### Proportional Electro-Hydraulic Directional and Flow Control Valves

These valves are double-deck directional and flow control valves employing as their pilot the electro-hydraulic proportional pressure reducing valves with two proportional solenoids. The flow rate can be controlled by changing an input current to the solenoids and the direction of the flow can be controlled by providing the current to either solenoid of the two.

By combining the valves with the power amplifiers specially designed for the valves, the speed control, acceleration, deceleration and directional control can be done with a single valve, which eventually makes the hydraulic circuits simple and contributes the cost of the hydraulic systems.

### Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Model No.</th>
<th>EDFHG-03</th>
<th>EDFHG-04</th>
<th>EDFHG-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Operating Pressure (MPa)</td>
<td></td>
<td>25</td>
<td>140</td>
<td>280</td>
</tr>
<tr>
<td>Rated Flow L/min (U.S.GPM) at Valve Pressure Difference:</td>
<td>1.0 MPa (145 PSI)</td>
<td>100 (26.4)</td>
<td>140 (37.0)</td>
<td>280 (74.0)</td>
</tr>
<tr>
<td>Pilot Pressure (MPa)</td>
<td></td>
<td>1.5 - 16 (220 - 2320) *1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pilot Flow L/min (U.S.GPM) at Normal</td>
<td></td>
<td>1 (.26)</td>
<td>1 (.26)</td>
<td>1 (.26)</td>
</tr>
<tr>
<td>at Transition</td>
<td></td>
<td>3 (.79)</td>
<td>4 (1.06)</td>
<td>6 (1.59)</td>
</tr>
<tr>
<td>Max. Tank Line Back Pressure (MPa)</td>
<td></td>
<td>16 (2320)</td>
<td>21 (3050)</td>
<td>21 (3050)</td>
</tr>
<tr>
<td>Max. Drain Line Back Pressure (MPa)</td>
<td></td>
<td>3.0 (435) *1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Current (ma)</td>
<td></td>
<td>800 mA</td>
<td>980 mA</td>
<td>900 mA</td>
</tr>
<tr>
<td>Coil Resistance (Ω)</td>
<td></td>
<td>10 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td></td>
<td>5% or less *1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td></td>
<td>1% or less *1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approx. Mass (kg)</td>
<td></td>
<td>11 (24.3)</td>
<td>12 (26.5)</td>
<td>15 (33.1)</td>
</tr>
</tbody>
</table>

*1 Take care to keep the difference between the pilot pressure and drain port back pressure consistently greater than 1.5 MPa (220 PSI).

*2 To obtain stable performance, keep the drain port back pressure low and minimize its fluctuations.

*3 The hysteresis and repeatability values indicated in the specifications for each control valve are determined under the following conditions:
- **Hysteresis Value:** Obtained when Yuken’s applicable power amplifier is used.
- **Repeatability Value:** Obtained when Yuken’s applicable power amplifier is used under the same conditions.

### Model Number Designation

<table>
<thead>
<tr>
<th>F-</th>
<th>EDFH</th>
<th>G</th>
<th>-03</th>
<th>-100</th>
<th>-3C2</th>
<th>-XY</th>
<th>-E</th>
<th>-31</th>
<th>*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Seals for Phosphate Ester Type Fluids (Omit if not required)</td>
<td>EDFH: Proportional Electro-Hydraulic Directional and Flow Control Valves</td>
<td>G: Sub-Plate Mounting</td>
<td>03 100: 100 (26.4)</td>
<td>04 140: 140 (37.0)</td>
<td>06 280: 280 (74.0)</td>
<td>XY: Metre-in • Metre-out</td>
<td>E: External Pilot None: Internal Pilot</td>
<td>31</td>
<td>Refers to 2</td>
</tr>
</tbody>
</table>

**F-**

1. Spool type shown in the column is for the centre position.

### Attachment

#### Mounting Bolts

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Socket Head Cap Screw</th>
<th>Qty.</th>
<th>Tightening Torque Nm (in. lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDFHG-03</td>
<td>M6 x 35 Lg.</td>
<td>4</td>
<td>12 - 15 (106 - 133)</td>
</tr>
<tr>
<td>EDFHG-04</td>
<td>M6 x 45 Lg.</td>
<td>4</td>
<td>12 - 15 (106 - 133)</td>
</tr>
<tr>
<td>EDFHG-06</td>
<td>M12 x 60 Lg.</td>
<td>6</td>
<td>100 - 123 (885 - 1089)</td>
</tr>
</tbody>
</table>

Japanese Standard “JIS” European Design Standard
N. American Design Standard
Sub-plates

Sub-plates are those for solenoid controlled pilot operated directional valves. For dimensions, see page 401 and 402.

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page 784).

Model Numbers: SK1091-D24-10

Instructions

Manual Adjustment

In the event of an electric fault or emergency, a manual shift can be made by screwing in the manual adjustment screw. Take care, however, that this manual shift has no flows adjusting function.

For this operation, set the pilot pressure (or P-port pressure on an internal-pilot model) below 7 MPa (1020 PSI).

After operation, be sure to return the manual adjustment screw completely to the original position.

<table>
<thead>
<tr>
<th>Sub-plates</th>
<th>Japanese Standard &quot;JIS&quot;</th>
<th>European Design Standard</th>
<th>N. American Design Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve Model Numbers</td>
<td>Sub-plate Model Numbers</td>
<td>Thread Size</td>
<td>Approx. Mass kg (lbs.)</td>
</tr>
<tr>
<td>EDFHG-03</td>
<td>DHGM-03Y-10</td>
<td>Re 3/4</td>
<td>4.7 (10.4)</td>
</tr>
<tr>
<td>EDFHG-04</td>
<td>DHGM-04-20</td>
<td>Re 1/2</td>
<td>4.4 (9.7)</td>
</tr>
<tr>
<td></td>
<td>DHGM-06X-50</td>
<td>Re 1</td>
<td>7.4 (16.3)</td>
</tr>
</tbody>
</table>

Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Sub-plates are those for solenoid controlled pilot operated directional valves. For dimensions, see page 401 and 402.
EDFHG-06-280-3C*-XY-*-31/3190

Position of cable departure can be changed. For details, refer to EDFHG-03 valve on page 748.

Note: For valve mounting surface dimensions, see the dimensional drawings of subplates (p.402) in common use.

Interchangeability between Current and New Design

- **Specifications and Characteristics**
  No changes in specifications and characteristics between current and new design.

- **Mounting Interchangeability**
  The mounting surface are interchangeable.
  Note that because of improvements made on the solenoids, the overall shapes have been changed as shown below.

Current: Design 30

![Current: Design 30 Diagram]

New: Design 31

![New: Design 31 Diagram]
Input Current vs. Flow
Viscosity: 30 mm²/s (141 SSU)
Valve Pres. Difference: P→A (B), B (A) → T 1 MPa (145 PSI)

Valve Pressure Difference vs. Flow
Viscosity: 30 mm²/s (141 SSU)

EDFHG-03

EDFHG-04

EDFHG-06
### Frequency Response

#### EDFHG-03

Model Number: EDFHG-03-100-3C2-E-31  
Viscosity: 30 mm²/s (141 SSU)  
Pilot Pressure: 15.7 MPa (2280 PSI)  
Travel of Spool: ±10% of Maximum Stroke

#### EDFHG-04

Model Number: EDFHG-04-140-3C2-E-31  
Viscosity: 30 mm²/s (141 SSU)  
Pilot Pressure: 15.7 MPa (2280 PSI)  
Travel of Spool: ±10% of Maximum Stroke

#### EDFHG-06

Model Number: EDFHG-06-280-3C2-E-31  
Viscosity: 30 mm²/s (141 SSU)  
Pilot Pressure: 15.7 MPa (2280 PSI)  
Travel of Spool: ±10% of Maximum Stroke

### Step Response

These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.

#### EDFHG-03

Viscosity: 30 mm²/s (141 SSU)  
Supply Pressure: 15.7 MPa (2280 PSI)

#### EDFHG-04

#### EDFHG-06

These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.
List of Seals and Solenoid Ass'y

EDFHG-03-100-3C-XY-*31/3190
EDFHG-04-140-3C-XY-*31/3190
EDFHG-06-280-3C-*XY-*31/3190

Note: The GDM-211-B-11 connector assembly (Item 29) is not included in the solenoid assembly.

When ordering seals, please specify the seal kit number from the table below. In addition to the above o-rings, seals for solenoid ass'y are included in the seal kit.

For the detail of the solenoid ass'y o-rings, see page 674.

List of Seal Kits

<table>
<thead>
<tr>
<th>Valve Model Numbers</th>
<th>Seal Kit Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDFHG-03</td>
<td>KS-EDFHG-03-31</td>
</tr>
<tr>
<td>EDFHG-04</td>
<td>KS-EDFHG-04-31</td>
</tr>
<tr>
<td>EDFHG-06</td>
<td>KS-EDFHG-06-31</td>
</tr>
</tbody>
</table>