Lever Operator
Directional Control Valves

DG17S-8-**-10
DG17S4-10 **-50
NFPA D08/D10, ISO-4401-08/10
# Table of Contents

General Information ........................................................................................................... 4
DG17S-8 Basic Characteristics
Installation Data
Mounting Interface
Shifting Action
DG17S4-10 Basic Characteristics
Mounting Interface
Shifting Action
Mounting Position
Service Information

Model Code DG17S-8 ........................................................................................................... 5
DG17S-8 Maximum Flow Rating
DG17S-8 Recommended Flow Rating .................................................................................. 6
Oil Flow Directions
DG17S-8 Pressure Drop ..................................................................................................... 7
DG17S-8 Installation Dimensions ....................................................................................... 8
DG17S-8 Subplates & Bolt Kits .......................................................................................... 9

Model Code DG17S4-10 .................................................................................................... 10
DG17S-8 Maximum Flow Rating
DG17S4-10 Pressure Drop ................................................................................................ 11
DG17S4-10 Installation Dimensions ............................................................................... 12
DG17S4-10 Subplates & Bolt Kit ..................................................................................... 13

Application Data ............................................................................................................... 14
Introduction

General Description

These valves are generally used to control the direction of flow in a hydraulic circuit. This, in turn, would control the direction of movement of a hydraulic cylinder, or the rotation of a fluid motor.

- DG17S-8 Lever Operated
- DG17S4-10 Lever Operated

Features and Benefits

- Suitable for the most demanding industrial applications with flow capacities up to 380 l/min (100 USgpm) and rated pressure of 210 bar (3000 psi).
- High pressure and flow capability for maximum cost-effectiveness.
- Low shock characteristics to maximize machine life.
- Solid cast body and core passages for maximum strength and minimal pressure drop.
- Designed and backed by Vickers, with over 70 years as the global leader in fluid power and motion control.
## General Information

### DG17S-8 Basic Characteristics
- **Max. pressure:** 210 bar (3000 psi)
- **Max. flow:** 380 l/min (100 USgpm)
- **Max. pressure port T:** 140 bar (2000 psi)
- **Weight spring centered/detented:** 13.5 kg (29.8 lbs.)
- **Weight spring offset:** 15 kg (33 lbs.)

### Installation Data
Drain connection must be piped directly to tank through a surge free line so there will be no back pressure at this port.

### Mounting Interface
- **ISO 4401-08**
- **NFPA D08**
- **CETOP 8**

Port connections are made by mounting valves on a subplate or manifold having mounting dimensions which conform to NFPA-D08 (ISO-4401-08) pattern.

### DG17S4-10 Basic Characteristics
- **Max. pressure:** 210 bar (3000 psi)
- **Max. flow:** 341 l/min (90 USgpm)
- **Max. pressure port T:** 210 bar (3000 psi)
- **Weight:** 42.6 kg (94 lbs.)
- **Weight (Subplate):** 17.2 kg (38 lbs.)

The DG17, lever operated valves are ideally suited for applications requiring a manually operated, four-way directional valve.

### Mounting Interface
- **ISO 4401-10**
- **NFPA D10**

Port connections are made by mounting the valves on a subplate or manifold having mounting dimensions which conform to NFPA-D10 (ISO-4401-10) pattern.

### Shifting Action
Spring offset valves are spring positioned unless lever is actuated. No-spring detented valves maintain the spool position last selected. Machine vibration, heat, improper circuitry and externally induced shocks may cause no-spring detented valves to shift prematurely.

Spring centered models return valve spool to center position by centering springs when lever pressure falls below minimum requirement.

### CAUTION
Surges of oil in a common tank line serving these and other valves can be of sufficient magnitude to cause inadvertent shifting of these valves. This is particularly critical in the no-spring detented type valves. Separate tank lines or a vented manifold with a continuous downward path to tank is necessary.

### Mounting Position
No-spring detented valves must be installed with the longitudinal axis horizontal for good machine reliability. The mounting position of spring-offset models is unrestricted.

Drain connection must be piped directly to tank through a surge free line so there will be no back pressure at this port.

### NOTE
Any sliding spool valve, if held for long periods of time, may stick and not spring return due to fluid residue formation and therefore, should be cycled periodically to prevent this from happening.

### Service Information
Refer to specific Vickers parts drawing for service parts information. A complete parts breakdown is contained in this drawing. Order by literature number.
- DG17S-8-*A/C/N I-3441-S
- DG17S-10-50 I-3564-S
Lever Operated Directional Valves

Model Code

DG17S - 8 - ** - 10 - LH

1 Directional Control
Manifold or subplate mounted; manual lever operated; 4-way flow direction.
Rated pressure 210 bar (3000 psi).

2 Interface
NFPA-D08 (ISO-4401-08)
8 - Flow 380 l/min (100 USgpm)

3 Spool Types
0, 2, 3, 4, 6, 8, 33 - (See flow rating tabulations for descriptions.)

4 Spool/Spring Arrangement
A - Spring offset
C - Spring centered
N - No-spring detented

5 Design Number
Subject to change. Installation dimensions remain as shown for design numbers 10 through 19 models.

6 Spring Offset Model
LH - Offset to B. (Omit for offset to A models shown.)

DG17S-8 Max. Flow Rating

<table>
<thead>
<tr>
<th>Model Code</th>
<th>70 bar (1000 psi)</th>
<th>140 bar (2000 psi)</th>
<th>210 bar (3000 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DG17S-8-0C-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-0A-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-0N-10</td>
<td>380 (100)</td>
<td>265 (70)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-2C-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-2A-10</td>
<td>380 (100)</td>
<td>265 (70)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-2N-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-3C-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-3N-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-4C-10</td>
<td>303 (80)</td>
<td>303 (80)</td>
<td>303 (80)</td>
</tr>
<tr>
<td>DG17S-8-4A-10</td>
<td>303 (80)</td>
<td>303 (80)</td>
<td>303 (80)</td>
</tr>
<tr>
<td>DG17S-8-4N-10</td>
<td>303 (80)</td>
<td>303 (80)</td>
<td>303 (80)</td>
</tr>
<tr>
<td>DG17S-8-6C-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-6A-10</td>
<td>380 (100)</td>
<td>190 (50)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-6N-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-8C-10</td>
<td>303 (80)</td>
<td>303 (80)</td>
<td>303 (80)</td>
</tr>
<tr>
<td>DG17S-8-8A-10</td>
<td>303 (80)</td>
<td>303 (80)</td>
<td>303 (80)</td>
</tr>
<tr>
<td>DG17S-8-8N-10</td>
<td>303 (80)</td>
<td>303 (80)</td>
<td>303 (80)</td>
</tr>
<tr>
<td>DG17S-8-33C-10</td>
<td>380 (100)</td>
<td>190 (50)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-33A-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
<tr>
<td>DG17S-8-33N-10</td>
<td>380 (100)</td>
<td>380 (100)</td>
<td>380 (100)</td>
</tr>
</tbody>
</table>
# DG17S-8 Flow Ratings

<table>
<thead>
<tr>
<th>Spring Centered ▼</th>
<th>Spring Offset ▼</th>
<th>No-Spring Detented ▼</th>
<th>Standard Spool Types</th>
<th>Recommended Flow Capacity at 210 bar (3000 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-C-</td>
<td>-A-</td>
<td>-N-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Spools</td>
<td>0, 2, 6 &amp; 33</td>
<td>All Spools</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Center Position & Spool Type*  
- A - B - P - T

*Description & Center Position*

<table>
<thead>
<tr>
<th>Spool Type</th>
<th>Position No.1 (Extreme Out)</th>
<th>Position No.3 (Extreme In) Normal for Spring Offset</th>
</tr>
</thead>
</table>
| 0, 2, 3, 6, 33 | Pr. → Cyl. B  
Cyl. A → Tank | Pr. → Cyl. B   
Cyl. A → Tank |
| 4 & 8      | Pr. → Cyl. A   
Cyl. B → Tank | Pr. → Cyl. B   
Cyl. A → Tank |

**Full flow**

**Restricted flow**

*See Direction of Flow Chart, next page.*

**Center position applies to:**
1. Spring centered models and no-spring detented models at intermediate position #2.
2. Spring offset models at center crossover.

---

## Direction of Oil Flow for Lever Positions

<table>
<thead>
<tr>
<th>Spool Type</th>
<th>Position No.1 (Extreme Out)</th>
<th>Position No.3 (Extreme In) Normal for Spring Offset</th>
</tr>
</thead>
</table>
| 0, 2, 3, 6, 33 | Pr. → Cyl. B  
Cyl. A → Tank | Pr. → Cyl. B   
Cyl. A → Tank |
| 4 & 8      | Pr. → Cyl. A   
Cyl. B → Tank | Pr. → Cyl. B   
Cyl. A → Tank |
DG17S-8 Pressure Drop

### Pressure Drop Curves

<table>
<thead>
<tr>
<th>Spool Type &amp; Center Position</th>
<th>P → A</th>
<th>B → T</th>
<th>P → B</th>
<th>A → T</th>
<th>P → T on Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>“0”</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>“2”</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>–</td>
</tr>
<tr>
<td>“3”</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>–</td>
</tr>
<tr>
<td>“4”</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>“6”</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>–</td>
</tr>
<tr>
<td>“8”</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>“33”</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>–</td>
</tr>
</tbody>
</table>

Example:
Find the pressure drop from P → B for type 2 spool. Using the table above find numeral 2 in spool type column. To the right of numeral 2, find the reference curve number 3 under P → B column. The pressure drop from P → B for type 2 spool would be obtained on curve number 3.

1. Pressure drop curves give approximate pressure drop (ΔP) when passing 21 cSt (100 SUS) fluid(s) having .865 specific gravity.

2. For any other viscosity(s), the pressure drop (ΔP) will change as follows:

<table>
<thead>
<tr>
<th>Viscosity</th>
<th>14</th>
<th>32</th>
<th>43</th>
<th>54</th>
<th>65</th>
<th>76</th>
<th>86</th>
</tr>
</thead>
<tbody>
<tr>
<td>cSt (SUS)</td>
<td>(75)</td>
<td>(150)</td>
<td>(200)</td>
<td>(250)</td>
<td>(300)</td>
<td>(350)</td>
<td>(400)</td>
</tr>
<tr>
<td>% of ΔP (Approx.)</td>
<td>93</td>
<td>111</td>
<td>119</td>
<td>126</td>
<td>132</td>
<td>137</td>
<td>141</td>
</tr>
</tbody>
</table>

3. For any other specific gravity (G₁)*, the pressure drop (ΔP₁), will be approximately:

   \[ ΔP₁ = ΔP(G₁/G) \]

* Specific gravity of fluid may be obtained from its producer. The value is higher for fire-resistant fluids than for oil.
DG17S-8 Installation Dimensions

Lever Operated
Spring Centered DG17S-8-*C-10
No-Spring Detented DG17S-8-*N-10

Millimeters (inches)

Port "A"
Pressure port

Port "B"

Port

Tank port

Position #1

Position #2

Position #3

234.9 (9.25)

55.8 (2.20)

53.0 (2.09)

100.7 (3.96)

184.0 (7.24)

168.6 (6.64)

314.6 (12.38)

291.1 (11.46)

111.0 (4.37)

81.0 (3.19)

57.0 (2.25)

Identification Plate:
Showing flow direction
information and model code
number.

C"bore
4 places

Port "A" test connection
.4375-20 UNF-2B straight thread

Port "B" test connection
.4375-20 UNF-2B straight thread

Mounting surface
(seals furnished)

Lever Shifting Force/Dimensions

<table>
<thead>
<tr>
<th>Spool</th>
<th>Dimension A</th>
<th>Dimension B</th>
<th>Force (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>79.5 (3.13)</td>
<td>334.4 (13.16)</td>
<td>6.8 (15)</td>
</tr>
<tr>
<td>2, 3, 6, 33</td>
<td>79.5 (3.13)</td>
<td>334.4 (13.16)</td>
<td>9.1 (20)</td>
</tr>
<tr>
<td>4, 8</td>
<td>96.0 (3.78)</td>
<td>350.9 (13.82)</td>
<td>11.3 (25)</td>
</tr>
</tbody>
</table>

* At recommended flow and maximum operating pressure.
DG17S-8 Subplates & Bolt Kits

Valves, subplates and mounting bolts must be ordered separately.

Example:
(1) DG17S-8-2C-10 Valve
(1) DGSM-8-10-T12 Subplate
(1) BKG06-635 Inch Bolt Kit or
(1) BKG8-655M Metric Bolt Kit

When subplate is not used, a machined pad must be provided for mounting. Pad must be flat within 0.0127 mm (.0005 inch) and smooth within 1.6 µm (63 microinch). Mounting bolts, when provided by customer, should be SAE grade 7 or better.

DGSM-8-10-T12/16
Mounting Subplates

DGSM-8-10-T20
Mounting Subplate
Lever Operated Directional Valve

Model Code

DG17S4-10 ** C 5* - LH

1. Directional Control
2. Mounting Type
   G - Manifold or Subplate
3. Valve Operator
   17 - Manual lever operated
4. Sliding Spool

5. Flow Direction
   4 - Four-way - spring offset model only

6. Valve Size
   10 - ISO-4401-10, NFPA-D10 interface

7. Spool Type
   0, 2, 4, 6, 8, 33

8. Spool/Spring Arrangement
   A - Spring offset
   C - Spring centered
   N - No-spring, detented

9. Design Number
   Subject to change. Installation dimensions remain as shown for design numbers 50 through 59.
   -50 Design has top located nameplate.
   -53 Design has 1/4” NPT test ports.

10. Left Hand
    Blank - Omit if not required.

Flow Direction & Rating

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Spool Type</th>
<th>Flows l/min (USgpm) @ 210 bar (3000 psi)</th>
<th>Direction of oil flow for valve spool position</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Spring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detented N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DG17S4-100N</td>
<td>0 - Open center all ports</td>
<td>284 (75)</td>
<td>Press. Port A &amp; Port B → Tank</td>
</tr>
<tr>
<td>DG17S4-100C</td>
<td>2 - Closed center all ports</td>
<td>341 (90)</td>
<td>Press. Port A &amp; Port B Blocked</td>
</tr>
<tr>
<td>DG17S4-102A</td>
<td>4 - Tandem Closed crossover</td>
<td>189 (50)</td>
<td>Press.→ Tank Port A &amp; Port B blocked</td>
</tr>
<tr>
<td>DG17S4-104C</td>
<td>6 - Closed center P only</td>
<td>341 (90)</td>
<td>Press. Blocked Port A &amp; Port B→ Tank</td>
</tr>
<tr>
<td>DG17S4-108C</td>
<td>8 - Tandem Open crossover</td>
<td>189 (50)</td>
<td>Press.→ Tank Port A &amp; Port B blocked</td>
</tr>
<tr>
<td>DG17S4-1033C</td>
<td>33 - Closed center Bleed A &amp; B</td>
<td>341 (90)</td>
<td>Press. Blocked Port A &amp; Port B→ Tank</td>
</tr>
<tr>
<td>DG17S4-106C</td>
<td>10 - ISO-4401-10, NFPA-D10 interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DG17S4-106A</td>
<td>12 - No-spring, detented</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DG17S4-10 Model Series

Functional Symbols
Spring offset - A
Spring centered - C
No-spring - Detented N

Position #3

Pressure Drop

<table>
<thead>
<tr>
<th>Spool Type</th>
<th>P to A</th>
<th>B to T</th>
<th>P to B</th>
<th>A to T</th>
<th>P to T Centered</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3.2 bar (47 psi)</td>
<td>4.2 bar (61 psi)</td>
<td>3.0 bar (44 psi)</td>
<td>4.6 bar (67 psi)</td>
<td>3.5 bar (51 psi)</td>
</tr>
<tr>
<td>2</td>
<td>2.5 bar (36 psi)</td>
<td>3.8 bar (55 psi)</td>
<td>2.7 bar (38 psi)</td>
<td>3.7 bar (53 psi)</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>4.1 bar (60 psi)</td>
<td>8.3 bar (120 psi)</td>
<td>5.5 bar (80 psi)</td>
<td>9.2 bar (134 psi)</td>
<td>3.7 bar (54 psi)</td>
</tr>
<tr>
<td>6</td>
<td>2.3 bar (34 psi)</td>
<td>2.2 bar (32 psi)</td>
<td>2.6 bar (37 psi)</td>
<td>2.1 bar (30 psi)</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>3.5 bar (51 psi)</td>
<td>8.1 bar (118 psi)</td>
<td>3.9 bar (57 psi)</td>
<td>8.9 bar (129 psi)</td>
<td>3.6 bar (52 psi)</td>
</tr>
<tr>
<td>33</td>
<td>2.5 bar (36 psi)</td>
<td>3.7 bar (53 psi)</td>
<td>2.7 bar (38 psi)</td>
<td>3.5 bar (51 psi)</td>
<td>—</td>
</tr>
</tbody>
</table>

1. Figures in the pressure drop chart give approximate pressure drops (ΔP) when passing 379 l/min (100 USgpm) flow (Q) of 100 SUS fluid(s) having .865 specific gravity.

2. For any other flow rate (Q1), the pressure drop (ΔP1) will be approximately:
   \[ \Delta P_1 = \Delta P \left( \frac{Q_1}{Q_2} \right)^2 \]

3. For any other viscosity(s), the pressure drop (ΔP) will change as follows:

<table>
<thead>
<tr>
<th>Viscosity (cSt)</th>
<th>14</th>
<th>32</th>
<th>43</th>
<th>54</th>
<th>65</th>
<th>76</th>
<th>86</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUS (Approx.)</td>
<td>93</td>
<td>111</td>
<td>119</td>
<td>126</td>
<td>132</td>
<td>137</td>
<td>141</td>
</tr>
</tbody>
</table>

4. For any other specific gravity (G1)*, the pressure drop (ΔA1), will be approximately:
   \[ \Delta P_1 = \Delta P \left( \frac{G_1}{G} \right) \]

* Specific gravity of fluid may be obtained from its producer. The value is higher for fire-resistant fluids than for oil.
Lever Operated Directional Valves
Spring Offset, Spring Centered & Detented

- Four-way Spring Centered - DG17S4-10*C-5*
- Four-way No Spring w/Detent - DG17S4-10*N-5*
- Four-way Spring Offset† - DG17S-10*A-5*

Millimeters (inches)

Position #1: extreme out
Position #2: intermediate
Position #3: extreme in (normal spring offset position)

Spool Type
<table>
<thead>
<tr>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension A</td>
<td>100 (3.94)</td>
<td>100 (3.94)</td>
<td>120.7 (4.75)</td>
<td>100 (3.94)</td>
<td>120.7 (4.75)</td>
</tr>
</tbody>
</table>

Test connections: 4375-20 UNF-2B thd. 1/4” NPT -50 design

Spring offset only
-50 design nameplate
-53 design nameplate

Gasket surface for mounting.
Sealing rings furnished.

† Offset models have an internal spring which returns the spool when the lever is released.
DG17S4-10 Subplates & Bolt Kit

Valves, subplates and mounting bolts must be ordered separately.

Example:
One (1) DG17S4-102C-5° Valve
One (1) BKDG10-636 Bolt Kit

When subplate is not used, a machined pad (as indicated by subplate shaded area, below, must be provided for mounting. Pad must be flat within 0,0127 mm (.0005 inch) and smooth within 1,6 µm (63 microinch). Mounting bolts, when provided by customer, should be SAE grade 7 or better.

Mounting Subplate
DGSM-10(*) -11

-Manifolds or other mounting interface can be drilled to 33,3 (1.312) dia. Fitting size and fitting spacing limit the subplate port size to 28,6 (1.125) dia.
Application Data

Fluid Cleanliness
Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials, and additives for protection against wear of components, elevated viscosity, and inclusion of air.

Essential information on the correct methods for treating hydraulic fluid is included in Vickers publication 561 “Vickers Guide to Systemic Contamination Control” available from your local Vickers distributor or by contacting Vickers, Incorporated. Recommendations on filtration and the selection of products to control fluid condition are included in 561.

Recommended cleanliness levels, using petroleum oil under common conditions, are based on the highest fluid pressure levels in the system and are coded in the chart below. Fluids other than petroleum, severe service cycles, or temperature extremes are cause for adjustment of these cleanliness codes. See Vickers publication 561 for exact details.

<table>
<thead>
<tr>
<th>Product</th>
<th>System Pressure Level</th>
<th>&lt;70 (&lt;1000)</th>
<th>70-210 (1000-3000)</th>
<th>210+ (3000+)</th>
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<tbody>
<tr>
<td>Vane Pumps – Fixed</td>
<td>20/18/15</td>
<td>19/17/14</td>
<td>18/16/13</td>
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<tr>
<td>Vane Pumps – Variable</td>
<td>18/16/14</td>
<td>17/15/13</td>
<td></td>
<td></td>
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<tr>
<td>Piston Pumps – Fixed</td>
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<td>18/16/14</td>
<td>17/15/13</td>
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<tr>
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<td>17/15/13</td>
<td>16/14/12</td>
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<tr>
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<td>20/18/15</td>
<td>19/17/14</td>
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<tr>
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<tr>
<td>Radial Piston Motors</td>
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<td>19/17/13</td>
<td>18/16/13</td>
<td></td>
</tr>
</tbody>
</table>

Fluids and Seals
Flourocarbon seals are standard and are suitable for use with phosphate ester type fluids or their blends, water glycol, water-in-oil emulsion fluids and petroleum oil.