

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

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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 ⁽¹⁾ | g | 35, 3 axes | | |
| Shock Resistance ⁽²⁾ | 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 ⁽³⁾ | 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 ⁽³⁾ | 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 ⁽⁴⁾ | ms | < 3 | | |
| Frequency Response (-3dB gain, ±25% signal) ⁽⁴⁾ | 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

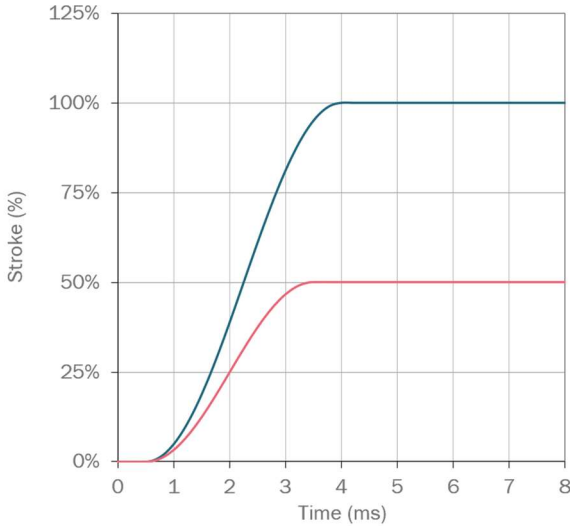
4) Measured as 90% output rise time with Δ70 bar P-T (two control edges)



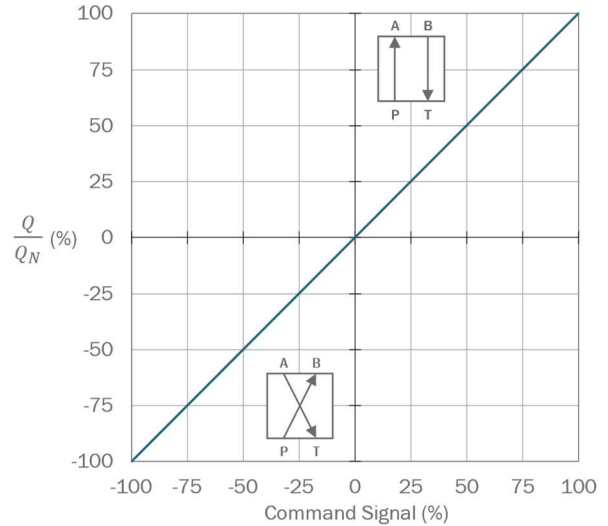


Performance Graphs

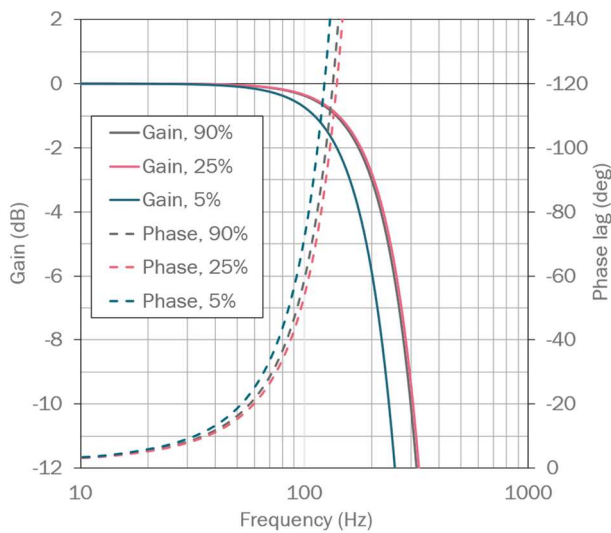
Step Response (1)



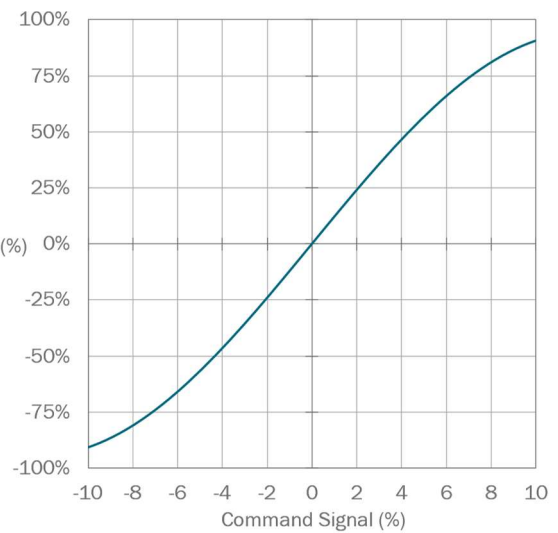
Flow vs Command



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 (± 5 mA) are not available for the S4 Pro.

± 10 V (Code A)

| Absolute Maximum Ratings ⁽¹⁾ | | 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 ⁽²⁾ | A | - | - | 3.3 |
| Differential Input Signal | V | -10 | - | 10 |
| Input Impedance | k Ω | 200 | - | - |

± 20 mA (Code B)

| Absolute Maximum Ratings ⁽¹⁾ | | 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 ⁽²⁾ | A | - | - | 3.3 |
| Differential Input Signal | mA | 20 | - | 20 |
| Input Impedance ⁽³⁾ | Ω | - | 392 | - |





+4 to +20 mA (Code C)

| Absolute Maximum Ratings ⁽¹⁾ | | 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 ⁽²⁾ | A | - | - | 3.3 |
| Differential Input Signal | mA | 4 | - | 20 |
| Differential Input Signal for drive off ⁽⁴⁾ | mA | -20 | - | 2 |
| Input Impedance ⁽³⁾ | Ω | - | 392 | - |

±5 V (Code D)

| Absolute Maximum Ratings ⁽¹⁾ | | 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 ⁽²⁾ | 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 | Ω | 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

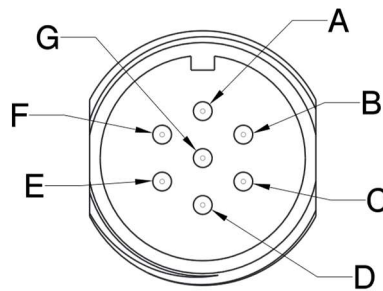
Please note pin orientation. Not to scale. Flying leads that terminate in bare wires do not have associated diagrams. In these cases, please refer to the wire colour to determine the correct pin out.

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

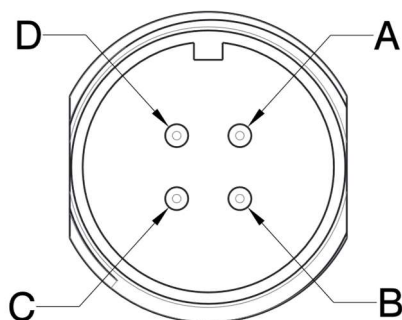
| Pin | Function | Description |
|-----|---|---|
| A | Supply + | +24 V |
| B | Supply 0 V | 0 V |
| C | Output – Enable Input ⁽¹⁾ | Output 0 V Reference Drive Enable Input ⁽¹⁾ |
| D | Input + | Differential Input Signal, + |
| E | Input – | Differential Input Signal, – |
| F | Output + | Output Signal |
| 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



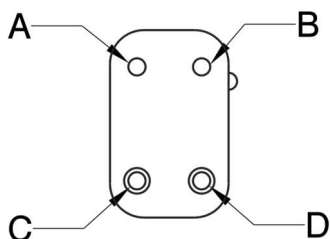
4 Pin Circular Connector (Code E4)



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)



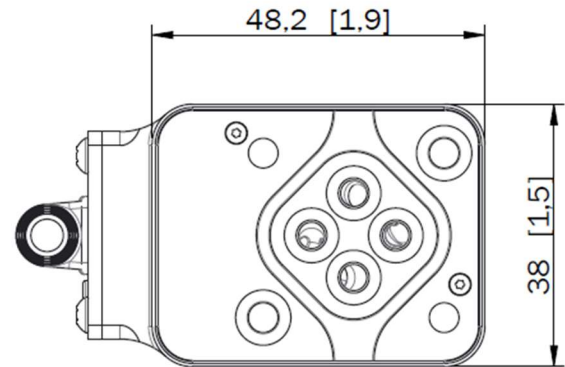
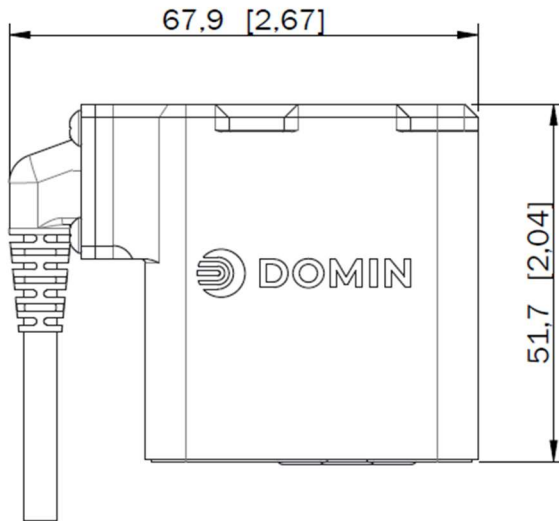
Type: Flying Lead
Termination: Winchester™ G4-20P

| 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, + |

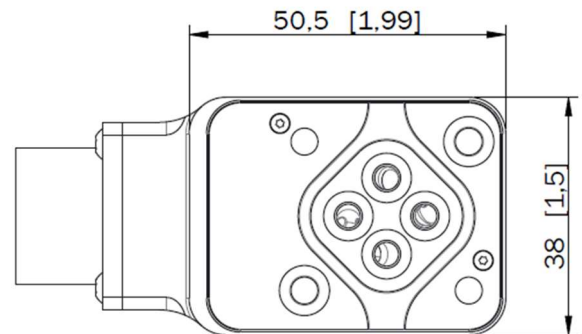
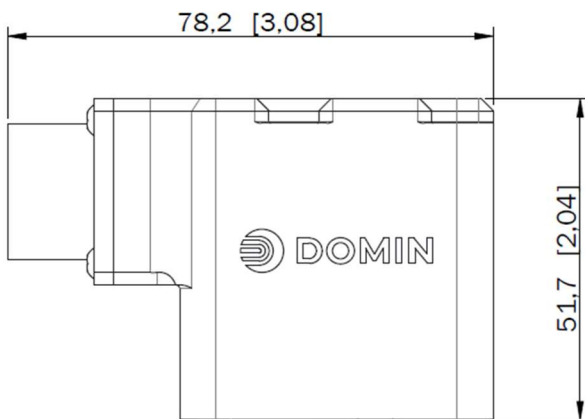


Unit Dimensions

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 |

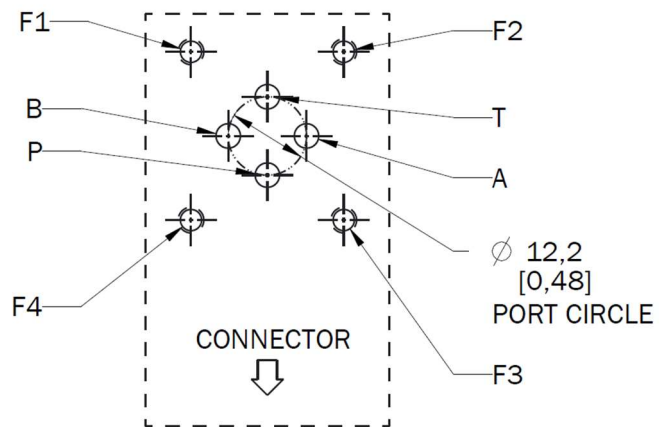
Bolts (F1, F2, F3, F4)

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 ¹ |
| N | No Enable Functionality |

| Code 5 Electrical Connector | |
|-----------------------------|--|
| E | 6 pin + PE circular connector ² |
| E4 | 4 pin circular connector ² |
| 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

