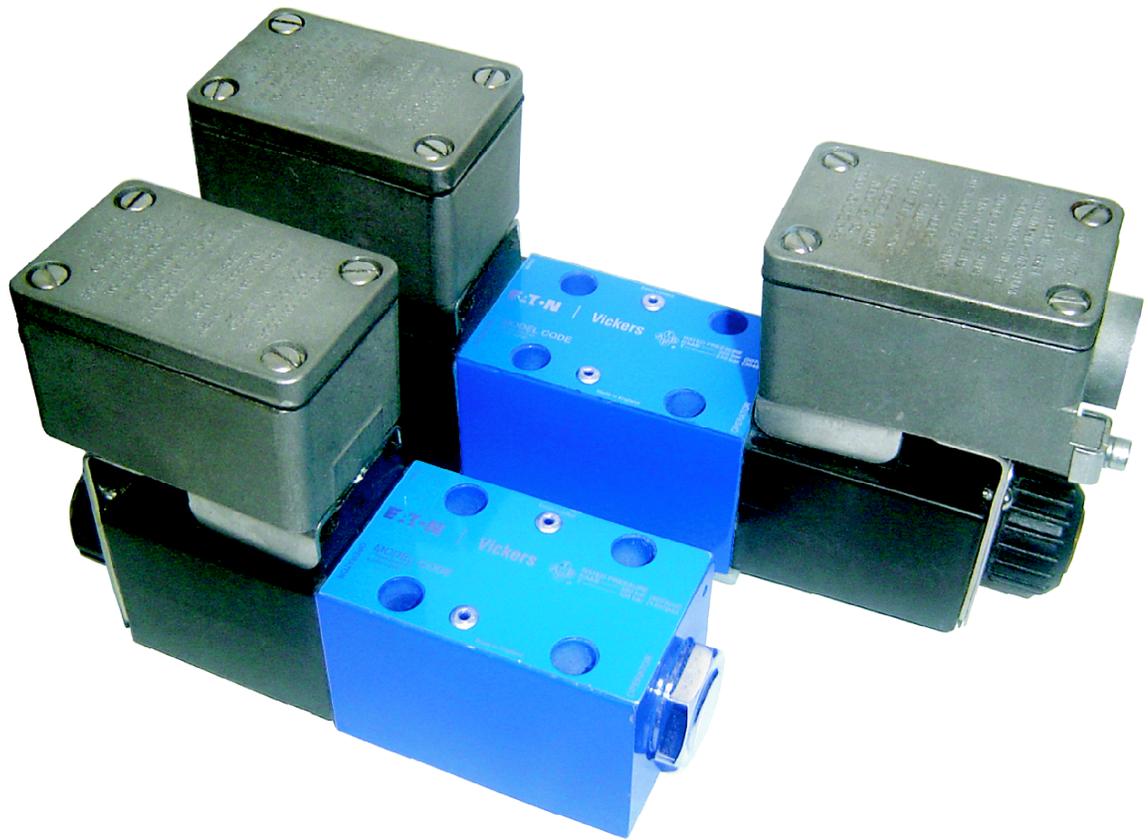


Vickers®
ATEX-Rated Solenoid Operated
Directional Valves

DG4V-3S-X*
6* design
to 40 l/min
(10.5 USgpm)

ISO 4401,
size 03; ANSI/
B93.7M-D03



Powering Business Worldwide

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Introduction

General Description

These solenoid operated directional control valves are for directing and stopping flow at any point in a hydraulic system. The "X" series has been specially designed and developed to conform to the ATEX directive 94/9/EG for equipment that has been installed in new applications in potentially explosive atmospheres.

These ATEX directive 94/9/EG approved valves extend the product offering of DG4V3-60 design series valves for applications that require ATEX compliant products for hazardous environments.

New features of the "X" valve series

1. Flameproof (d) levels of protection for hazardous zones 1 & 2.
2. New additional Increased Safety (m) and Encapsulated (e) levels of protection for use in hazardous zones 1 & 2.
3. All ATEX valves are supplied with technical documentation as required by the ATEX directive.

In addition to the NEW features above, the ATEX valves also retain the key benefits offered by the DG4V3S-* series valves.

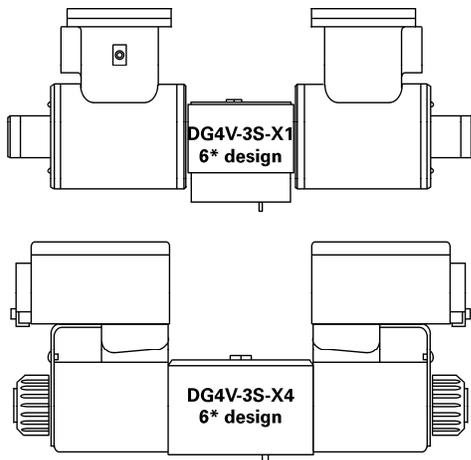
Features and Benefits

- New expanded product offering for hazardous environments, opening up new opportunities.
- Multi-fluid capability without need to change seals.
- Higher sustained machine productivity and higher uptime because of proven fatigue life and endurance, tested over 20 million cycles.

DG4V-3S-X Series

- Up to 40 l/min (10.5 USgpm) respectively at 350 bar (5000 psi).
- Extends the DG4V3S-* series valves.
- Offers designers the opportunity to select the optimum value package for each application.
- International standard interface. The valve mounting face conforms to ISO 4401, size 03, and is compatible with related international standards.

Typical Side View



DG4V-3S-X*-6* Design

Characteristics

DG4V-3S-X*-6* Design

Mounting interface

ISO 4401 size 03
ANSI/B93.7M size D0
CETOP RP65H, size 3
DIN 24340, NG6

Basic characteristics

Maximum pressure
DG4V-3S: 350 bar (5075 psi)
Maximum flow
DG4V-3S: Up to 40 l/min
(10.5 USgpm)

Temperature limits ▲

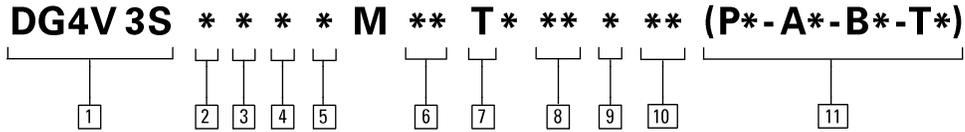
Minimum ambient:
-20°C (-4°F)
Maximum ambient:
+70°C (158°F)

Fluid temperature

For mineral oil
Minimum = -20°C (-4°F)
Maximum = +70°C (158°F)

▲ The temperature limits of these valves are subject to specific operating conditions. Please refer to the Instruction for Use document supplied with each valve.

Model Code



1 Directional Control Valve
DG4V 3S – Subplate Mounted, Solenoid Operated Standard Performance Valve to ISO 4401-AB-03-4-B, up to 40 litres/min (10.5 USgpm) at 350 bar (5000psi)

2 Spool type
0, 2, 6, 8*

3 Spool/Spring Arrangement
A – Spring offset, end to end
AL – As A but left hand build
B – Spring offset, end to center
BL – As B but left hand build
C – Spring centered

4 Manual Override Options
Blank – Plain override(s) in solenoid end only

5 Solenoid Energisation Identity
Blank – ANSI B93 9 (Sol. ‘a’ flow from ‘P’ to ‘A’)
V – Solenoid ‘a’ at port ‘A’ end of valve and/or solenoid ‘b’ at ‘B’ end of valve
 Note: 8 type spool must be ordered with V in model code

6 Coil Type
X1 – Flamproof solenoids to ATEX II 2 G, IEC classification EEx d IIB T*
X4 – Increased Safety and encapsulated solenoids to ATEX II 2 G, IEC classification EEx me II T4

7 Electrical Connector
T – Wired terminal block

8 Coil rating
X1 Coil Availability
A – 110V AC, 50HZ
C – 220V AC, 50HZ
ER – 120V AC, 60HZ
H – 24V DC
OJ – 48V DC
P – 110V DC

X4 Coil Availability
H – 24V DC
G – 12V DC

9 Tank Port Rating
4 – 70 bar, for X1 valves only
7 – 210 bar, for X4 valves only

10 Design Number
60 – Basic design
61 – For 8C spool only

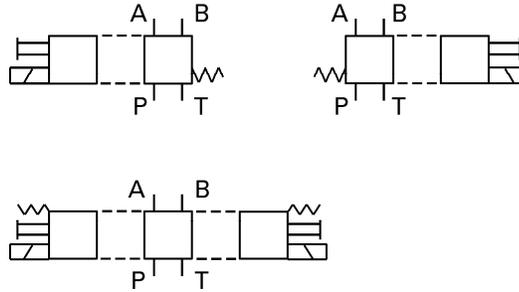
11 Port orifice plugs
NP
P** – P port ** orifice size in 1/0 mm (03 = 0.3)
A** – A port ** orifice size in 1/0 mm (03 = 0.3)
B** – B port ** orifice size in 1/0 mm (03 = 0.3)
T** – T port ** orifice size in 1/0 mm (03 = 0.3)

*** Other spools are available on request**

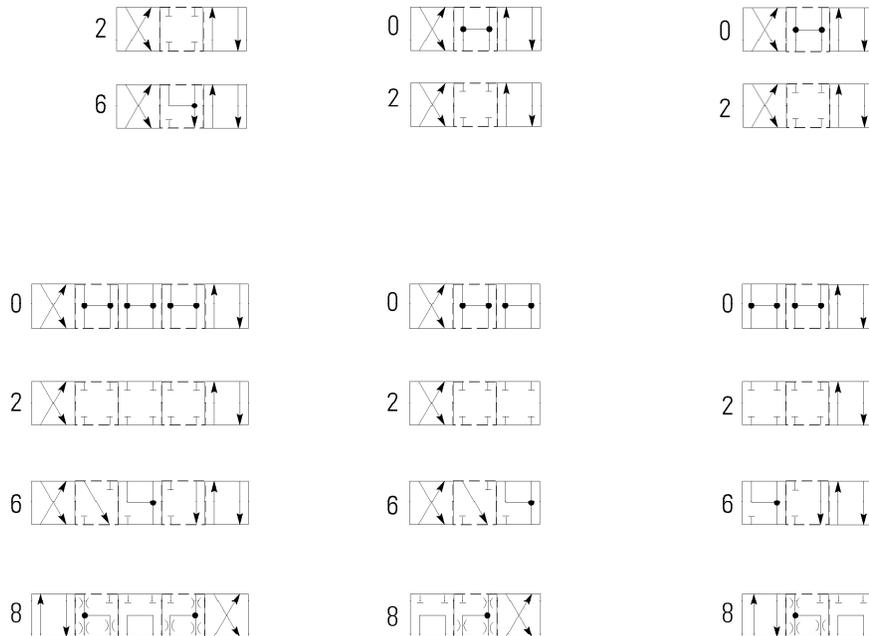
Spool Data

Spool Symbols

Functional Symbol



Available Spools for DG4V-3S-X*-6*



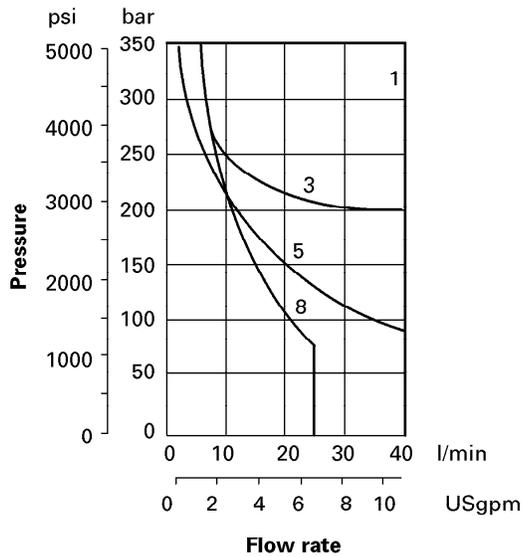
Operating Data

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

| | |
|--|---|
| Feature | DG4V-3S-X*-6* |
| Pressure limits: P, A and B ports T port | 350 bar (5075 psi) 70 bar (1015 psi) for X1, 210 bar (3045 psi) for X4 |
| Flow rating | See performance data |
| Relative duty factor | Continuous rating (ED = 100%) |
| Type of protection | IEC 144 class IP54 |
| Permissible Voltage Fluctuation | + 0, -10% |
| Typical response times at 100% rated volts measured from application/removal of voltage to full spool displacement of "2C" spool at: Flow Rate at P-A, B-T Pressure Energizing De-energizing | 20 l/min (5.3 USgpm) 175 bar (2537 psi) 60 ms 40 ms |
| Power consumption, solenoids at rated voltage and 20°C (68°F) | |
| X4 coils | |
| 12V DC solenoid rating - type G | 30W |
| 24V DC solenoid rating - type H | 30W |
| X1 coils | |
| 24V DC solenoid rating - type H | 33W |
| 48V DC solenoid rating - type OJ | 33W |
| 110V DC solenoid rating - type P | 33W |
| 110V AC, 50Hz, solenoid rating - type A | 28W 68VA |
| 220V AC, 50Hz, solenoid rating - type C | 28W 68VA |
| 120V AC, 60Hz, solenoid rating - type ER | 28W 68VA |

Performance Data

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.

| Spool/Spring Code | Curve No. |
|-------------------|-----------|
| 0A(L) | 3 |
| 0B(L) & 0C, 0F | 1 |
| 2A(L) | 3 |
| 2B(L) & 2C | 3 |
| 6B(L) & 6C, 6F | 5 |
| 8B(L) & 8C | 8▲ |

▲ Consult Eaton regarding each application that will jointly have flow rates approaching this curve and a pressurized volume exceeding 2000 cm³ (122 cu. in.)

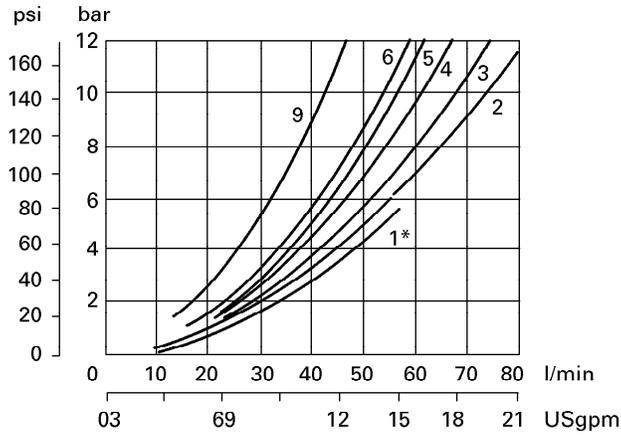
Flow limits are applicable to all valves having simultaneous equal flow rates from P to A or B and from B or A to T.

Consult Eaton, with application details, if either of the following usages are required:

- Single flow path, i.e. P to A, P to B, A to T or B to T.
- Substantially different simultaneous flow rates between P to A or B and B or A to T, e.g. when A and B are connected to a cylinder having a large differential area.

Performance Data

Pressure drops



* Curve for spool type 6: not recommended for flows in excess of 60 l/min (15.8 US gpm).

Pressure drops in offset positions where otherwise indicated

| Spool/Spring Code | Spool positions covered | P to A | P to B | A to T | B to T | P to T | B to A or A to B |
|-------------------|-------------------------|--------|--------|--------|--------|--------|------------------|
| 0A(L)C | Both | 5 | 5 | 2 | 2 | - | - |
| 0B(L)C & 0C | De-energized | - | - | - | - | 4 | - |
| | Energized | 4 | 4 | 2 | 2 | - | - |
| 2A(L) | Both | 6 | 6 | 5 | 5 | - | - |
| 2B(L) & 2C | Energized | 5 | 5 | 2 | 2 | - | - |
| 6B(L) & 6C | De-energized | - | - | 3 | 3 | - | - |
| | Energized | 6 | 6 | 1 | 1 | - | - |
| 8B(L) & 8C | All | 9 | 9 | 5 | 5 | 3 | - |

For other viscosities, pressure drops approximate to:

Viscosity cSt (SUS)

| | | | | | | |
|--------|--------|-------|-------|-------|-------|-------|
| 14 | 20 | 43 | 54 | 65 | 76 | 85 |
| (17.5) | (97.8) | (200) | (251) | (302) | (352) | (399) |

% of Δp

| | | | | | | |
|----|----|-----|-----|-----|-----|-----|
| 81 | 88 | 104 | 111 | 116 | 120 | 124 |
|----|----|-----|-----|-----|-----|-----|

A change to another specific gravity will yield an approximately proportional change in pressure drop.

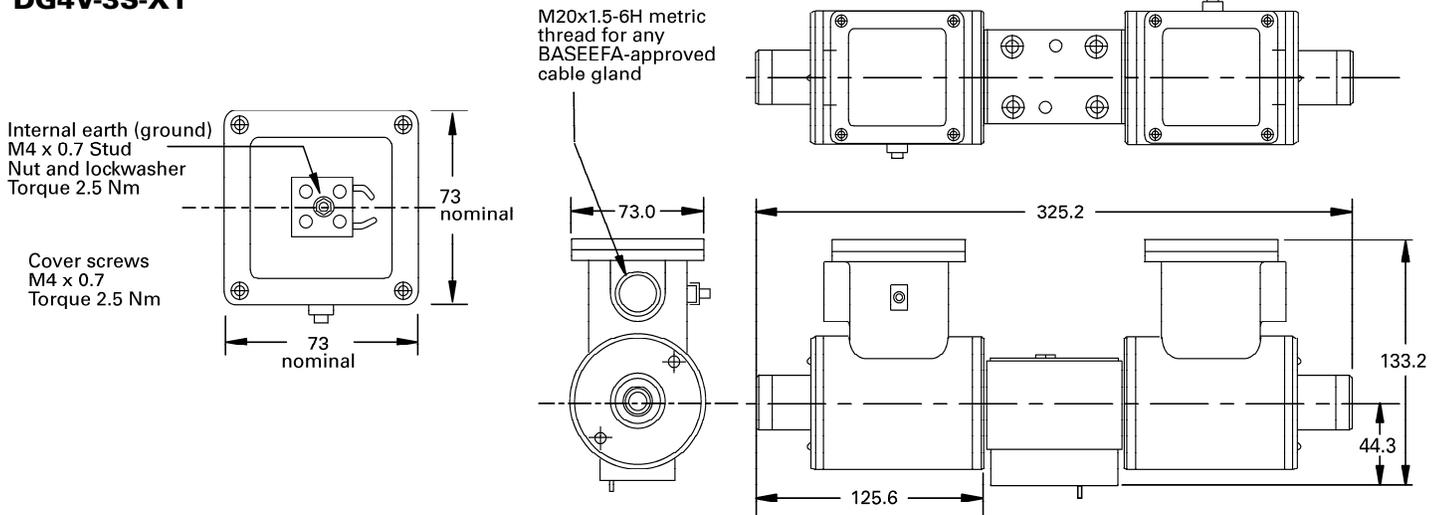
The specific gravity of a fluid may be obtained from its producer. Fire resistant fluids usually have higher specific gravities than oil.

Installation Dimensions

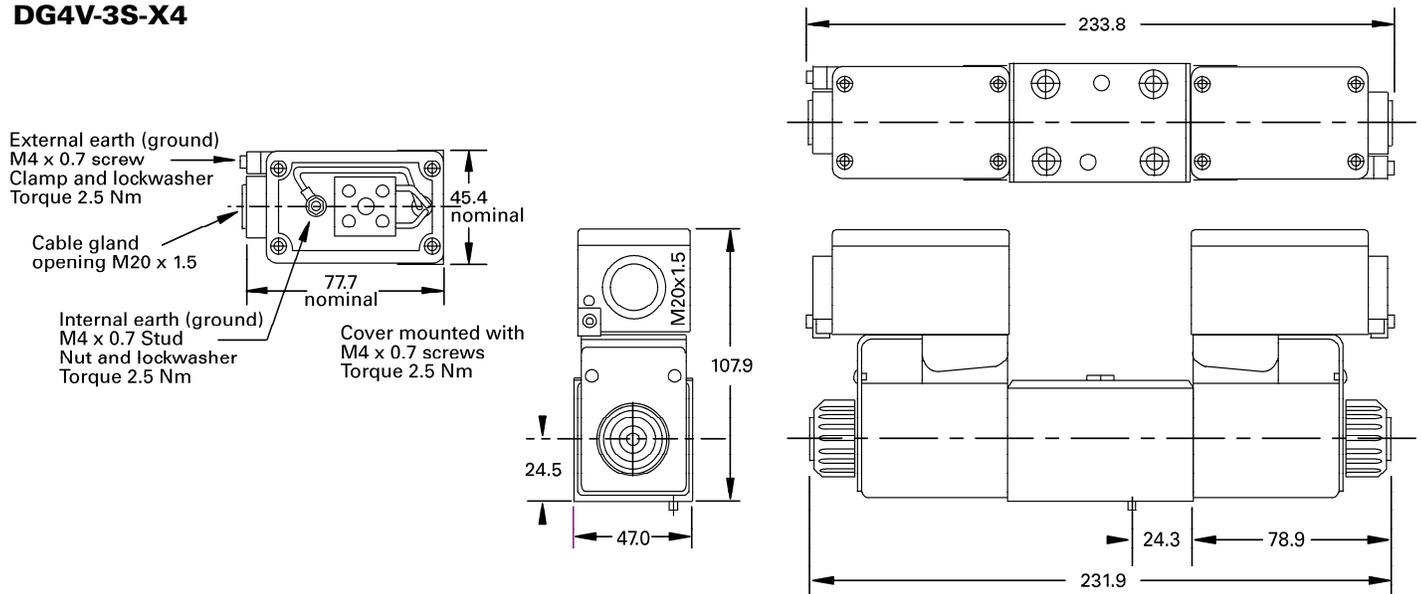
In mm



DG4V-3S-X1



DG4V-3S-X4



Application Data

Fluid Cleanliness

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

Recommendations on contamination control methods and the selection of products to control fluid condition are included in Eaton's publication 9132 or 561, "Vickers® Guide to Systemic Contamination Control". The book also includes information on the Eaton concept of "ProActive Maintenance". The following recommendations are based on ISO cleanliness levels at 2 µm, 5 µm and 15 µm.

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

Eaton products, as any components, will operate with apparent satisfaction in fluids with higher cleanliness codes than those described. Other manufacturers will often recommend levels above those specified.

Experience has shown, however, that life of any hydraulic component is shortened in fluids with higher cleanliness codes than those listed above. These codes have been proven to provide a long trouble-free service life for the products shown, regardless of the manufacturer.

Hydraulic Fluids

Materials and seals used in these valves are compatible with antiwear hydraulic oils, and 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 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.

Mounting Bolt Kits

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

Mass, approx. kg (lb)

DG4V3S-*C-X1 = 7.9 kg (17.42 lb)

DG4V3S-A/B-X1 = 4.6 kg (10.14 lb)

DG4V3S-*C-X4 = 3.5 kg (7.72 lb)

DG4V3S-A/B-X4 = 2.3 kg (5.07 lb)

Mounting Attitude

No restrictions.

Service Information

It is recommended that, should any mechanical or electronic repair be necessary, valves be returned to the nearest Eaton repair center.

The products will be refurbished as necessary and retested to specification before return.

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