

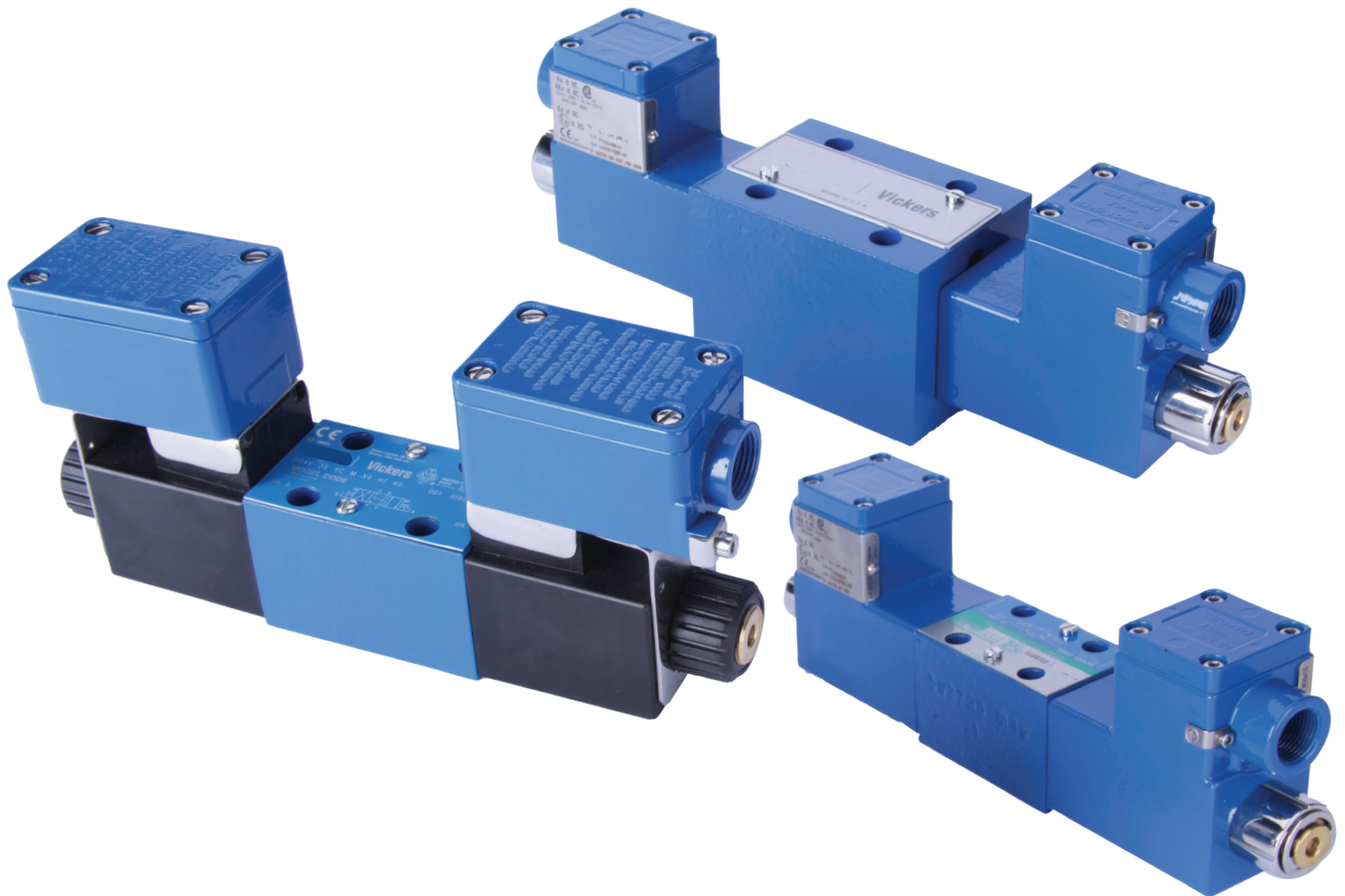


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Introduction

General Description

These solenoid operated directional control valves are for directing and stopping flow at any point in a hydraulic system. This series has been specially designed and developed for equipment that has been installed in new applications in potentially explosive atmospheres.

DG4V-3S, X4 option

- ATEX approval
- Hazardous locations - Ex II 2 G; Zone 1 and Zone 2.
- Protection type - EEx me II T4; "increased safety" and "encapsulated"

DG4V-3S and DG4V4, X5 option

- ATEX, UL, and CSA approval; complies to all 3 directives
- ATEX approval; hazardous locations - Ex II 2 G; Zone 1

and Zone 2; protection type EEx d IIB T*; "flameproof"

- UL and CSA approval; hazardous locations - Class 1, Group C/D; Class 2, Group E/F/G; Division 1 & 2

Characteristics

DG4V-3S-X4 & X5-6* Design Mounting interface

ISO 4401 size 03
ANSI/B93.7M size D03
CETOP RP65H, size 3
DIN 24340, NG6

Basic characteristics

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

DG4V4-01, X5-10 Design Mounting interface

ISO 4401 size 05
ANSI/B93.7M size D05
CETOP RP65H, size 5
DIN 24340, NG10

Basic characteristics

Maximum pressure
315 bar (4500 psi)
Maximum flow up to 80 L/min
(21 USgpm)

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 10 million cycles.

Temperature limits

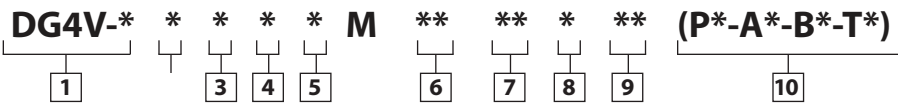
Minimum ambient:
-20°C (-4°F)
Maximum ambient:
+70°C (158°F)

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-D03/NG6
DG4V4-01-D05/NG10
Subplate Mounted, Solenoid
Operated, ISO 4401size

2 Spool type
0, 2, 6, 8*

* Other spools are available on request in model code

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 overrides in sole
noid 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
Note: 8 type spool must be ordered with V

6 Coil Type
X4 (only available on DG4V-3S)
• ATEX approval; “Increased
safety” and “encapsulated”
solenoids to IEC classifica-
tion EEx me II T4
X5
• ATEX, ExdIIIC2G, approval;
Zone 1 and 2, protection
type “flame proof.”
• UL and CSA approval;
Class 1, group C/D,
Class 2 group, group E/F/G;
Division 1 & 2

7 Coil rating
X5 Coil Availability
A – 110V AC, 50HZ
ER – 120V AC, 60HZ
C – 220V AC, 50HZ
ES – 240V AC, 60HZ
H – 24V DC
OJ – 48V DC
P – 110V DC
X4 Coil Availability
H – 24V DC
G – 12V DC

8 Tank Port Rating
4 – 70 bar, for X5 valves only
7 – 210 bar, for X4 valves only

9 Design Number
60 – DG4V-3S
61 – 8C spool only,
DG4V-3S
10 – DG4V4-01

10 Port orifice plugs
Blank – No orifice
P** – P port ** orifice size in
1/10 mm (03 = 0.3)
A** – A port ** orifice size in
1/10 mm (03 = 0.3)
B** – B port ** orifice size in
1/10 mm (03 = 0.3)
T** – T port ** orifice size in
1/10 mm (03 = 0.3)

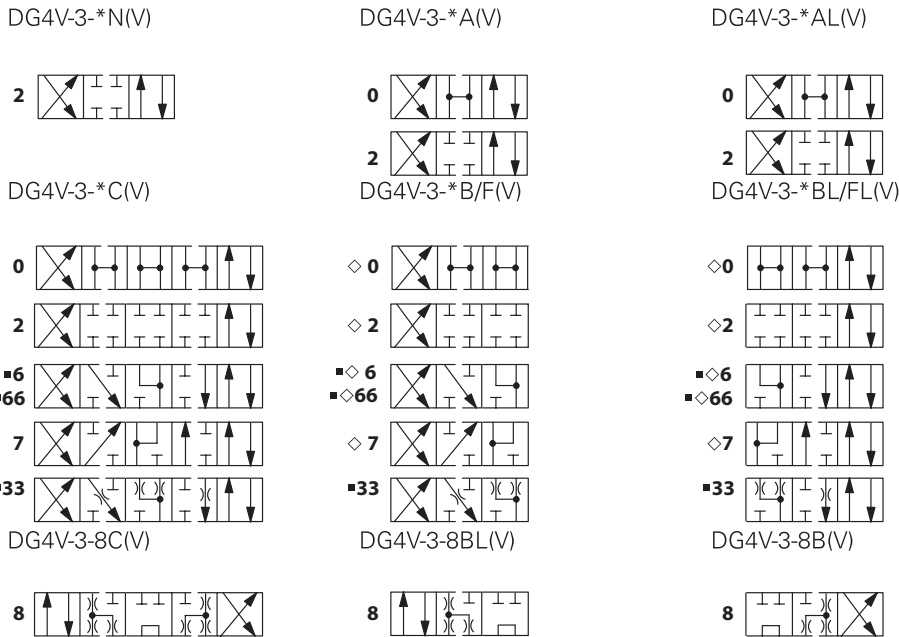
Functional Symbols

Spools

Available spool options

(illustrated to the right)
Configurations include
3-position and 2-position,
spring centered, spring off-
set and no-spring detented.

The valve function schematics apply to both U.S. and European valves.



Operating Data

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

Valve size	DG4V-3S		DG4V4-01	
Pressure limits:				
P, A and B ports	350 bar		315 bar	
T port	70 bar for X5, 210 bar for X4		70 bar	
Flow rating	See performance data		See performance data	
Relative duty factor	Continuous rating (ED = 100%)		Continuous rating (ED = 100%)	
Type of protection	IEC 144 class IP66		IEC 144 class IP66	
Permissible Voltage Fluctuation	DC ± 10%		DC ± 10%	
Typical response times at 100% rated volts measured from application/removal of voltage to full spool displacement of “2C” spool at:			DC	AC
Flow Rate at P-A, B-T	20 l/min	20 l/min	40l/min	40l/min
Pressure, P Port	175 bar	175 ms	175 ms	175 ms
Energizing	60 ms	100 ms	60 ms	100 ms
De-energizing	40 ms	100 ms	40 ms	100 ms
Power consumption, solenoids at rated voltage and 20°C (68°F)				
X4 coils				
12V DC solenoid rating - type G	30W		30W	
24V DC solenoid rating - type H	30W		30W	
X5 coils				
24V DC solenoid rating - type H	17W		17W	
48V DC solenoid rating - type OJ	17W		17W	
110V DC solenoid rating - type P	17W		17W	
110V AC, 50Hz, solenoid rating - type A	20W		20W	
120V AC, 60Hz, solenoid rating - type ER	20W		20W	
220V AC, 50Hz, solenoid rating - type C	20W		20W	
240V AC, 60Hz, solenoid rating - type ES	20W		20W	

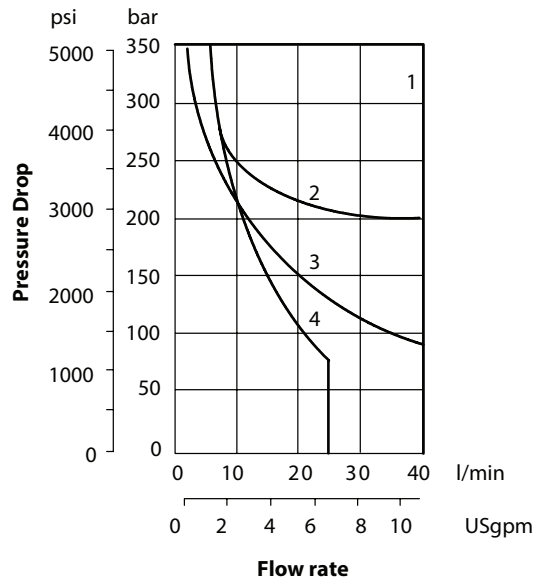
Performance Data

DG4V-3S, X4 and X5

Maximum flow rates

Typical with mineral oil at 36 cSt (168.6 SUS) and a specific gravity of 0.87. Performance based on full power solenoid coils warm and operating at 90% rated voltage.

Spool/Spring Code	DG4V-3S
0A(L)	2
0B(L) & 0C, 0F	1
2A(L)	2
2B(L) & 2C	2
6B(L) & 6C, 6F	3
8B(L) & 8C	4

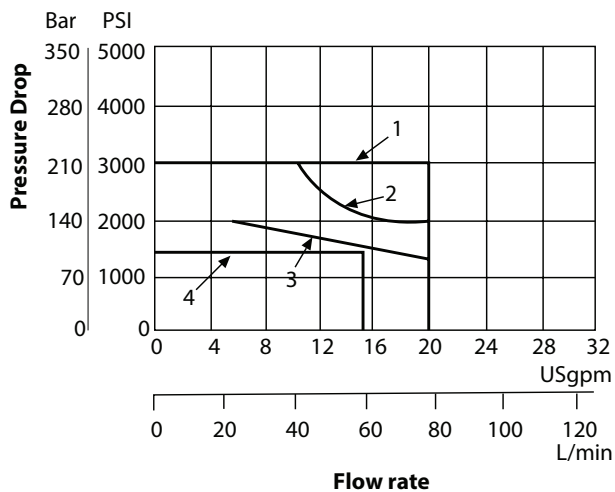


DG4V4-01, X5

Maximum flow rates

Typical with mineral oil at 36 cSt (168.6 SUS) and a specific gravity of 0.87. Performance based on full power solenoid coils warm and operating at 90% rated voltage.

Spool/Spring Code	AC	DC
0A(L)	1	4
0B(L) & 0C, 0F	1	4
2A(L)	1	4
2B(L) & 2C	1	4
6B(L) & 6C, 6F	2	4
8B(L) & 8C	3	4

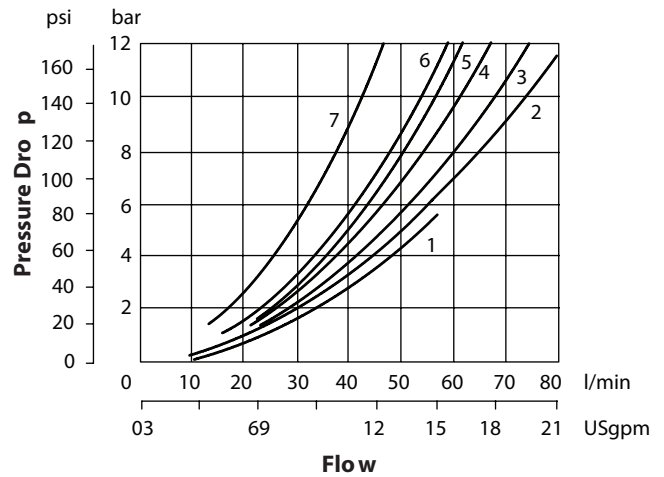


Performance Data

Flow Curves

DG4V-3S, X4 & X5

Spool/Spring Code	Spool Positions	P to A	P to B	A to T	B to T	P to T	B to A
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	7	7	5	5	3	-



DG4V4-01, X5

Pressure drops in offset positions except where otherwise indicated.

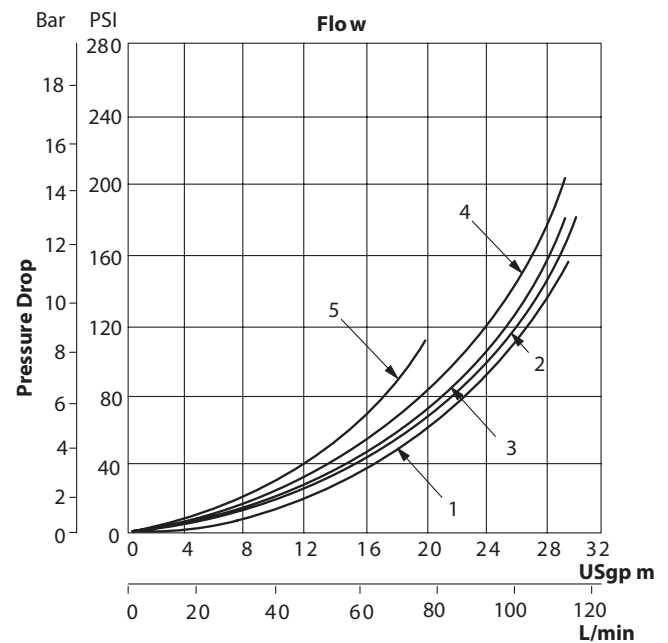
Spool code	P to A	P to B	A to T	B to T	P to T
0	1	1	1	2	1
2	4	4	2	3	-
6	4	4	1	2	-
8	6	6	4	4	3

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.



In mm

233.8
[9.20"]

EXPLOSION-PROOF SOLENOID

231.9
[9.13"]

24.3
[0.95"]

78.9
[3.10"]

EXTERNAL GROUND CONNECTION

24.5
[0.96"]

47.0
[1.85"]

107.9
[4.24"]

M20x1.5

[illegible]

Technical drawings of the 1000 Series Solenoid Valve, showing dimensions in inches and millimeters.

Top View Dimensions:

- Overall width: 69.47 [2.735]
- Distance from left face to centerline: 34.73 [1.367]

Side View Dimensions:

- Overall height: 99.10 [3.901]
- Distance from top face to centerline: 11.16 DIA
- Distance from bottom face to centerline: 26.59 [1.047]
- Distance from left face to centerline: 7.14 [.281] DIA

Front View Dimensions:

- Overall height: 73.57 [2.896]

Labels and Features:

- EXPLOSION-PROOF SOLENOID
- EXTERNAL GROUND CONNECTION
- M20x1.5 METRIC THREAD CABLE GLAND ENTRY
- SNAP RING
- INTERFACE PROTECTED BY SHIPPING COVER

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 publication 9132 or 561, "Vickers® Guide to Systemic Contamination Control". The book also includes information on the 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

Danfoss 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 recommended bolt kits, bolts used should be to ISO 898, 12.9 or better.

Mass, approx. kg (lb)

DG4V3S-*C = 3.5 kg (7.72 lb)

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

DG4V4-01-*C = 6 kg (13.2 lb)

DG4V4-01-*A/B = 4.5 kg (10 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 Danfoss repair center.

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

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Products we offer:

- Cartridge valves
- DCV directional control valves
- Electric converters
- Electric machines
- Electric motors
- Gear motors
- Gear pumps
- Hydraulic integrated circuits (HICs)
- Hydrostatic motors
- Hydrostatic pumps
- Orbital motors
- PLUS+1® controllers
- PLUS+1® displays
- PLUS+1® joysticks and pedals
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- PLUS+1® sensors
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