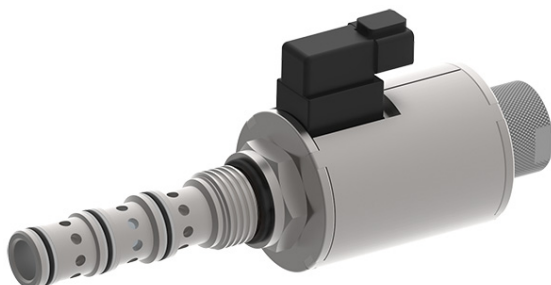


4-Ways / 2-Pos. Cartridge Spool Valve, SAE 12 / NG 10

$Q_{max} = 16.0 \text{ gpm [60 l/min]}$, $p_{max} = 5000 \text{ psi [350 bar]}$
direct acting, with solenoid operation
Series ESDV-12-4B | C | D...



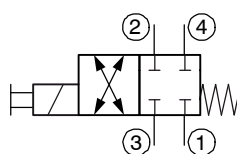
- Compact design for cavity type C1240
- A low power consumption
- Continuous duty cycle
- Low heat rise of the solenoid coil
- Hardened precision fitted spool & sleeve provides consistent high performance and long life
- High performance solenoid valve
- All exposed parts with zinc plating
- High pressure wet-armature solenoids
- Interchangeable IP rated solenoid coils available
- The slip-on coil can be rotated, and it can be replaced without opening the hydraulic envelope
- Various plug-connector systems and voltages are available
- Can be fitted in a line-mounting body
- Replaces EMDV-12-4...

1 Description

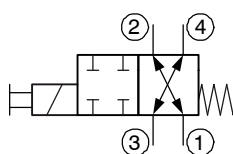
These direct acting 4-Ways / 2-Pos. solenoid operated spool valves, series ESDV-12-4... are size SAE 12 / NG 10, pressure balanced screw-in cartridges with a 1-1/16-12 UN mounting thread. When the solenoid coil is de-energized, the main spool is held in neutral position by the return spring. Actuation of the spool happens by a wet-armature solenoid system. Port 3 is designed to be the pressure inlet port. Pressure inlet port 3 as well as the consumer ports 2 and 4 are 5000 psi (350 bar) endurance proof and flow can be directed in both directions (see symbols). Port 1 is designed to be connected to the tank and the maximum pressure is limited to 3200 psi (220 bar). Spool type ESDV-12-4B is normally closed, i.e. there is no connection between ports 1, 2, 3 and 4. Once the solenoid coil is activated, port 3 is connected to 4 and port 2 to 1. Spool type ESDV-12-4C is normally open, i.e. there is a connection between port 2 to 1 as well as 3 to 4. Once the solenoid coil is activated, the

C-spool closes all connections and therefore only minimal spool leakage appears. Spool type ESDV-12-4D in neutral bypasses from 3 to 1. Once the solenoid coil is activated, ports 3 and 4 and ports 2 and 1 are connected. While the spool is moving there is a connection between ports 1, 2, 3 and 4 (D-spool shifts in open transition) and therefore the valve shifts "softer" and creates less pressure peaks.. Manual override operation: Press and hold on the small plunger which is located on top of the valve with a similar object smaller than 0.180" diameter. All external parts of this cartridge valve are zinc plated and are thus suitable for use in harsh operating environments. The slip-on coils can be replaced without opening the hydraulic envelope and can be positioned at any angle through 360°. If you intend to manufacture your own cavities or are designing a line-mounting installation, please refer to the section "Related data sheets".

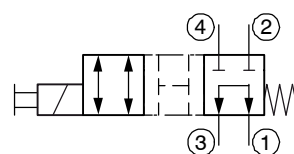
2 Symbol (ISO 1219)



ESDV-12-4B...



ESDV-12-4C...



ESDV-12-4D...

3 Technical data

General characteristics		Description, value, unit	
Designation		4-Ways / 2-Positions cartridge spool valve	
Design		direct acting, with solenoid operation	
Mounting method		screw-in cartridge 1-1/16-12 UN	
Size		SAE 12 / NG 10 for cavity type C1240	
Weight		1.25 lbs	[0,567 kg]
Mounting attitude		unrestricted (preferably vertical, coil down)	
Hydraulic characteristics		Description, value, unit	
Maximum operating pressure	- ports 4, 3, 2 - port 1	5000 psi 3200 psi	[350 bar] [220 bar]
Maximum flow rate	- B, C, D spool	16 gpm	[60 l/min]
Internal leakage		25 cu.in/min by 3200 psi 35 cu.in/min by 5000 psi	[410 ml/min by 220 bar] [574 ml/min by 350 bar]
Hydraulic fluid		HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER	
Hydraulic fluid temperature range	NBR: Viton:	-13 °F ... +180 °F + 5 °F ... +250 °F	[-25 °C ... +80 °C] [-15 °C ... +120 °C]
Viscosity range		10...500 mm ² /s (cSt), recommended 15...250 mm ² /s (cSt)	
Minimum fluid cleanliness Cleanliness class to ISO 4406 : 1999		class 20/18/15	
Electrical characteristics		Description, value, unit	
Supply voltage		12 V DC, 24 V DC, 103 V DC, 206 V DC note: • for AC applications an external rectifier circuit is required • the effective voltage in AC (with external rectifier circuit) is 11% higher than the rated DC voltage: 103 VDC → 115 V AC (respectively 206 V DC → 230 V AC) • above 48 V a ground connection to the metal housing of the coil is required	
Supply voltage tolerance		± 10 %	
Ambient temperature range		-22 °F ... +140 °F	[-30 °C ... +60 °C]
Power consumption at max. control current	12 V DC, 24 V DC 103 V DC ²⁾ , 206 V DC ²⁾	Nominal power consumption: 27 W 31 VA ³⁾	
Switching time		45 ... 100 ms (solenoid ON) 20 ... 100 ms (solenoid OFF) These times are strongly influenced by fluid pressure, flow rate and viscosity, as well as by the dwell time under pressure.	
Relative duty cycle		100 %	
Protection class to ISO 20 653 / EN 60 529		IP 65 / IP 67 / IP 69K, see "Ordering code" (with appropriate mating connector and proper fitting and sealing)	
Electrical connection		2-pin square plug to ISO 4400 / DIN 43 650 (standard) ³⁾ for other connectors, see "Ordering code"	

Note:

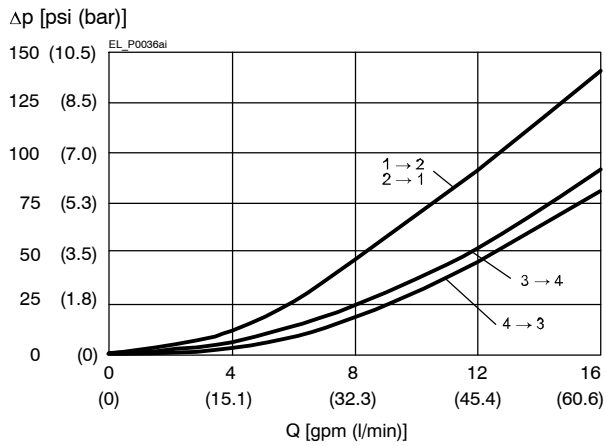
2) for AC applications an external rectifier circuit is required. ATTENTION: The effective voltage in AC (with external rectifier circuit) is 11% higher than the rated DC voltage.

3) above 48 V a ground connection to the metal housing of the coil is required.

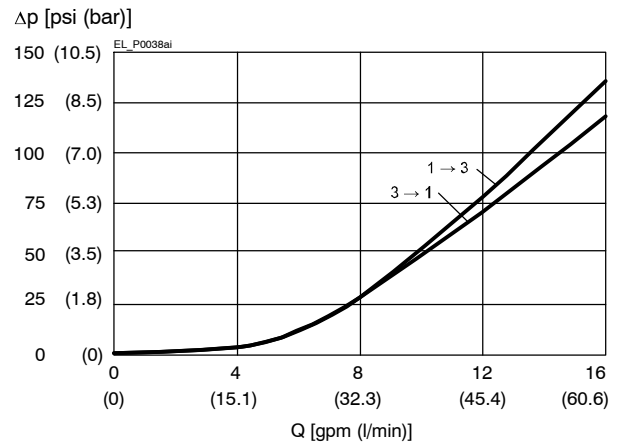
4 Performance graphs

measured with oil viscosity 33 mm²/s (cSt)

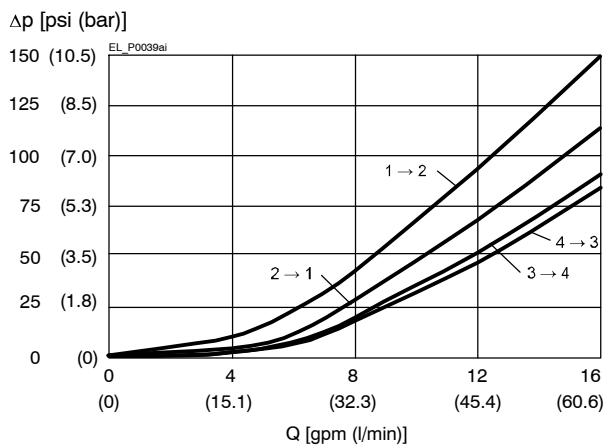
$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic
ESDV-12-4B (energising)



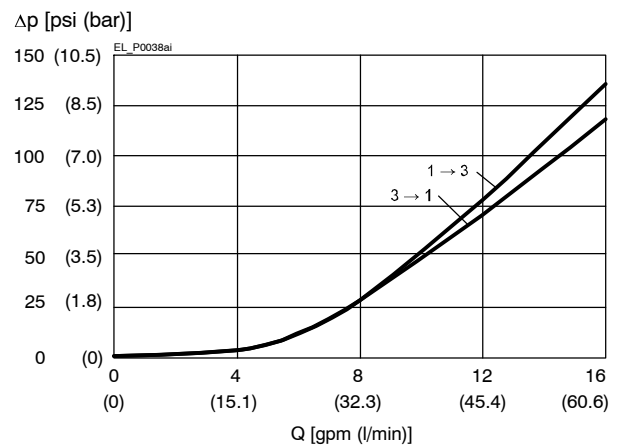
$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic
ESDV-12-4C (de-energising)



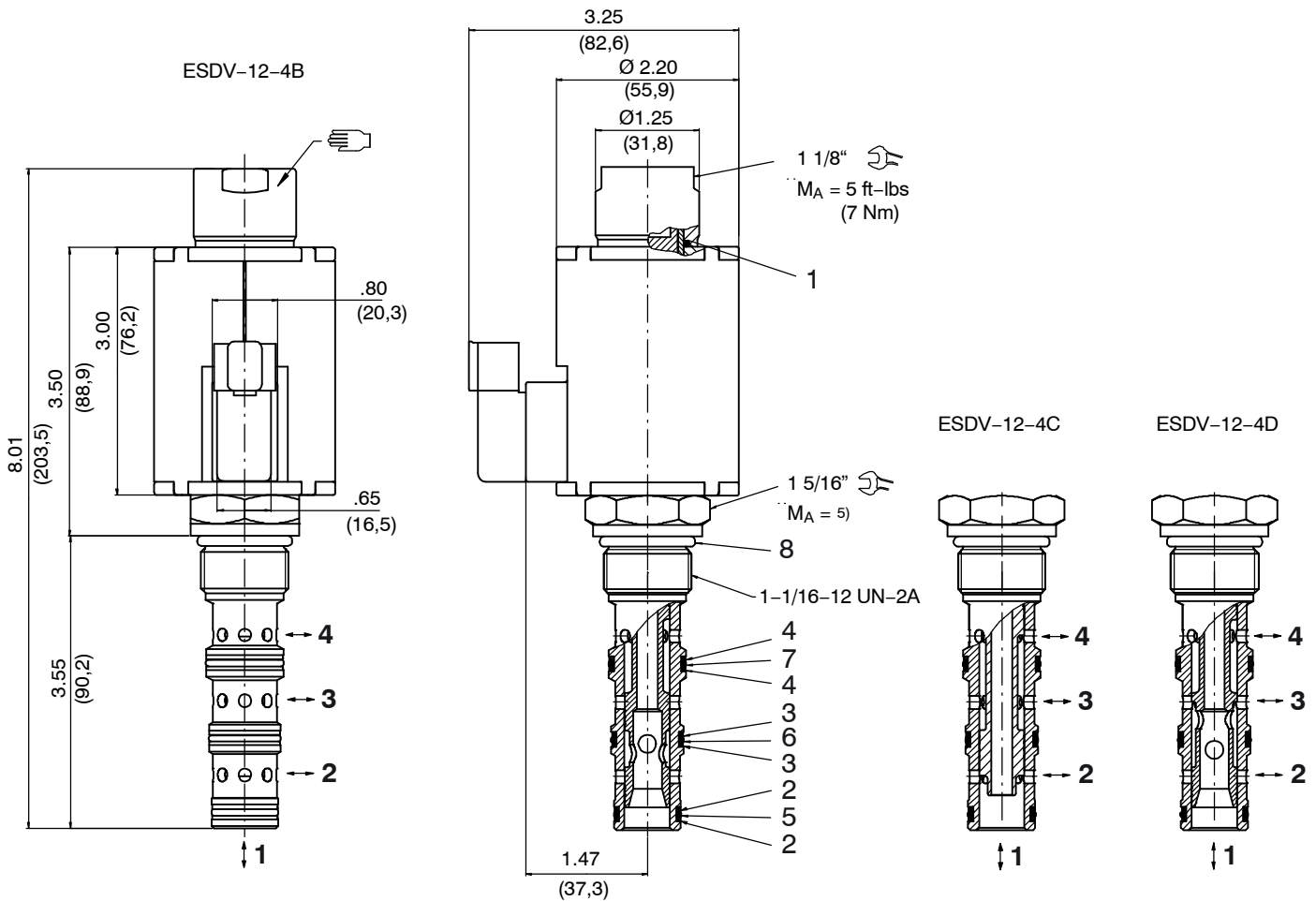
$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic
ESDV-12-4D (energising)



$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic
ESDV-12-4D (de-energising)



5 Dimensions & sectional view



Tightening torque M_A ⁵⁾

Cavity type	C1240
When fitted in aluminium	55...60 ft-lbs (74 - 81 [Nm])
When fitted in steel	70...75 ft-lbs (95 - 101 [Nm])

6 Installation information



IMPORTANT!

When fitting the cartridges, use the specified tightening torque. No adjustments are necessary, since the cartridges are set in the factory.



ATTENTION!

Only qualified personnel with mechanical skills may carry out any maintenance work. Generally, the only work that should ever be undertaken is to check, and possibly replace, the seals. When changing seals, oil or grease the new seals thoroughly before fitting them.

Seal kit NBR no. SKN-1242-S1 ⁴⁾

Item	Qty.	Description	
1	1	O-ring no. 020 \varnothing 0,864 x 0,070 FKM	Inch
2	2	Backup ring 0.697x0.052 x 0.048 FI0751	Inch
3	2	Backup ring 0.768 x 0.053 x 0.048 FI0751	Inch
4	2	Backup ring 0.830 x 0.053 x 0.048 FI0751	Inch
5	1	O-ring no. 017 \varnothing 0.676 x 0.070 B-70	Inch
6	1	O-ring no. 018 \varnothing 0.739 x 0.070 B-70	Inch
7	1	O-ring no. 019 \varnothing 0.801 x 0.070 B-70	Inch
8	1	O-ring no. 912 \varnothing 0.924 x 0.116 B-90	Inch



IMPORTANT!

⁴⁾ Seal kit with FKM (Viton) seals, no. SKV-1242-S1

7 Ordering code

Ex. **ESDV** - **12** - **N** - **4A** - **0** - **24** **D** **_**

ESDV	=	directional valve, spool-type, direct acting		
12	=	size SAE 12 / NG 10		
N	=	NBR (Nitrile) seals (standard)		
V	=	FKM (Viton) seals (special seals - please contact BUCHER)		
4B	=	B Spool 4-ways/2-position		
4C	=	C Spool 4-ways/2-position		
4D	=	D Spool 4-ways/2-position (open transition)		
0	=	cartridge only		
04BA	=	line-mounting body G 1/2" -14 BSPP	aluminum	} on request
04BS	=	line-mounting body G 1/2" -14 BSPP	steel	
06BA	=	line-mounting body G 3/4" -14 BSPP	aluminum	
06BS	=	line-mounting body G 3/4" -14 BSPP	steel	
10TA	=	line-mounting body SAE-10	aluminum	
10TS	=	line-mounting body SAE-10	steel	
12TA	=	line-mounting body SAE-12	aluminum	
12TS	=	line-mounting body SAE-12	steel	
...	=	voltage e.g. 24 (24 V)		
D	=	current DC		
		mating plug not supplied:		
T	=	Deutsch axial plug connection DT04-2P (IP 67/69K) ¹⁾		
TR	=	Deutsch axial plug connection DT04-2P (with protection diode, IP 67/69K) on request ¹⁾		
S	=	1/4" Spade Terminals connection ¹⁾		
F	=	flying leads (18 inch, [450 mm]) ¹⁾		
H	=	ISO 4400 / DIN 43 650 connection (IP 65)		

Note:

¹⁾ only up to 48 V

8 Related data sheets

Reference	(Old no.)	Description
520-P-000050		Form tools
520-P-000430	(0-043.0)	Cavity type C1240
520-P-001020		Coils D 2.2/.875 for screw-in cartridge valves
520-P-000431	(0-043.1)	Line-mounting body, 12 series – 4 way

info.el@bucherhydraulics.com

www.bucherhydraulics.com/commoncavity

© 2020 by Bucher Hydraulics, Inc., 2545 Northwest Parkway, Elgin, Illinois 60124, USA

All rights reserved.

Data is provided for the purpose of product description only, and must not be construed as warranted characteristics in the legal sense. The information does not relieve users from the duty of conducting their own evaluations and tests. Because the products are subject to continual improvement, we reserve the right to amend the product specifications contained in this catalogue.

Classification: 430.300.330.305.315.380