This product has been designed and tested to meet specific standards outlined in the European Electromagnetic Compatibility Directive (EMC) 2014/30/EU which repealed Directive 2004/108/EC. For Restriction of Hazardous Substances, complies to (RoHS) Directive 2011/65/EU. For instructions on installation requirements to achieve effective protection levels, see the Installation Wiring Practices for Eaton’s Electronic Products. Wiring practices relevant to this Directive are indicated by △ Electromagnetic Compatibility (EMC).
General description

Vickers™ KBDG5V-5/7/8/10 are solenoid operated directional control, non-feedback type proportional valves. These are two-stage proportional directional control valves in which the main-stage spool is positioned according to the output from an integrally mounted proportional, solenoid operated, pressure-reducing valve. Direction of main-spool travel depends upon which of the two solenoids of the pilot valve is energized and the amount of travel is dependent upon the current input to the solenoid.

At any intermediate position of the main spool, a force balance exists between the controlled, reduced pilot pressure acting on the spool end and the opposing centering spring, plus the action of flow forces. There is no electrical feedback of the main-stage spool position.

This range of valves offers effective and economic solutions for applications having repetitive load conditions throughout each operating cycle, e.g. mold closure/opening in plastics molding machinery.

Standard features and benefits

- These global products, manufactured to world-class quality standards, are sold and serviced throughout the world.
- These valves open up expanded application opportunities as a cost effective alternative to feedback-type proportional and servo valves.
- Auxiliary DIN-rail mounted function modules available.

Typical section

KBDG5V-7
Without integral pilot pressure reducer
WARNING

Valves with integral amplifiers are supplied with or without the metal 7-pin plug. The Vickers™ plug, part no. 934939, must be correctly fitted to ensure that the EMC rating and IP67 rating are achieved. The plug retaining nut must be tightened to 2-2.5 Nm (1.5-2.0 lbf ft) to effect a proper seal.
Spool data

Spool types and flow ratings

Symmetric spools

Flow ratings for flow through P-A-B-T at $p = 5$ bar (72 psi) per flow path, e.g. P-A, or B-T. For other pressure drop values see “Flow Gain” curves on pages 10 and 11.

Asymmetric spools

Figure preceding metering type designator, “N” (e.g. 2C***N) is flow rating P-A, or A-T (“A” port flow); figure after “N” (N***) is flow rating P-B, or B-T (“B” port flow).

<table>
<thead>
<tr>
<th>Spool code</th>
<th>Main stage spool symbol</th>
<th>Flow rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2C90N</td>
<td>2C</td>
<td>90 L/min (24 USgpm)</td>
</tr>
<tr>
<td>33CB0</td>
<td>33C</td>
<td>80 L/min (21 USgpm)</td>
</tr>
<tr>
<td>2C180N</td>
<td>2C</td>
<td>180 L/min (48 USgpm)</td>
</tr>
<tr>
<td>33CB5N</td>
<td>33C</td>
<td>85 L/min (22.6 USgpm)</td>
</tr>
<tr>
<td>33C170N</td>
<td>33C</td>
<td>170 L/min (45 USgpm)</td>
</tr>
<tr>
<td>2C330N</td>
<td>2C</td>
<td>330 L/min (88 USgpm)</td>
</tr>
<tr>
<td>33C330N</td>
<td>33C</td>
<td>330 L/min (88 USgpm)</td>
</tr>
<tr>
<td>2C550N</td>
<td>2C</td>
<td>550 L/min (145 USgpm)</td>
</tr>
<tr>
<td>7C550N</td>
<td>7C</td>
<td>550 L/min (145 USgpm)</td>
</tr>
<tr>
<td>12C550N</td>
<td>12C</td>
<td>550 L/min (145 USgpm)</td>
</tr>
<tr>
<td>33C550N</td>
<td>33C</td>
<td>550 L/min (145 USgpm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spool code</th>
<th>Main stage spool symbol</th>
<th>Flow rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2C70N5</td>
<td>2C</td>
<td>70 L/min (18.6 USgpm), “A” port flow</td>
</tr>
<tr>
<td>33C60N35</td>
<td>33C</td>
<td>60 L/min (16 USgpm), “A” port flow</td>
</tr>
<tr>
<td>33C130N65</td>
<td>33C</td>
<td>65 L/min (17.3 USgpm), “B” port flow</td>
</tr>
<tr>
<td>133C160N100</td>
<td>133C</td>
<td>100 L/min (26.6 USgpm), “B” port flow</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spool code</th>
<th>Main stage spool symbol</th>
<th>Flow rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2C330N200</td>
<td>2C</td>
<td>330 L/min (88 USgpm), “A” port flow</td>
</tr>
<tr>
<td>33C330N200</td>
<td>33C</td>
<td>330 L/min (88 USgpm), “A” port flow</td>
</tr>
<tr>
<td>133C330N200</td>
<td>133C</td>
<td>330 L/min (88 USgpm), “A” port flow</td>
</tr>
<tr>
<td>12C330N200</td>
<td>12C</td>
<td>330 L/min (88 USgpm), “A” port flow</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spool code</th>
<th>Main stage spool symbol</th>
<th>Flow rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2C310N550</td>
<td>2C</td>
<td>310 L/min (82.6 USgpm), “A” port flow</td>
</tr>
<tr>
<td>33C310N550</td>
<td>33C</td>
<td>310 L/min (82.6 USgpm), “B” port flow</td>
</tr>
<tr>
<td>33C550N310</td>
<td>33C</td>
<td>550 L/min (145 USgpm), “B” port flow</td>
</tr>
<tr>
<td>133C550N310</td>
<td>133C</td>
<td>550 L/min (145 USgpm), “B” port flow</td>
</tr>
</tbody>
</table>
Functional symbols

Spool symbols
Simplified symbols including transient flow conditions (dotted line).

Spool type 2C
Spool type 7C
Spool type 12C
Spool type 33C
Spool type 133C with typical regenerative circuit

Typical schematic symbol

* Internal plug shown, for external pilot supply (via port X). For internal pilot supply (from port P) plug is not fitted. Port X should be blocked at mounting interface, or otherwise plugged at subplate or manifold block. See "Model Code".

▲ Internal plug shown, for external pilot drain (via port Y). For internal pilot drain (via port T) plug is not fitted. Port Y should be blocked at mounting interface, or otherwise plugged at subplate or manifold block. See "Model Code".

See also “Pilot Drain Application” notes.
Operating data

Data is typical with fluid at 36 cSt (168 SUS) and 50°C (122°F).

### Power supply (24V)
- (Model code 3S)
- 24V DC (21V to 36V including 10% peak-to-peak ripple) maximum current - 1.2A

### Command signal

- **Voltage mode**
  - 0 to 10V DC, or 0 to –10V DC, or –10V to + 10V DC
- **Input impedance**
  - MI: 47 kΩ
  - MA: 18V (max)
- **Max differential voltage to pin E to pin B**
  - 4V
- **Current mode**
  - 4-20 mA
- **The content of row input impedance**
  - 100 ohms
- **Command signal (Current)**
  - (Model code 2)
  - 4 to 20 mA
  - 100Ω

### Valve enable signal:

- **Enable**
  - >0.0V (34V max)
- **Disable**
  - <2.0V
- **Input impedance**
  - 36 kΩ

### 7-pin plug connector

- **Pin Description**
  - A Power supply positive (+)
  - B Power supply 0V and current command return
  - C Valve enable (PH7 & PR7)
  - D Command signal (+V or current in)
  - E Command signal (-V or current GND)
  - F Output monitor
  - G Protective ground

### Electromagnetic compatibility (EMC)

- **Conducted Emissions CISPR11 -2015-06 Ed 6.0 /EN55011 - Class A, 150kHz to 30MHz**
- **Radiated Emissions CISPR11 -2015-06 Ed 6.0 /EN55011 - Class A, 30MHz – 1GHz**
- **RF Continuous Conducted disturbances IEC 61000-4-6, 3Vrms Class A 150 KHz to 80 MHz**
- **RF Electromagnetic Field, 80MHz to 1GHz, 10V/m; 1.4GHz to 2.7GHz, 3V/m, Meets Criterion A**
- **Surge: IEC 61000-4-5**
  - DC Power Port: ±1kV
  - Signal/Control Port: ±1kV
- **Electrical Fast Transients IEC 61000-4-4, Class B**
  - DC Power Port: ±1kV
  - Signal/Control Port: ±0.5kV
- **Electrostatic discharges (ESD) IEC 61000-4-2, Class B**
  - Air ±8kV
  - Contact ±4kV

### ROHS Compliance:

Complies with: Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU

### Monitor signal (pin F)

- **Output impedance**
  - 0 to +5V (0.39 V/A)
  - 10kΩ

### Reproducibility, valve-to-valve (at factory settings):

- **Flow at 100% command signal**
  - ≤5%

### Protection:

- **Electrical**
  - Reverse polarity protected

- **Environmental**
  - IEC 529, Class IP67

### Ambient air temperature range for full performance

- 0°C to 70°C (32°F to 158°F)

### Oil temperature range for full performance

- 0°C to 70°C (32°F to 158°F)

### Minimum temperature at which valves will work at reduced performance

- –20°C (~–4°F)

### Storage temperature range

- –25°C to +85°C (-13°F to +185°F)

### Mass:

- **Valves with integral pressure reducing module**
  - KBDGV5-5: 9.8 kg (21.2 lb)
  - KBDGV-7: 11.9 kg (25.8 lb)
  - KBDGV-8: 20.6 kg (44.6 lb)
  - KBDGV10: 54.9 kg (118.9 lb)

- **For models without reducing module, deduct 1.2 kg (2.6 lb)**

### Supporting products:

- **Auxiliary electronic modules (DIN-rail mounting):**
  - EHA-CON-201-A-2* Signal converter
    - See catalog 2410A
  - EHD-DSG-201-A-1* Command signal generator
    - See catalog 2470
  - EHA-RMP-201-A-2* Ramp generator
    - See catalog 2427
  - EHA-PID-201-A-2* PID controller
    - See catalog 2427
  - EHA-PSU-201-A-10 Power supply
    - See catalog 2410A

- **Ramp time**
  - 0-12 sec for full step input (0-100%)

- **Relative duty factor**
  - Continuous rating (ED = 100%)

- **Hysteresis with flow through P-A-B-T**
  - <8% of rated flow
Data is typical with fluid at 36 cSt (168 SUS) and 50°C (122°F).

### Minimum pressure

**KBDG5V-5/7/8**  
For full flow performance, pilot pressure ≥45 bar (650 psi).

**KBDG5V-10**  
For full flow performance, pilot pressure ≥28 bar (405 psi).

i.e.
Pressure at port P for internal pilot supply.

or
Pressure at port X for external pilot supply.

### Maximum Pressures, bar (psi) for models without integral pilot pressure reducer

<table>
<thead>
<tr>
<th>Model</th>
<th>Pilot pressure source</th>
<th>Model code</th>
<th>Ports P, A, B</th>
<th>T</th>
<th>X</th>
<th>Y †</th>
</tr>
</thead>
<tbody>
<tr>
<td>KBDG5V-5</td>
<td>External</td>
<td>E</td>
<td>315</td>
<td>210</td>
<td>200</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(4500)</td>
<td>(3000)</td>
<td>(2900)</td>
<td>(116)</td>
</tr>
<tr>
<td></td>
<td>Internal</td>
<td>Omit</td>
<td>200‡</td>
<td>210</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2900)</td>
<td>(3000)</td>
<td>(116)</td>
<td></td>
</tr>
<tr>
<td>KBDG5V-7/8</td>
<td>External</td>
<td>E</td>
<td>350</td>
<td>350</td>
<td>200</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5000)</td>
<td>(5000)</td>
<td>(2900)</td>
<td>(116)</td>
</tr>
<tr>
<td></td>
<td>Internal</td>
<td>Omit</td>
<td>200‡</td>
<td>350</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2900)</td>
<td>(5000)</td>
<td>(116)</td>
<td></td>
</tr>
<tr>
<td>KBDG5V-10</td>
<td>External</td>
<td>E</td>
<td>350</td>
<td>350</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5000)</td>
<td>(5000)</td>
<td>(580)</td>
<td>(116)</td>
</tr>
<tr>
<td></td>
<td>Internal</td>
<td>Omit</td>
<td>40</td>
<td>350♣</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(580)</td>
<td>(5000)</td>
<td>(116)</td>
<td></td>
</tr>
</tbody>
</table>

### For models with integral pilot pressure reducer

<table>
<thead>
<tr>
<th>Model</th>
<th>Pilot pressure source</th>
<th>Model code</th>
<th>Ports P, A, B</th>
<th>T</th>
<th>X</th>
<th>Y †</th>
</tr>
</thead>
<tbody>
<tr>
<td>KBDG5V-5</td>
<td>External</td>
<td>EX</td>
<td>315</td>
<td>210</td>
<td>315</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(4500)</td>
<td>(3000)</td>
<td>(4500)</td>
<td>(116)</td>
</tr>
<tr>
<td></td>
<td>Internal</td>
<td>X</td>
<td>315</td>
<td>210</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(4500)</td>
<td>(3000)</td>
<td>(116)</td>
<td></td>
</tr>
<tr>
<td>KBDG5V-7/8</td>
<td>External</td>
<td>EX</td>
<td>350</td>
<td>350♣</td>
<td>315</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5000)</td>
<td>(5000)</td>
<td>(4500)</td>
<td>(116)</td>
</tr>
<tr>
<td></td>
<td>Internal</td>
<td>X</td>
<td>350</td>
<td>350♣</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5000)</td>
<td>(5000)</td>
<td>(116)</td>
<td></td>
</tr>
<tr>
<td>KBDG5V-10</td>
<td>External</td>
<td>EX</td>
<td>350</td>
<td>350♣</td>
<td>315</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5000)</td>
<td>(5000)</td>
<td>(4500)</td>
<td>(116)</td>
</tr>
<tr>
<td></td>
<td>Internal</td>
<td>X</td>
<td>350</td>
<td>350♣</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(5000)</td>
<td>(5000)</td>
<td>(116)</td>
<td></td>
</tr>
</tbody>
</table>

---

- When using internal pilot pressure, port X should be plugged at the subplate or manifold face (e.g. manifold not drilled for connection to port X).
- § The maximum pressure for ports A and B is: 310 bar (4500 psi) for size 5; 350 bar (5000 psi) for sizes 7 and 8.
- † See “Pilot Drain Application” note.
- ♦ Pilot must be externally drained, otherwise "Y" port pressure applies.
- ♣ Pilot must be externally drained, otherwise "T" port pressure limited to 210 bar (3000 psi).
Power capacity envelopes

Flow through P-A-B-T or P-B-A-T

Power capacity
Looped flow

![Diagram of flow paths]

L/min USgpm

Flow rate

Pressure drop

Flow rate

L/min

USgpm

Pressure drop

psi bar

Flow rate

0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600

0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800 4000 4200 4400 4600 4800 5000 5200 5400 5600 5800 6000 6200 6400 6600 6800 7000

2C90N 2C180N 2C330N 2C550N
Flow characteristics

Flow gain curves at stated values of total valve pressure drop, for flow P-A-B-T, or P-B-A-T.

KBDG5V-5-2C90N

KBDG5V-5-33C80N

KBDG5V-7-2C180N

KBDG5V-7-33C170N

KBDG5V-8-33C330N
Flow characteristics

Flow gain curves at 10 bar (145) psi valve pressure drop, for flow P-A-B-T, or P-B-A-T.

KBDG5V-10-2C550N

Asymmetric spools

At 5 bar (72 psi) valve pressure drop

2C70N45 @ 5 bar delta P

33C60N35 @ 5 bar delta P

33C130N65 @ 5 bar delta P

133C160N100 @ 5 bar delta P
**Step response (typical)**

Test conditions:
- No pressure reducer module
- Flow P-A-B-T
- Total valve \( \Delta p = 10 \text{ bar (145 psi)} \)
- External pilot pressure = 50 bar (725 psi)
- “Response” = Time, from step response signal, until output reaches 90% of step change value

<table>
<thead>
<tr>
<th>Input signal step change</th>
<th>Spool response times (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KBDG5V-5</td>
</tr>
<tr>
<td>0 to 100%</td>
<td>42</td>
</tr>
<tr>
<td>100% to 0</td>
<td>33</td>
</tr>
<tr>
<td>10% to 90%</td>
<td>43</td>
</tr>
<tr>
<td>90% to 10%</td>
<td>40</td>
</tr>
<tr>
<td>25% to 75%</td>
<td>34</td>
</tr>
<tr>
<td>75% to 25%</td>
<td>30</td>
</tr>
<tr>
<td>90% to 90%</td>
<td>78</td>
</tr>
</tbody>
</table>

Pilot flow required to achieve above response times:

<table>
<thead>
<tr>
<th></th>
<th>KBDG5V-5</th>
<th>KBDG5V-7</th>
<th>KBDG5V-8</th>
<th>KBDG5V-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.8 L/min</td>
<td>6.2 L/min</td>
<td>6.2 L/min</td>
<td>23.0 L/min</td>
<td></td>
</tr>
<tr>
<td>(0.98 USgpm)</td>
<td>(1.6 USgpm)</td>
<td>(1.6 USgpm)</td>
<td>(5.96 USgpm)</td>
<td></td>
</tr>
</tbody>
</table>
Installation dimensions

KBDG5V Models with “EX” or “X”  
(With integral pilot pressure reducer)  
The illustration is correct for KBDG5V-8 valves  
Dimensions are shown in mm (inches)  

KBDG5V Models with “E” or no symbol  
(Without integral pilot pressure reducer)  

▲ Overall installed length of KBD valves is X1 with connector fitted, and X2 without.
Installation dimensions

Pilot supply and drain plugs

KBDG5V-7 models
- Only *
- Remove this plug for access to pilot drain plug

KBDG5V-7 models
- Only *
- M6 x 8 mm plug, part no. 471131:
  - Fitted for external pilot drain.
  - Not fitted for internal pilot drain.

KBDG5V-5 models
- Viewed from port B end of main-stage
- M5 plug, part no. 471119. Remove for internal pilot supply
- Pilot connections
- P, T
- M5 plug, part no. 471119. Remove for internal pilot drain

KBDG5V-7 models
- Only *
- Size 7 only *
- M5 internal thread for removal of closure plug

* Internal plug shown, for external pilot supply (via port X).

For internal pilot supply (from port P) plug is not fitted. Port X should be blocked at mounting interface, or otherwise plugged at subplate of manifold block. See “Model Code”.

KBDG5V-8 models
- Section through port P of main-stage

KBDG5V-10 models
- Plug, part no. 7074. Remove for internal pilot drain
- Plug, part no. 30560 for internal pilot drain, part no. 7074 for external pilot drain

KBDG5V-8 models
- 1/4” NPT plug, part no. 113000. Remove for internal pilot supply

KBDG5V-10 models
- Plug, part no. 30560. Remove for internal pilot drain
Views on mounting faces

All O-seals supplied

KBDG5V-5

4 holes for mounting bolts
Ø 7.02 (0.27 Ø) spotfaced to
Ø 11.0 (0.43 Ø)

KBDG5V-7

6 holes for mounting bolts
4 x Ø 11.0 (0.43 Ø) c'bored
Ø 17.5 (0.68 Ø)
2 x Ø 6.4 (0.25 Ø) c'bored
Ø 11.0 (0.43 Ø)

KBDG5V-8

6 holes for mounting bolts
Ø 13.5 (0.53 Ø) spotfaced to
Ø 20.0 (0.78 Ø)

KBDG5V-10

6 holes for mounting bolts
Electrical information

Block diagram KBDG5V- *

Wiring

Connections must be made via the 7-pin plug mounted on the amplifier. Recommended cable sizes are:

Power cables

For 24V supply:
- 0.75 mm² (18 AWG) up to 20m (65 ft)
- 1.00 mm² (16 AWG) up to 40m (130 ft)

Signal cables

0.50 mm² (20 AWG)

Screen (shield)

A suitable cable would have 7 cores, a separate screen for the signal wires and an overall screen. Cable outside diameter 8,0-10,5 mm (0.31-0.41 inches). See connection diagrams on next page.

Electrical information

7-pin plug connections

+24V Power 0V

Enable ▲

Non-inverting Inverting

Current monitor Protective ground

Solenoid drive 2

PWM modulator

Solenoid drive 1

▲ In valves with PH7 or PR7 type electrical connection.

WARNING

All power must be switched off before connecting or disconnecting any plugs.
**Voltage input (M1) wiring**

- Spool position monitor voltage (pin F) will be referenced to the KB valve local ground.

**Wiring connections for M1 valves with enable feature**

**Note:** In applications where the valve must conform to European RFI/EMC regulations, the outer screen (shield) must be connected to the outer shell of the 7 pin connector, and the valve body must be fastened to the earth ground. Proper earth grounding practices must be observed in this case, as any differences in command source and valve ground potentials will result in a screen (shield) ground loop.
Current input (M2) wiring

- Spool position monitor voltage (pin F) will be referenced to the KB valve local ground.

Wiring connections for M2 valves with enable feature

**Note:** In applications where the valve must conform to European RFI/EMC regulations, the outer screen (shield) must be connected to the outer shell of the 7 pin connector, and the valve body must be fastened to the earth ground. Proper earth grounding practices must be observed in this case, as any differences in command source and valve ground potentials will result in a screen (shield) ground loop.

**WARNING**

**Electromagnetic Compatibility (EMC)**

It is necessary to ensure that the valve is wired up as above. For effective protection, the user electrical cabinet, the valve subplate or manifold and the cable screens should be connected to efficient ground points. The metal 7 pin connector part no. 934939 should be used for the integral amplifier. In all cases both valve and cable should be kept as far away as possible from any sources of electromagnetic radiation such as cables carrying heavy current, relays and certain kinds of portable radio transmitters, etc. Difficult environments could mean that extra screening may be necessary to avoid the interference. It is important to connect the 0V lines as shown above. The multi-core cable should have at least two screens to separate the demand signal and monitor output from the power lines. The enable line to pin C should be outside the screen which contains the demand signal cables.
Hydraulic fluids and fluid cleanliness

Recommendations on contamination control methods and the selection of products to control fluid condition are included in Eaton Hydraulic Fluid Recommendation 03-401-2010 rev 1.

For products in this catalog the recommended levels are: 0 to 70 bar (1000 psi)...18/16/13 70+ bar (1000+ psi)...17/15/12

Hydraulic fluids

Materials and seals used in these valves are compatible with antiwear hydraulic oils, and with non-alkyl-based phosphate esters.

The extreme operating viscosity range is 500 to 13 cSt (2270 to 70 SUS) but the recommended running range is 54 to 13 cSt (245 to 70 SUS).

Installation

The proportional valves in this catalog can be mounted in any attitude, but it may be necessary in certain demanding applications, to ensure that the solenoids are kept full of hydraulic fluid. Good installation practice dictates that the tank port and any drain port are piped so as to keep the valves full of fluid once the system start-up has been completed.

Mounting bolt kits

For KBDG5V-5
BK02-156493M (metric)
BK590720 (inch)

For KBDG5V-7
BKDG7M (metric)
BK590724 (inch)

For KBDG5V-8
BKDG8-655M (metric)
BKDG06-635 (inch)

For KBDG5V-10
BKDG10636M (metric)
BKDG10636 (inch)

If not using recommended Vickers™ bolt kits, bolts used should be to ISO 898, 12.9 or better.

Mounting bolt torques

Recommended torques with threads lubricated

For KBDG5V-5
M6 or 1/4"-20 UNC bolts:
To 210 bar (3000 psi) 14 Nm (10.3 lbf ft)
To 310 bar (4500 psi) 20 Nm (14.75 lbf ft)

For KBDG5V-7
M10 or 3/8"-16 UNC bolts:
49 to 59 Nm (36 to 43 lbf ft) plus
M6 or 1/4"-20 UNC bolts 9 to 14 Nm (6.6 to 10.3 lbf ft)

For KBDG5V-8
M12 or 1/2"-13 UNC bolts
103 to 127 Nm (76 to 93 lbf ft)

For KBDG5V-10
M20 or 3/4"-10 UNC-2B bolts 185-220 Nm (250-300 lbf ft)

Seal kits (Mainstage only)

KBDG5V-5............565143
KBDG5V-7............02-351175
KBDG5V-8............02-352520
KBDG5V-10............02-329888

Plugs

7-pin plug (metal) 934939
7-pin plug (plastic) 694534
(Metal plug must be used for full EMC protection)

Note: An alternative metal connector which gives EMC protection but not IP67 rating is available from ITT-Cannon, part number CA06-COM-E-14S-A7-P.

Service information

The products from this range are preset at the factory for optimum performance; disassembling critical items would destroy these settings. It is recommended that if any mechanical or electronic repair is necessary, valves should be returned to the nearest Eaton Hydraulics repair center. The products will be refurbished as necessary and retested to specification before return.

Field repair is restricted to the replacement of the seals.
This page is intentionally left blank
Changes to the products, to the information contained in this document, and to prices are reserved; so are errors and omissions. Only order confirmations and technical documentation by Eaton is binding. Photos and pictures also do not warrant a specific layout or functionality. Their use in whatever form is subject to prior approval by Eaton. The same applies to Trademarks (especially Eaton, Moeller, and Cutler-Hammer). The Terms and Conditions of Eaton apply, as referenced on Eaton Internet pages and Eaton order confirmations.