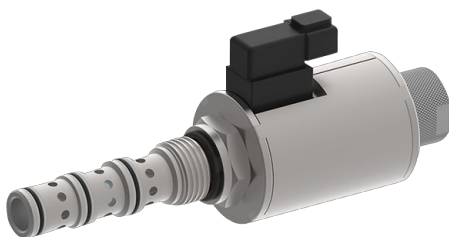


# Directional valve 4-way/2-position

$Q_{\max} = 20 \text{ gpm}$ ,  $p_{\max} = 5000 \text{ psi}$

direct acting, spool type, switching solenoid with emergency override

Type series: ESDV-12-4F...



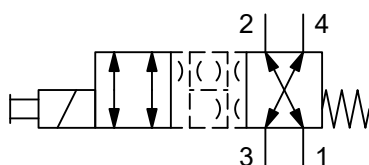
- Screw-in cartridge valve
- For cavity C1240
- All external parts zinc plated, chromited (CrVI-free)
- Installation in threaded port body type B1240
- Hardened, precision fitted spool & cage provides a reliable and long life
- High pressure wet-armature solenoids
- The slip-on coil can be rotated, and it can be replaced without opening the hydraulic envelope
- Various plug-connector systems and voltages are available

## Description

The 4-way/2-position solenoid operated directional seat valves, series ESDV-12-4F... are size NG 10 / SAE 12, direct acting, pressure balanced, screw-in-valves 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. This pressure inlet port 3 and as well as the consumer ports 4 and 2 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 tank and the maximum pressure is limited to 3200 psi at port 1. In neutral position, there is a connection between port 3 to 4 as well as 2 to 1. Once the solenoid coil is activated, ports 2 and 3 are connected as

well as 1 and 4. The transition position has a negative overlap and is therefore open. While the spool is moving from neutral position to actuated position ports 1, 2, 3 and 4 are connected and therefore the valve to shift "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 the screw-in valves are zinc plated and are thus suitable for use in the harshest operating environments. The slip-on coils can be replaced without opening the hydraulic envelope and can be positioned at any angle through 360°. For self-assembly, please refer to the section related data sheets.

## Symbol



## Technical data

General characteristics	Description, value, unit
Function group	Directional valve
Function	4-way/2-position
Design	Screw-in cartridge valve
Controls	switching solenoid with emergency override
Characteristic	direct acting, spool type
Transition/central position of spool/piston	zero or underlap/negative (open)
Construction size	NG 10 / SAE 12
Thread size	1 1/16-12 UN-2A
Mounting attitude	unrestricted (preferably vertical, coil down)
Weight	3.53 lb
Cavity acc. factory standard	For cavity C1240
Tightening torque steel	72.3 ft·lb
Tightening torque aluminium	57.5 ft·lb
Tightening torque tolerance	± 10 %
Minimum ambient temperature	- 22 °F
Maximum ambient temperature	+ 176 °F
Surface protection	All external parts zinc plated, chromited (CrVI-free)
Sealing material	see ordering code
Seal kit order number	NBR: SKN-1242-S1 / SKV-1242-S1

Hydraulic characteristics	Description, value, unit
Maximum operating pressure	5000 psi
Maximum flow rate	20 gpm
Flow direction	see symbol
Hydraulic fluid	HL and HLP mineral oil according to DIN 51 524; other fluids on request!
Minimum fluid temperature	- 22 °F
Maximum fluid temperature	+ 176 °F
Viscosity range	10 ... 500 mm <sup>2</sup> /s (cSt)
Recommended viscosity range	15 ... 250 mm <sup>2</sup> /s (cSt)
Minimum fluid cleanliness (cleanliness class according to ISO 4406:1999)	class 20/18/15
Internal leakage flow rate	25 cu.in/min by 3200 psi/35 cu.in/min by 5000 psi

Electric characteristics	Description, value, unit
Actuator type	solenoid coil
Solenoid coils type	D2.2 / .875
Supply voltage DC	12/24 V DC
Supply voltage tolerance	± 10 %
Switching time	45...100 ms (solenoid ON) 20...100 ms (solenoid OFF)
Relative duty cycle	100 %

Electric characteristics	Description, value, unit
Electrical connection coil	several connection types available, see ordering code
Protection class solenoid coil 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)

**i NOTE!**  
The switching time can be strongly dependent on flow rate, pressure, oil viscosity and the dwell time under pressure. In practice, the switching time may therefore deviate from the specified value range.

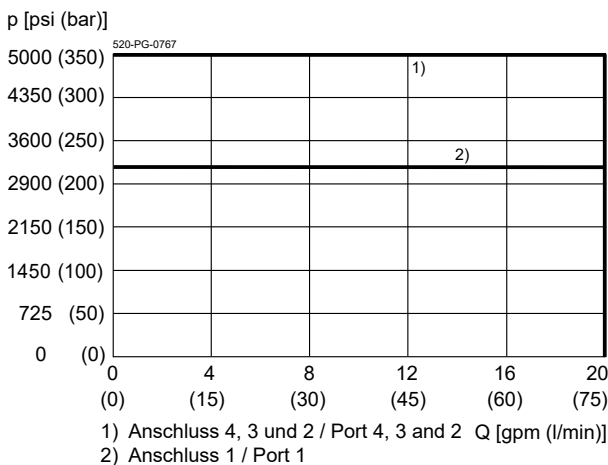
**i NOTE!**  
For AC applications an external rectifier circuit is required. The effective voltage in AC (with external rectifier circuit) is 11% higher than the rated DC voltage.

**i NOTE!**  
Above 48 V a ground connection to the metal housing of the coil is required.

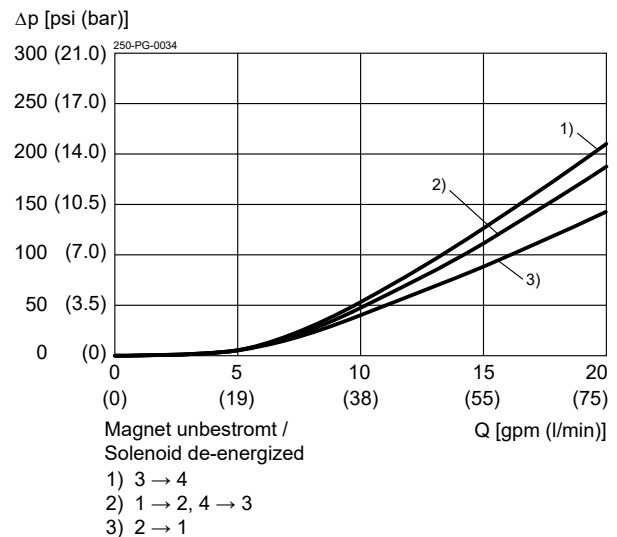
## Performance graphs

measured with oil viscosity 33.0 mm<sup>2</sup>/s (cSt)

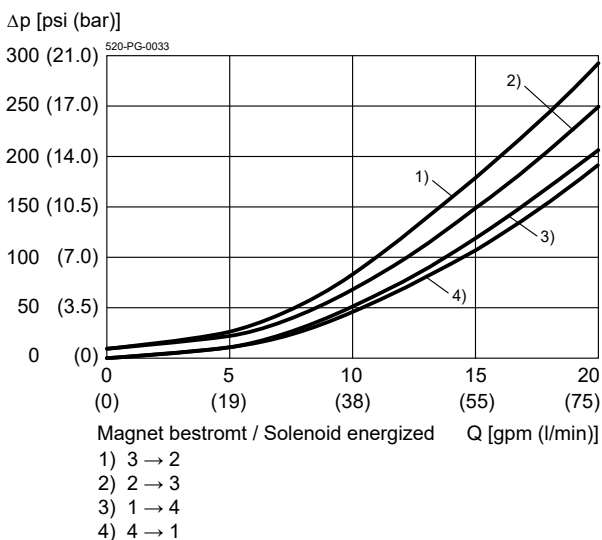
$p = f(Q)$  Performance limit



$\Delta p = f(Q)$  Pressure drop-flow rate characteristic

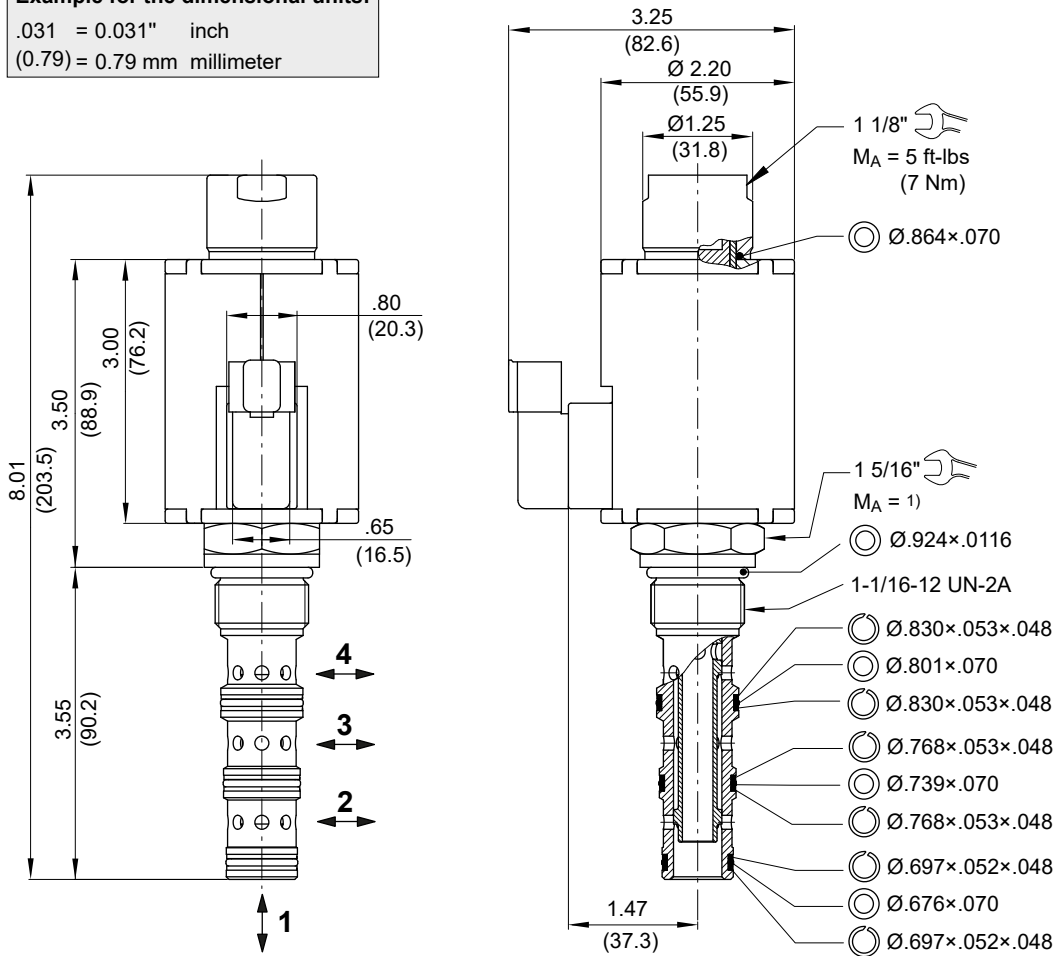


$\Delta p = f(Q)$  Pressure drop-flow rate characteristic



Dimensions and sectional view

**Beispiel für die Masseinheit:**  
**Example for the dimensional units:**  
.031 = 0.031" inch  
(0.79) = 0.79 mm millimeter



Installation information

**i IMPORTANT!**  
1) When fitting the screw-in cartridge valve, use the specified tightening torque. The value can be found in the chapter "Technical data".

**! 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.

**i NOTE!**  
The seals are not available individually. The seal kit order number can be found in the chapter "Technical data".

Ordering code

Ex. **ESDV** - **12** - **N** - **4F** - **0** - **24** **D** -

- ESDV = directional valve, spool-type, direct acting
  - 12 = SAE 12 / nominal size 10
  - N = NBR (nitril-butadien-rubber / BUNA) seals **(standard)**
  - V = FKM (fluorocarbon rubber / VITON) seals  
(special seals on request)
  - 4F = spooltype F, 4-way/2-position (open transition)
  - 0 = cartridge only **(standard)**
  - 04BA = line-mounting body G 1/2"-14 BSPP aluminium
  - 04BS = line-mounting body G 1/2"-14 BSPP steel
  - 06BA = line-mounting body G 3/4"-14 BSPP aluminium
  - 06BS = line-mounting body G 3/4"-14 BSPP steel
  - 10TA = line-mounting body SAE 10 aluminium
  - 10TS = line-mounting body SAE 10 steel
  - 12TA = line-mounting body SAE 12 aluminium
  - 12TS = line-mounting body SAE 12 steel
  - ... = voltage e.g. 24 (24 V)
  - D = current DC
- } on request
- mating plug not supplied:  
 T = Deutsch axial plug connection DT04-2P (IP 67/69K)  
 TR = Deutsch axial plug connection DT04-2P (with protection diode, IP 67/69K) on request  
 F = flying leads (18 inch [450 mm])  
 H = ISO 4400 / DIN 43 650 connection (IP 65)

Related data sheets

Reference	Description
<a href="#">520-P-000050</a>	Form tools
<a href="#">520-P-001020</a>	Solenoid coil D2.2/.875
<a href="#">520-P-000430</a>	Cavity C1240
<a href="#">520-P-000431</a>	Threaded port body B1240