



# Pilot Operated Directional Valve

DG3V-7-30 Design

# Solenoid Controlled Pilot Operated Directional Valve

DG5V-7-50 Design

## General description

DG\*V-7 valves are used primarily for controlling the starting, stopping and direction of fluid flow.

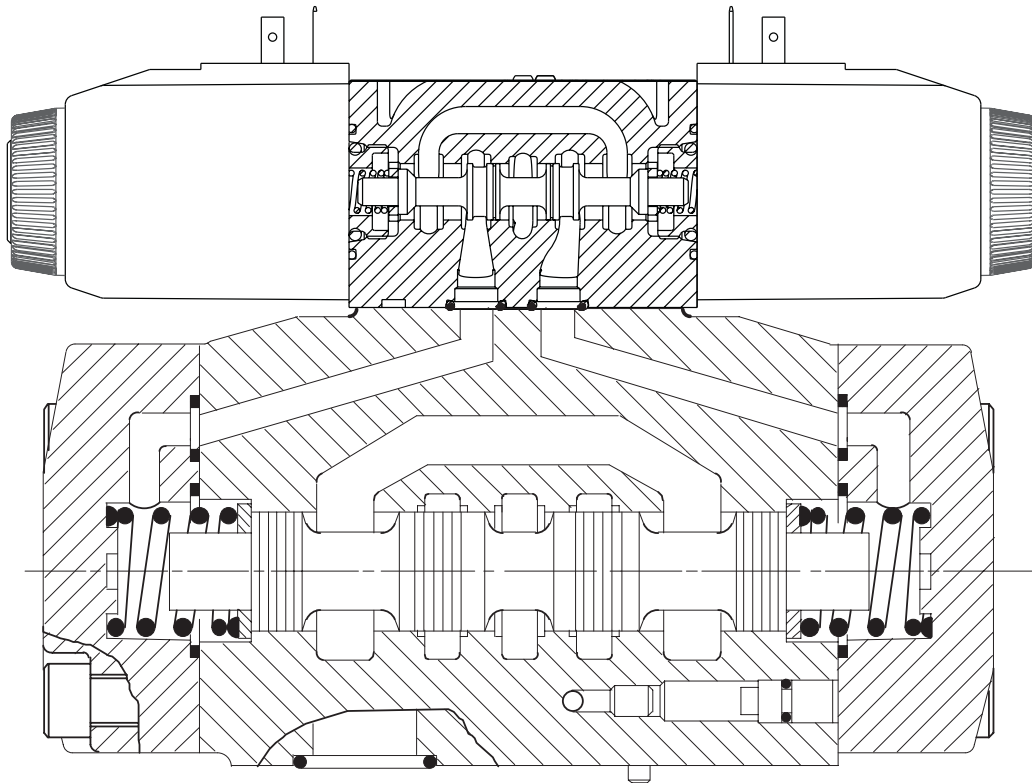
Two series of valves, DG5V solenoid controlled, pilot operated and DG3V pilot operated models are available with a wide selection of spools. These include meter-in and meter-out spools and a regeneration type that can obviate extra valves essential in traditional circuit arrangements.

All spools have been designed to provide good low shock, fast response characteristics which can be enhanced by optional stroke and/or pilot choke adjustments.

Models include spring offset, spring centered and detented versions.

## Features and Benefits

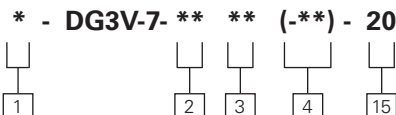
- High pressure and flow capability for maximum cost-effectiveness.
- Low headloss to minimize power wastage.
- Low shock characteristics to maximize machine life.
- Facility to change solenoid coils without disturbing the hydraulic envelope.
- The many optional features, particularly for DG5V valves, permit matching to virtually every application within the valve's power capacity.
- **Optional mainstage spool position monitoring switch (CE marked)**



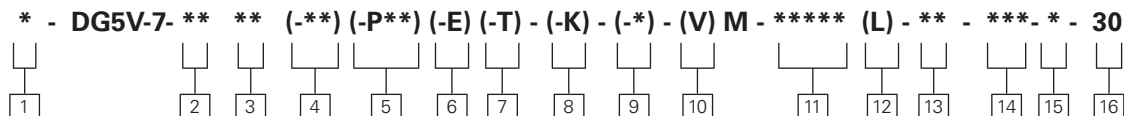
# Model Code

## DG3V-7 30 Series, Pilot Operated Directional Valves

### For pilot operated valves:



### For solenoid controlled, pilot operated valves:



#### 1 Fluid Compatibility

**Blank** – Standard BUNA-Nitrile Seals

**F3** – Viton Seals

Note: For further information see “Hydraulic Fluids” section on page 13.

#### 2 Spool type

See “Functional Symbols” section on pages 5-6.

#### 3 Spool spring arrangement

**A** – Spring offset, end-to-end (P to B when operated)

**AL** – As “A” but left-hand build (P to A when operated)

**B** – Spring offset, end-to-center (P to B when operated) ■

**BL** – As “B” but left-hand build (P to A when operated) ■

**C** – Spring centered

**N** – Two-position detented

■ DG5V option. Same function from DG3V-7-\*C valves by alternating pilot supply to one port (X or Y) and permanently draining the other.

#### 4 Spool Control

Omit if not required

**1** – Stroke adjustment at both ends ▲■

**2** – Pilot choke adjustment both ends

**3** – “1” and “2” combined ▲■

**7** – Stroke adjustment, port A end only ▼

**8** – Stroke adjustment, port B end only ▼

**27** – “2” and “7” combined ▼

**28** – “2” and “8” combined  
Omit if not required

▲ Not applicable to DG5V-7-\*B(L) models.

▼ Not applicable to models shown in the “Spring offset, end-to-center, opposite hand” section on page 6

◆ Not applicable to models shown in the “Spring offset, end-to-center” section on page 6

■ Not applicable for spool “8” models

#### 5 Main Stage Spool Monitoring Switch

**Blank** – None

**PCA** – Center sensing switch on “A” port end

**PCB** – Center sensing switch on “B” port end

**PDA** – Double offset sensing switch on “A” port end

**PDB** – Double offset sensing switch on “B” port end

**PCD** – Center sensing switch on “A” port end and double offset sensing switch on “B” port end

**PPA** – Offset sensing proximity switch “A” port end

**PPB** – Offset sensing proximity switch “B” port end

**PPD** – Offset sensing proximity switch both ends ■

\* The spool position monitoring switch shown on this technical document is CE marked and certified and complies to European Standard EN 61000-6-4: 2001 (Emissions) for Class A and European Standard EN 61000-6-2: 2001 (Immunity).

■ Not applicable for spool “8” models

#### 6 External Pilot Supply, DG5V Valve Option

Omit for internal pilot supply

**E** – Valve configured for external pilot supply to port X

#### 7 Internal Pilot Drain, DG5V Valve Option

Omit for external drain, which is also mandatory for 1, 8 and 9 spool-type valves

**T** – Valve configured for internal pilot valve drain.

#### 8 Minimum Pilot Pressure Generator (P Port Option)

**Blank** – None

**K**– 0.35 bar cracking pressure

#### 9 Manual Override Option

**Blank** – Plain override in solenoid end(s) only ▲

**H** – Water-resistant manual override on solenoid end(s) ▲

**W** – Twist & lock override in solenoid ends •

**Z** – No override at either end  
▲ No override in non-solenoid end of single-solenoid valves.  
• DC only

#### 10 Solenoid Energization Identity

**V** – Solenoid “A” is at port A end of pilot valve and/or solenoid “B” at port B end independent of main-stage valve port locations or spool type; German practice.

Omit (except as noted below) for US ANSI B93.9 standard

whereby solenoid “A” is that which, when energized, connects P to A in main-stage valve, and/or solenoid “B” connects P to B.

Note: Energization identities on valves with type 8 spools are identical under US and German practices. In such cases the “V” code is used.

#### 11 Solenoid Type Connection(s)

**U** – ISO4400, DIN43650 connector

**U1** – ISO4400 fitted with PG11 plug

**U6** – ISO4400 with fitted DIN plug with lights

**KU** – Top exit flying lead (150mm)

**KUP4** – Junior timer (Amp) connector

**KUP5** – Integral Deutsch connector

**FW** – Flying lead with 1/2” NPT thread wiring housing

**FTW** – Fly. lead wired terminal block & 1/2” NPT thread wiring housing

**FPA3W** – Fly. lead, 3 Pin connector & 1/2” NPT thread wiring housing

**FPA5W** – Fly. lead, 5 pin connector & 1/2” NPT thread wiring housing

# Model Code (Cont...)

## **12 Indicator Lights**

**Blank** – None

**L** – Solenoid indicator lights•

• Flying lead coil type only

## **13 Surge Suppressor/damper**

**D1** – Diode positive bias

**D2** – Negative bias

**D7** – Transorb type

## **14 Coil Rating**

See Page 7 for circuit details

**B** – 110V AC 50Hz/120V AC  
60 Hz

**BL** – 110V 50 Hz/120V 60 Hz

**D** – 220V AC 50 Hz/240V  
AC 60 Hz

**DS** – 28V DC 30 watt

**G** – 12V DC

**GL** – 12V DC

**H** – 24V DC

**HL** – 24V DC

**HM** – 24V DC 8 watt

## **15 Tank Port Rating**

**6** – 210 bar (3000 psi) for AC  
performance.

**7** – 210 bar (3000 psi) for DC  
performance.

## **16 Design Number**

20 series for DG3V valves.

30 series for DG5V valves.

Subject to change.

# Application Notes

## **Pilot Pressure**

- Pilot pressure must always exceed tank line pressure by at least the requisite minimum pilot pressure. This also applies when combining open center spools (0, 1, 8, 9 and 11) with internal pilot pressure, but they should be used only with externally drained valves.
- Internally drained valves may be used only when surges in the tank line cannot possibly overcome the minimum pilot pressure differential referred to above. When the possibility of pressure surges in the tank line exist, externally drained valves are recommended.
- When DG5V-7-\*N valves are de-energized the pilot and main spools remain

in the last selected position, provided that pilot pressure is maintained. If pilot pressure fails, or falls below the minimum, the main spool will spring center.

**Caution:** Because of this in-built feature the flow conditions of the center position must be selected with care, for the effect on both the direction of flow and the pilot pressure.

## **Stroke Adjustment Options**

These control the maximum opening of the main spool/body passages by adjusting the limits of spool stroke. By this means, the response time and the pressure drop across the valve for any particular flow rate can be controlled. Stroke adjusters can be fitted at either or both ends of the main-stage valve for adjusting the stroke in

one or both directions. One use of stroke adjusters is for controlling the metering characteristics of “X\*” or “Y\*”- type spools. (See model code #4.)

## **Pilot Choke Adjustment Options**

These provide a meter-out flow control system to the fluid in the pilot chambers of main-stage valves. It allows the velocity of the mainstage spool to be controlled, thereby reducing transient shock condition. For optimum results, a constant reduced pilot pressure is recommended.

## **Control Data, General**

- Dependent on the application and the system filtration, any sliding spool valve, if held shifted under

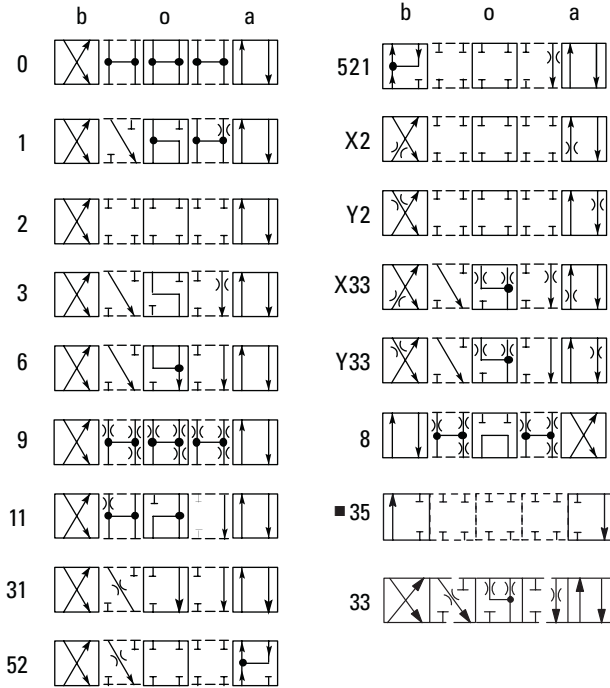
pressure for long periods of time, may stick and not move readily due to fluid residue formation. It may therefore need to be cycled periodically to prevent this from happening.

- Surges of fluid in a common drain line serving two or more valves can be of sufficient magnitude to cause inadvertent shifting of the spools. It is recommended that circuit protection be used, such as separate drain lines.
- Control by stroke adjusters, pilot chokes and minimum-pilot-pressure generator options is described on this page.

# Functional Symbols

## Spool Types

Shown in 3-position form, plus 2 transients.



## Notes:

1. In the detailed and simplified symbols on this and the previous pages, the transient positions are omitted for simplicity.

2. In certain 2-position valves, the "o" position becomes an additional transient, i.e. in DG5V-7-\*A(L) and DG5V-7-\*N valves.

Your Eaton representative can provide further details.

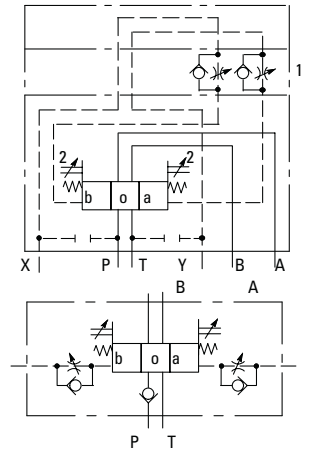
■ Only 35A available

## DG3V-7 Options

The following are shown in a DG3V-7-\*C example:

1. Pilot choke module
2. Stroke adjusters at either or at both ends (shown at both ends in example)

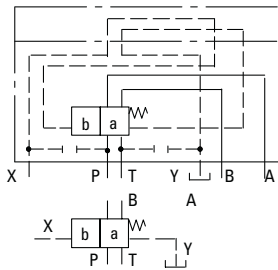
One or more options can be built into any DG3 series valve.



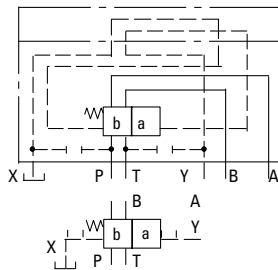
## DG3V-7 Pilot Operated Models

Comprehensive and simplified symbols.

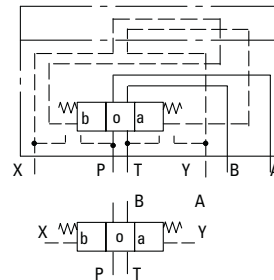
### Spring Offset, End-to-End, DG3V-7-\*A



### Spring Offset, End-to-End, Opposite Hand, DG3V-7-\*AL



### Spring Centered, DG3V-7-\*C

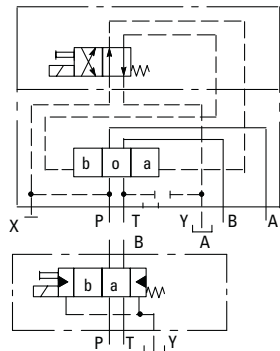


# Functional Symbols

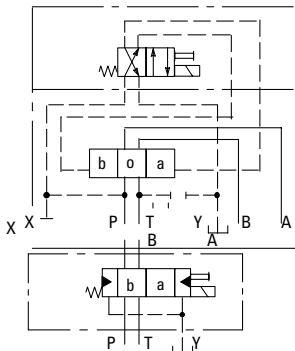
## DG5V-7, Solenoid Controlled, Pilot Operated Models

Comprehensive and simplified symbols shown configured for external pilot supply and internal drain

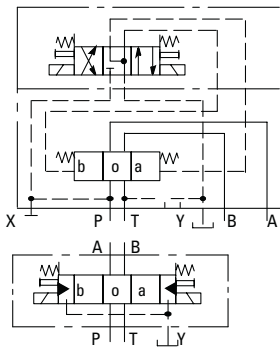
Spring Offset, End-to-End, DG5V-7-\*A



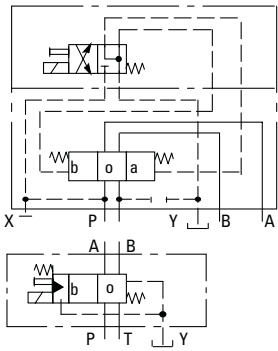
Spring Offset, End-to-End, Opposite Hand, DG5V-7-\*AL



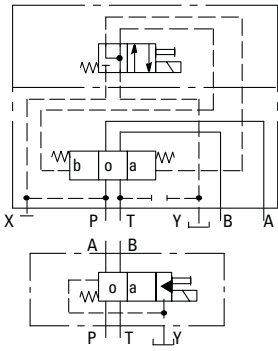
Spring Centered, DG5V-7-\*C



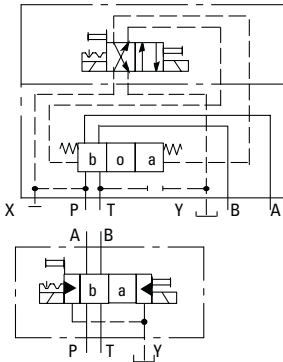
Spring Offset, End-to-Center DG5V-7-\*B



Spring Offset, End-to-Center, Opposite Hand DG5V-7-\*BL



Detented, DG5V-7-\*N

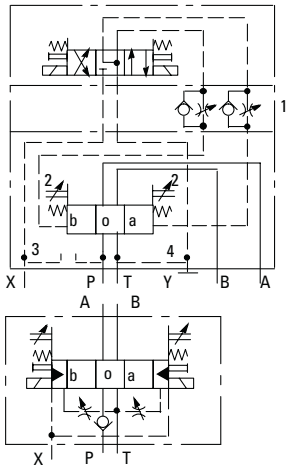


### DG5V-7 Options

The following are shown in a DG5V-7-\*C example:

1. Pilot choke module
2. Stroke adjusters, at either or at both ends (shown at both ends in example)
3. External pilot connection
4. Internal drain

One or more options can be built into any DG5 series valve.



### SOLENOID IDENTIFICATION

| Model<br>(see also in "Model Code" on page 8) | Spool types    | Solenoid identity at:<br>Main port "A" end | Solenoid identity at:<br>Main port "B" end |
|---|----------------|--|--|
| DG5V-7-*A/B(-**)(-E)(-T)(-*)-M                | All except "8" | —  | B  |
| DG5V-7-*A/B(-**)(-E)(-T)(-*)-VM               | All except "8" | —  | A  |
|   | "8" only       | B  | —  |
| DG5V-7-*AL/BL(-**)(-E)(-T)(-*)-M              | All except "8" | A  | —  |
| DG5V-7-*AL/BL(-**)(-E)(-T)(-*)-VM             | All except "8" | B  | —  |
|   | "8" only       | —  | A  |
| DG5V-7-*C/N(-**)(-E)(-T)(-*)-M                | All except "8" | A  | B  |
| DG5V-7-*C/N(-**)(-E)(-T)(-*)-VM               | All spools     | B  | A  |

# Operating Data

## MAXIMUM PRESSURES:

### DG3V-7 valves; ports:

|                  |                    |
|------------------|--------------------|
| P, A, B, X and Y | 350 bar (5000 psi) |
| T                | 250 bar (3626 psi) |

### DG5V-7-\*\*(L)(-\*)(-E)(-\*) valves, (externally drained); ports:

|                  |                      |
|------------------|----------------------|
| P, A, B, T and X | 350 bar (5000 psi) ▲ |
| Y                | 210 bar (3045 psi) ▲ |

### DG5V-7-\*\*(L)(-\*)(-E)-T(-\*) valves, (internally drained); ports:

|               |                      |
|---------------|----------------------|
| P, A, B and X | 350 bar (5000 psi) ▲ |
| T             | 210 bar (3045 psi) ▲ |

**Pilot pressures** See "Pilot Pressures" on page 9

▲ The DG5V, 50 design two-stage valves have been designed to satisfy the needs of most applications.

Consult your Eaton representative about an alternative model if:

- a) Valves are required to remain pressurized for long periods without frequent switching, and /or
- b) Back pressure on the drain port of externally drained models (or the tank port of internally drained models) is required to rise above 210 bar (3000 psi).

## MAXIMUM FLOW RATES, L/MIN (USGPM) AT THE MINIMUM PILOT PRESSURES ■, AND WITH SPOOL TYPE:

|                                     |           |           |            |            |            |
|-------------------------------------|-----------|-----------|------------|------------|------------|
| See Pilot Pressures on page 12      | 70 (1000) | 140(2000) | 210 (3000) | 280 (4060) | 350 (5000) |
| 0, 2, 3, 6, 31, 33, 35, 52 or 521 ♦ | 300 (80)  | 300 (80)  | 300 (80)   | 300 (80)   | 300 (80)   |
| 1, 9 or 11                          | 260 (69)  | 220 (58)  | 120 (32)   | 100 (26)   | 90 (24)    |
| 8                                   | 300 (80)  | 300 (80)  | 250 (66)   | 165 (44)   | 140 (37)   |

■ Higher flow rates possible at higher pilot pressures; consult your local Eaton sales engineer.

♦ Consult your local Eaton sales engineer regarding flow limits relative to the regenerative position of type 52 and 521 spools.

## ELECTRICAL INFORMATION

### Control (swept) volume(s), DG3V and main-stage of DG5V valves:

|               |   |
|---------------|---|
| Center-to-end | 7.28 cm <sup>3</sup> (0.44 in <sup>3</sup> )  |
| End-to-end    | 14.56 cm <sup>3</sup> (0.88 in <sup>3</sup> ) |

**Voltage ratings, DG5V valves** See 14 in "Model Code" on page 4

### Voltage limits, DG5V valves:

|                 |                                     |
|-----------------|-------------------------------------|
| Maximum voltage | See "Temperature limits", on page 8 |
| Minimum voltage | 90% of rated voltage                |

### Power consumption, DG5V valves with AC solenoids:

|  | Initial VA rms | Holding VA rms |
|--|----------------|----------------|
| Dual-frequency coils at 50 Hz, types "B" and "D" | 265            | 49             |
| Dual-frequency coils at 60 Hz, types "B" and "D" | 260            | 48             |

**Power consumption, DG5V valves with DC solenoids** 30W at rated voltage and 20 C (68 F)

**Relative duty factor, DG5V valves** Continuous; ED = 100%

### Type of protection, DG5V valves:

|   |                             |
|---|-----------------------------|
| ISO 4400 coils with plug fitted correctly | IEC 144 class IP65          |
| Junction box                              | IEC 144 class IP65 (NEMA 4) |
| Coil winding                              | Class H                     |
| Lead wires (coil types "F****")           | Class H                     |
| Coil encapsulation                        | Class F                     |

Note : For information on pilot valves please refer segment B, C, D of the catalog.



# Operating Data

## Pressure drop characteristics

See page 9, 10

## Response times, DG5V valves:

Typical values for a DG5V-7-2C-E spring centered, externally piloted valve under standard test conditions and operating with 150 L/min (40 USgpm) at 350 bar (5000 psi).

| Coil rating: | Pilot pressure, bar (psi): | Energizing | Time, ms ♦ De-energizing |
|--------------|----------------------------|------------|--------------------------|
| 110V 50 Hz   | 15 (218)                   | 75         | 40                       |
|              | 50 (730)                   | 50         | 40                       |
|              | 150 (2180)                 | 40         | 40                       |
|              | 210 (3000)                 | 40         | 40                       |
|              | 250 (3600)                 | 40         | 40                       |
| 24V DC       | 15 (218)                   | 90         | 45 ▲                     |
|              | 50 (730)                   | 65         | 45 ▲                     |
|              | 150 (2180)                 | 55         | 45 ▲                     |
|              | 210 (3000)                 | 55         | 45 ▲                     |
|              | 250 (3600)                 | 55         | 45 ▲                     |

♦ From applying a signal at the solenoid until the main-stage spool completes its travel.

▲ In pure switched circuit conditions, devoid of the effects of any suppression diodes and full-wave rectifiers.

## TEMPERATURE LIMITS:

Fluid temperature limits See appendix

Ambient temperature limits: See appendix

Minimum ambient, all valves -20°C (-4°F)

## Maximum ambients, DG5V valves with coils listed in 12 in “Model Code” two pages back, and under conditions stated below:

Dual-frequency coils:

at 50 Hz and 107% of rated voltage 65°C (150°F)

at 50 Hz and 110% of rated voltage 65°C (150°F)

at 60 Hz and 107% of rated voltage 65°C (150°F)

at 60 Hz and 110% of rated voltage 65°C (150°F)

Single-frequency (50 Hz) coils at 50 Hz and 110% of rated voltage 65°C (150°F)

DC coils at 110% of rated voltage 70°C (158°F)

## INSTALLATION DIMENSIONS:

Valves See page 11, 12, 13

## Mass (weight), basic models: kg (lb) approx.

DG3V-7-\*A(L) 10,0 (22.0) ♦

DG3V-7-\*/\*B(L)/\*C 7,3 (16.1) ♦

DG5V-7-\*A/B (AC voltages) 8,4 (18.5) ♦

DG5V-7-\*A/B (DC voltages) 8,5 (18.7) ♦

DG5V-7-\*C/N (AC voltages) 8,7 (19.2) ♦

DG5V-7-\*C/N (DC voltages) 9,1 (20.0) ♦

♦ Add 1,1 kg (2.4 lb) when pilot chock adjustment is fitted.

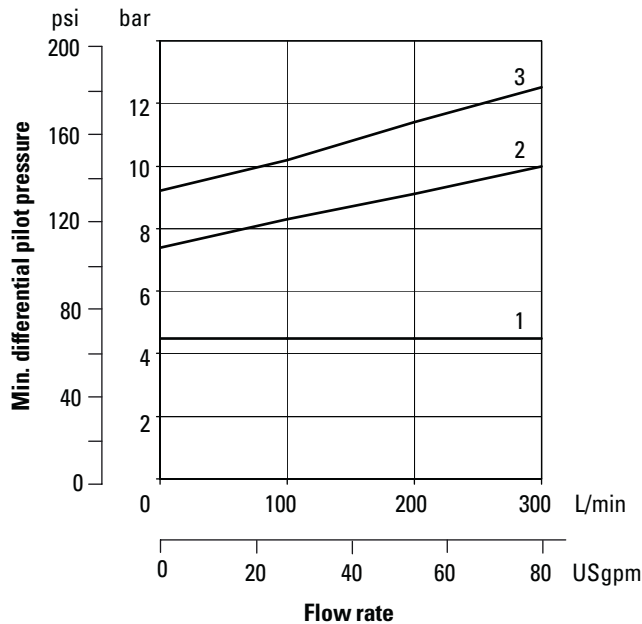
Note : For information on pilot valves please refer segment B, C, D of the catalog.



# Performance Data

## Pilot Pressures

Maximum: 350 bar (5000 psi). Typical minimum differential pilot pressure characteristics, shown below, are based on looped flow through P to A to B to T under standard test conditions.

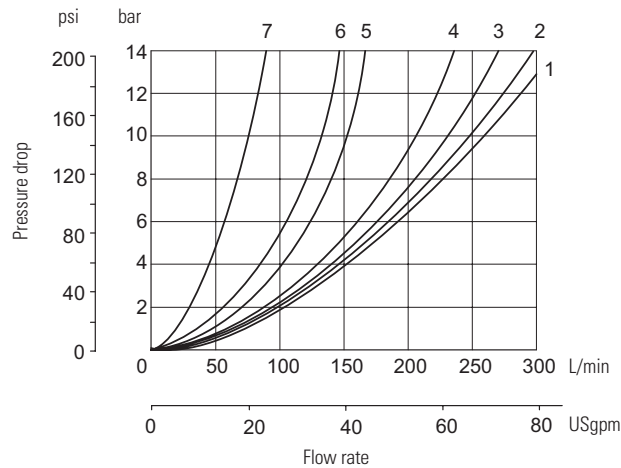


| Spool Types | 0 | 1 | 2 | 3 | 4 | 6 | 8 | 9 | 11 | 31 | 33 | 52 | X* | Y* |
|-------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| Curve       | 1 | 1 | 3 | 3 | 1 | 2 | 1 | 1 | 1  | 3  | 3  | 3  | 3  | 3  |
| ref.        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

### Applicable to:

| Model        | Spool type              | Curve correction        |
|--------------|-------------------------|-------------------------|
| DG3V-7-*C    | All                     | As drawn                |
| DG5V-7-*A(L) | 0, 2, 6, 9, 52, X2 & Y2 | Subtract 3 bar (44 psi) |
| DG5V-7-*B(L) | 0, 2, 6, 52▲, X2 & Y2   | As drawn                |
| DG5V-7-*C    | All                     | As drawn                |
| DG5V-7-*N    | 0, 2, 6, 9, 52, X2 & Y2 | As drawn                |

▲ DG5V-7-52BL models only.



### FLOW-DIRECTION CURVE REFERENCE

| SPOOL TYPE | P - A | B - T | P - B | A - T | P - T |
|------------|-------|-------|-------|-------|-------|
| 0          | 2     | 1     | 2     | 3     | 3■    |
| 1          | 1     | 2     | 2     | 3     | 4▼    |
| 2          | 1     | 2     | 1     | 2     | -     |
| 3          | 1     | 2     | 1     | 3     | -     |
| 4          | 2     | 2     | 2     | 1     | 6     |
| 6          | 1     | 1     | 1     | 3     | -     |
| 8          | 2     | 2     | 2     | 1     | 5     |
| 9          | 1     | 2     | 1     | 3     | 7     |
| 11         | 2     | 3     | 1     | 2     | 4     |
| 31         | 1     | 3     | 1     | 2     | -     |
| 33         | 1     | 2     | 1     | 2     | -     |
| 52▲        | 2●    | -     | 3▼    | -     | -     |
| 52◆        | -     | -     | 3     | 3     | -     |

■ Ports A and B plugged.

● Port B plugged.

▼ Port A plugged.

◆ Selected P to B.

▲ Selected P to A.

## Pressure Drop Characteristics

The following typical pressure drops ( $\Delta p$ ) at flow rates ( $Q$ ) are based on standard test conditions, using oil of 0.865 specific gravity. Except where otherwise stated, for any other flow rate ( $Q_1$ ) the pressure drop ( $\Delta p_1$ ) will be approximately  $\Delta p_1 = \Delta p (Q_1/Q)^2$ .

# Installation Dimensions

Millimeters (inches)

## Solenoid Controlled Models with ISO 4400 (DIN 43650)

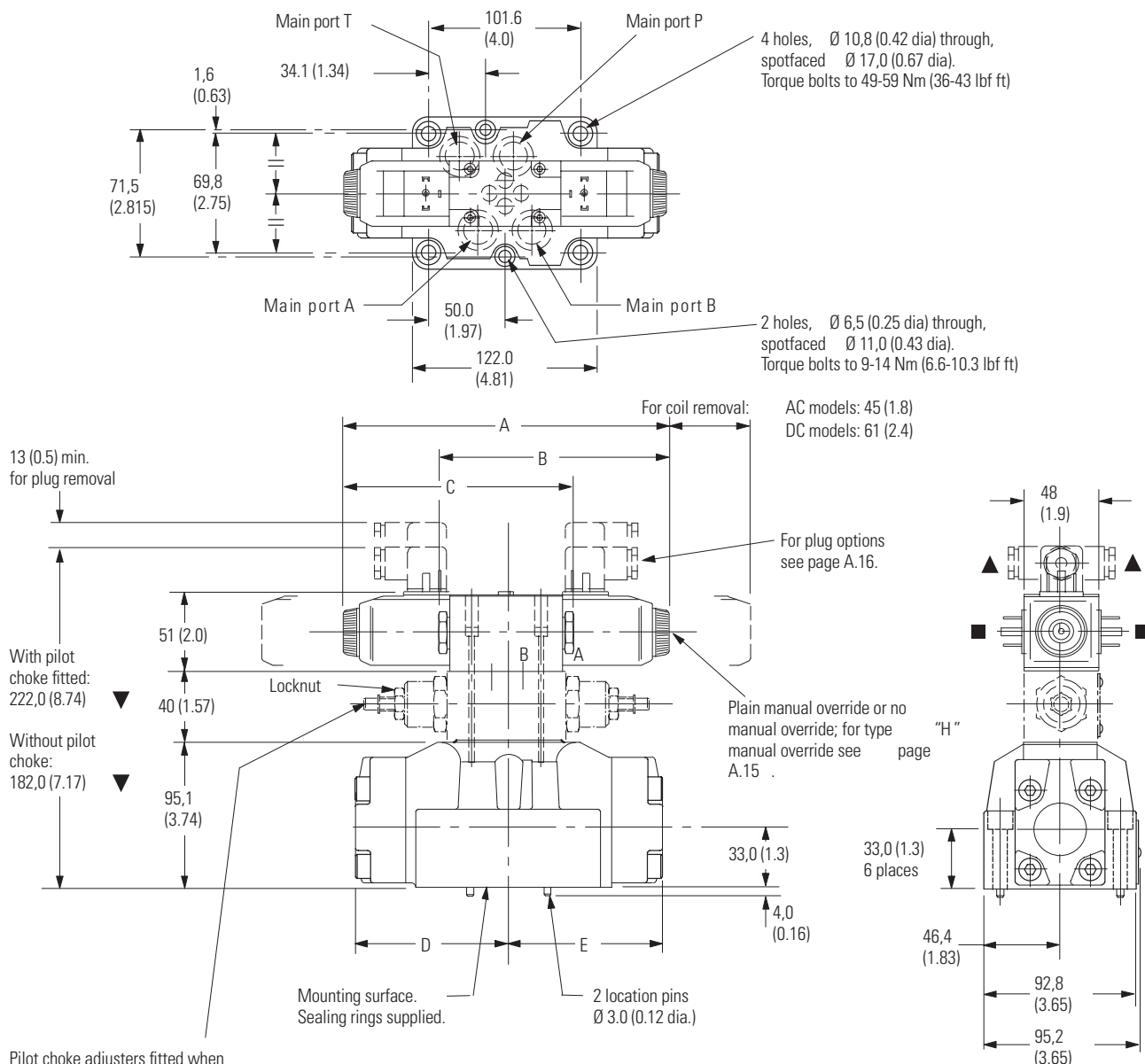
### Electrical Connections and Pilot Choke

DG5V-7-\*\*-\*(L)(-2)(-E)(-T)(-\*)-(V)M-U example

For dimensions A, B, C, D and E see page 16

For solenoid identification see page 16

For stroke adjusters see page 15



Pilot choke adjusters fitted when Model Code **4** = 2, 3, 27 or 28. To adjust, turn locknut counter-clockwise, then turn screw clockwise to slow down rate of spool travel, or counter-clockwise to increase the rate. Retighten locknut to 25-30 Nm (18-22 lbf ft).

▼ May vary according to plug source.

■ Alternative plug positions by loosening knurled nut counter-clockwise, turning coil and re-tightening nut.

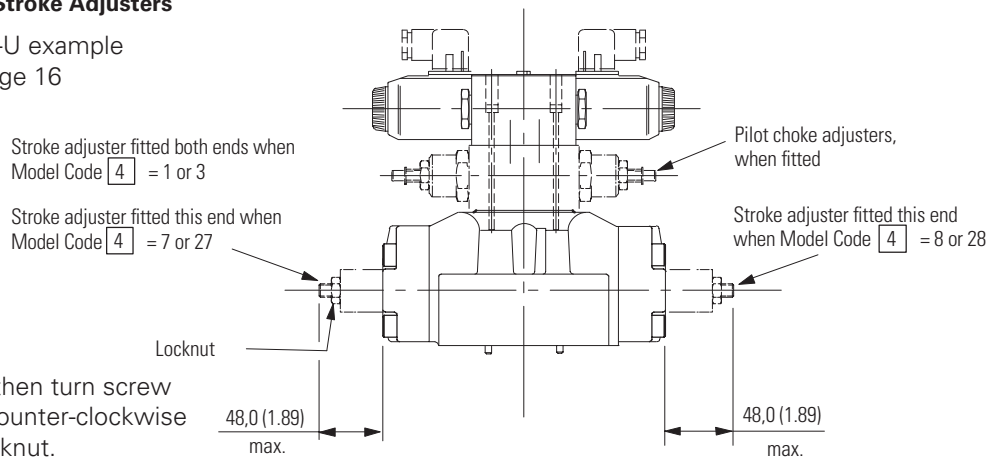
▲ Cable entry can be positioned at 90 either way from position shown, by re-assembling the contact holder into the appropriate position inside the plug connector housing.

# Installation Dimensions

## Solenoid Controlled Models with Stroke Adjusters

DG5V-7-\*\*\* (L)(-2)(-E)(-T)(-\*)-(V)M-U example

For solenoid identification see page 16



### To Adjust:

Turn locknut counter-clockwise, then turn screw clockwise to shorten stroke, or counter-clockwise to increase stroke. Re-tighten locknut.

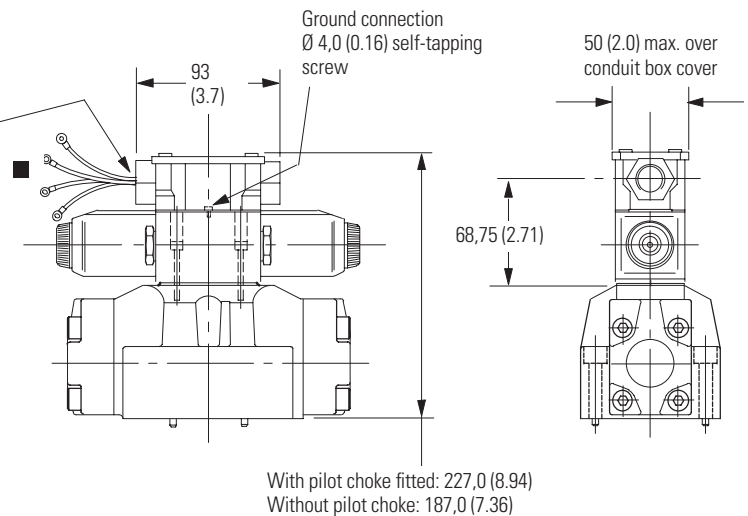
## Solenoid Controlled Models with Junction Box having Optional Terminal Strip and Indicator Lights

DG5V-7-\*\*\* (L)(-\*)-(E)(-T)(-\*)-(V)MF\*\* (L) example.

For solenoid identification see page 16

Available also with other options shown above and on previous page.

M20-6H x 1,5 thread for F(T)J options, or 1/2" NPT for F(T)W options, at both ends. Closure plug fitted at one end.  
For other options see [10] & [11] in Model Code, eight pages back, and under NFPA Connector--- and "Terminal Strip and Lights" sections, two pages on.

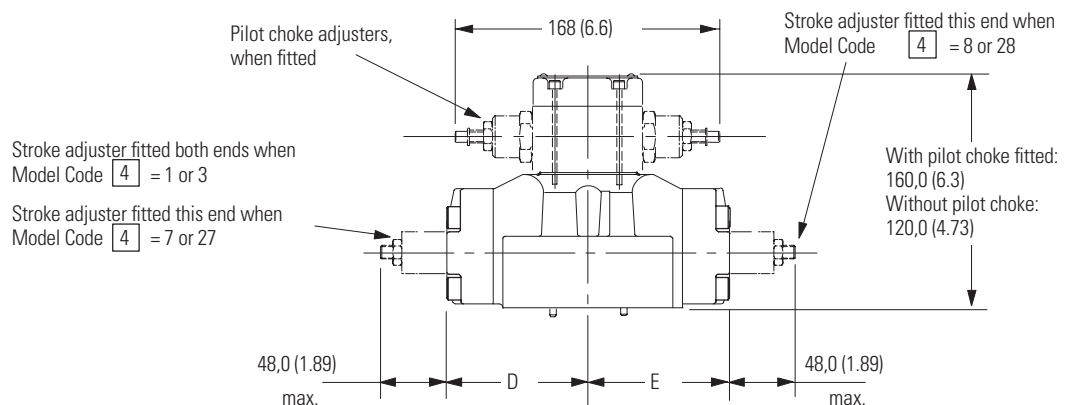


■ Ref. "Model Code": [9]

Codes "FW": 2 lead wires for each solenoid, approx. 150 (6.0) long. M3 (#6) terminals provided for customer connection.  
Codes "FTW": Valve supplied with lead wires connected into terminal strip suitable for M3 (#6) terminals provided for customer connection.

## Pilot Operated Models with Optional Pilot Choke and/or Stroke Adjusters

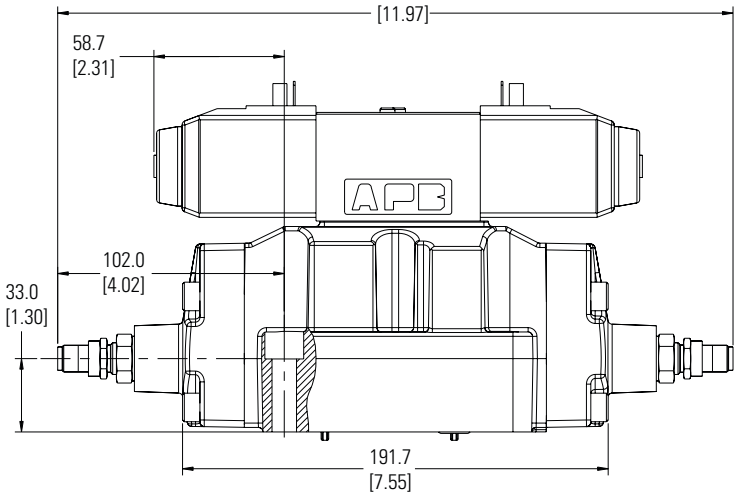
DG3V-7-\*\*-2)(-\*\*) examples



# Installation Dimensions

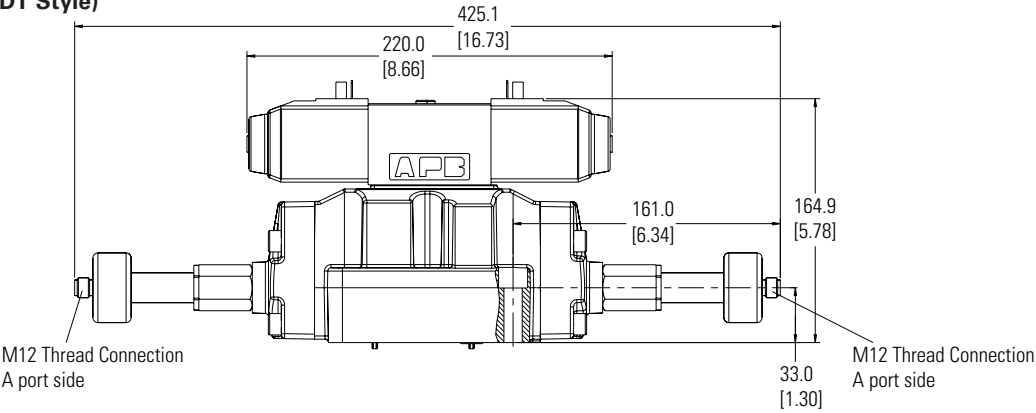
## DG5V-7 with Main Stage Spool Monitoring Switch “PPA”, “PPB” or “PPD” Models (Proximity Switch)

Millimeters (inches)



## DG5V-7 with Main Stage Spool Monitoring Switch “PPA”, “PPB” or “PPD” Models (LVDT Style)

Millimeters (inches)



# Installation Dimensions

## Solenoid Identification

| Model (see also in [10] "Model Code" on page I.3) | Spool types                            | Solenoid identity at:<br>Main port "A" end | Main port "B" end |
|---|--|--|-------------------|
| DG5V-7-*A/B(-**)(-E)(-T)(-K)(-*)-M                | All except "4" & "8"                   | -  | B                 |
| DG5V-7-*A/B(-**)(-E)(-T)(-K)(-*)-VM               | All except "4" & "8"<br>"4" & "8" only | -<br>B                                     | A<br>-            |
| DG5V-7-*AL/BL(-**)(-E)(-T)(-K)(-*)-M              | All except "4" & "8"                   | A  | -                 |
| DG5V-7-*AL/BL(-**)(-E)(-T)(-K)(-*)-VM             | All except "4" & "8"<br>"4" & "8" only | B<br>-                                     | -<br>A            |
| DG5V-7-*C/D/N(-**)(-E)(-T)(-K)(-*)-M              | All except "4" & "8"                   | A  | B                 |
| DG5V-7-*C/D/N(-**)(-E)(-T)(-K)(-*)-VM             | All Spools                             | B  | A                 |

## DIMENSIONS

| Basic model designation | AC models |           |           | DC models |           |           |              |              |
|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|--------------|
|                         | A         | B         | C         | A         | B         | C         | D            | E            |
| DG3V-7-*C               | —         | —         | —         | —         | —         | —         | 97,0 (3.82)  | 97,0 (3.82)  |
| DG3V-7-*A ■             | —         | —         | —         | —         | —         | —         | 97,0 (3.82)  | 131,0 (5.16) |
| DG3V-7-*A(L) ■          |           |           |           |           |           |           |              |              |
| DG3V-7-*D               | —         | —         | —         | —         | —         | —         | 131,0 (5.16) | 97,0 (3.82)  |
| DG5V-7-*A ■             |           | 147 (5.8) | —         | —         | 157 (6.2) | —         | 97,0 (3.82)  | 97,0 (3.82)  |
| DG5V-7-*B ■             | —         |           |           |           |           |           |              |              |
| DG5V-7-4/8BL            |           |           |           |           |           |           |              |              |
| DG5V-7-*AL ■            | —         | —         | 147 (5.8) | —         | —         | 157 (6.2) | 97,0 (3.82)  | 97,0 (3.82)  |
| DG5V-7-*BL ■            |           |           |           |           |           |           |              |              |
| DG5V-7-4/8B             |           |           |           |           |           |           |              |              |
| DG5V-7-*C               | 200 (7.8) | —         | —         | 220 (8.7) | —         | —         | 97,0 (3.82)  | 97,0 (3.82)  |
| DG5V-7-*N               |           |           |           |           |           |           |              |              |
| DG5V-7-*D               | 200 (7.8) |           |           | 220 (8.7) |           |           | 131,0 (5.16) | 97,0 (3.82)  |

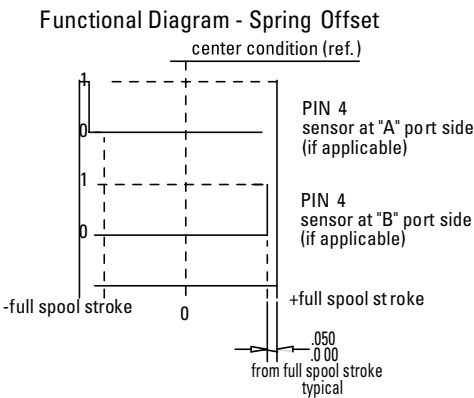
■ Not types "8" or "8" spools.

# Electrical Information

## Main Stage Spool Monitoring Switch (Proximity Switch)

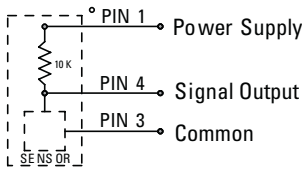
| SPECIFICATIONS                      |   |
|-------------------------------------|---|
| Supply Voltage (Vs)                 | 10 to 30 Vdc  |
| Supply Current (Is)                 | 8 mA at 24 Vdc (plus load current)  |
| Supply Over-voltage Rating:         | 35 Vdc continuous   |
| Supply Reverse Polarity Rating      | -35 Vdc (with no shorts)  |
| Short Circuit Tolerance:            | Continuous short between any two pins   |
| High Potential Test, Pin to Case:   | 300 Vdc   |
| Electronmagnetic Compatibility:     | ISO 7637 Parts O and I worst case and<br>Immunity to Radiated Electromagnetic Fields, 10 KHZ to 1 GHZ per SAE J1113/25 Sep 95 |
| Pins to Case Resistance             | 50 Megohms  |
| Load Dump Tolerance:                | 80 Vdc Peak, 400 ms Decay, with 1.5 Ohm Source Impedance  |
| Switching Frequency:                | 0 to 3K Hz  |
| Output:                             | Open collector PNP sourcing, normally open  |
| Sensing Distance (offset position): | 1.27 ± 0.25 mm (.050" ± .010")  |
| Hysteresis:                         | 0.25 mm (.010") Max.  |
| Rise/Fall Time:                     | 6.5/1.5 microsec R1=820 Ohm, C1=20 pF @ 8Vdc  |
| Output Leakage Current              | 10µa Max.   |
| Output Voltage High:                | +Vs – 2.2 Vdc minimum   |
| Output Load Current:                | 200 mA Max.   |
| Operating Pressure:                 | 350 bar (5000 psi)  |
| Operating Temperature:              | -40° to 110°C   |
| Humidity:                           | 0 to 100%   |

Electrical information shown in this window is for offset sensing,  
Proximity Switch "PPA" , "PPB" or "PPD" Models

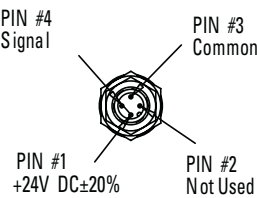


0= voltage at pin 4 0.5V min.  
1= voltage at pin 4 (Vs – 2.2V) min.

### Output Circuit Wiring Instructions



### Connector Detail



# Electrical Information

## Main Stage Spool Monitoring Switch (LVDT Style)

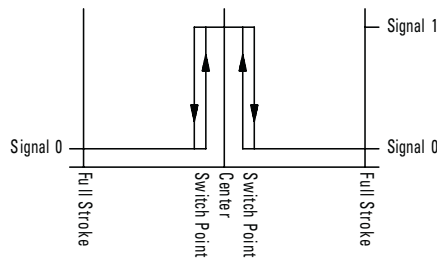
### SPECIFICATIONS

|   |                               |
|---|-------------------------------|
| Supply Voltage (Vs)                     | 24VDC +/-20%                  |
| (Full Wave Bridge with Capacitor)       |                               |
| Reverse Polarity Protection             | Max. 300 V Installed          |
| Ripple Voltage                          | 10%                           |
| Current Consumption                     | 40 mA Approx.                 |
| Outputs                                 | NC Contact Positive           |
| Sensing Distance (offset position)      | 5.85 to 6.15 mm               |
| Sensing Distance (from center position) | ± 0.35 to 0.65 mm             |
| Hysteresis                              | <0.06 mm                      |
| Output Voltage                          | (No Short Circuit Protection) |
| Signal 1                                | Vs – 2.5 V                    |
| Signal 0                                | < 1.8 V                       |
| Output Current                          | < 400 mA AT INPUT + 20%       |
| Environmental Protection                | IP65 (With Mounted Plug)      |
| Operating Temp Range                    | -20° C to +85° C              |
| Operating Pressure                      | 315 bar (4500 psi)            |
| CE Declaration of Conformity No.        | 00 02 002 9 93                |

**ATTENTION:** EMC ONLY ENSURED WHEN USING SCREENED CABLES AND SCREENED PLUG CASING!

Electrical information shown in this window is for offset sensing,  
Proximity Switch "PPA", "PPB" or "PPD" Models

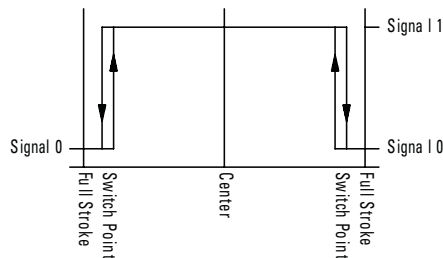
TYPICAL "PC A/PCB" OUTPUT  
(FOR SENSING CENTER POSITION)



Signal 0 = Voltage at pin 2/4 < 1.8V

Signal 1 = Voltage at pin 2/4 > (Vs – 2.5V)

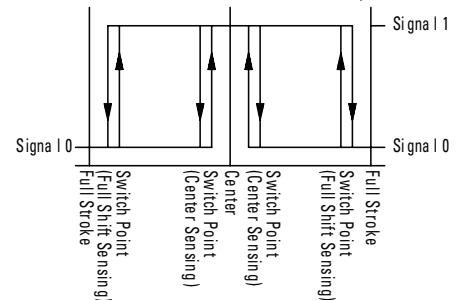
TYPICAL "PD A/PDB" OUTPUT  
(FOR FULL SHIFT SENSING)



Signal 0 = Voltage at pin 2/4 < 1.8V

Signal 1 = Voltage at pin 2/4 > (Vs – 2.5V)

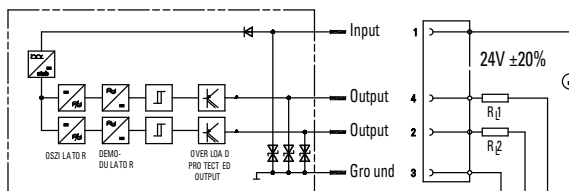
TYPICAL "PCD" OUTPUT  
(FOR CENTER SENSING 'A' PORT END,  
FULL SHIFT SENSING 'B' PORT END)



Signal 0 = Voltage at pin 2/4 < 1.8V

Signal 1 = Voltage at pin 2/4 > (Vs – 2.5V)

Electrical Schematic and Mating Connector Detail



R<sub>1</sub>, R<sub>2</sub> = e.g. Coil Resistance of the switch relay >= 60 OHMS

Connector Detail

