curves

Step response

Code "K" without spool position feedback

Code "R" with spool position feedback
Direct Operated Proportional DC Valve
Series WL*06*

Dimensions

WLF42*

WLL43*

Surface finish

<table>
<thead>
<tr>
<th>Kit</th>
<th>NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK375</td>
<td>SK-WLL06F</td>
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<tr>
<td>4x M5x30</td>
<td>8.1 Nm</td>
</tr>
<tr>
<td>DIN 912 12.9</td>
<td></td>
</tr>
</tbody>
</table>
Characteristics

The WLL directional control valve series of the nominal size NG10 (CETOP 5) provides variable flow rates.

These valves are available with/without spool position feedback and electrically controlled by the external digital amplifier modules VRD350/355 or PWD00A-400.

Typical applications are:
- Exact and repeatable adjustment of flow rates, applications with rapid / slow speed profile and the positioning of hydraulic drives.

Technical features
- Spool / sleeve design
- High reproducibility from valve to valve
- Low hysteresis
- Progressive flow characteristics for sensitive adjustment of flow rate
- Manual override
- Spool position feedback, optional
Direct Operated Proportional DC Valve
Series WL*10*

**Ordering Code**

- **W**: DC valve
- **L**: Design
- **E**: Spool type
- **R**: Seal NBR (different seal compound by request)

**Spool type**

- **L**: Design series

<table>
<thead>
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</tr>
<tr>
<td>F42</td>
<td><img src="image" alt="F42 Style" /></td>
</tr>
</tbody>
</table>

**Flow [l/min] at ∆p 5 bar per metering edge**

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool type</th>
<th>Flow [l/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>G10P040</td>
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<tr>
<td>G10P060</td>
<td><img src="image" alt="G10P060" /></td>
<td>60</td>
</tr>
<tr>
<td>K10P060</td>
<td><img src="image" alt="K10P060" /></td>
<td>60</td>
</tr>
<tr>
<td>G10A060</td>
<td><img src="image" alt="G10A060" /></td>
<td>60 / 30</td>
</tr>
<tr>
<td>K10A060</td>
<td><img src="image" alt="K10A060" /></td>
<td>60 / 30</td>
</tr>
</tbody>
</table>

*Please order plug/s separately. See accessories.*

**Bold letters = Short-term availability**
## Technical Data

### General
- **Design**: Direct operated proportional DC valve
- **Actuation**: Proportional solenoid
- **Mounting position**: Optional
- **Environmental temp.**: -20...+60 °C

### Hydraulics
- **Pressure medium**: Hydraulic oil as per DIN 51 524 ... 535, other fluids by request
- **Viscosity, recommended [mm²/s]**: 30 ... 80
- **Viscosity, max. admiss. [mm²/s]**: 20 ... 380
- **Oil temperature [°C]**: 0 ... 60
- **Filtration**: Permitted contamination class of pressure medium as per NAS 1638
  - β < 75
  - class 7 - 9
  - X = 10
- **Mounting pattern**: DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
- **Operating pressure [bar]**: Port P, A, B, max. 315 bar, Port T max. 210 bar
- **Nominal size DIN**: NG10
- **Weight [kg]**: 6.5
- **Nominal flow at ∆p=5 bar per metering edge [l/min]**: 40 and 60

### Static / Dynamic
- **Hysteresis [%]**: ≤ 6
- **Threshold [%]**: 0.8
- **Sensitivity [%]**: ≤ 0.4
- **Response time t for 100% [ms]**: ≤ 40

### Solenoid
- **Type**: G09
- **Protection class DIN 40050**: IP 65
- **Power consumption [VA]**: 31.5
- **Nominal resistance [Ohm]**: 1.8
- **Nominal current (100%ED) [A]**: 3.4
- **Voltage [V]**: 9
- **Electrical connection solenoid**: EN 175301-803

### Wiring
- **Solenoid coil**

![Wiring Diagram](image)

- 1 = coil connection
- 2 = coil connection
- PE = ground potential
Characteristics Curves

**Direct Operated Proportional DC Valve**

Series WL*10*

### Flow characteristics

*at Δp = 5bar per metering edge*

Spool code G06P* / K06P*

![Flow characteristics graph](image)

Spool code G06A* / K06A*

![Flow characteristics graph](image)

### Dynamic response (WLL43G10* with power amplifier VRD350)

measured at: ±25% amplitude, offset 50%

![Dynamic response graph](image)
Characteristic Curves

Operation limits $Q = f(\Delta p)$

**WL*P060* **

![Graph for WL*P060*]

**WL*P040* **

![Graph for WL*P040*]

**Step response**

**Code "K"** without spool position feedback

![Step response for "K" without feedback]

**Code "R"** with spool position feedback

![Step response for "R" with feedback]
The D*1FS pilot operated proportional valves series of the nominal sizes NG10 to NG32 (CETOP 5 to 10) provides flow rate control. These valves are electrically controlled with EW* series analogue power amplifiers or with VRD350/355 digital power amplifiers. The spool position is controlled by an electronic feedback device.

Typical applications are:
- Exact and reproducible adjustment of flow rates,
- Movement of the drive in rapid / slow speed profile and the soft acceleration and deceleration to improve the drive characteristics.

Technical features
- Low leakage
- Sensitive flow rate adjustment
- Spool position feedback
- Fail safe centre position
- Optional: center position monitoring
- Expanded functions with digital amplifier VRD350

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>a</td>
</tr>
<tr>
<td>b</td>
<td>P</td>
</tr>
<tr>
<td>T</td>
<td></td>
</tr>
</tbody>
</table>
### Pilot Operated Proportional DC Valve

**Series D*1FS**

**Catalogue HY11-2500/UK**

**Ordering Code**

- **D** - DC valve
- **1** - Nominal size
- **F** - Flow control
- **S** - Spool type
- **N** - Pilot connection
- **W** - Valve accessories
- **S** - Solenoid voltage
- **N** - Nominal flow
- **D** - Design series

#### Nominal size

<table>
<thead>
<tr>
<th>Code</th>
<th>Nominal size</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>91</td>
<td>NG25 / CETOP 8</td>
</tr>
<tr>
<td>11</td>
<td>NG32 / CETOP 10</td>
</tr>
</tbody>
</table>

**11** - with enlarged connections Ø 32mm

#### Spool type

- **E01**
- **E02**
- **B31**
- **B32**

#### Flow (l/min) at Δp 5bar per metering edge

<table>
<thead>
<tr>
<th>Code</th>
<th>D31</th>
<th>D41</th>
<th>D81</th>
<th>D91</th>
<th>D111</th>
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<tr>
<td>B</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>C</td>
<td>-</td>
<td>120</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E</td>
<td>-</td>
<td>-</td>
<td>300</td>
<td>-</td>
<td>-</td>
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<tr>
<td>L</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1000</td>
</tr>
</tbody>
</table>

**Solenoid voltage**

- **0** - standard accessories
- **B1** - Monitor switch (plug included)
- **L** - 6 VDC (to use digital power amplifier)
- **X** - 16 VDC (to use analogue power amplifier)

**Valve accessories**

- **0** - standard accessories
- **B1** - Monitor switch (plug included)

**Code**

- **1** - internal inlet
- **2** - external inlet
- **4** - internal drain
- **5** - external drain

#### Bold letters = Short-term availability

- Please order plug/s separately.
- See chapter 3 accessories.
- Plug for spool position feedback included.

---

**Parker Hydraulics**

[Home] [3-34] [Contents] [Ordering Code] [Index]
## Technical Data

### General
- **Design**: Pilot-operated DC Valve with position feedback
- **Actuation**: Proportional solenoid
- **Mounting position**: Optional
- **Environmental temperature**: $-20 \ldots +60 \degree C$

### Hydraulics
- **Pressure medium**: Hydraulic oil as per DIN 51 524 ... 535, other fluids by request
- **Viscosity, recommended**: $30 \ldots 80 \text{ [mm²/s]}$
- **Oil temperature**: $0 \ldots 60 \degree C$
- **Filtration**: Permissible contamination class of $X = 75$
- **Pilot stage**: Class 7, $X = 5$
- **Main stage**: Class 9, $X = 15$
- **Mounting pattern**: DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
- **Operating pressure**
  - Port P, T, A, B, X max. 350 bar, Port Y max. 10 bar
- **Nominal size**: DIN NG10, NG16, NG25, NG32
- **CETOP**: 05, 07, 08, 10
- **Weight**: 7.1 kg, 10.8 kg, 19 kg, 62 kg
- **Nominal flow at $\Delta p = 5$ bar per metering edge**
  - NG10: 45 l/min
  - NG16: 120 l/min
  - NG25: 300/400 l/min
  - NG32: 1000 l/min
- **Drain (140bar)**
  - NG10: 0.1 l/min
  - NG16: 0.2 l/min
  - NG25: 0.6 l/min
  - NG32: 1.0 l/min
- **Pilot stage**
  - **Pilot pressure**: 20 - 350 (optimal dynamics at 50)
  - **Pilot volume req. (const.)**: < 1.2 l/min
- **Static / Dynamic**
  - **Hysteresis**: < 0.5%
  - **Sensitivity**: < 0.2%
  - **Response time**: 35 ms, 60 ms, 80 ms, 200 ms

### Solenoid
- **Protection class DIN 40050**: IP 54
- **Nominal resistance**: 9.8 Ohm, 2.2 Ohm
- **Nominal current (100%ED)**
  - NG10: 1.3 A
  - NG16: 2.54 A
- **Voltage**: 16 V, 6 V
- **Elec. connection, solenoid**: EN 175301-803
- **Elec. connection, pos. indicator**: M12 / Spin
- **EMV conformity, pos. indicator**: EN 50081-2
- **EN 50082-1**

### Wiring
- **Solenoide coil**
- **Spool position signal**
- **1** = coil connection
- **2** = coil connection
- **PE** = ground connection
- **1** = output, actual spool position
- **2** = supply (+24V)
- **3** = GND (0V)
- **4** = not used
- **5** = ground
Flow characteristics
at \( \Delta p = 5 \)bar per metering edge

Spool code E*
Pilot Operated Proportional DC Valve
Series D*1FS

Pilot Flow

Pilot connection

**D31FS**

- Pilot connection diagram
- Open: ●, Closed: ○

**Pilot Oil Flow**

<table>
<thead>
<tr>
<th>Pilot oil</th>
<th>Inlet</th>
<th>Drain</th>
<th>B</th>
<th>C</th>
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</thead>
<tbody>
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<td>●</td>
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<td>●</td>
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<tr>
<td>internal</td>
<td>○</td>
<td>○</td>
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<tr>
<td>external</td>
<td>●</td>
<td>○</td>
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</tbody>
</table>

**D41FS**

- Pilot connection diagram
- Open: ●, Closed: ○

**Pilot Oil Flow**

<table>
<thead>
<tr>
<th>Pilot oil</th>
<th>Inlet</th>
<th>Drain</th>
<th>B</th>
<th>C</th>
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</thead>
<tbody>
<tr>
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<td>○</td>
<td>●</td>
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<td>external</td>
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<td>○</td>
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**D81/91FS**

- Pilot connection diagram
- Open: ●, Closed: ○

**Pilot Oil Flow**

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<thead>
<tr>
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<th>Drain</th>
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<th>C</th>
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<tbody>
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<tr>
<td>external</td>
<td>●</td>
<td>○</td>
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**D111FS**

- Pilot connection diagram
- Open: ●, Closed: ○

**Pilot Oil Flow**

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<th>Inlet</th>
<th>Drain</th>
<th>B</th>
<th>C</th>
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</table>
### Pilot Operated Proportional DC Valve

**Series D*1FS**

#### D31FS

**Dimensions**

<table>
<thead>
<tr>
<th>Surface finish</th>
<th>Kit</th>
<th>Kit</th>
<th>NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK385</td>
<td>4x M6x40</td>
<td>13.6 Nm</td>
<td>SK-D31FS-N30</td>
</tr>
<tr>
<td>DIN 912 12.9</td>
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</tbody>
</table>

#### D41FS

<table>
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<th>Kit</th>
<th>NBR</th>
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<tbody>
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<tr>
<td>4x M10x60</td>
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<tr>
<td>DIN 912 12.9</td>
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</tbody>
</table>

---

**Surface finish**

- BK385
- BK320

**Kit**

- 4x M6x40
- 2x M6x55
- 4x M10x60

**NBR**

- SK-D31FS-N30
- SK-D41FS-N30

---

**2_1FS.PM6.5 RH**
Pilot Operated Proportional DC Valve
Series D*1FS

D81/91FS

Dimensions

Surface finish

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</thead>
<tbody>
<tr>
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<td>6x M12x95 115 Nm</td>
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</tbody>
</table>

D111FS

Dimensions

Surface finish

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<th>NBR</th>
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</thead>
<tbody>
<tr>
<td>BK386</td>
<td>6x M20x90 553 Nm</td>
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</table>

D_1FS/PMS.5.9R1
Notes
The D*FX directional control valve series of the nominal size NG6 (CETOP3) provides variable flow rates.

Typical applications are:
Exact and reproducible adjustment of flow rates, movement of the drive in rapid / slow speed profile and the soft acceleration and deceleration to improve the drive characteristics.

**Technical features**
- Integrated control electronics
- Spool position feedback
- Progressive flow characteristics for sensitive adjustment of flow rate
- Spring centred spool
- Manual override
Direct Operated Proportional DC Valve
Series D1FX

Ordering Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool type</th>
<th>Flow [l/min] at ∆p 5bar per metering edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01C</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>E01F</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>E01H</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>E02C</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>E02F</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>E02H</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>B31F</td>
<td></td>
<td>15 / 7.5</td>
</tr>
<tr>
<td>B32F</td>
<td></td>
<td>15 / 7.5</td>
</tr>
</tbody>
</table>

Please order plug/s separately.
See chapter 3 accessories.

**Bold letters = Short-term availability**
# Technical Data

## Series D1FX

### General
- **Design**: Direct operated proportional DC valve with integrated power amplifier
- **Actuation**: Proportional solenoid
- **Mounting position**: Optional
- **Environmental temp. [°C]**: -20 ... +60

### Hydraulics
- **Pressure medium**: Hydraulic oil as per DIN 51 524 ... 535, other fluids by request
- **Viscosity, recommended [mm²/s]**: Oil temperature [°C]
  - 30 ... 80
  - 20 ... 380
- **Oil temperature [°C]**: 0 ... 60
- **Filtration**: Permitted contamination class of pressure medium as per NAS 1638
  - Class 9: X = 15
- **Mounting pattern**: DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
- **Operating pressure [bar]**:
  - Port P, A, B, max. 315 bar, Port T max. 35 bar
- **Nominal size DIN**: NG06 03
- **Type**: C, F, H
- **Weight [kg]**: 3.4
- **Nominal flow at ∆p=5bar per metering edge [l/min]**: 7.5, 15, 20

### Static / Dynamic
- **Hysteresis [%]**: < 1.5
- **Repeatability [%]**: < 0.5
- **Response time t [ms]**: 60

### Integrated electronics
- **Supply voltage [V]**: 21 ... 30
- **Power consumption [VA]**: 30
- **Current consumption max. [A]**: 3
- **Input signal Polarity**
  - Voltage [V]: D against E positive corresponds to P-A, B-T, negative corresponds to P-B, A-T
  - Impedance [kOhm]: 100
  - Current [mA]: ±20
  - Impedance [Ohm]: 500
- **Diagnostic output pin F [V]**: ±10
- **Plug connector**: 6 + PE DIN 43563

### Wiring

![Wiring Diagram]

**Supply voltage**: 24 V

**Diagnosis** (spool position): NG06

**Ground**: - Set value

**Enable**: + Set value

**Reference potential**: 0 V

**Diagnostic output pin F**: ±10

*Parker Hydraulics*
Flow characteristics D1FX
at $\Delta p = 5$bar per metering edge

Spool Code E*

Spool Code B*
Operation limits D1FX
100% command signal

Dynamic response D1FX
Direct Operated Proportional DC Valve
Series D1FX

Dimensions

<table>
<thead>
<tr>
<th>Surface finish</th>
<th>Kit</th>
<th></th>
<th>NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK375</td>
<td>4x M5x30</td>
<td>6.1 Nm</td>
<td>SK-D1FX-N30</td>
</tr>
<tr>
<td>DIN 912 12.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Characteristics

The proportional DC valves of the D1FH series with nominal size NG6 (CETOP3) provide variable flow rates.

This valve is a high dynamic control valve with integrated electronics.

The D1FH features a precision zero lapped spool and sleeve assembly ideally suiting it for precision high performance closed loop control applications.

Technical features

- Integrated valve electronics
- Closed loop controlled spool position
- Linear flow characteristics
- Fourth fail safe position
- Spool / sleeve design
Direct Operated Proportional DC Valve

Series D1FH

Ordering Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool type</th>
<th>Flow [l/min] at ( \Delta p = 350\text{bar} ) per metering edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>E50B</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>E50D</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>E50H</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>E50M</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>E80B</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>E80D</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>E80H</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>E80M</td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

Please order plug/s separately. See chapter 3 accessories.

Bold letters = Short-term availability.
### General
- **Design**: Direct operated proportional DC valve with integrated power amplifier
- **Actuation**: Proportional solenoid
- **Mounting position**: optional
- **Environmental temp. [°C]**: -20 ... +60

### Hydraulics
- **Pressure medium**: Hydraulic oil as per DIN 51 524 ... 535, other fluids by request
- **Viscosity, recommended [mm²/s]**: 30 ... 80
  - max. admss. [mm²/s]: 20 ... 380
- **Oil temperature [°C]**: 0 ... 60
- **Filtration**: Permitted contamination class of pressure medium as per NAS 1638 $\beta_x = 75$
  - class 7 $X = 10$
- **Mounting pattern**: DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
- **Operating pressure [bar]**: Port P, A, B, max. 315; Port T min. 1.4, max. 35
- **Nominal size DIN**: NG06
  - CETOP: 03
- **Weight [kg]**: 3.7
- **Nominal flow at Δp=35bar**
  - per metering edge [l/min]: 5, 10, 20, 40
  - Drain, max. [l/min]: 1.0

### Static / Dynamic
- **Hysteresis [%]**: < 0.5
- **Reversible span [%]**: < 0.1
- **Sensitivity [%]**: < 0.1
- **Response time [ms]**: 16

### Integrated electronics
- **Supply voltage [V]**: 21 ... 30
- **Power consumption [VA]**: 30
- **Current requirement [A]**: 2
- **Current consumption max. [A]**: 4
- **Polarity**: D against E positive corresponds to P-A, B-T, negative corresponds to P-B, A-T
- **Voltage [V]**: ±10
  - Impedance [kOhm]: 100
  - Current [mA]: ±20
  - Impedance [Ohm]: 500
- **Diagnostic output PIN F [V]**: ±10
- **Protection class**: IP65, NEMA 4
- **Plug**: 6 + PE DIN 43563

### Wiring
- Diagnosis (spool/pos/cm)
- Reference potential
- Set value
- Ground
- Enable
Flow characteristics
at \( \Delta p = 35 \text{bar per metering edge} \)

Operation limits
100% Nominal current

Dynamic response
Dimensions

Direct Operated Proportional DC Valve
Series D1FH

Catalogue HY11-2500/UK

Dimensions

Surface finish

<table>
<thead>
<tr>
<th>Surface finish</th>
<th>Kit</th>
<th>Kit KIT NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK375</td>
<td>4x M5x30 DIN 912 12.9</td>
<td>SK-D1FH-N12</td>
</tr>
</tbody>
</table>

8.1 Nm
The pilot-operated proportional DC valves series of the D*1FH series are high performance valves with electronic spool position feedback. Valves are available in sizes NG10 to NG32 (CETOP5 to CETOP8). Typical applications are:

- High precision and reproducible adjustment of flow rates, applications in rapid / creep speed with spool position monitoring for presses and dynamic position and p/Q closed loop systems.

**Technical features**

- Low leakage
- Very low hysteresis
- Zero lap and overlap spool design available
- Mechanical zero point adjustment for zero lap spools
- High dynamics
- Spool position feedback
- Optional: centre position monitoring
Pilot Operated Proportional DC Valve
Series D*1FH

### Ordering Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Spool type</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01</td>
<td>overlap</td>
</tr>
<tr>
<td>E02</td>
<td>overlap</td>
</tr>
<tr>
<td>B31</td>
<td>overlap 2</td>
</tr>
<tr>
<td>B32</td>
<td>overlap 2</td>
</tr>
<tr>
<td>B11</td>
<td>overlap</td>
</tr>
<tr>
<td>B12</td>
<td>overlap</td>
</tr>
<tr>
<td>E52</td>
<td>overlap 2</td>
</tr>
<tr>
<td>B61</td>
<td>overlap 2</td>
</tr>
</tbody>
</table>

1) with enlarged connections Ø 32mm
2) not for D111FH

### Valve accessories

- **Code**: 0 standard
- **B** Monitor switch (plug included)

### Electrical variation

- **B**: Voltage input 0...±10V standard
- **E**: Current input 0...±20mA
- **S**: Current input 4...20mA

### Flow [l/min] at ∆p 5bar per metering edge

<table>
<thead>
<tr>
<th>Code</th>
<th>D31</th>
<th>D41</th>
<th>D81/91</th>
<th>D111</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>55</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>105</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>80</td>
<td>140</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E</td>
<td>-</td>
<td>190</td>
<td>250</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
<td>240</td>
<td>310</td>
<td>-</td>
</tr>
<tr>
<td>H</td>
<td>-</td>
<td>400</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>L</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Please order plug/s separately.
See chapter 3 accessories.

**Bold letters = Short-term availability**
## Technical Data

### General
- **Design**: Pilot-operated proportional DC valve with integrated power amplifier
- **Actuation**: Proportional solenoid
- **Mounting position**: optional
- **Environmental temp. [°C]**: -20...+60

### Hydraulics
- **Pressure medium**: Hydraulic oil as per DIN 51 524 ... 535, other fluids by request
- **Viscosity, recommended [mm²/s]**: 30 ... 80, max. admis. [mm²/s]: 20 ... 380
- **Oil temperature [°C]**: -20 ... 60
- **Filtration**: Permissible contamination class of pressure medium as per NAS 1638
  - Pilot stage: Class 7
  - Main stage: Class 9
- **Operating pressure [bar]**:
  - Port P, T, A, B, X max. 350 bar,
  - Port Y max. 10 bar
- **Nominal size**:
  - DIN NG10, CETOP 05
  - DIN NG16, CETOP 07
  - DIN NG25, CETOP 08
  - DIN NG32, CETOP 10
- **Weight [kg]**: 8.1 (NG10), 11.6 (NG16), 20.7 (NG25), 62 (NG32)
- **Nominal flow at ∆p=5bar**:
  - per metering edge [l/min]: 80 (NG10), 240 (NG16), 400 (NG25), 1000 (NG32)
  - Max. flow [l/min]: 170 (NG10), 420 (NG16), 900 (NG25), 2000 (NG32)
- **Drain (140bar) [l/min]**: 0.1 (NG10), 0.2 (NG16), 0.6 (NG25), 1.0 (NG32)

### Pilot stage
- **Pilot pressure [bar]**: 20 - 350 (optimal dynamics at 70)
- **Pilot volume req. (const.) [l/min]**: < 1.2
- **Pilot volume requirement for min. step response [l/min]**: 2.0 (NG10), 4.1 (NG16), 9.0 (NG25), 18.0 (NG32)

### Static / Dynamic
- **Hysteresis [%]**: < 0.1
- **Threshold [%]**: < 0.1
- **Sensitivity [%]**: < 0.05
- **Response time [ms]**: 25 (NG10), 45 (NG16), 65 (NG25), 150 (NG32)

### Integrated electronics (D*1FH)
- **Supply voltage [V]**: 18 ... 30
- **Power consumption [VA]**: 30
- **Current consumption max. [A]**: 2
- **Starting current (0.5ms) [A]**: 7
- **Input signal**:
  - **Voltage [V]**: ±10 (0...+10V → P–B) ²
  - **Impedance [kOhm]**: 100
  - **Current [mA]**: ±20 (0...+20mA → P–B) ²
  - **Impedance [Ohm]**: 500
  - **Current [mA]**: 4...20 (12...4mA → P–B)
  - **Impedance [Ohm]**: 500
  - **Diagnostic output Pin F [V]**: ±10
- **Protection class**: IP54
- **Temperature drift [%/°C]**: 0.005
- **Plug connector**: 6 + PE DIN 43563

---

¹) overlap spool
²) inverse polarity by request
Enable input
The power stage is activated via pin C (enable input).

Supply voltage monitoring
If the minimal supply voltage drops below, it is internally monitored and displayed via the status LED.

Control monitoring
A control error is indicated if there is an error in the control circuit of the valve.

<table>
<thead>
<tr>
<th>Display is green</th>
<th>Normal operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display off</td>
<td>Supply voltage is outside the permissible range of 18 ... 30V</td>
</tr>
<tr>
<td>Display is red</td>
<td>Control error</td>
</tr>
</tbody>
</table>

Enable input

Supply voltage monitoring

Control monitoring

Arrangement of the potentiometers
Spindle trimmer for zero point compensation
Diagnostics for spool stroke

Wiring
Characteristic Curves

Pilot Operated Proportional DC Valve
Series D*1FH

Characteristic flow lines
at Δp = 5bar per metering edge

Spool type E01, E02

Spool type E52

Spool type B31, B32

Spool type B61
Characteristic Curves

Step response

**D31FH**

**D41FH**

**D81/91FH**

**D111FH**
Pilot Operated Proportional DC Valve
Series D*1FH

Dynamic response

**D31FH**

[Amplitude vs Frequency Graph]

**D41FH**

[Amplitude vs Frequency Graph]

**D81/91FH**

[Amplitude vs Frequency Graph]

**D111FH**

[Amplitude vs Frequency Graph]
Pilot Operated Proportional DC Valve
Series D*1FH

Pilot Flow

Pilot connection

D31FH

D41FH

D81/91FH

D111FH
Pilot Operated Proportional DC Valve
Series D*1FH

Dimensions

D81/91FH

Surface finish

Kit

NBR

DIN 912 12.9

BK360

6x M12x95

115 Nm

SK-D91FW-N10

D111FH

Surface finish

Kit

NBR

BK360

6x M20x90

553 Nm

SK-D111FW-N10

DIN 912 12.9

3-62
**Proportional DC Valves**

**Accessories**

### Solenoid connector D**FW, D**FS, WL*, RL*

<table>
<thead>
<tr>
<th>Description</th>
<th>Variation</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 175301-803 2+PE PG 9 black B</td>
<td>5001710</td>
<td></td>
</tr>
<tr>
<td>EN 175301-803 2+PE PG 9 grey A</td>
<td>5001711</td>
<td></td>
</tr>
<tr>
<td>EN 175301-803 2+PE PG 11 black B</td>
<td>5001716</td>
<td></td>
</tr>
<tr>
<td>EN 175301-803 2+PE PG 11 grey A</td>
<td>5001717</td>
<td></td>
</tr>
</tbody>
</table>

### Feedback connector D**FS, WL*06*R*

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 / 5pin</td>
<td>5004109</td>
</tr>
</tbody>
</table>

### Monitor switch connector D**1FW / D**1FT / D**1FS / D**1FH

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 / 5pin</td>
<td>5004109</td>
</tr>
</tbody>
</table>

### Central connector D**FT / D**FH / D**FX

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 43563 6+PE</td>
<td>5004072</td>
</tr>
</tbody>
</table>

---

**Parker Hydraulics**

Home  3-63  Contents  Ordering Code  Index
Proportional DC Valves
Mounting Patterns

to DIN 24340-A6, size NG6/CETOP3

With * marked dimensions ± 0.1mm.
All other dimensions ± 0.2mm.

Subplates and manifolds see chapter 8

Accessories 3.PM6.5 RH
Proportional DC Valves
Mounting Patterns

to DIN 24340-A25, size NG25/CETOP8

With * marked dimensions ± 0.1mm.
All other dimensions ± 0.2mm.

Subplates and manifolds see chapter 8

to DIN 24340-A32, size NG32/CETOP10

With * marked dimensions ± 0.1mm.
All other dimensions ± 0.2mm.

Subplates and manifolds see chapter 8

Accessories 3.PM6.5 RH

Parker Hydraulics