

# S4 Pro Datasheet

## Product Overview

The Domin S4 Pro series of direct drive servo valves (DDV) are lightweight, high-performance directional flow control valves that cover a range of rated flows from 0.7 l/min to 18 l/min up to a maximum pressure of 350 bar per spool land.

Based on a miniature port circle of 12.2 mm and with a weight of less than 300 g, the S4 Pro is suited to applications that require the superior performance, dynamics and reliability expected of a DDV in an ultra-compact package.

## Key Features

- Integrated electronics with spool position feedback
- Rated flow rate of up to 18 l/min
- Bandwidth of over 200 Hz
- Low power consumption of less than 2 W
- Miniature footprint (ISO 10372 size 01)
- Low weight of 290 g

## Versatile by Design

The S4 Pro is designed to be customised. Standard modifications include:

- Rated flow rates of up to 18 l/min
- 6 different control methods
- 2 different hydraulic fluids
- 3 choices of seal material
- 4 choices of connector

## Contents

Technical Data.....	2
Performance Graphs.....	3
Electronics Data.....	4
Standards Compliance.....	6
Electronic Interface Diagrams.....	7
Unit Dimensions.....	9
Mounting Surface Pattern.....	10

## Contact Us

If you have any questions about using the S4 Pro, or if you need a non-standard configuration, we would be happy to hear from you.

Contact us using the details below and one of our team will be there to assist you.



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## Technical Data

General Data				
Design	Direct Drive Servo Valve			
Actuation	Rotary-Rotary			
Size	Miniature			
Mounting Interface	ISO 10372-01-01-0-92			
Ambient Temperature	°C (°F)	-20 to +60 (-4 to +140)		
Mass	kg (lb)	0.29 (0.64)		
Vibration Resistance <sup>(1)</sup>	g	35, 3 axes		
Shock Resistance <sup>(2)</sup>	g	50		
Hydraulic Data				
Max. Operating Pressure (P, A, B, T)	bar (psi)	350 (5000)		
Fluid	Hydraulic Oil DIN 51524-535			
Fluid Temperature	°C (°F)	-20 to +80 (-5 to +175)		
Viscosity	cSt	5 to 500		
Rated Flow <sup>(3)</sup>	l/min	0.7 to 6	6 to 11	11 to 18
	(US gal/min)	(0.2 to 1.6)	(1.6 to 2.9)	(2.9 to 4.8)
Flow Maximum	l/min	1.4 to 12	12 to 22	22 to 36
	(US gal/min)	(0.4 to 3.2)	(3.2 to 5.8)	(5.8 to 9.6)
Leakage at 100 bar <sup>(3)</sup>	l/min	<0.2 (0.05)	<0.45 (0.12)	<0.45 (0.12)
	(US gal/min)			
Filtration	ISO 4406 (1999) 18/16/13			
Static/Dynamic Data				
Response Time at 100% Step Input <sup>(4)</sup>	ms	< 3		
Frequency Response (-3dB gain, ±25% signal) <sup>(4)</sup>	Hz	> 200		
Frequency Response (-90deg phase, ±25% signal)	Hz	> 110		
Hysteresis	%	< 1		
Threshold	%	< 1		
Null Shift	%	< 1		

1) BS EN 60068-2 (20-35Hz, 16g for 15 minutes per axis, 35-2000Hz, 35g for 15 minutes per axis)

2) BS EN 60068-2 (20 shocks 50g in Z axis)

3) Axis cut valve, tested at 70 bar according to ISO-10770-1-8.1.4

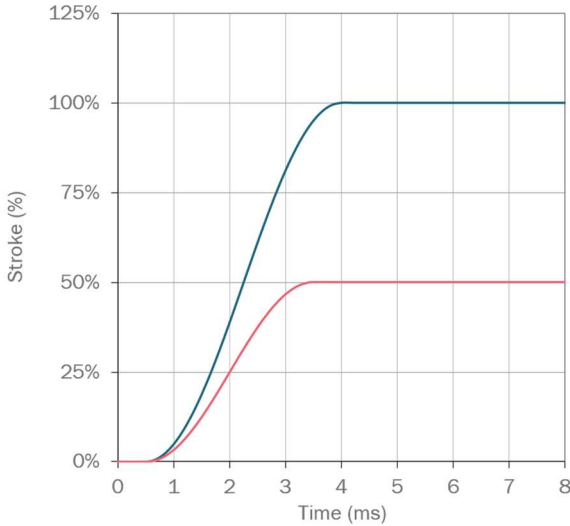
4) Measured as 90% output rise time with Δ70 bar P-T (two control edges)



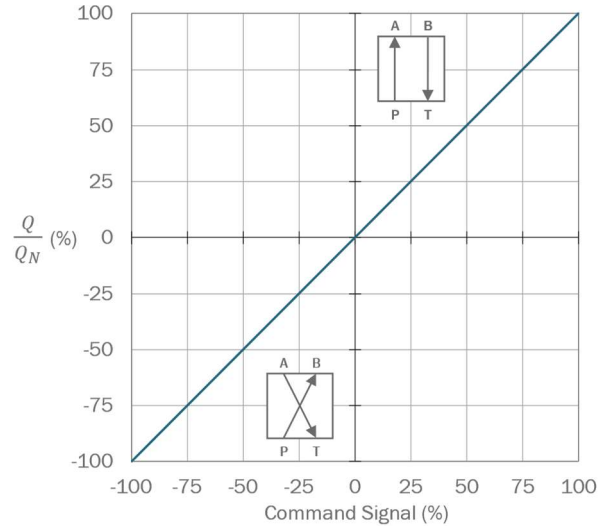


## Performance Graphs

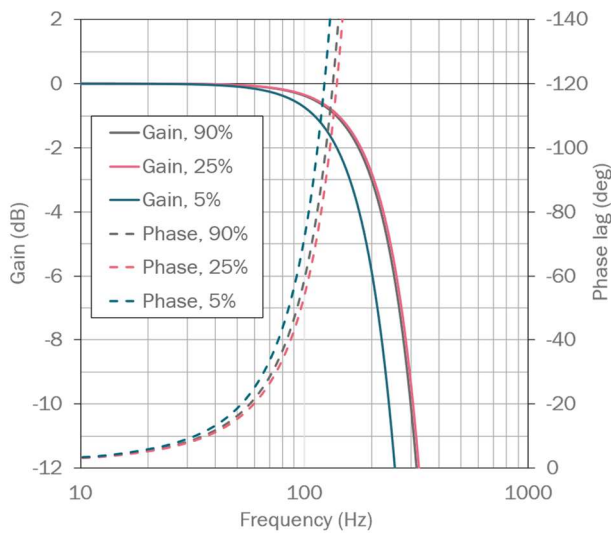
### Step Response (1)



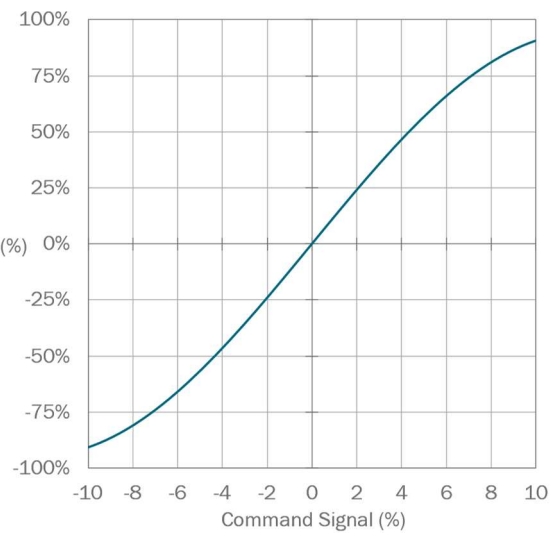
### Flow vs Command



### Frequency Response (1)



### Pressure Gain



1) Measured at a 70 bar pressure drop.





## Electronics Data

Ratings of the valve electronics vary based on selected command input. See the product configuration guide on page 9 of this document for details on product codes. Note that input ranges of Code E ( $\pm 5$  mA) are not available for the S4 Pro.

### $\pm 10$ V (Code A)

Absolute Maximum Ratings <sup>(1)</sup>		Min.	Typical	Max.
Supply Voltage	V	0	-	30
Differential Input Signal	V	-10.5	-	10.5
Input Signal Common Mode Offset	V	-10	-	10
Normal Operating Conditions				
Supply Voltage	V	22	24	30
Peak Current Consumption <sup>(2)</sup>	A	-	-	3.3
Differential Input Signal	V	-10	-	10
Input Impedance	k $\Omega$	200	-	-

### $\pm 20$ mA (Code B)

Absolute Maximum Ratings <sup>(1)</sup>		Min.	Typical	Max.
Supply Voltage	V	0	-	30
Differential Input Signal	mA	-25	-	25
Input Signal Common Mode Offset	V	-10	-	10
Normal Operating Conditions				
Supply Voltage	V	22	24	30
Peak Current Consumption <sup>(2)</sup>	A	-	-	3.3
Differential Input Signal	mA	20	-	20
Input Impedance <sup>(3)</sup>	$\Omega$	-	392	-





## +4 to +20 mA (Code C)

Absolute Maximum Ratings <sup>(1)</sup>		Min.	Typical	Max.
Supply Voltage	V	0	-	30
Voltage Mode Differential Input Signal	mA	-25	-	25
Input Signal Common Mode Offset	V	-10	-	10
Normal Operating Conditions				
Supply Voltage	V	22	24	30
Peak Current Consumption <sup>(2)</sup>	A	-	-	3.3
Differential Input Signal	mA	4	-	20
Differential Input Signal for drive off <sup>(4)</sup>	mA	-20	-	2
Input Impedance <sup>(3)</sup>	Ω	-	392	-

## ±5 V (Code D)

Absolute Maximum Ratings <sup>(1)</sup>		Min.	Typical	Max.
Supply Voltage	V	0	-	30
Differential Input Signal	V	-5.5	-	5.5
Input Signal Common Mode Offset	V	-5	-	5
Normal Operating Conditions				
Supply Voltage	V	22	24	30
Peak Current Consumption <sup>(2)</sup>	A	-	-	3.3
Differential Input Signal	V	-5	-	5
Input Impedance	kΩ	200	-	-

- 1) Conditions outside the absolute maximum ratings may cause permanent damage to the valve. These are absolute ratings only. Operation of the product outside of the nominal operating conditions is not guaranteed and may affect product reliability.
- 2) The valve supply must be protected with a 4 AT fuse or equivalent overcurrent protection device.
- 3) Valves with a current command signal use a 0.1% tolerance shunt resistor to measure demand current.
- 4) For 4 to 20mA command signal, a current in this range will disable the motor drive until a current outside this range is received at the command input.





## Valves with Enable Function

Valves can be provided with an enable function. This allows the valve to be enabled or disabled by varying the voltage into the enable pin (see page # for details of the pin out). Note that valves with a code C command type can also be enabled or disabled using the command signal; see the corresponding table above for further details.

Normal Operating Conditions		Min.	Typical	Max.
Voltage for Drive Enable	V	9	-	28
Voltage for Drive Disable	V	0	-	5
Input Impedance	$\Omega$	50	-	-

## Standards Compliance

EMC Regulations: EN 61000-6-2  
EN55011:1998+A1  
Performance Tests: ISO 10770-1  
Pressure Rating: ISO 10771  
Hydraulic Interface: ISO 10372-01-01-0-92



## Electronic Interface Diagrams

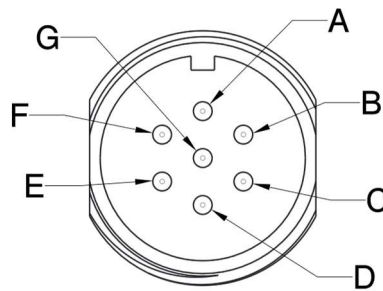
Please note pin orientation. Not to scale. Flying leads that terminate in bare wires do not have associated diagrams. In these cases, please refer to the wire colour to determine the correct pin out.

### 4 Contact, Unterminated flying lead (Code B4)

Type: Flying Lead (300mm length)  
 Termination: Bare Wires

Wire Colour	Function	Description
White	Supply 0 V	0 V
Black	Supply +	+24 V
Green	Input – (Ground Reference)	Differential Input Signal, –
Red	Input +	Differential Input Signal, +

### 6 + PE Circular Connector (Code E)



Type: Case-Mounted  
 Termination: Connector according to EN 175201-804/MIL 5015 equivalent, shell size 14

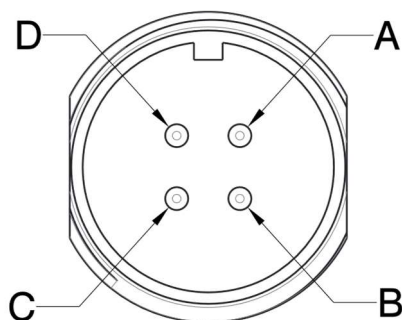
Pin	Function	Description
A	Supply +	+24 V
B	Supply 0 V	0 V
C	Output – Enable Input <sup>(1)</sup>	Output 0 V Reference Drive Enable Input <sup>(1)</sup>
D	Input +	Differential Input Signal, +
E	Input –	Differential Input Signal, –
F	Output +	Output Signal
G	Earth	-

1) When the enable function is selected, the function of pin C is the enable input. This replaces the standard pin function.

# S4 Pro Datasheet



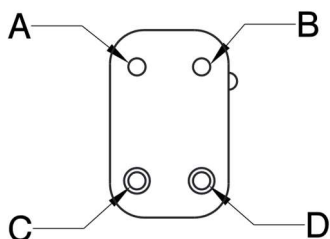
## 4 Pin Circular Connector (Code E4)



Type: Case-Mounted  
Termination: Connector according to EN 175201-804/MIL 5015 equivalent, shell size 14  
Number of Contacts: 4

Pin	Function	Description
A	Supply +	+24 V
B	Input +	Differential input signal, +
C	Input -	Differential input signal, -
D	Supply 0 V	0 V

## G4 Rack and Panel Connector (Code G)



Type: Flying Lead  
Termination: Winchester™ G4-20P

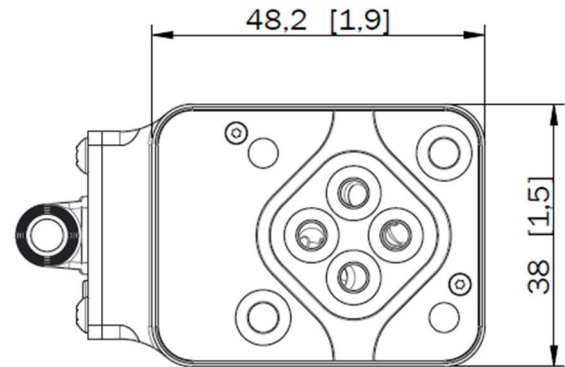
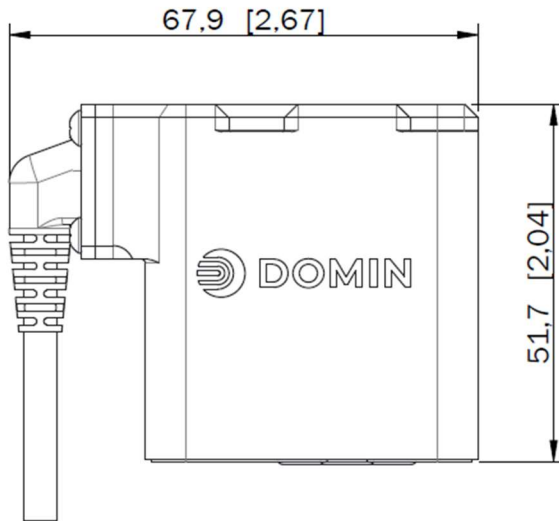
Pin	Function	Description
A	Supply 0 V	0 V
B	Supply +	+24 V
C	Input - (Ground Reference)	Differential Input Signal, -
D	Input +	Differential Input Signal, +



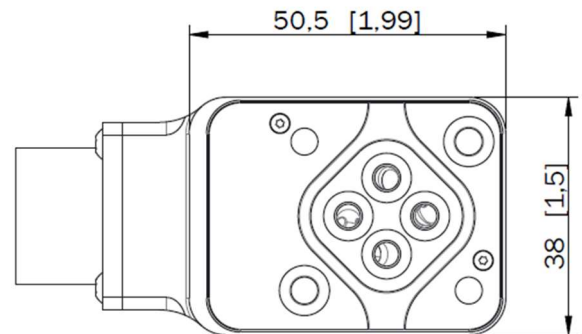
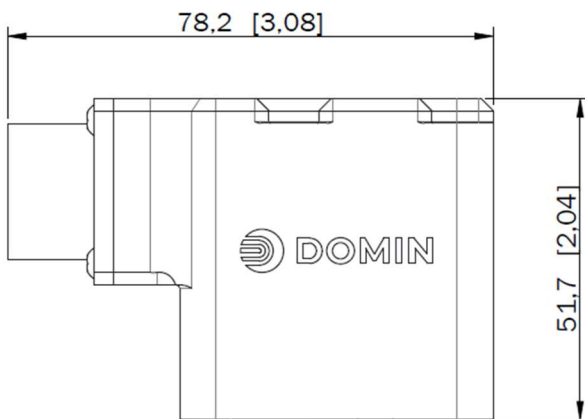


## Unit Dimensions

### Connector Code G and B4



### Connector Code E and E4



Nominal dimensions are displayed in mm. Bracketed dimensions are in inches. Not to scale.

## Mounting Surface Pattern

According to ISO 10372-01-01-0-92

	F1	F2	F3	F4	P	A	B	T
Diameter $\emptyset$	mm M4	M4	M4	M4	3.8	3.8	3.8	3.8
X Position	mm 0	23.8	23.8	0	11.9	18.0	5.8	11.9
Y Position	mm 0	0	26.2	26.2	19.2	13.1	13.1	7.0

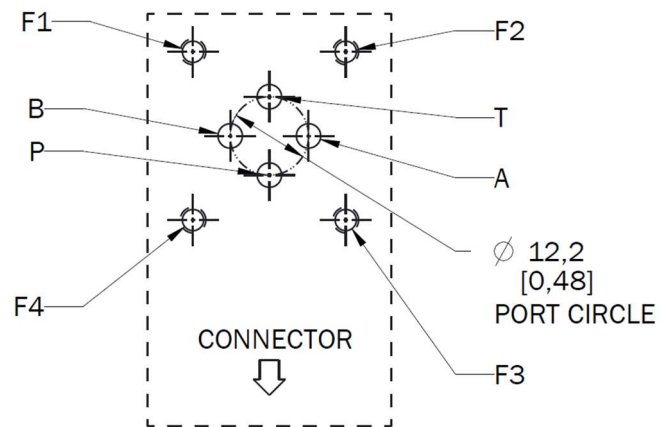
### Bolts (F1, F2, F3, F4)

Type: M4 x 55 DIN EN ISO 4762-10.9  
 Required Torque: 2.5 Nm (1.84 ft-lbf)

### O-Rings (P, A, B, T)

Type: 4.47 x  $\emptyset$  1.78 (ISO 3601-1-008)  
 Material: NBR, EPDM or Viton, 70 Shore A  
 Hardness: 70 Shore A

Not to scale.



### Variants on request

At Domin, we are proud of our ability to offer tailored solutions that meet our customers' specific needs. If you require a non-standard configuration, or a bespoke modification, we are confident we can provide you with the best solution. Talk to us using the contact details provided and one of our team will respond as soon as possible.

# S4 Pro Datasheet



Code 1 Rated Flow	
Any value in range 0.5 to 18	
Rated flow in l/min for 35 bar ΔP per control edge	
R – Suffix for reversal of A and B port e.g. 18R	

Code 2 Spool Lap Condition	
A	Axis cut (1% overlap linearised)
O	3% Overlap (linearised to 50% gain over centre)
D	10% Overlap (with flow dead band)
X	For other options please enquire

Code 3 Control Method	
A	± 10 V
B	± 20 mA
C	4 to 20 mA
D	± 5 V
X	For other options please enquire
For differing input and output signals, use two letters, e.g. AC denotes ± 10V Input and 4 to 20mA output	

Code 4 Power off Position	
C	Centre
X	For other options please enquire

Code 9 Custom ID	
Assigned individually to any with customised options upon enquiry	

Code 8 Seal Material	
N	Nitrile
V	Viton
X	For other options please enquire

Code 7 Fluid Type	
R	Recommended - any hydraulic oil in accordance with DIN 51524, filtered in accordance with ISO4406 18/16/13. Compatibility with water-free synthetic fluids available on enquiry.
X	For other options please enquire

Code 6 Enable Mode	
Y	Enable mode on <sup>1</sup>
N	No Enable Functionality

Code 5 Electrical Connector	
E	6 pin + PE circular connector <sup>2</sup>
E4	4 pin circular connector <sup>2</sup>
B4	4 contact, unterminated flying lead
G	G4-20P Rack and Panel connector
X	For other options please enquire

1. Only available with connector option E  
 2. EN 175201-804/MIL 5015 equivalent connector, shell size 14