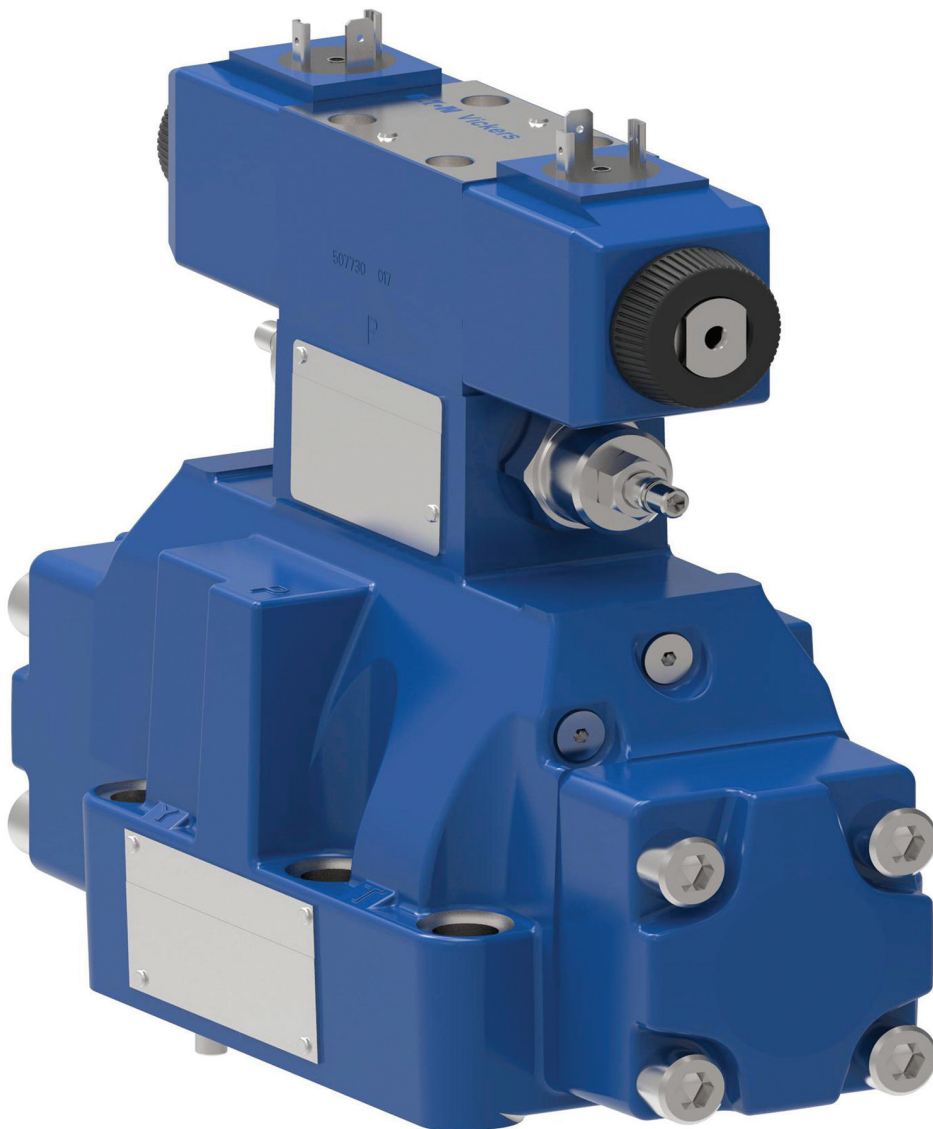


ISO4401 size 08; ANSI/B93.7M-08
DG3V-8 & DG5V-8 10 Design



Remote pilot operated directional valve

DG3V-8 10 Design

Solenoid controlled pilot operated directional valve

DG5V-8 10 Design

General description

The Size 8 Directional Control Valve serves as a control valve package. It offers directional control, pilot pressure reducers, pilot chokes, and main stage stroke adjustment to control the flow. The valves are generally used to control large flows up to 700 l/min (185 USgpm) at 350 bar (5000 psi) and provide low pressure drops. The range includes:

- **DG3V-8** - remote pilot operated valve.
- **DG5VM-8-H** - DG4V-3-60 high performance D03 pilot valve 210 bar (3000 psi) tank line rating.

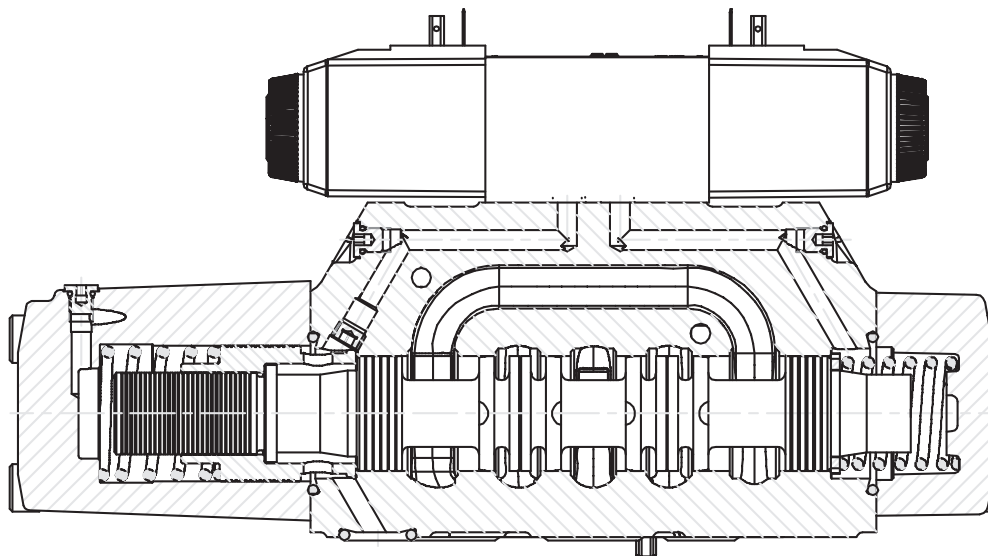
Each valve contains a mainstage spool which is positioned in the valve by special arrangement. The four arrangements are:

- **Spring offset** - For single stage operation, one spring returns spool to an offset position. For two-stage operation, springs and washers are removed from main stage and offset action is obtained from pilot valve.
- **Spring centered** - Spring and washer are located on both ends of main stage spool to control centering.
- **Pressure centered** - Centering springs are used in addition to pilot pressure, to provide positive centering should pilot pressure fail.
- **No spring for DG3** - Springs and washers are provided so that in the event of pilot pressure failure, the main spool will spring center.

Features and benefits

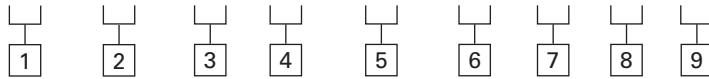
A “mini-system” capability with wide variety of spool and spring arrangements, stroke and pilot choke adjustments, integral check valves.

- High force solenoids and centering springs assure consistent shifting through a wide range of pressure and silting extremes.
- Optional Mainstage Spool Position Monitoring Switch (CE marked)
- Suitable for demanding industrial or mobile applications by providing for reliable operations.
- Endurance tested to 10 million cycles and fatigue tested without failure to ensure highest reliability.
- Fatigue testing performed to NFPA specifications to ensure the highest reliability in applications requiring high flows and pressure.
- Solid cast body and cored passages for maximum strength and minimal pressure drop.
- Electrical options including coil types, connections, and wiring housings allow full compatibility and reliable performance in any system application.
- Plain, waterproof options are available to facilitate system troubleshooting or servicing.



V-E

(F*) - DG3V - 8 - (B) - ** - (L) - (*) - (*) - 10



1 Seals

- F3** Seals for fire resistant fluids.
F6 Seals for water glycol.

2 Directional control valve

- DG3V** Subplate mounted; pilot operated remote operator.
 Pressure rating 350 bar (5000 psi) for all ports.

3 Valve size

- 8** Valve size CE TOP 8, NFPA D08

5 Spool types

Please refer functional symbols on page 7 for spool types.

6 Spool spring arrangement

- A** Spring offset to cylinder 'A'
AL Spring offset to cylinder "B" remove section 7
C Spring centered
D Pressure centered

8 Spool control modifications

- 1** Stroke adjustment (both ends)
 (available on C & B lank (no spring) models)
2 Pilot choke adjustment (available on all models)
3 Pilot choke and stroke adjusters (both ends)
 (available on C & Blank (no spring) models)
 Stroke adjusters on cylinder A end only
 (available on A, C & Blank (no spring) models)
7 Stroke adjusters on cylinder A end only
 (available on A, C & Blank (no spring) models)
8 Stroke adjusters on cylinder 'B' end only
 (available on AL, C, & Blank (no spring) models)
27 If both are required (available on A, C, & Blank
 (no spring) models)

9 Check valve in pressure port

- K** 0,35 bar (5 psi) check
Q 2,42 bar (35 psi) check
R 3,45 bar (50 psi) check
S 5,20 bar (75 psi) check

10 Design number

Subject to change. Installation dimensions remain as shown for design numbers 10 through 19.

V-E

DG5V-8 Solenoid controlled pilot operated directional valves

(F*)-DG5V-8 - * - (B) - * - ** - (**) - (*) - P** - (E) - (T) - (*) - (V) - M - * * * * - (L) - (*) - ** - 10

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1 Seals (omit if not required.)

- F3** Seals for fire resistant fluids.
F6 Seals for water glycol.

2 Pilot valve type

- H** CETOP 3, High performance

3 Spool Types

Please refer functional symbols on page 7 for spool types.

5 Spool spring arrangement

- A** Spring offset, end to end (P to B when shifted)
AL Spring offset, end to end, left hand build (P to A when shifted)
B Spring centered, single solenoid (P to B when shifted)
BL Spring centered, single solenoid, left hand build (P to A when shifted)
C Spring centered, dual solenoid
N Two position detented

6 Manual override option

- Blank** Plain override in solenoid end(s) only ▲
H Water-resistant override on solenoid end(s)
Z No override at either end
 No override in non-solenoid end of single-solenoid valves.
Omit None required
1 Stroke adjustment both ends (not available on "D" pressure centered, models)
2 Pilot choke adjustment
3 Pilot choke adjustment and stroke adjustment both ends (not available on "D" pressure centered, models)
7 Stroke adjustment on 'A' port end (not available on "D", pressure centered models)
8 Stroke adjustment on 'B' port end
27 Pilot choke adjustment and stroke adjustment on 'A' port end (not available on "D", pressure centered, models)
28 Pilot choke adjustment and stroke adjustment on 'B' port end
3 "1" and "2" combined ▲■
7 Stroke adjustment, port A end only ▼
8 "2" and "7" combined ▼
27 "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

8 Main stage spool monitoring switch

- Blank** None
PCA Center sensing switch on "A" port end (not available on "D", pressure centered, and 1/3/7/27, stroke adjust models)
PCB Center sensing switch on "B" port end (not available on 1/3/8/28, stroke adjust models)
PDA Double offset sensing switch on "A" port end (not available on "D", pressure centered, and 1/3/7/27, stroke adjust models)
PDB Double offset sensing switch on "B" port end (not available on 1/3/8/28, stroke adjust models)
PCD Center sensing switch on "A" port end and double offset sensing switch on "B" port end (not available on "D", pressure centered, and 1/3/7/8/27/28, stroke adjust models)
PPA Offset sensing proximity switch "A" port end (not available on "D", pressure centered, and 1/3/7/27, stroke adjust models)
PPB Offset sensing proximity switch "B" port end (not available on 1/3/8/28, stroke adjust models)
PPD Offset sensing proximity switch both ends (not available on "D", pressure centered, and 1/3/7/8/27/28, stroke adjust models)
Note 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).

9 External pilot pressure

- E** External pilot pressure.
Blank For internal pilot pressure models.

10 Internal pilot drain

- T** Internal pilot drain to 'T' port.
Blank For external pilot drain models.

11 Check valve in pressure port (Omit if not required.)

- K** 0,35 bar (5 psi) check
S 5,20 bar (75 psi) check

12 Solenoid energization identity (Omit if not required.)

- Blank** Standard arrangement for ANSI B93.9 (i.e. energize solenoid A to follow flow P to A).
V Solenoid identification determined by position of solenoid (i.e. solenoid A at port A end/solenoid B at port B end).
Note 4 and 8 type spools are always V. Solenoid energization identity is independent of mainstage porting.

V-E

(F*)-DG5V-8 - * - (B) - * - ** - (**) - (*) - P** - (E) - (T) - (*) - (V) - M - * * * * * - (L) - (*) - ** - 10

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

13 Flag symbol

M Electrical options and features

14 Coil Type

U ISO4400, DIN43650 connector
U1 ISO4400 fitted with PG11 plug
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

Note Refer DG4V3 Catalog for more options

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

18 Design number

General description

DG5V-8 models are two-stage directional control valves having an integrally mounted wet armature solenoid pilot valve. These valves are generally used to control the movement of a work cylinder or the rotation of a fluid motor.

Pressure centered models

V-E

Designated by “D” under spring/spool arrangement in model code.

This option provides faster, more positive spring centering time by use of pilot pressure to center the spool. The valve spool is returned to center position when pilot pressure is applied at both ends of the spool. The centering springs are used in addition to pilot pressure to ensure positive centering of spool.

If pilot pressure fails or falls below the required minimum, the spool will spring return to the center position. Pilot pressure is not available through the use of an integral check valve. Pressure centered valves have a drain port “W” and must have provisions for this feature.

Notes:

Pressure centered valves require a pilot valve which directs pilot oil to connections “X” and “Y” of the valve at the same time pressure centering is desired. The centering time depends on the rate of pressure rise in the pilot chamber.

Spring offset models

Designated by “A” under spring/spool arrangement in model code.

Spring offset model has an internal spring which returns the spool to offset position when the pilot connection “X” is open to tank. Pilot connection “Y” becomes a drain connection and must be piped directly to tank at atmospheric pressure through a surge-free tank line. Back pressure at this connection would cause valve to malfunction.

Caution:

Spring offset models contain a high assembled spring load. Call Eaton Service for disassembly instructions.

Spring centered models

Designated by “C” under spring/spool arrangement in model code.

A spring and washer arrangement is used on both ends of the spool. If control pressure is removed, the valve will go to center position due to spring force.

No-Spring models

Designated by a “Blank” under spring/spool arrangement in model code.

When the solenoid is de-energized, the spool returns to the last position attained.

Performance characteristics

Spring centered, pressure centered and spring offset models require continuous pilot pressure to maintain shifted position. Spring centered models return valve spool to center position by centering springs when pilot pressure fails or falls below minimum requirement.

Shift times

Shift times are defined as the time from pilot pressure application/removal to the point of the start of a pressure rise/decline in appropriate port.

Caution:

Flow conditions of the spring centered position must be selected with care, both for the effect on the direction of the flow, and the pilot pressure. (The “9” main spool will not ensure sufficient pilot pressure in the center position for internal pilot pressure models).

Pressure centered models:

Valve spool is returned to center position by pilot pressure, when pilot pressure is removed. If pilot pressure fails or falls below the required minimum, the valve spool will spring return to center position. (At spring centered valve flow rates).

Caution:

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

Notes:

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.

Shifting action

The pilot valve solenoids of spring centered, pressure centered, and spring offset models must be energized continuously to keep the main stage spool in the shifted position. No-spring detented models only need to be energized momentarily (for approximately 0.1 second).

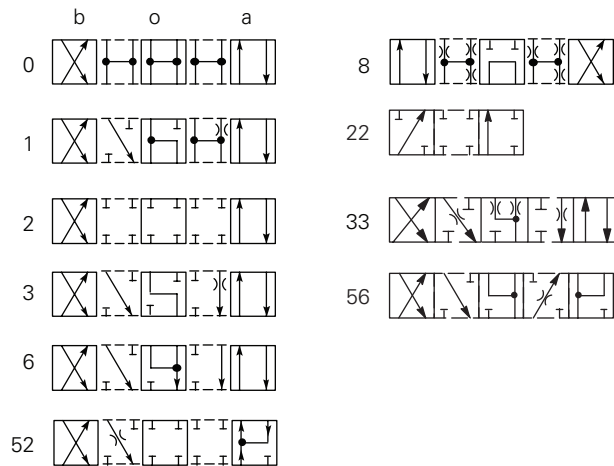
Spring centered and pressure centered models return the valve spool to the center position when both solenoids are de-energized or pilot pressure fails or falls below minimum requirements. Spring offset models return the spool to the offset position by pilot pressure when the solenoid is de-energized.

When no-spring detented models are de-energized, the pilot and main spools remain in their last position as long as there are no unusual shock, vibration, or pressure transients, and the spool axis is horizontal. If pilot pressure fails or falls below minimum requirements, the main spool will spring center (at spring centered flow rates), but will not drift to a reversal of flow position. The pilot stage will remain in the detented position.

When used as other than a normal 4-way valve, consult your Eaton representative.

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-8-*A(L) and DG5V-8-*N valves.

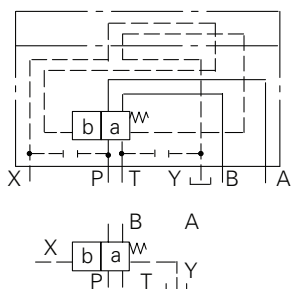
Your Eaton representative can provide further details.

V-E

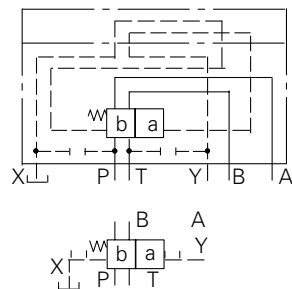
DG3V-8 pilot operated models

Comprehensive and simplified symbols.

Spring offset, end-to-end, DG3V-8-*A



Spring offset, end-to-end, DG3V-8-*A



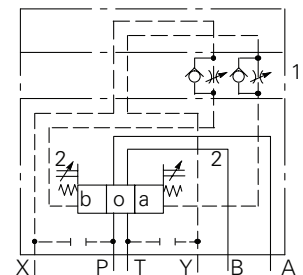
DG3V-8 options

The following are shown in a DG3V-8-*C example:

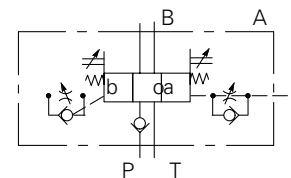
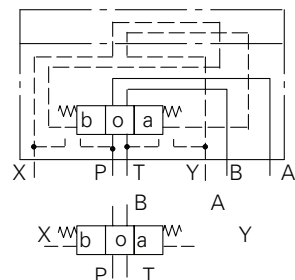
1. Pilot choke module

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.



Spring centered, DG3V-8-*C

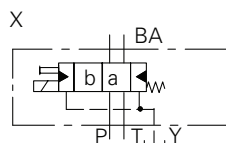
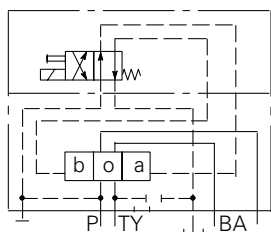


DG5V-8, solenoid controlled, pilot operated models

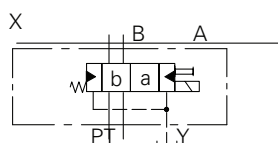
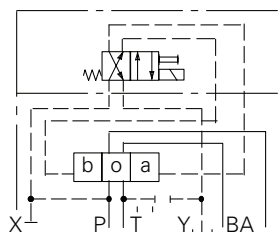
Comprehensive and simplified symbols shown configured for external pilot supply and internal drain

V-E

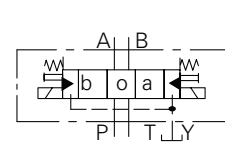
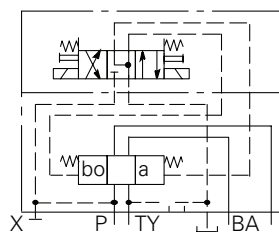
Spring offset, end-to-end, DG5V-8-*A



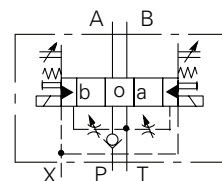
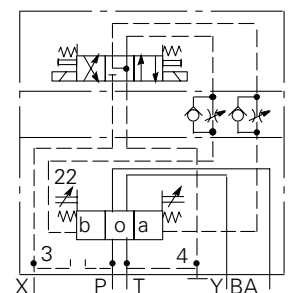
Spring offset, end-to-end, opposite hand, DG5V-8-*AL



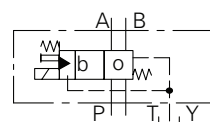
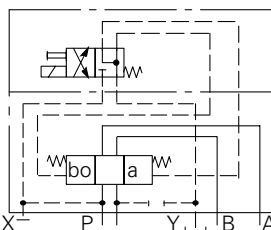
Spring centered, DG5V-8-*C



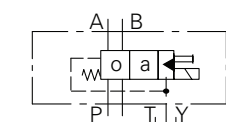
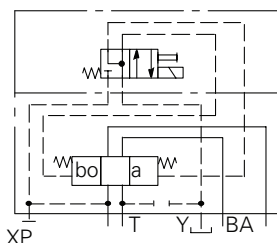
DG5V-8 options



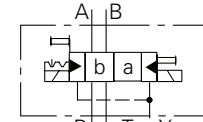
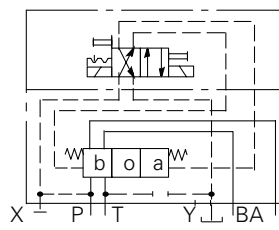
Spring offset, end-to-center DG5V-8-*B



Spring offset, end-to-center, opposite hand DG5V-8-*BL



Detented, DG5V-8-*N



The following are shown in a DG5V-8-*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.

Maximum pressures:

DG3V-8 valves; ports:

P, A, B and T *	350 bar (5000 psi)
Y §	350 bar (5000 psi)

DG5V-8 valves, (externally drained)

P, A, B, T and X *	350 bar (5000 psi) ▲
Y §	210 bar (3000 psi)

DG5V-8 valves, (internally drained)

P, A, B and X	350 bar (5000 psi) ▲
T §	210 bar (3000 psi)

Maximum flow without mal-function (DG3V-8 and DG5V-8) 700 L/min (185 Usgpm)

Pilot pressures See "Pilot Pressures" on page 150

Electrical information:

See 17 in "model code" on page 148

Voltage ratings, DG5V valves

See "Temperature limits", on page 151

Voltage limits, DG5V valves:

90% of rated voltage

Maximum voltage Initial VA rms Holding VA rms

Minimum voltage 265 49

Power consumption, DG5V valves with AC solenoids: 260 48

Dual-frequency coils at 50 Hz, types "B" and "D" 30W at rated voltage and 200C (680F)

Dual-frequency coils at 60 Hz, types "B" and "D" Continuous; ED = 100%

Power consumption, DG5V valves with DC solenoids IEC 144 class IP65

Relative duty factor, DG5V valves IEC 144 class IP65 (NEMA 4)

Type of protection, DG5V valves: Class H

ISO 4400 coils with plug fitted correctly Class H

Junction box Class F

Coil winding

Lead wires (coil types "F****")

Coil encapsulation

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

▲ The DG5V, 10 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 350 bar (5000 psi).

* The method for verifying the rated fatigue pressure of the complete unit conforms to NFPA/T2.6.1 R1-1991 (Catalog C/90), Fluid Power Systems and Products method for verifying the fatigue pressure rating of the pressure containing envelope.

§ Internal drain models drain the pilot valve through the tank port of the mainstage. External drain models drain the pilot valve through the "Y" port of the mainstage. To provide proper operation without malfunction, the pilot pressure must always exceed tank or drain line pressure by the minimum pilot pressure required per valve and spool type (see charts on page 16). Tank or drain line surges which would reduce this differential are to be avoided as they may cause the mainstage to shift. Mainstage tank pressure is limited to the tank line rating of the pilot valve on internally drained models (with "T" included in the model code). Internal drains may be used with all models except pressure centered "D" models. Pressure centered models must be externally drained through "Y" and "W" ports. To achieve the maximum tank line rating of 350 bar (5000 psi) of the mainstage, an external pilot drain must be used and it is recommended that a separate line be provided directly to the tank.

Pressure drop characteristics

See page 152, 153

Response times, DG5V valves:

Typical values for a DG5V-8-2C-E spring centered, externally piloted valve under standard test conditions and operating with 150 L/min (40 USgpm) at 350 bar (5000 psi).

V-E

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 157 to 163
Mass (weight), basic models:	kg (lb) approx.
DG3V-8-*A(L)	10,0 (22.0) ◆
DG3V-8-*B(L)/*C	7,3 (16.1) ◆
DG5V-8-*A/B (AC voltages)	8,4 (18.5) ◆
DG5V-8-*A/B (DC voltages)	8,5 (18.7) ◆
DG5V-8-*C/N (AC voltages)	8,7 (19.2) ◆
DG5V-8-*C/N (DC voltages)	9,1 (20.0) ◆

◆ Add 1,1 kg (2.4 lb) when pilot choke adjustment is fitted.

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

Typical with mineral oil at 36 cSt (168.6 SUS) and a specific gravity of 0.87.

Maximum flow rates

Performance based on full power solenoid coils warm and operating at 90% rated voltage.

Pressure drop & malfunction flow

The following table lists the appropriate pressure drop curve and malfunction flow curve between ports for each spool type. Use the following example to determine pressure drop for a selected spool.

Example: Find the pressure drop from P → B for type 7 spool. Using the table find numeral 7 in the spool type column. To the right of numeral 7 find the reference curve 2 (from pressure drop curve chart at bottom of page) under P → B column.

The pressure drop from P → B for type 7 spool would be obtained on curve 2. Likewise, the malfunction for numeral 7 would be found on curve 1 (from malfunction flow curve chart at bottom of page).

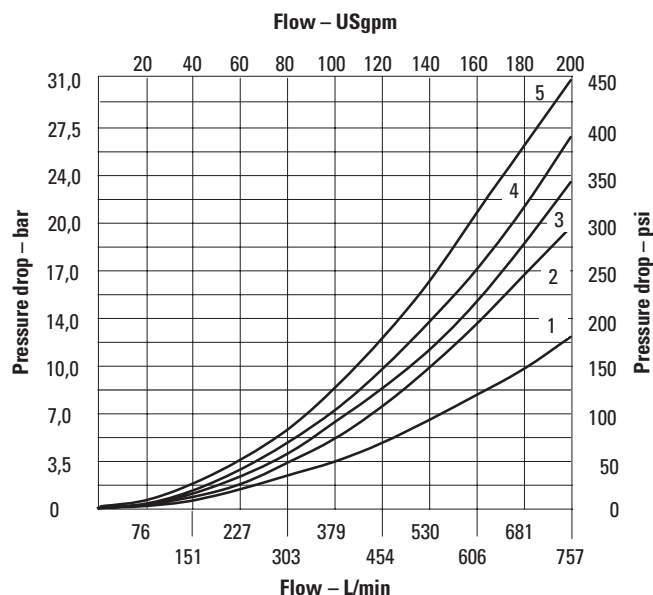
- Figures in the pressure drop chart give approximate pressure drop (ΔP) when passing 473 l/min (125 USgpm) flow (Q) of 35 cSt (164 SUS) fluids(s) having .865 specific gravity.
- For any other flow rate (Q_1), the pressure drop (ΔP_1) will be approximately: $\Delta P_1 = P(Q_1/Q)^2$.
- For any other viscosity(s), the pressure drop (ΔP), will change as follows:
- For any other specific gravity (G_1), the pressure drop (ΔP_1) will be approximately: $\Delta P_1 = \Delta P(G_1/G)$.

Spool Type	Pressure drop curve number					Malfunction flow curve number
	P → A	B → T	P → B	A → T	P → T in center	
0	2	2	2	2	3	1
1	1	2	1	3	2	3
2	1	2	1	1	—	2
3	1	2	1	4	—	2
6	1	3	1	4	—	1
8	4	3	4	2	5	1
33	1	3	1	2	—	2
35	See page 28					
52	2	—	4	4	—	1

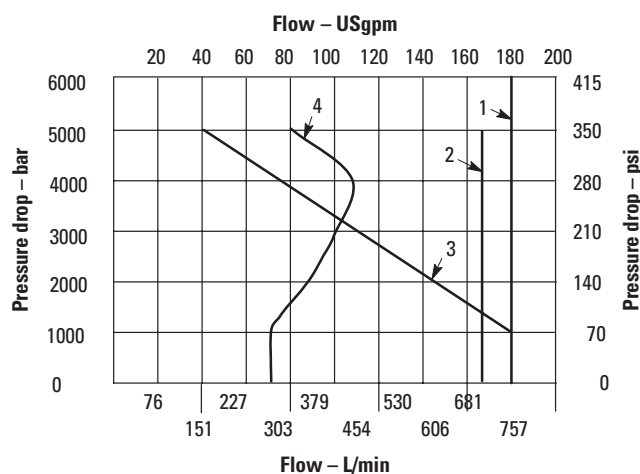
Viscosity cSt (SUS)	14 (17.5)	20 (97.8)	43 (200)	54 (251)	65 (302)	76 (352)	85 (399)
% of PΔ (Approx.)	81	88	104	111	116	120	124

V-E

Pressure drop curves



Malfunction flow curves



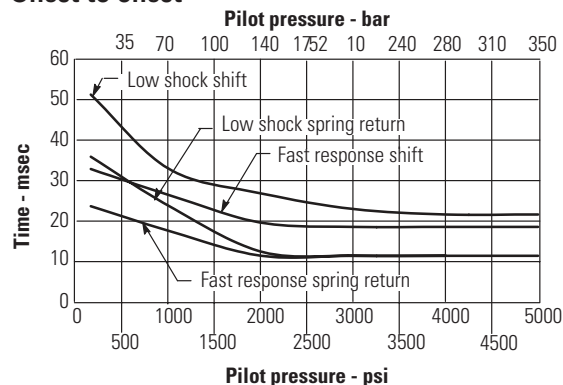
Performance data

DG3V-8 Model

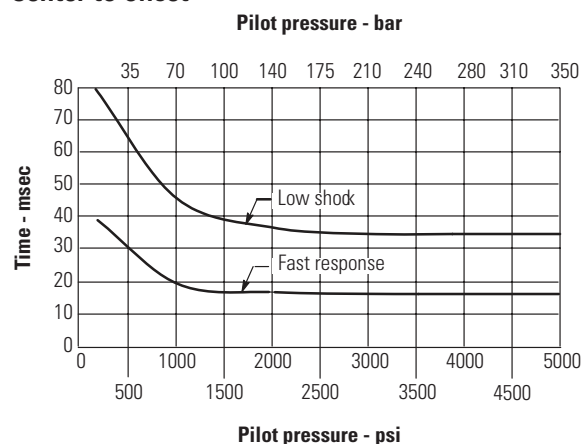
Response time

The response time shown in the charts are defined as the time between pilot pressurization/ de-pressurization and the initial change in the inlet port pressure.

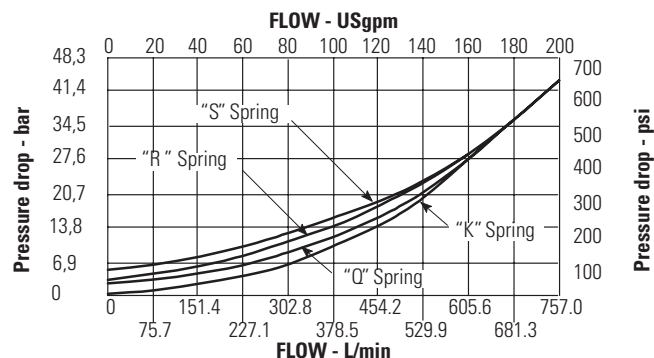
Offset to offset



Center to offset



Pressure drop across check valve



Spring centering times @ rated flow & pressure

Spool type	Time
Closed center	.040 sec.
Open center	.050 sec.

Centering times for pressure Centered valves @ rated pressure (A to P or B to P)

See malfunction flow curves on page 148.

350 bar (5000 psi)

350 bar (5000 psi)

350 bar (5000 psi)

Conforms to NFPA/T2.6.1 R1-1991

See fatigue pressure rating of the

Integral check valves

For internal pilot pressure, an integral pressure port check valve is available. This back pressure will be present at the cylinder ports. The pilot pressure generated is the total of: P → T drop through the valve in center condition, pressure drop through the check valve, plus the pressure at the tank port.

To prevent load drop, a check valve in the pressure port can be used to prevent reverse flow from a cylinder port to the pressure port.

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Pressure drop & malfunction flow

The following table lists the appropriate pressure drop curve and malfunction flow curve between ports for each spool type. Use the following example to determine pressure drop for a selected spool.

Example: Find the pressure drop from P → B for type 7 spool. Using the table find numeral 7 in the spool type column.

To the right of numeral 7 find the reference curve 2 (from pressure drop curve chart at bottom of page) under P → B column.

The pressure drop from P → B for type 7 spool would be obtained on curve 2. Likewise, the malfunction for numeral 7 would be found on curve 1 (from malfunction flow curve chart at bottom of page).

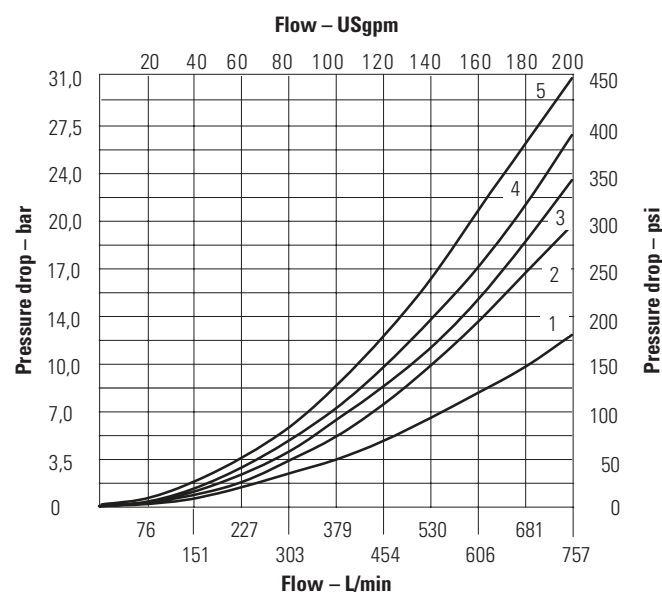
- Figures in the pressure drop chart give approximate pressure drop (ΔP) when passing 473 l/min (125 USgpm) flow (Q) of 35 cSt (164 SUS) fluids(s) having .865 specific gravity.
- For any other flow rate (Q_1), the pressure drop (ΔP_1) will be approximately $\Delta P_1 = \Delta P(Q_1/Q)^2$.
- For any other viscosity(s), the pressure drop (ΔP), will change as follows:
- For any other specific gravity (G_1), the pressure drop (ΔP_1) will be approximately: $\Delta P_1 = \Delta P(G_1/G)$.

Spool type	Pressure drop curve number					Malfunction flow curve number
	P → A	B → T	P → B	A → T	P → T in center	
0	2 →	2 →	2 →	2 →	3 →	1
1	1	2	1	3	2	3
2	1	2	1	1	—	2
3	1	2	1	4	—	2
6	1	3	1	4	—	1
8	4	3	4	2	5	1
33	1	3	1	2	—	2
35A	See page 165					
52	2	—	4	4	—	1

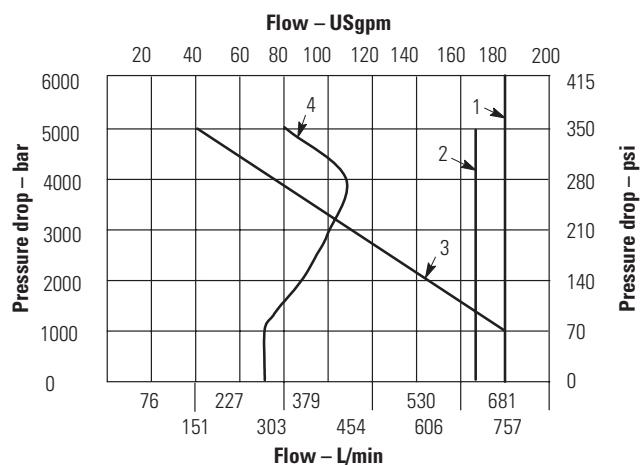
Viscosity cSt (SUS)	14 (75)	32 (150)	43 (200)	54 (250)	65 (300)	76 (350)	86 (400)
% of ΔP (Approx.)	93	111	119	126	132	137	141

V-E

Pressure drop curves



Malfunction flow curves



Performance data

DG5V-8 Model

Response times

Response times are defined as the time from solenoid energization/de-energization to the point of the start of a pressure rise/decline in appropriate port.

Solenoid energizing

Spring centered, pressure centered and spring offset DG5V-8 types must be energized continuously. No-spring detented DG5V-8 type may be energized momentarily. Pressure centered and spring centered DG5V-8 types return valve spool to center position when both solenoids are de-energized.

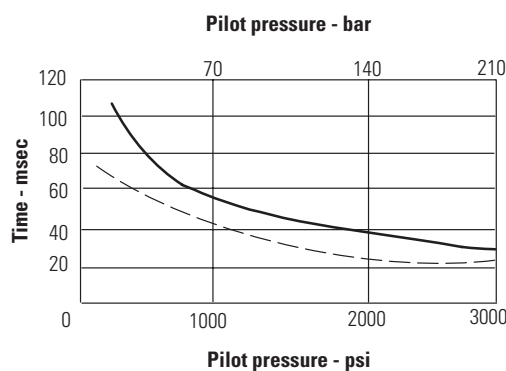
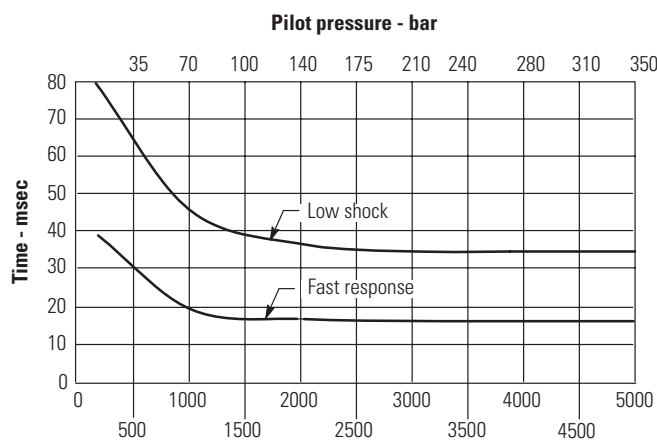
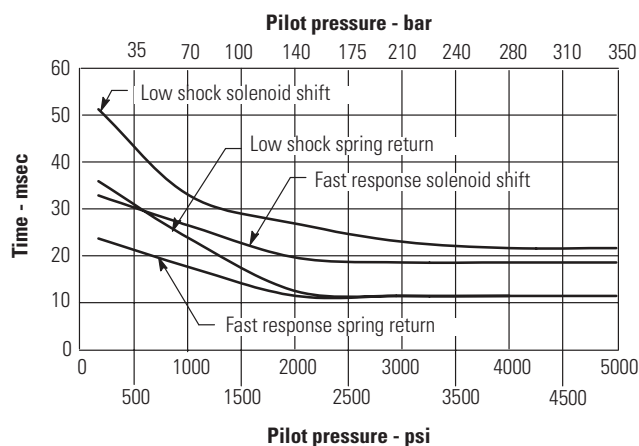
Mounting position

No-spring detented valves must be installed with the longitudinal axis horizontal for good machine reliability. The mounting position of spring centered and spring offset models is unrestricted provided that the pilot pressure supply is maintained as required. (Spring offset valves do not have a spring in the main spool section).

Spring centering times @ Rated flow & pressure

Spool type	Time
Closed center	.040 sec.
Open center	.050 sec.

V-E



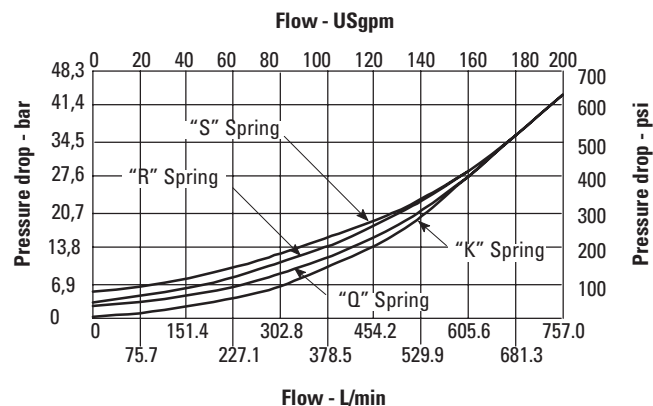
— Standard Low Shock
- - - Fast Response

Integral check valves

For internal pilot pressure, an integral pressure port check valve is required for internally piloted valves with open center spools (0,1,4,8 & 9). The pilot pressure generated is the total of: P → T drop through the valve in center condition, pressure drop through the check valve, plus the pressure at the tank port.

For proper operation, total pressure drop must be greater than the minimum required pilot pressure (see chart). To prevent load drop, a check valve in the pressure port can be used to prevent reverse flow from a cylinder port to pressure port. If using as reverse flow check, maximum reverse pressure is limited to 210 bar (3000 psi).

Pressure drop across check valve

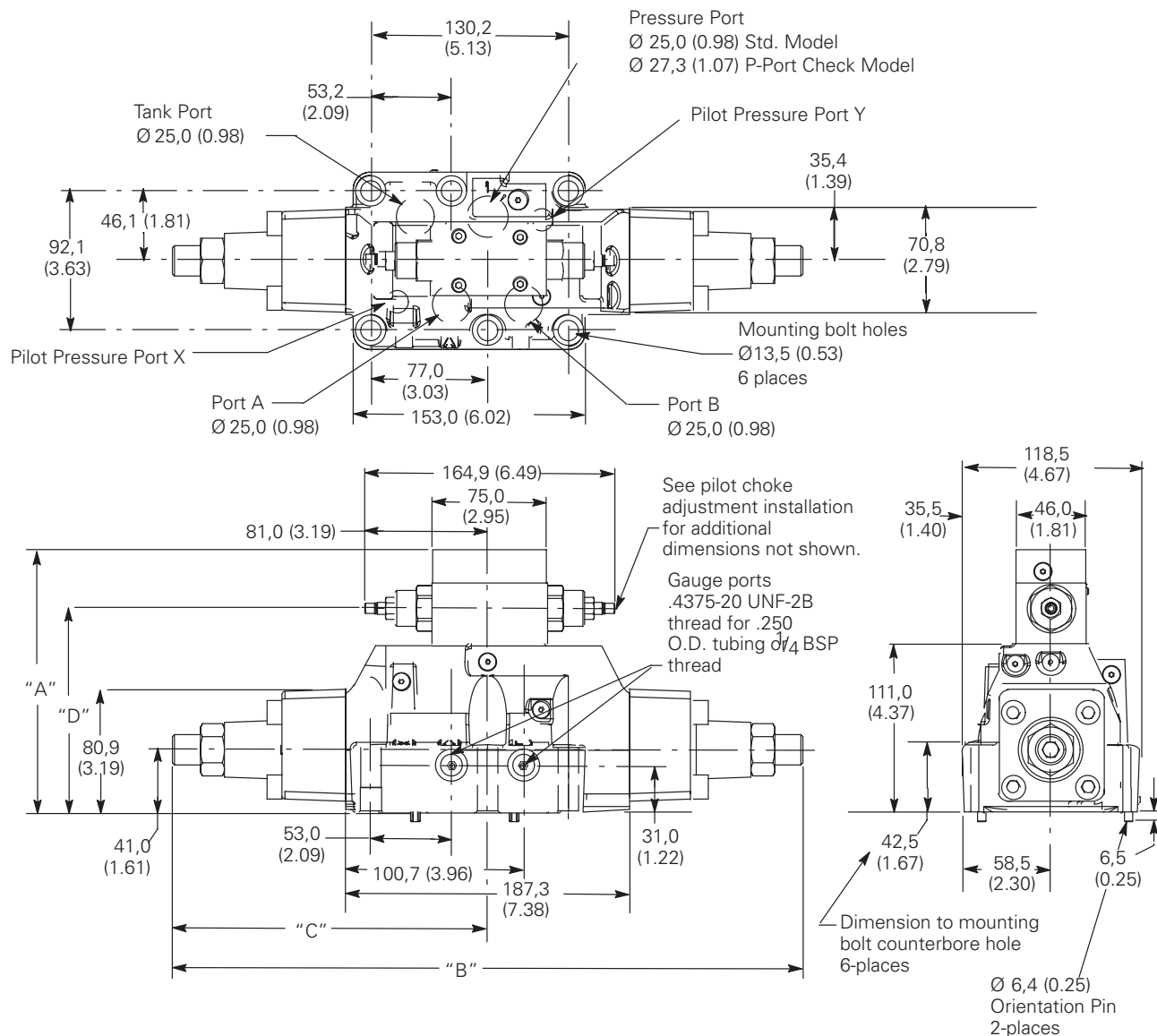


V-E

Installation dimensions

DG3V-8-(C)-*-10 spring centered model

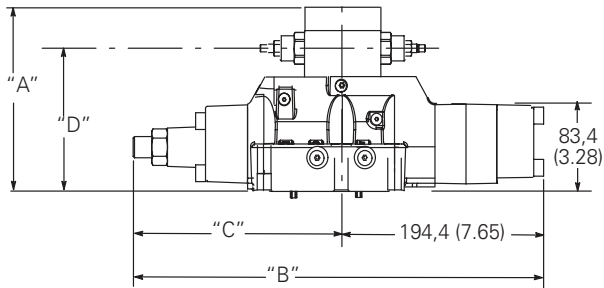
Millimeters (inches)



Spool control modifications	"A" dimension	"B" dimension	"C" dimension	"D" Dimension (pilot choke adjustment)
Without pilot choke or stroke adjustment	133,0 (5.23)	265,3 (10.44)	132,6 (5.22)	—
Stroke adjustment (both ends)	133,0 (5.23)	415,9 (16.37)	208,0 (8.18)	—
Pilot choke adjustment	173,0 (6.81)	265,3 (10.44)	132,6 (5.22)	134,2 (5.28)
Stroke adjustment on cyl. 'A'	133,0 (5.23)	340,6 (13.40)	208,0 (8.18)	—
Stroke adjustment on cyl. 'B'	133,0 (5.23)	340,6 (13.40)	132,6 (5.22)	—
Pilot choke and stroke adjustment on cyl. 'A'	173,0 (6.81)	340,6 (13.40)	208,0 (8.18)	134,2 (5.28)
Pilot choke and stroke adjustment on cyl. 'B'	173,0 (6.81)	132,6 (5.22)	134,2 (5.28)	134,2 (5.28)
Pilot choke and stroke adjustment (both ends)	173,0 (6.81)	415,9 (16.37)	208,0 (8.18)	134,2 (5.28)

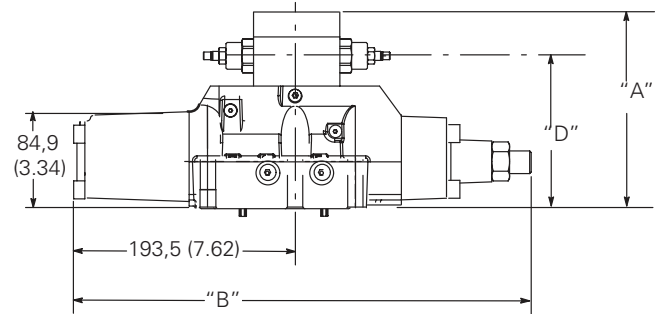
DG3V-8-(L)-*-*-*10 spring offset model

Millimeters (inches)



DG3V-8-D-*-*-*10 pressure centered model

Millimeters (inches)



V-E

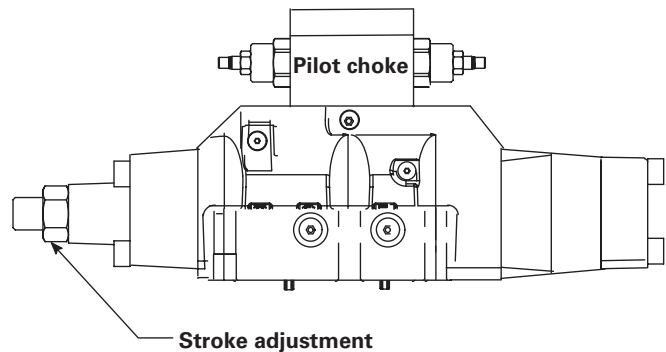
Spool control modifications	"A" dimension	"B" dimension	"C" dimension	"D" Dimension (pilot choke adjustment)
Without pilot choke or stroke adjustment	133,0 (5.23)	265,3 (10.44)	132,6 (5.22)	—
Without pilot choke or stroke adjustment (left-hand build)	133,0 (5.23)	326,9 (12.87)	194,4 (7.65)	134,2 (5.28)
Pilot choke adjustment	173,0 (6.81)	265,3 (10.44)	132,6 (5.22)	134,2 (5.28)
Stroke adjustment on cyl. 'A' (left-hand build)	133,0 (5.23)	402,3 (15.83)	208,0 (8.18)	—
Stroke adjustment on cyl. 'B'	133,0 (5.23)	340,6 (13.40)	132,6 (5.22)	—
Pilot choke and stroke adjustment on cyl. 'A' (left-hand build)	173,0 (6.81)	340,6 (13.40)	208,0 (8.18)	134,2 (5.28)
Pilot choke and stroke adjustment on cyl. 'B'	173,0 (6.81)	340,6 (13.40)	132,6 (5.22)	134,2 (5.28)

Pilot choke DGMFN-3-Y-A2W-B2W-41

Pilot choke increases the amount of time to shift the mainstage spool, lowering the possibility of large flow transients in the circuit. It is adjusted by backing off locknuts and turning adjusting screws inward to decrease rate of spool travel and outward to increase spool travel rate. See spool control modifications in model code.

Stroke adjustment

Stroke adjustment limits movement of the mainstage spool. Backing off the jamnut and turning the adjusting screw inward decreases spool stroke. See spool control modifications in model code.).

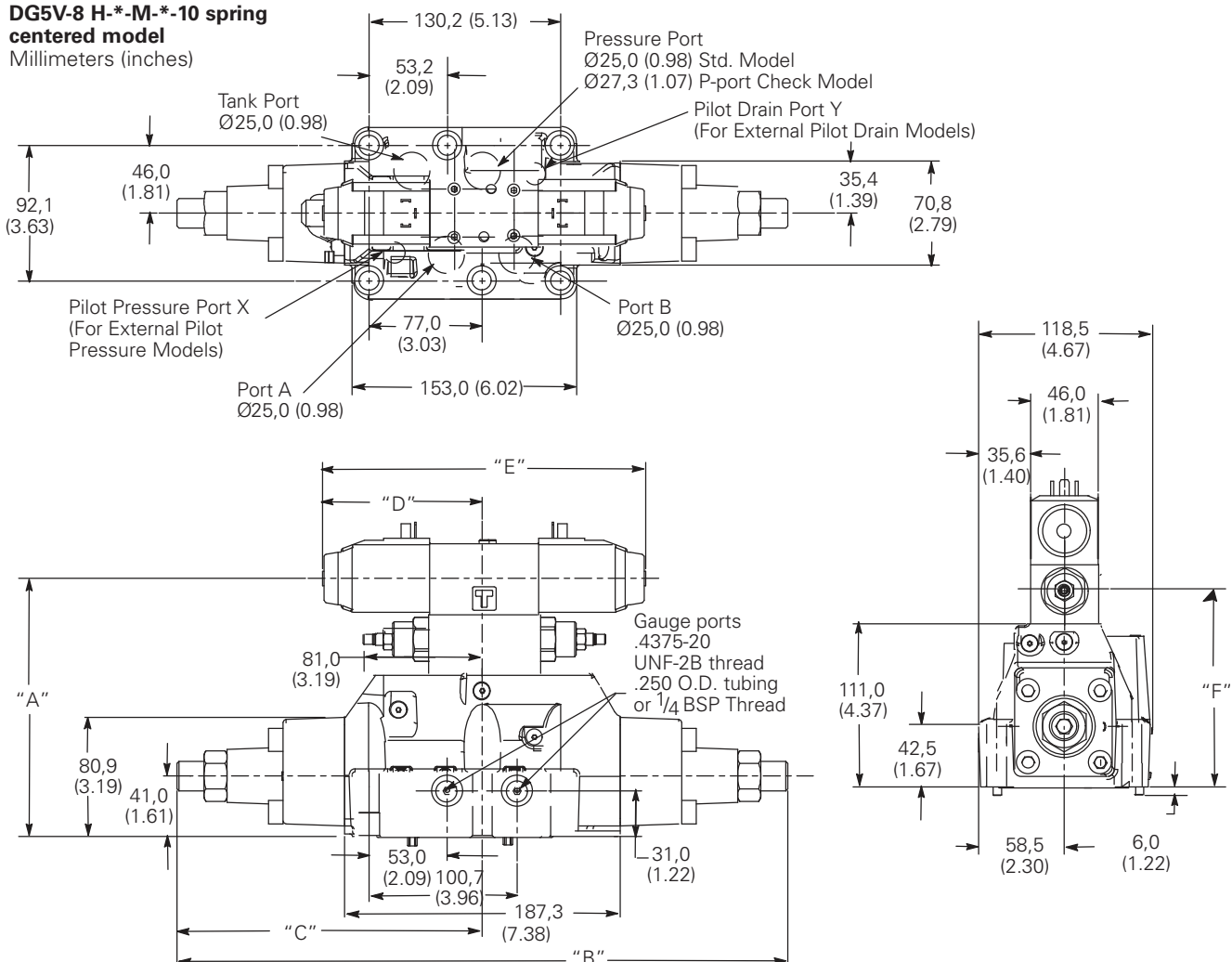


Installation dimensions

DG5V-8 H-*-M-*-10 spring centered model

Millimeters (inches)

V-E

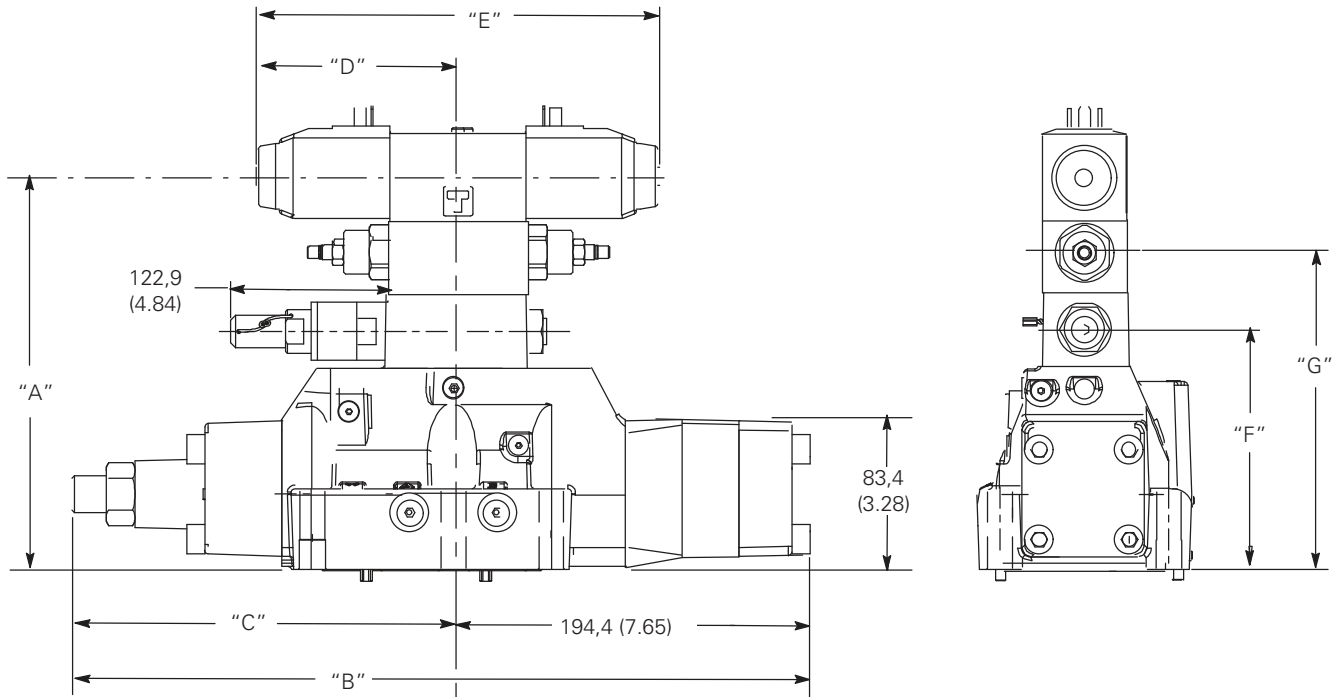


Dimensions

Dimensions										
				"D"		"E" pilot				"F"
						Dual solenoid		Single solenoid		Pilot choke
						AC Sol.	DC Sol.	AC Sol.	DC Sol.	
Spool control modifications				AC Sol.	DC Sol.	AC Sol.	DC Sol.	AC Sol.	DC Sol.	
Without pilot choke or stroke adjustment	135,6 (5.33)	265,3 (10.44)	132,6 (5.22)							
Stroke adjustment (both ends)		415,9 (16.37)	208,0 (8.18)							
Pilot choke adjustment	175,6 (6.91)	265,3 (10.44)	132,6 (5.22)							134,2 (5.28)
Stroke adjust. on cyl. 'A'	135,6 (5.33)	340,6 (13.40)	208,0 (8.18)	98,8 (3.88)	108,8 (4.28)	200,0 (7.87)	220,0 (8.66)	146,5 (5.76)	156,5 (6.16)	
Stroke adjust on cyl. 'B'			132,6 (5.22)							
Pilot choke and stroke adjust. on cyl 'A'			208,0 (8.18)							
Pilot choke and stroke adjust. on cyl. 'B'	175,6 (6.91)		132,6 (5.22)							134,2 (5.28)
Pilot choke and stroke adjust. on both ends		415,9 (16.37)	208,0 (8.18)							

DG5V-8-A(L)-*-10 spring offset model

Millimeters (inches)



V-E

Dimensions

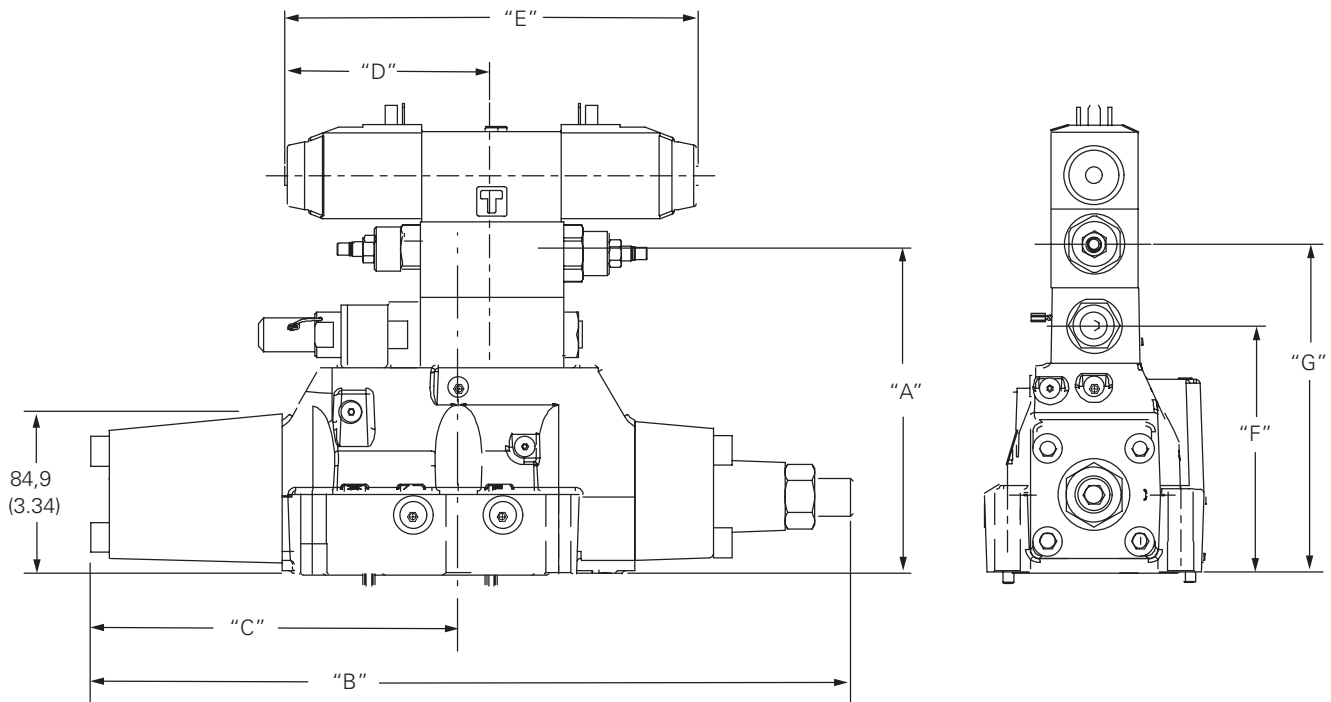
Spool control modifications	"A"	"B"	"C"	"D"		"E" pilot				"F"	"G"
				AC Sol.	DC Sol.	Dual solenoid		Single solenoid		Reducer module	Pilot Choke
						AC Sol.	DC Sol.	AC Sol.	DC Sol.		
Without pilot choke or stroke adjustment	175,6 (6.91)	265,3 (10.44)	132,6 (5.22)								
Stroke adjustment (both ends)		415,9 (16.37)	208,0 (8.18)								
Pilot choke adjustment	215,6 (8.48)	265,3 (10.44)	132,6 (5.22)								134,2 (5.28)
Stroke adjust. on cyl. 'A'	175,6 (6.91)	340,6 (13.40)	208,0 (8.18)	98,8 (3.88)	108,8 (4.28)	200,0 (7.87)	220,0 (8.66)	146,5 (5.76)	156,5 (6.16)	134,2 (5.28)	
Stroke adjust on cyl. 'B'			132,6 (5.22)								
Pilot choke and stroke adjust. on cyl 'A'			208,0 (8.18)								
Pilot choke and stroke adjust. on cyl. 'B'	215,6 (8.48)		132,6 (5.22)								134,2 (5.28)
Pilot choke and stroke adjust. on both ends		415,9 (16.37)	208,0 (8.18)								

Installation dimensions

DG5V-8-A(L)-*-10 spring offset model

Millimeters (inches)

V-E



Dimensions

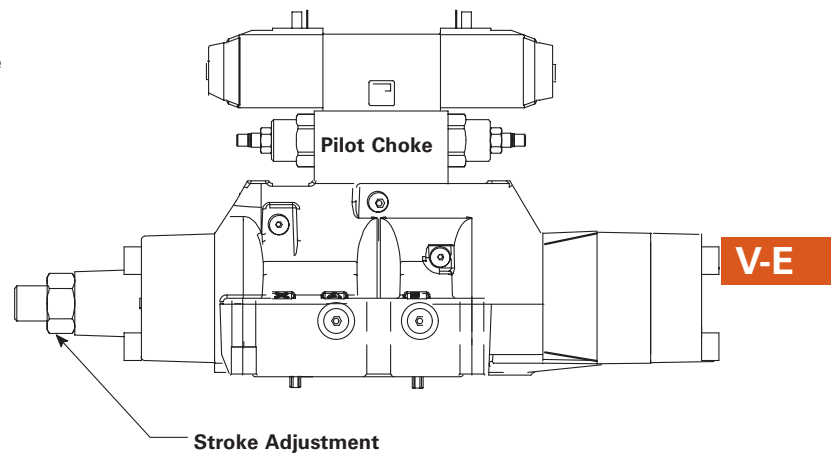
Dimensions											
"A" "B" "C"				"D"		"E" pilot				"F"	"G"
						Dual solenoid		Single solenoid			
Spool control modifications				AC Sol.	DC Sol.	AC Sol.	DC Sol.	AC Sol.	DC Sol.	Reducer module	Pilot Choke
Without pilot choke or stroke adjustment	135,6 (5.33)	326,1 (12.83)	193,5 (7.61)	98,8 (3.88)	108,8 (4.28)	200,0 (7.87)	220,0 (8.66)	146,5 (5.76)	156,5 (6.16)		134,2 (5.28)
Stroke adjust on cyl. 'B'		401.5									
Pilot choke and stroke adjust. on cyl. 'B'	175,6 (6.91)	(15.80)									
(With reducer)											
Without pilot choke or stroke adjustment	175,6 (6.91)	326,1 (12.83)	193,5 (7.61)	98,8 (3.88)	108,8 (4.28)	200,0 (7.87)	220,0 (8.66)	146,5 (5.76)	156,5 (6.16)	131,0 (5.15)	134,2 (5.28)
Stroke adjust on cyl. 'B'		401,5									
Pilot choke and stroke adjust. on cyl. 'B'	215,6 (8.48)	(15.80)									

Pilot choke DGMFN-3-Y-A2W-B2W-41

Pilot choke increases the amount of time to shift the mainstage spool, lowering the possibility of large flow transients in the circuit. It is adjusted by backing off locknuts and turning adjusting screws inward to decrease rate of spool travel and outward to increase spool travel rate. See spool control modifications in model code.

Stroke adjustment

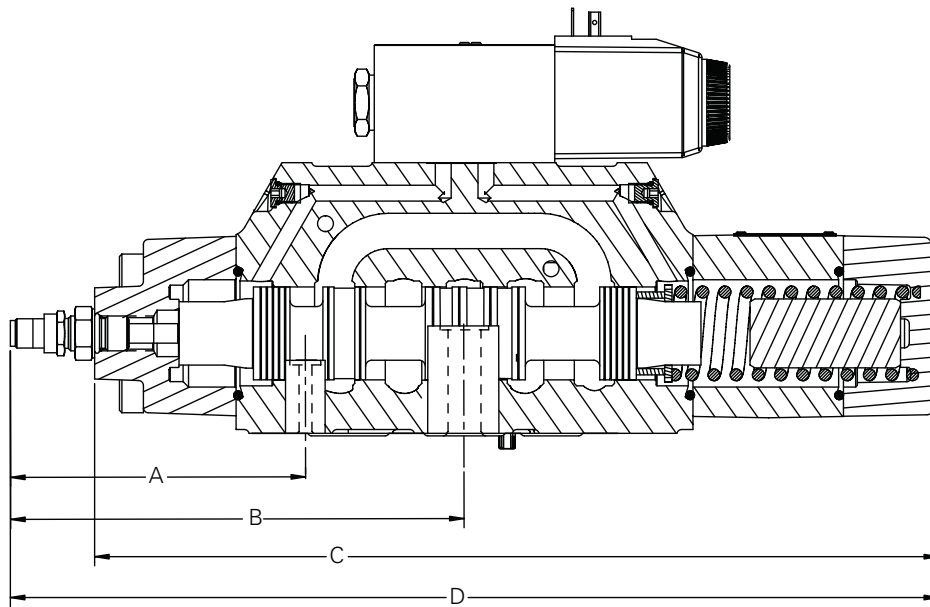
Stroke adjustment limits movement of the mainstage spool. Backing off the jamnut and turning the adjusting screw inward decreases spool stroke. See spool control modifications in model code.



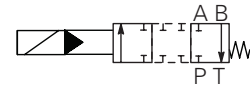
Installation dimensions

Valve for Safety Circuit Application (35A Spool)

V-E



Main Stage Hydraulic Symbol



Model	B	B	C	D	Leakage P-A	Flow curve
	mm (in)	mm (in)	mm (in)	mm (in)	cc/min (in ³ /min)	Available upon request
DG5V5-35A	118.5 (4.67)		234.7 (9.24)	262.1 (10.32)	Available upon request	See DG5V7 catalog
DG5V7-35A		152.1 (5.99)	252.1 (9.92)	286.6 (11.28)	Available upon request	Available upon request
DG5V8-35A		151.7 (5.97)	346.0 (13.62)	380.5 (14.98)	156 (9.5)	Available upon request
DG5V10-35A		230.7 (9.10)	443.4 (17.46)	476.3 (18.8)	Available upon request	

DG5V-8 with main stage spool monitoring switch "PC*" or "PD*" Models (LVDT Style Switch)

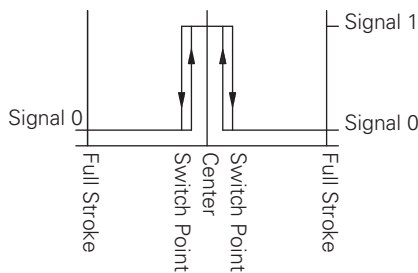
Millimeters (inches)

Specifications

Supply Voltage (Vs)	24VDC \pm 20%
(Full Wave Bridge with Capacitor)	
Reverse Polarity Protection	MAX. 300V Installed
Ripple Voltage	10%
Current consumption	40mA Approx.
Outputs	NC Contact Positive (No Short Circuite Protection)
Sensing Distance (offset position)	5.85 to 6.15 mm
Sensing Distance (from center position)	\pm 0.35 to 0.65 mm
Hysteresis	\leq 0.06 mm
Output voltage	
Signal 0	< 1.8V
Signal 1	Vs - 2.5V
Output Current	<400mA at Input +20%
Environmental Protection	IP65 (With Mounted Plug)
Operating Temperature Range	-20°C to +85°C
Max. Operating Pressure	315 bar (4500 psi)
CE Declaration of Conformity No.	00 02 002 9 93
P-Channel, Contact Positive	
Attention: EMC only ensured when using screened cables and screened plug casing.	

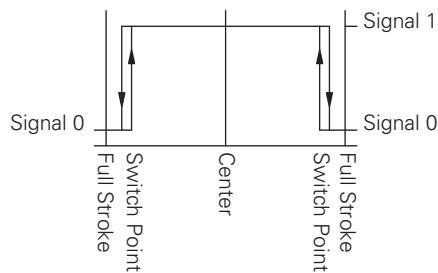
V-E

Typical "PCA/PCB" output (for sensing center position)



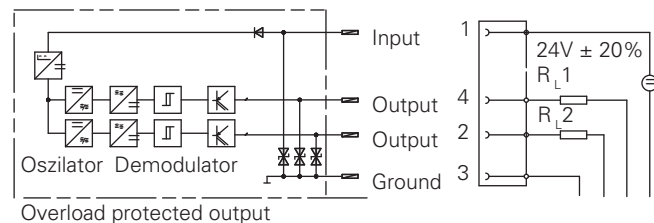
Signal 0 = Voltage at pin 2/4 < 1.8V
Signal 1 = Voltage at pin 2/4 > (Vs - 2.5V)

Typical "PDA/PDB" output (for full shift sensing)



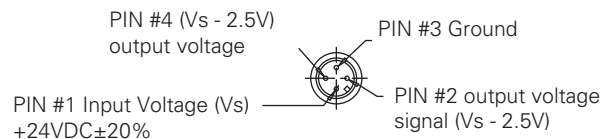
Signal 0 = Voltage at pin 2/4 < 1.8V
Signal 1 = Voltage at pin 2/4 > (Vs - 2.5V)

Electrical schematic and Mating connector detail



R_L1, R_L2 = e.g. Coil Resistance of the switch relay \geq 60 OHMS

Connector detail



General description

Pilot valves are identified in the model code by the following letters: “S” Standard or “H” High Performance. The pilot valves can be ordered to match a variety of mainstage spool types and valve bodies.

The chart below shows ordering information for each pilot valve. For example, to order a High Performance pilot “H” with a Spring Offset mainstage “A”, use the following model code: DG4V-3- 2A-M-* -60

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Valve model code:	Main stage spool type	Pilot valve model code
High performance/standard	All except 4 & 8	DG4V-3-2A-M-* -60
DG5V-8-H-*A-* -M-* -10	4A & 8A only	DG4V-3-2AL-VM-* -60
	4AL & 8AL only	DG4V-3-2A-VM-* -60
	All except 4 & 8	DG4V-3-6B-M-* -60
DG5V-8-H-*B-* -M-* -10	4B & 8B only	DG4V-3-6BL-VM-* -60
	4BL & 8BL only	DG4V-3-6B-VM-* -60
	All except 4 & 8	DG4V-3-6C-M-* -60
DG5V-8-H-*C-* -M-* -10	4C & 8C only	DG4V-3-6C-VM-* -60
	All except 4 & 8	DG4V-3-7C-M-* -60
DG5V-8-H-*D-* -M-* -10	4D & 8D only	DG4V-3-7C-VM-* -60
	All except 4 & 8	DG4V-3-6F-M-* -60
DG5V-8-H-*F-* -M-* -10	4F & 8F only	DG4V-3-6FL-VM-* -60
	4FL & 8FL only	DG4V-3-6F-VM-* -60
	All except 4 & 8	DG4V-3-6N-M-* -60
DG5V-8-H-*N-* -M-* -10	4N & 8N only	DG4V-3-6N-VM-* -60

Minimum pilot pressure requirements

Spool type	Pilot pressure bar (psi)	
	A, B, C, F, N Models	D Models
Closed center	10 (150)	P to A: 12 (175) P to B: 21 (300)
Open center	5 (75)	P to A: 10 (150) P to B: 10 (150)