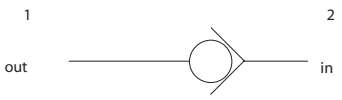
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Check Valves
Quick Reference

Cartridge	Model No.	Cavity	Description	Flow*	Pressure	Page
	CV04-NB	CP04-2	Check Valve, Ball Type, Normal Direction	3 l/min [1 US gal/min]	207 bar [3000 psi]	02.6
	CV08-NB	SDC08-2		30 l/min [8 US gal/min]	310 bar [4500 psi]	02.7
	CV10-NB	SDC10-2		83 l/min [22 US gal/min]	207 bar [3000 psi]	02.8

Cartridge	Model No.	Cavity	Description	Flow*	Pressure	Page
	CV08-NP	SDC08-2	Check Valve, Poppet Type, Normal Direction	30 l/min [8 US gal/min]	310 bar [4500 psi]	02.9
	CV10-NP	SDC10-2		85 l/min [22 US gal/min]	300 bar [4350 psi]	02.10
	CP100-3	SDC10-2		115 l/min [30 US gal/min]	350 bar [5000 psi]	02.11
	CP102-1	SDC16-2		210 l/min [55 US gal/min]	210 bar [3000 psi]	02.12
	CP103-1	SDC20-2		380 l/min [100 US gal/min]	210 bar [3000 psi]	02.13

Cartridge	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP104-2	CP04-2	Check Valve, Reverse Direction	3 l/min [1 US gal/min]	210 bar [3000 psi]	02.14

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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Cartridge Valves Technical Information
Check Valves
Quick Reference

Cartridge	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP108-2	SDC08-2	Check Valve, Reverse Direction	20 l/min [5 US gal/min]	350 bar [5000 psi]	02.15
	CP100-2	SDC10-2		50 l/min [13 US gal/min]	350 bar [5000 psi]	02.16
	CP101-2	CP12-2		75 l/min [20 US gal/min]	350 bar [5000 psi]	02.17
	CP102-2	SDC16-2		150 l/min [40 US gal/min]	350 bar [5000 psi]	02.18
	CP103-2	SDC20-2		265 l/min [70 US gal/min]	350 bar [5000 psi]	02.19

Slip-in	Model No.	Cavity	Description	Flow*	Pressure	Page
	3C50-01	FC-144	Check Valve, Slip-in	70 l/min [19 US gal/min]	210 bar [3000 psi]	02.20
	3C60-01	FC-144		70 l/min [19 US gal/min]	140 bar [2000 psi]	02.21
	3C80-01	FC-304		190 l/min [50 US gal/min]	140 210 bar [2000 psi]	02.22
	3C90-01	FC-304		190 l/min [50 US gal/min]	210 bar [3000 psi]	02.23

Symbol	Model No.	Cavity	Description	Flow*	Pressure	Page
	3C11-01	none	Check Valve, In-line, Female Port	20 l/min [5 US gal/min]	350 bar [5000 psi]	02.24
	RS 06	none		30 l/min [8 US gal/min]	350 bar [5000 psi]	02.25
	3C12-01	none		35 l/min [9 US gal/min]	350 bar [5000 psi]	02.26
	RS 10	none		60 l/min [16 US gal/min]	350 bar [5000 psi]	02.27
	3C13-01	none		70 l/min [19 US gal/min]	350 bar [5000 psi]	02.28
	3C14-01	none		95 l/min [25 US gal/min]	350 bar [5000 psi]	02.29
	RS 13	none		100 l/min [26 US gal/min]	315 bar [4500 psi]	02.30
	RS 19	none		140 l/min [37 US gal/min]	280 bar [4000 psi]	02.31
	3C15-01	none		150 l/min [40 US gal/min]	350 bar [5000 psi]	02.32
	RS 25	none		200 l/min [53 US gal/min]	245 bar [3500 psi]	02.33
	3C16-01	none		230 l/min [61 US gal/min]	350 bar [5000 psi]	02.34

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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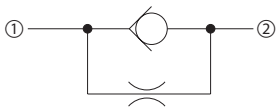
Cartridge Valves Technical Information
Check Valves
Quick Reference

Symbol	Model No.	Cavity	Description	Flow*	Pressure	Page
	3CM11-01	none	Check Valve, In-line, Male Port	20 l/min [5 US gal/min]	350 bar [5000 psi]	02.35
	3CM12-01	none		35 l/min [9 US gal/min]	350 bar [5000 psi]	02.36
	3CM13-01	none		70 l/min [19 US gal/min]	350 bar [5000 psi]	02.37
	3CM14-01	none		95 l/min [25 US gal/min]	350 bar [5000 psi]	02.38
	3CM15-01	none		150 l/min [40 US gal/min]	350 bar [5000 psi]	02.39
	3CM16-01	none		230 l/min [61 US gal/min]	350 bar [5000 psi]	02.40

Symbol	Model No.	Cavity	Description	Flow*	Pressure	Page
	2RN11-01	none	Check Valve, In-line, Female Port, with Orifice	20 l/min [5 US gal/min]	350 bar [5000 psi]	02.41

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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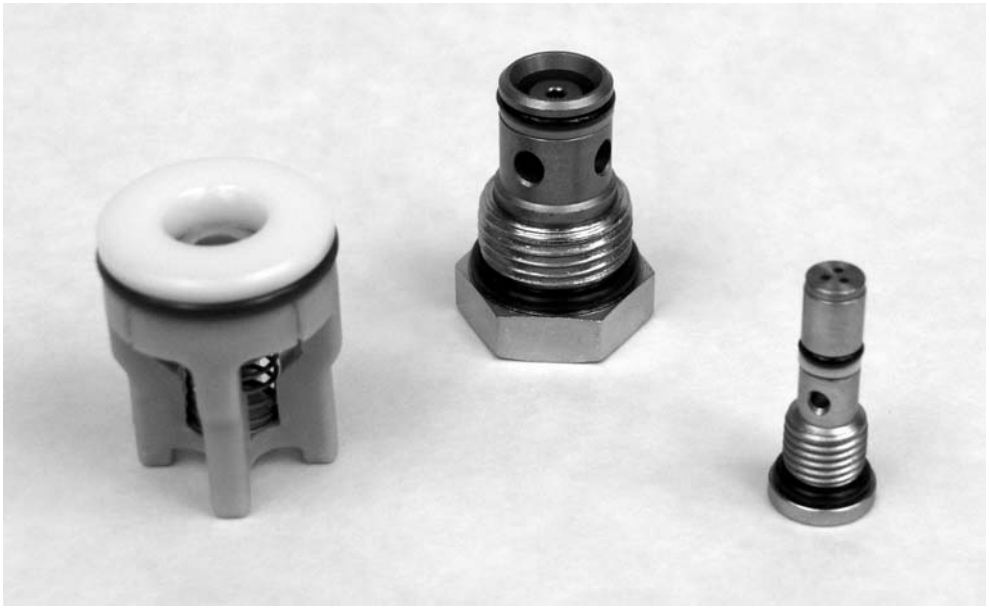
Cartridge Valves Technical Information
Check Valves
Application Notes

BASIC OPERATION

Check valves allow free flow in one direction and block flow in the opposite direction.

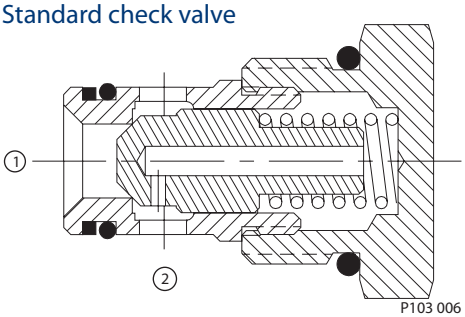
Check valves



STANDARD CHECK VALVES

Standard check valves, suitable for most applications, have fully guided poppets which always block flow from 2 to 1. They are spring biased closed until sufficient pressure is applied at 1 to open flow to 2. This pressure is commonly called the crack pressure. Several crack pressures are available for each model. Consult check valves section for details. This valve is also available with an integral orifice for free flow in one direction and controlled flow (speed) in the opposite direction.

Standard check valve

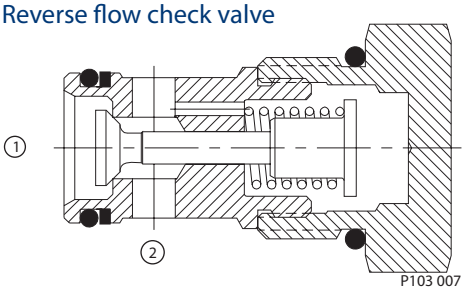


P103 006

REVERSE FLOW CHECK VALVES

Reverse flow check valves, useful for higher pressure applications or where housing or size constraints require this flow path are also available. These valves have guided poppets that block flow from 1 to 2 and are spring biased closed until sufficient pressure is applied at 2 to open flow to 1.

Reverse flow check valve



P103 007

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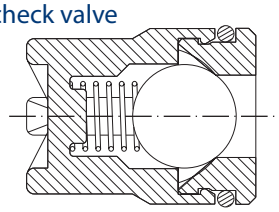
Cartridge Valves Technical Information
Check Valves
Application Notes

SLIP-IN CHECK VALVES

Slip-in style check valves are cartridges that drop into small cavities and are retained by SAE plugs or by other cartridge valves. They are ideal for use in manifolds where space savings is critical. Versions of these valves with Delrin® seats are also available for applications requiring extremely low leakage.

Slip-in check valve

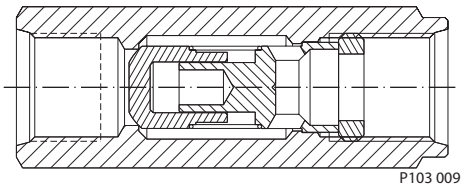


P103 008

INLINE CHECK VALVES

Also available are in-line check valves, which can be used to simplify machine plumbing.

Inline check valve



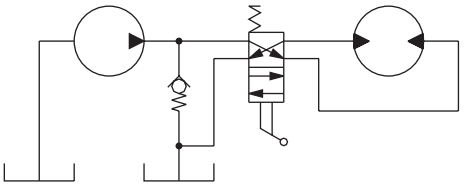
P103 009

APPLICATIONS

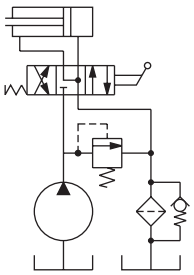
Check valves have many common applications including:

- Low pressure relief valve
- Bypass for filter elements
- Logic for load-sensing circuits
- Anti-cavitation or make-up
- Load holding (refer to Motion Control Valves for more information)

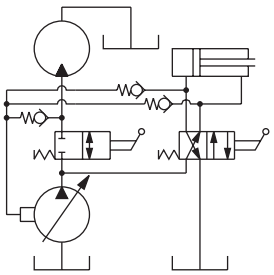
Low pressure relief valve



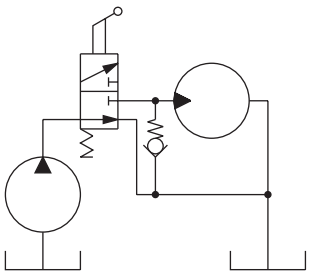
Bypass for filter elements



Logic for load-sensing circuits



Anti-cavitation



P103 010

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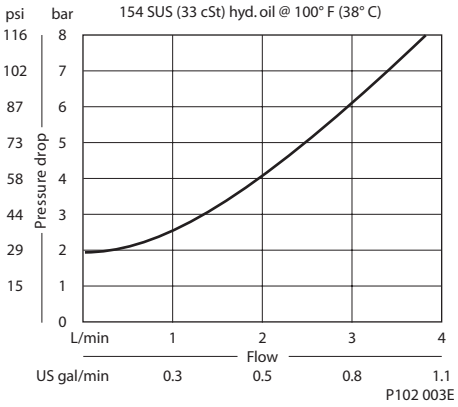
Cartridge Valves Technical Information
Check Valves
Cartridge
CV04-NB

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 003E

Schematic

P102 001E

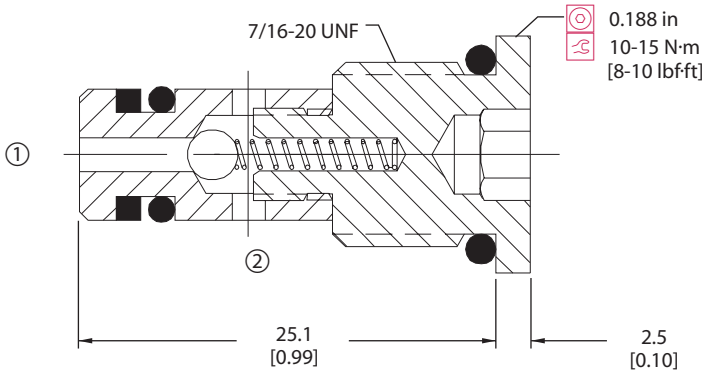
Specifications

Rated pressure	207 bar [3000 psi]
Rated flow at 7 bar [100 psi]	3 l/min [1 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.01 kg [0.03 lb]
Cavity	CP04-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 000E

ORDERING INFORMATION

CV04-NB-0.3-B-00

Crack Pressure
0.3 = 0.3 bar [5 psi]
1.7 = 1.7 bar [25 psi]

Housing and ports
00 = No Housing
4S = Al, #4 SAE
2B = Al, 1/4 BSP

Housing Part #
No Housing
CP04-2-4S
CP04-2-2B

Seals
B = Buna-N
V = Viton

Seal Kit
120077
11019554

P108 388E

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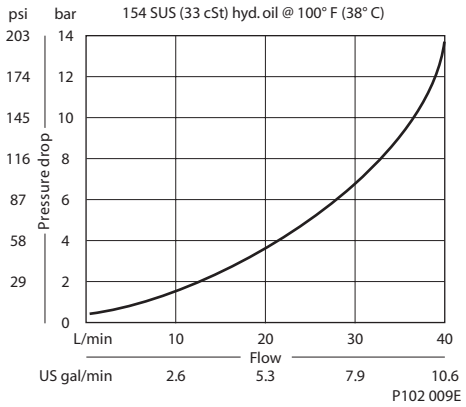
Cartridge Valves Technical Information
Check Valves
Cartridge
CV08-NB

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 009E

Schematic

P102 001E

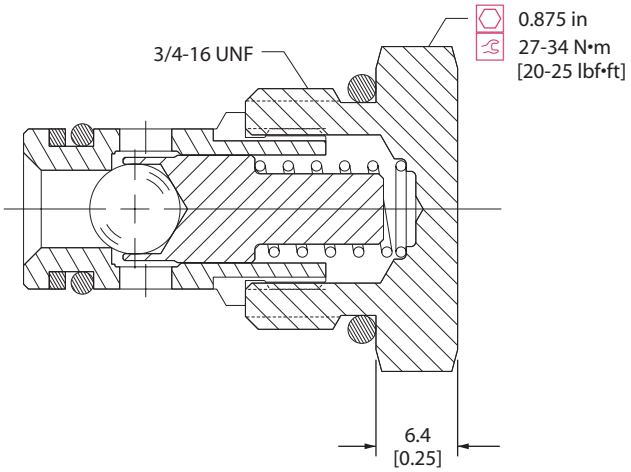
Specifications

Rated pressure	310 bar [4500 psi]
Rated flow at 7 bar [100 psi]	30 l/min [8 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.05 kg [0.11 lb]
Cavity	SDC08-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 556

ORDERING INFORMATION

CV08-NB-0.3-B-00

Crack Pressure
0.3 = 0.3 bar [5 psi]
0.7 = 0.7 bar [10 psi]
1 = 1.0 bar [15 psi]
2 = 2.0 bar [30 psi]
5 = 5.0 bar [65 psi]
7 = 7.0 bar [100 psi]

Housing and ports	Housing Part #
00 = No Housing	No Housing
DG-2B = Al, 1/4 BSP	SDC08-2-DG-2B
DG-3B = Al, 3/8 BSP	SDC08-2-DG-3B
4S = Al, #4 SAE	CP08-2-4S
6S = Al, #6 SAE	CP08-2-6S

Seals	Seal Kit
B = Buna-N	120221
V = Viton	120222

P108 389E

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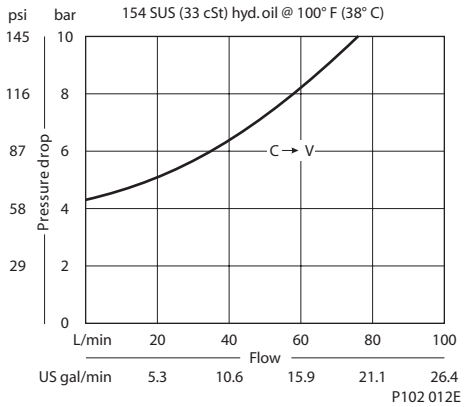
Cartridge Valves Technical Information
Check Valves
Cartridge
CV10-NB

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 012E

Schematic

P102 001E

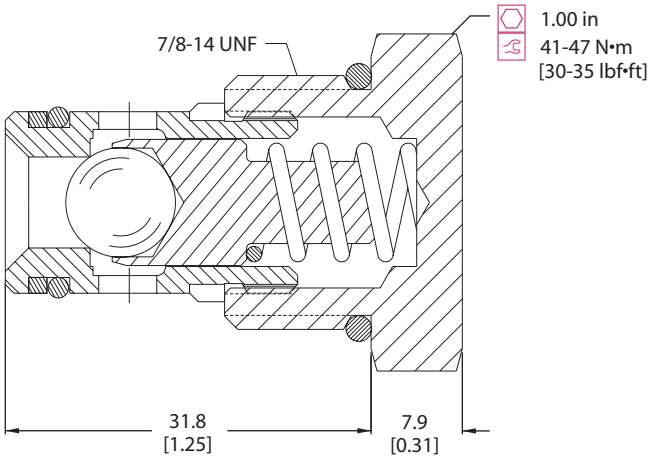
Specifications

Rated pressure	207 bar [3000 psi]
Rated flow at 7 bar [100 psi]	83 l/min [22 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.08 kg [0.17 lb]
Cavity	SDC10-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 558

ORDERING INFORMATION

CV10-NB-0.3-B-00

Crack Pressure
0.3 = 0.3 bar [5 psi]
1 = 1.0 bar [15 psi]
2 = 2.0 bar [30 psi]
5 = 5.0 bar [65 psi]
7 = 7.0 bar [100 psi]
10 = 10.3 bar [150 psi]

Housing and ports	Housing Part #
00 = No Housing	No Housing
DG-3B = Al, 3/8 BSP	SDC10-2-DG-3B
DG-4B = Al, 1/2 BSP	SDC10-2-DG-4B
6S = Al, #6 SAE	CP10-2-6S
8S = Al, #8 SAE	CP10-2-8S

Seals	Seal Kit
B = Buna-N	120015
V = Viton	120016

P108 390E

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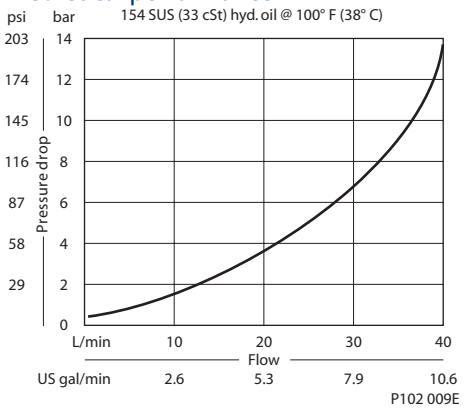
Cartridge Valves Technical Information
Check Valves
Cartridge
CV08-NP

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 009E

Schematic

P102 001E

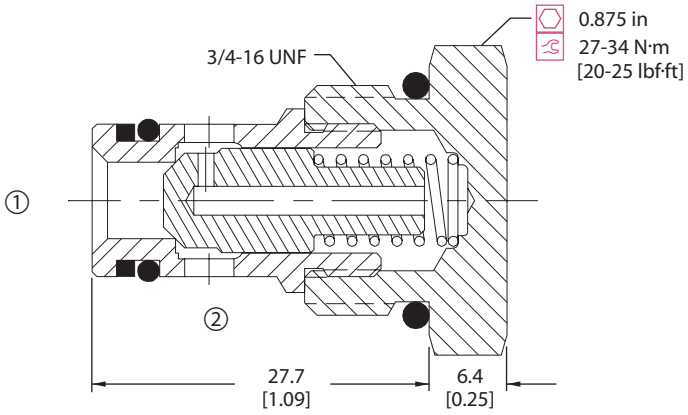
Specifications

Rated pressure	310 bar [4500 psi]
Rated flow at 7 bar [100 psi]	30 l/min [8 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.05 kg [0.11 lb]
Cavity	SDC08-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 008E

ORDERING INFORMATION

CV08-NP-0.3-B-4S

Crack Pressure
0.3 = 0.3 bar [5 psi]
0.7 = 0.7 bar [10 psi]
1 = 1.0 bar [15 psi]
2 = 2.0 bar [30 psi]
5 = 5.0 bar [65 psi]
7 = 7.0 bar [100 psi]

Housing and ports
00 = No Housing
DG2B = Al, 1/4 BSP
DG3B = Al, 3/8 BSP
4S = Al, #4 SAE
6S = Al, #6 SAE
Other housings available

Housing P/N
No Housing
SDC08-2-DG-2B
SDC08-2-DG-3B
CP08-2-4S
CP08-2-6S

Seals Seal kit
B = Buna N 120221
V = Viton 120222

P103 651E

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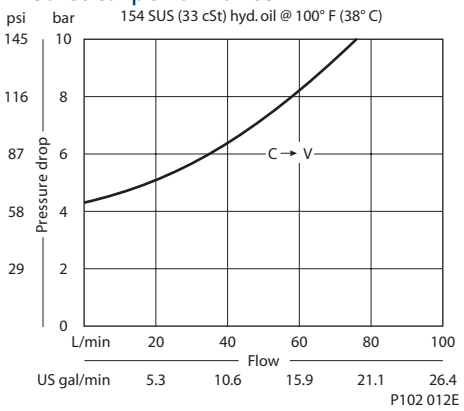
Cartridge Valves Technical Information
Check Valves
Cartridge
CV10-NP

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 012E

Schematic

P102 001E

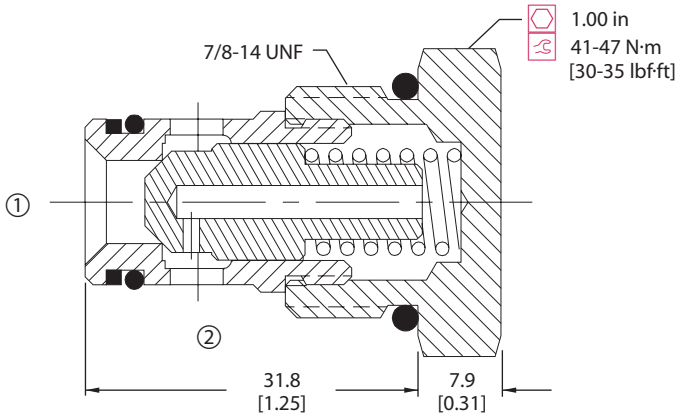
Specifications

Rated pressure	300 bar [4350 psi]
Rated flow at 7 bar [100 psi]	85 l/min [22 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.08 kg [0.18 lb]
Cavity	SDC10-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 011E

ORDERING INFORMATION

CV10-NP-5-B-6S

Crack Pressure
0.3 = 0.3 bar [5 psi]
1 = 1.0 bar [15 psi]
2 = 2.0 bar [30 psi]
5 = 5.0 bar [65 psi]
7 = 7.0 bar [100 psi]
10 = 10 bar [145 psi]

Seals — Seal kit
B = Buna N 120015
V = Viton 120016

Housing and ports		**Housing P/N**
00	= No Housing	No Housing
DG3B	= Al, 3/8 BSP	SDC10-2-DG-3B
DG4B	= Al, 1/2 BSP	SDC10-2-DG-4B
6S	= Al, #6 SAE	CP10-2-6S
8S	= Al, #8 SAE	CP10-2-8S

Other housings available

P103 650E

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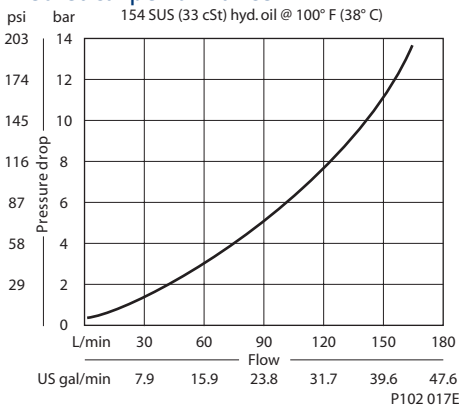
Cartridge Valves Technical Information
Check Valves
Cartridge
CP100-3

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 017E

Schematic

P102 001E

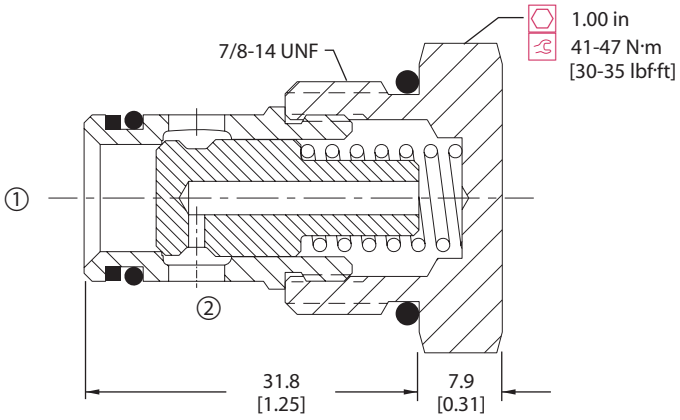
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	115 l/min [30 US gal/min]
Leakage	6 drops/min @ 207 bar [3000 psi]
Weight	0.08 kg [0.17 lb]
Cavity	SDC10-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 016E

ORDERING INFORMATION

CP100-3-B-8S-005

Housing and ports

		Housing P/N
0	= No Housing	No Housing
DG3B	= Al, 3/8 BSP	SDC10-2-DG-3B
DG4B	= Al, 1/2 BSP	SDC10-2-DG-4B
6S	= Al, #6 SAE	CP10-2-6S
8S	= Al, #8 SAE	CP10-2-8S

Other housings available

Crack pressure

005 = 0.34 bar [5 psi]
015 = 1.0 bar [15 psi]
040 = 2.8 bar [40 psi]
065 = 4.5 bar [65 psi]

Seals

		Seal kit
B	= Buna-N	120015
V	= Viton	120016

P102 171E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

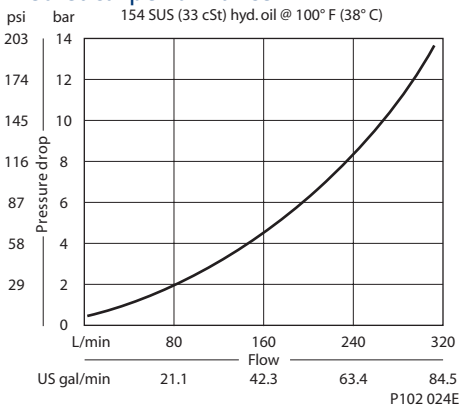
Cartridge Valves Technical Information
Check Valves
Cartridge
CP102-1

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 024E

Schematic

P102 001E

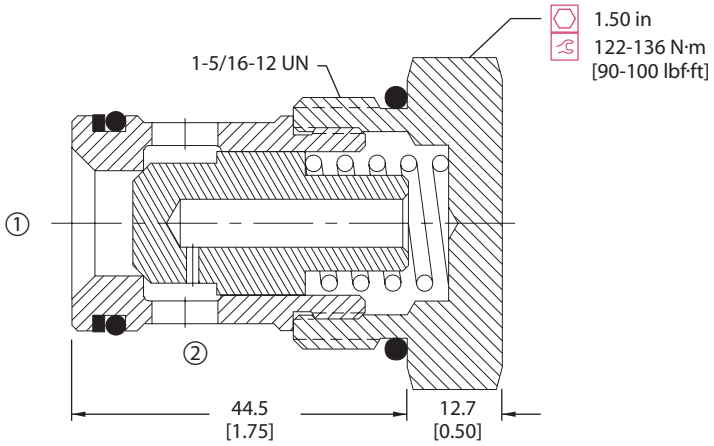
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	210 l/min [55 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.26 kg [0.57 lb]
Cavity	SDC16-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 023E

ORDERING INFORMATION

CP102-1-B-16S-005

Housing and ports

0	= No Housing	No Housing
DG6B	= Al, 3/4 BSP	SDC16-2-DG-6B
DG8B	= Al, 1 BSP	SDC16-2-DG-8B
12S	= Al, #12 SAE	CP16-2-12S
16S	= Al, #16 SAE	CP16-2-16S

Other housings available

Seals

B = Buna-N	Seal kit 120019
V = Viton	Seal kit 120020

Crack pressure

005 = 0.34 bar [5 psi]
015 = 1.0 bar [15 psi]
030 = 2.1 bar [30 psi]
040 = 2.8 bar [40 psi]
065 = 4.5 bar [65 psi]
100 = 6.9 bar [100 psi]

P102 186E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

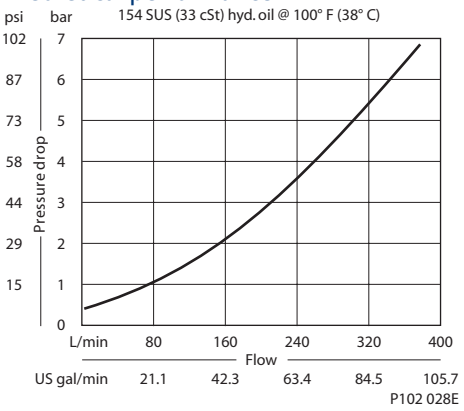
Cartridge Valves Technical Information
Check Valves
Cartridge
CP103-1

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 028E

Schematic

P102 001E

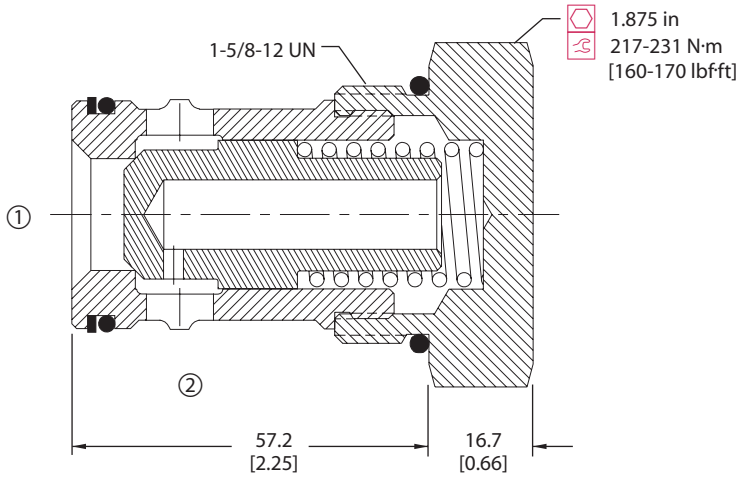
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	380 l/min [100 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.54 kg [1.20 lb]
Cavity	SDC20-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 027E

ORDERING INFORMATION

CP103-1-B-20S-005

Housing and ports
0 = No Housing
8B = Al, 1 BSP
10B = Al, 1-1/4 BSP
16S = Al, #16 SAE
20S = Al, #20 SAE
Other housings available

Housing P/N
No Housing
CP20-2-8B
CP20-2-10B
CP20-2-16S
CP20-2-20S

Crack pressure
005 = 0.34 bar [5 psi]
015 = 1.0 bar [15 psi]
065 = 4.5 bar [65 psi]

Seals **Seal kit**
B = Buna-N 120011
V = Viton 120012

P102 194E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

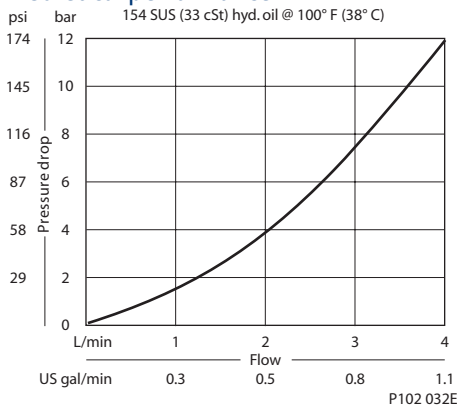
Cartridge Valves Technical Information
Check Valves
Cartridge
CP104-2

OPERATION

This valve allows free flow from 2 to 1 and blocks flow from 1 to 2.

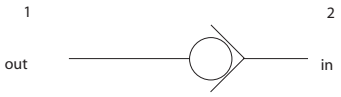
SPECIFICATIONS

Theoretical performance



P102 032E

Schematic



P108 233E

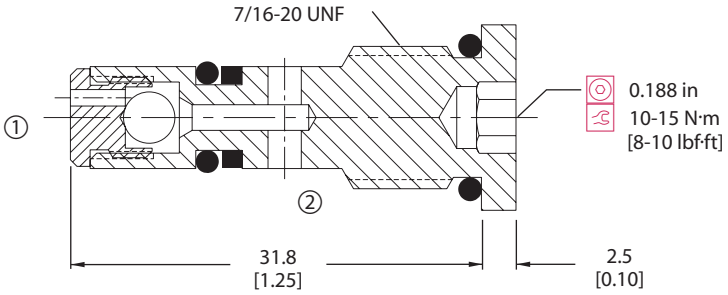
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	3 l/min [1 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.01 kg [0.03 lb]
Cavity	CP04-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 031E

ORDERING INFORMATION

CP104-2-B-4S

Housing and ports

		Housing P/N
0	= No Housing	No Housing
2B	= Al, 1/4 BSP	CP04-3-2B
4S	= Al, #4 SAE	CP04-2-4S

Other housings available

Seals

		Seal kit
B	= Buna-N	120077
V	= Viton	11019554

P102 147

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

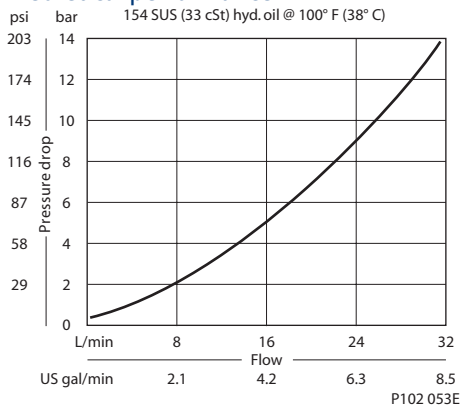
Cartridge Valves Technical Information
Check Valves
Cartridge
CP108-2

OPERATION

This valve allows free flow from 2 to 1 and blocks flow from 1 to 2.

SPECIFICATIONS

Theoretical performance



P102 053E

Schematic

P102 035E

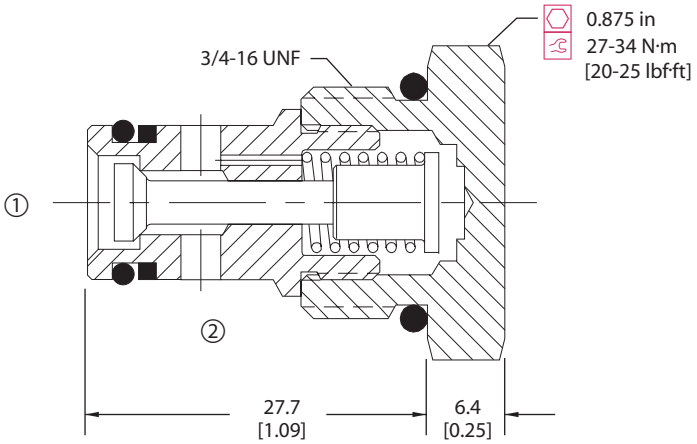
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	20 l/min [5 US gal/min]
Leakage	6 drops/min @ 207 bar [3000 psi]
Weight	0.05 kg [0.11 lb]
Cavity	SDC08-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 052E

ORDERING INFORMATION

CP108-2-B-6S-005

Crack pressure
005 = 0.34 bar [5 psi]
015 = 1.0 bar [15 psi]
030 = 2.1 bar [30 psi]
050 = 3.4 bar [50 psi]
065 = 4.5 bar [65 psi]
100 = 6.9 bar [100 psi]

Housing and ports

			Housing P/N
0	=	No Housing	No Housing
DG2B	=	Al, 1/4 BSP	SDC08-2-DG-2B
DG3B	=	Al, 3/8 BSP	SDC08-2-DG-3B
4S	=	Al, #4 SAE	CP8-2-4S
6S	=	Al, #6 SAE	CP8-2-6S

Other housings available

Seals

		Seal kit
B	= Buna-N	120221
V	= Viton	120222

P102 156E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

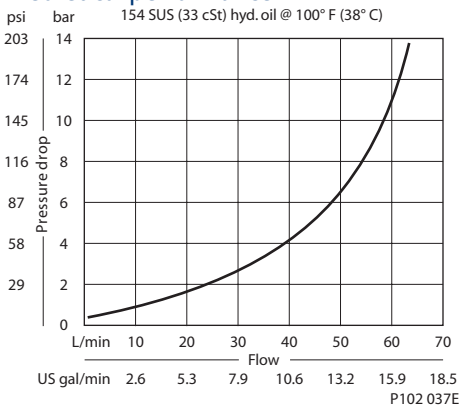
Cartridge Valves Technical Information
Check Valves
Cartridge
CP100-2

OPERATION

This valve allows free flow from 2 to 1 and blocks flow from 1 to 2.

SPECIFICATIONS

Theoretical performance



P102 037E

Schematic

P102 035E

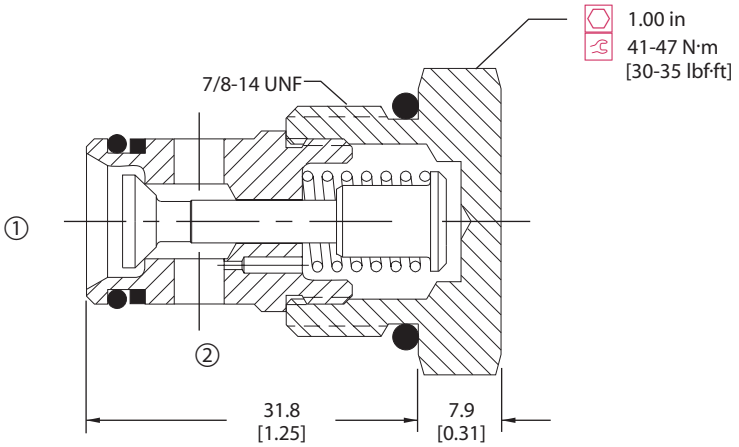
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	50 l/min [13 US gal/min]
Leakage	6 drops/min @ 207 bar [3000 psi]
Weight	0.08 kg [0.17 lb]
Cavity	SDC10-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 036E

ORDERING INFORMATION

CP100-2-B-8S-005

Housing and ports

			Housing P/N
0	=	No Housing	No Housing
DG3B	=	Al, 3/8 BSP	SDC10-2-DG-3B
DG4B	=	Al, 1/2 BSP	SDC10-2-DG-4B
6S	=	Al, #6 SAE	CP10-2-6S
8S	=	Al, #8 SAE	CP10-2-8S

Other housings available

Seals

		Seal kit
B	= Buna-N	120015
V	= Viton	120016

Crack pressure

005 = 0.34 bar [5 psi]
015 = 1.0 bar [15 psi]
030 = 2.1 bar [30 psi]
050 = 3.4 bar [50 psi]
065 = 4.5 bar [65 psi]
100 = 6.9 bar [100 psi]

P102 166E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

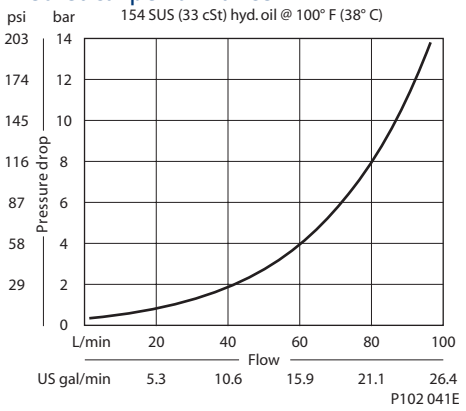
Cartridge Valves Technical Information
Check Valves
Cartridge
CP101-2

OPERATION

This valve allows free flow from 2 to 1 and blocks flow from 1 to 2.

SPECIFICATIONS

Theoretical performance



P102 041E

Schematic

P102 035E

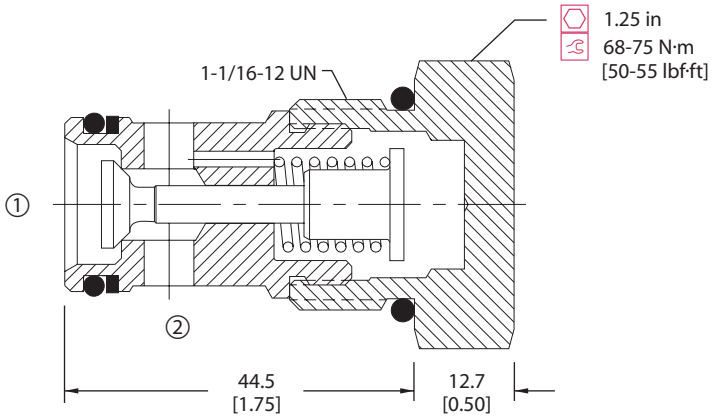
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	75 l/min [20 US gal/min]
Leakage	6 drops/min @ 207 bar [3000 psi]
Weight	0.18 kg [0.40 lb]
Cavity	CP12-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 040E

ORDERING INFORMATION

CP101-2-B-12S-005

Crack pressure
005 = 0.34 bar [5 psi]
015 = 1.0 bar [15 psi]
030 = 2.1 bar [30 psi]
065 = 4.5 bar [65 psi]
100 = 6.9 bar [100 psi]

Housing and ports / **Housing P/N**

0	= No Housing	No Housing
4B	= Al, 1/2 BSP	CP12-2-4B
6B	= Al, 3/4 BSP	CP12-2-6B
10S	= Al, #10 SAE	CP12-2-10S
12S	= Al, #12 SAE	CP12-2-12S

Other housings available

Seals

		Seal kit
B	= Buna-N	120017
V	= Viton	120018

P102 181E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

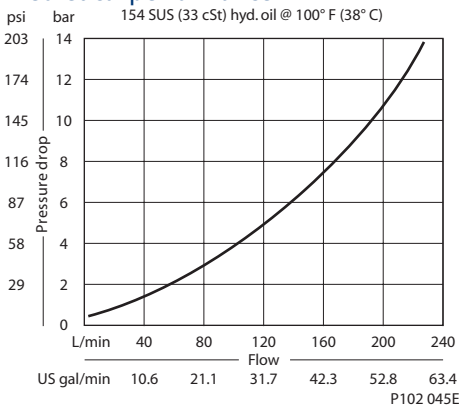
Cartridge Valves Technical Information
Check Valves
Cartridge
CP102-2

OPERATION

This valve allows free flow from 2 to 1 and blocks flow from 1 to 2.

SPECIFICATIONS

Theoretical performance



P102 045E

Schematic

P102 035E

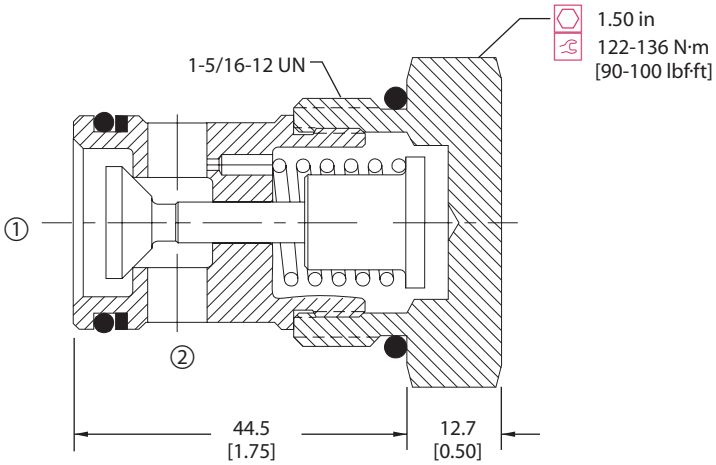
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	150 l/min [40 US gal/min]
Leakage	6 drops/min @ 207 bar [3000 psi]
Weight	0.26 kg [0.57 lb]
Cavity	SDC16-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 044E

ORDERING INFORMATION

CP102-2-B-16S-005

Housing and ports

			Housing P/N
0	=	No Housing	No Housing
HG-6B	=	Al, 3/4 BSP	SDC16-2-HG-6B
HG-8B	=	Al, 1 BSP	SDC16-2-HG-8B
12S	=	Al, #12 SAE	CP16-2-12S
16S	=	Al, #16 SAE	CP16-2-16S

Other housings available

Seals

		Seal kit
B	= Buna-N	120019
V	= Viton	120020

Crack pressure

005 = 0.34 bar [5 psi]
015 = 1.0 bar [15 psi]
030 = 2.1 bar [30 psi]
050 = 3.4 bar [50 psi]
065 = 4.5 bar [65 psi]
100 = 6.9 bar [100 psi]

P102 190E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

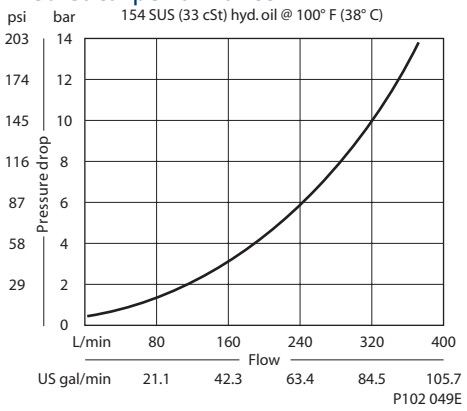
Cartridge Valves Technical Information
Check Valves
Cartridge
CP103-2

OPERATION

This valve allows free flow from 2 to 1 and blocks flow from 1 to 2.

SPECIFICATIONS

Theoretical performance



P102 049E

Schematic

P102 035E

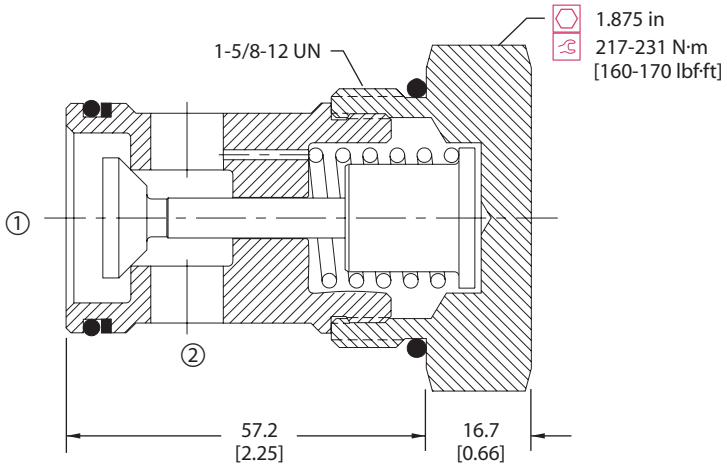
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	265 l/min [70 US gal/min]
Leakage	6 drops/min @ 207 bar [3000 psi]
Weight	0.54 kg [1.20 lb]
Cavity	SDC20-2

DIMENSIONS

mm [in]

Cross-sectional view



P102 048E

ORDERING INFORMATION

CP103-2-B-20S-005

Housing and ports

			Housing P/N
0	=	No Housing	No Housing
8B	=	Al, 1 BSP	CP20-2-8B
10B	=	Al, 1-1/4 BSP	CP20-2-10B
16S	=	Al, #16 SAE	CP20-2-16S
20S	=	Al, #20 SAE	CP20-2-20S

Other housings available

Seals

Code		Seal kit
B	= Buna-N	120011
V	= Viton	120012

Crack pressure

005 = 0.34 bar [5 psi]
015 = 1.0 bar [15 psi]
030 = 2.1 bar [30 psi]
050 = 3.4 bar [50 psi]
065 = 4.5 bar [65 psi]
100 = 6.9 bar [100 psi]

P102 142E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

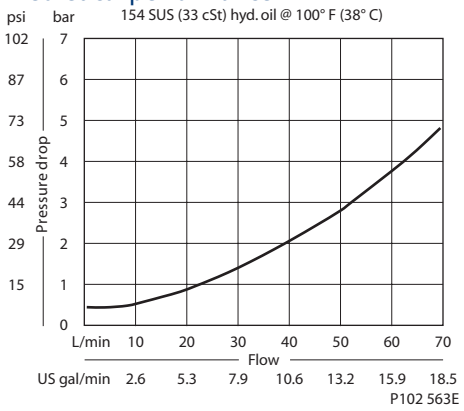
Cartridge Valves Technical Information
Check Valves
Slip-in
3C50-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 563E

Schematic

P102 001E

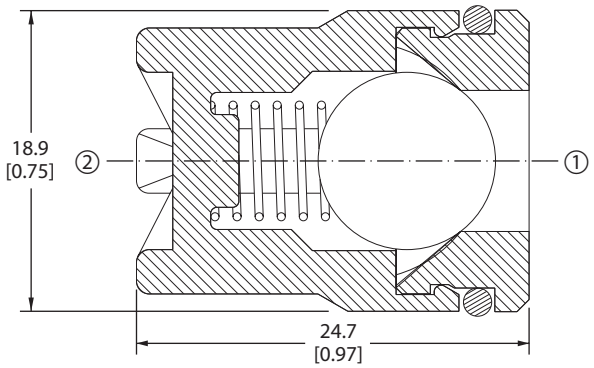
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	70 l/min [19 US gal/min]
Leakage	15 drops/min @ rated pressure
Weight	0.03 kg [0.07 lb]
Cavity	FC-144

DIMENSIONS

mm [in]

Cross-sectional view



P102 550

ORDERING INFORMATION

3C50-01-B-0-005

Crack pressure
005 = 0.34 bar [5 psi]

Housing and ports
0 = No Housing

Seals

	Seal kit
B = Buna-N	720399
V = Viton	720420

P102 552E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

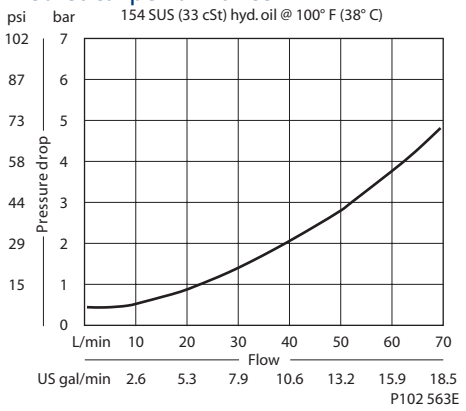
Cartridge Valves Technical Information
Check Valves
Slip-in
3C60-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1. Valve uses a Delrin® seat for low leakage

SPECIFICATIONS

Theoretical performance



P102 563E

Schematic

P102 001E

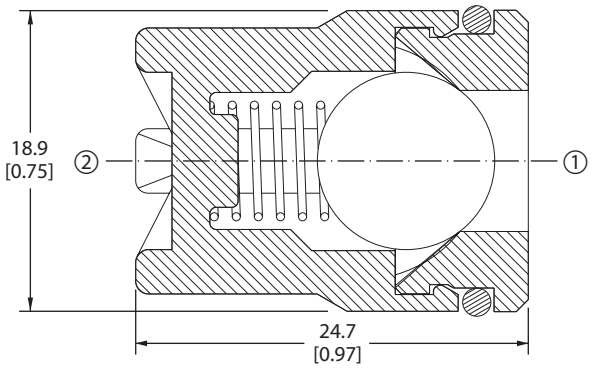
Specifications

Rated pressure	140 bar [2000 psi]
Rated flow at 7 bar [100 psi]	70 l/min [19 US gal/min]
Leakage	6 drops/min @ rated pressure
Weight	0.01 kg [0.02 lb]
Cavity	FC-144

DIMENSIONS

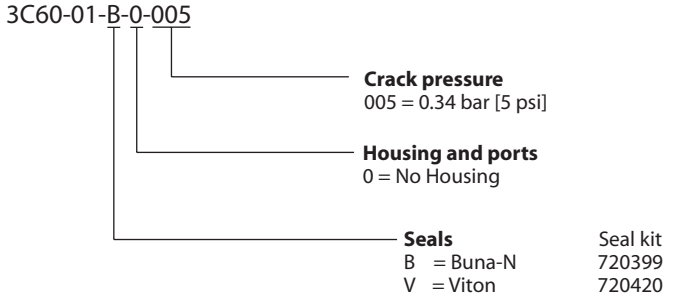
mm [in]

Cross-sectional view



P102 550

ORDERING INFORMATION



P102 551E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

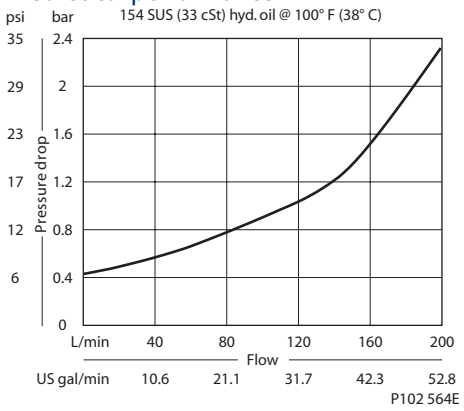
Cartridge Valves Technical Information
Check Valves
Slip-in
3C80-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1. Valve uses a Delrin® seat for low leakage.

SPECIFICATIONS

Theoretical performance



P102 564E

Schematic

P102 001E

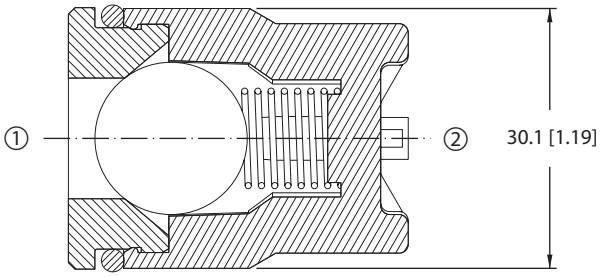
Specifications

Rated pressure	140 bar [2000 psi]
Rated flow at 7 bar [100 psi]	190 l/min [50 US gal/min]
Leakage	6 drops/min @ rated pressure
Weight	0.04 kg [0.09 lb]
Cavity	FC-304

DIMENSIONS

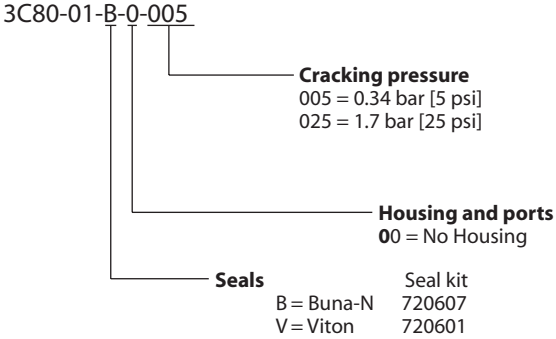
mm [in]

Cross-sectional view



P102 553E

ORDERING INFORMATION



P102 554E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

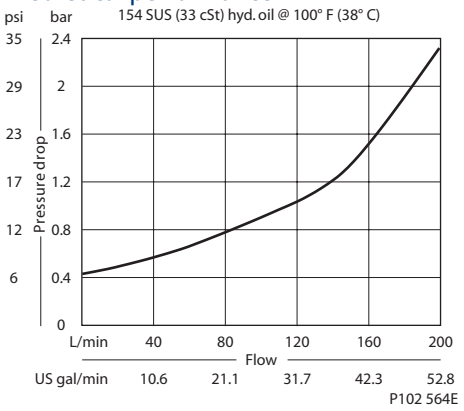
Cartridge Valves Technical Information
Check Valves
Slip-in
3C90-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 564E

Schematic

P102 001E

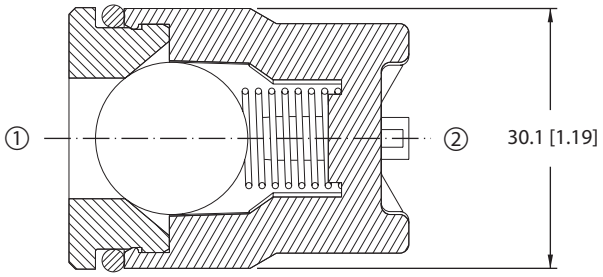
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	190 l/min [50 US gal/min]
Leakage	15 drops/min @ rated pressure
Weight	0.05 kg [0.11 lb]
Cavity	FC-304

DIMENSIONS

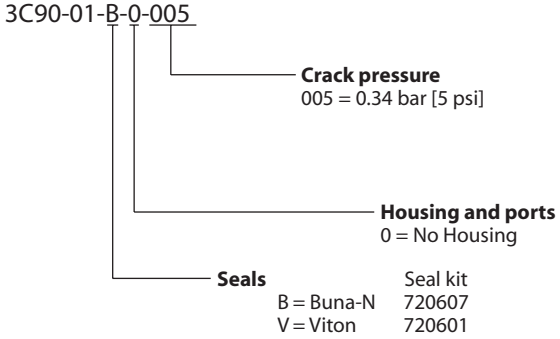
mm [in]

Cross-sectional view



P102 553E

ORDERING INFORMATION



P102 555E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

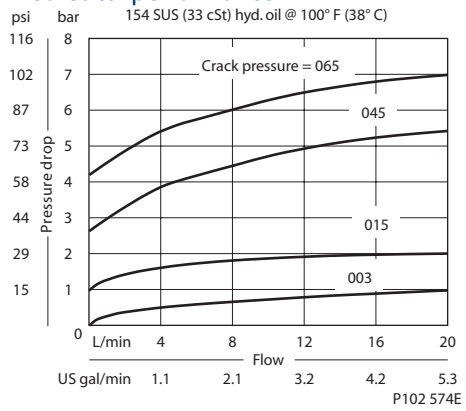
Cartridge Valves Technical Information
Check Valves
In-line
3C11-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 574E

Schematic

P102 001E

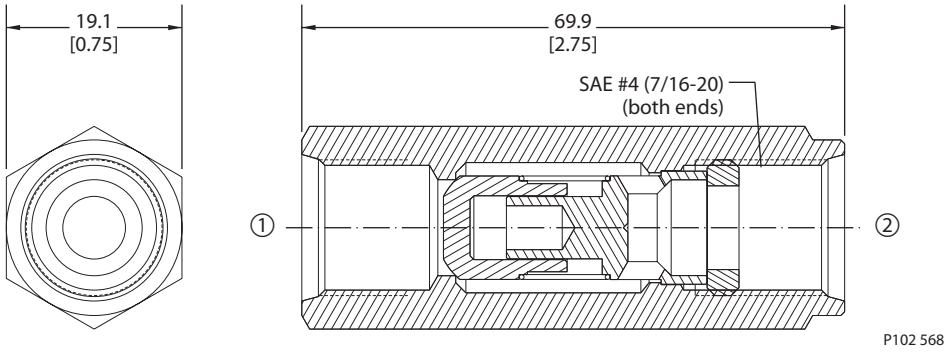
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	20 l/min [5 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.11 kg [0.24 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 568

ORDERING INFORMATION

3C11-01-4S-65

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Port sizes
4S =SAE #4

P102 580E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

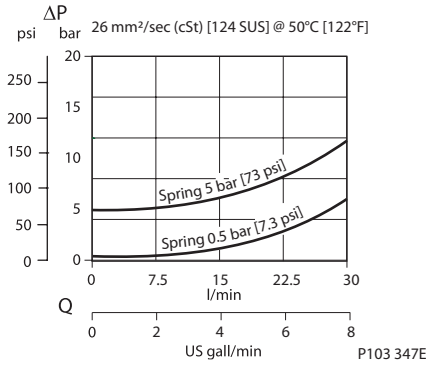
Cartridge Valves Technical Information
Check Valves
In-line
RS 06

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P103 347E

Schematic

P102 001E

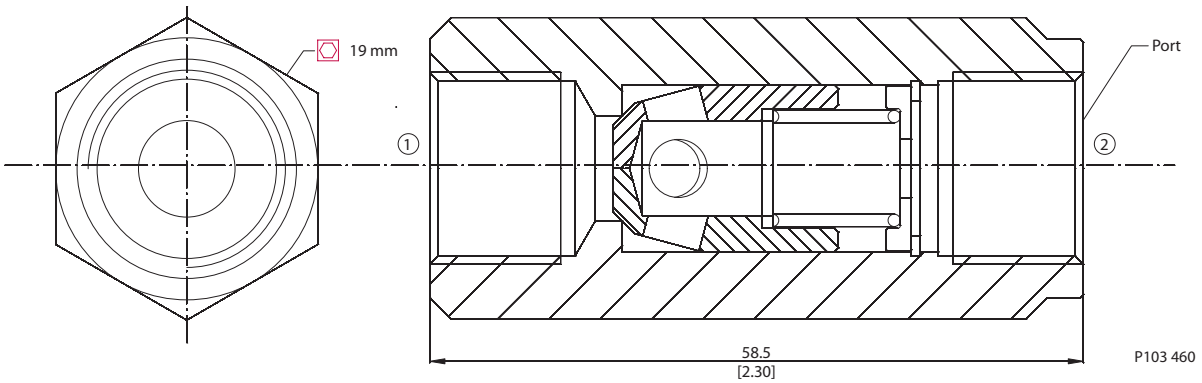
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	30 l/min [8 US gal/min]
Weight	0.08 kg [0.18 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P103 460

ORDERING INFORMATION

RS 06 / 0.5 G

Port
A = SAE #6
G = 1/4 BSP

Crack pressure
0.5 = 0.5 bar [7.25 psi]
5 = 5 bar [72.5 psi]

P103 348E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

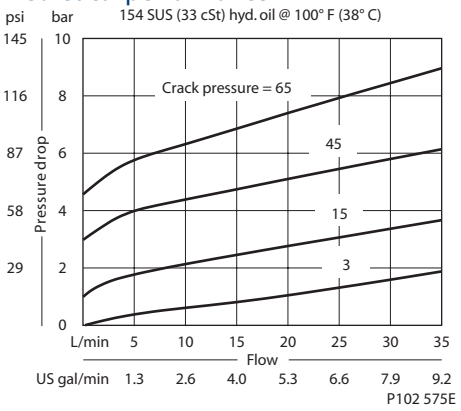
Cartridge Valves Technical Information
Check Valves
In-line
3C12-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 575E

Schematic

P102 001E

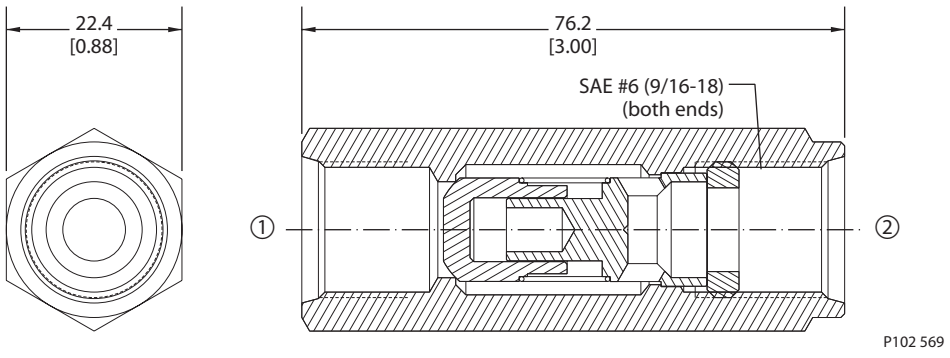
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	35 l/min [9 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.17 kg [0.37 lb]
Cavity	none

DIMENSIONS

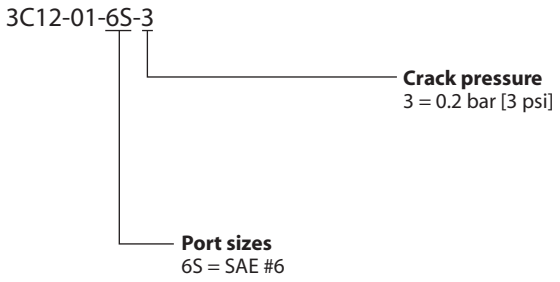
mm [in]

Cross-sectional view



P102 569

ORDERING INFORMATION



P102 581E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

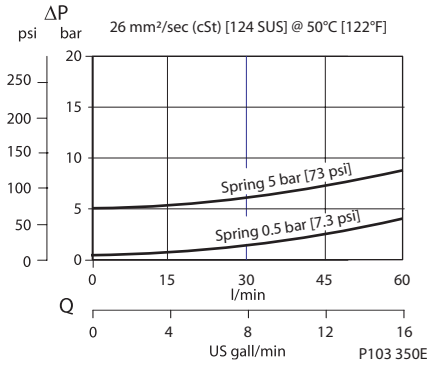
Cartridge Valves Technical Information
Check Valves
In-line
RS 10

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic

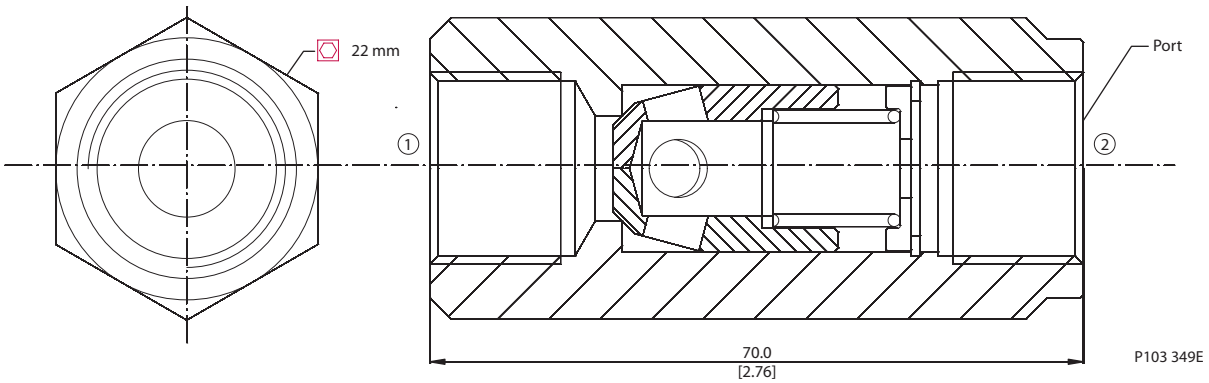
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	60 l/min [16 US gal/min]
Weight	0.13 kg [0.29 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

RS 10 / 5 - G

Port
G = 3/8 BSP

Crack Pressure
0.5 = 0.5 bar [7 psi]
5 = 5 bar [73 psi]

P103 351E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

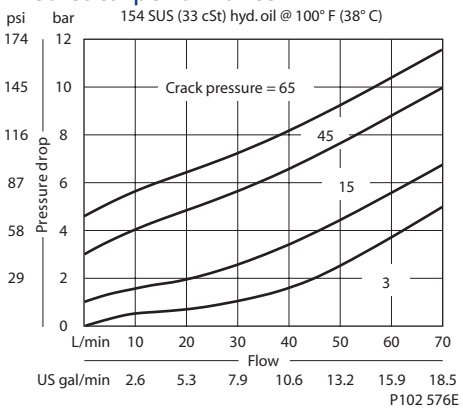
Cartridge Valves Technical Information
Check Valves
In-line
3C13-01

OPERATION

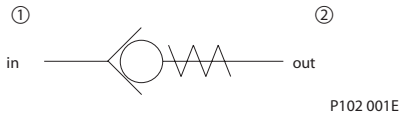
This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic



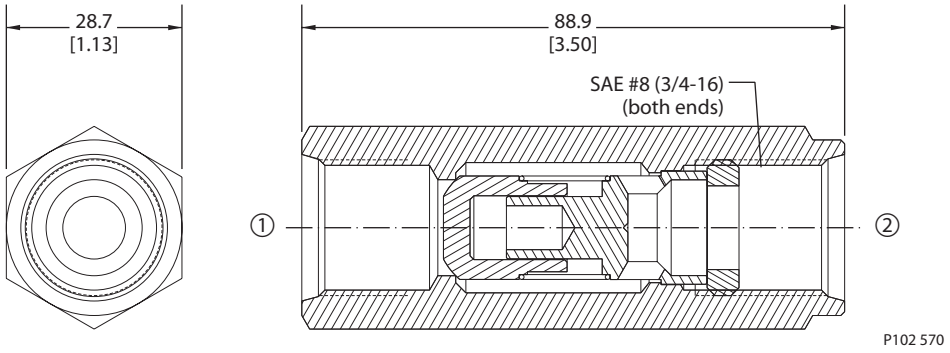
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	70 l/min [19 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.31 kg [0.68 lb]
Cavity	none

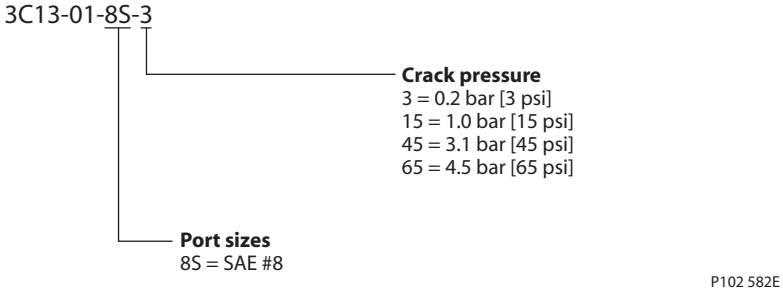
DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION



Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

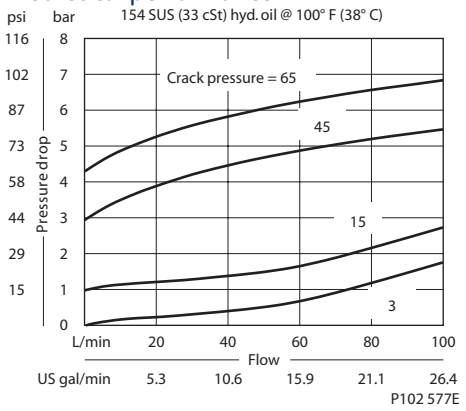
Cartridge Valves Technical Information
Check Valves
In-line
3C14-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 577E

Schematic

P102 001E

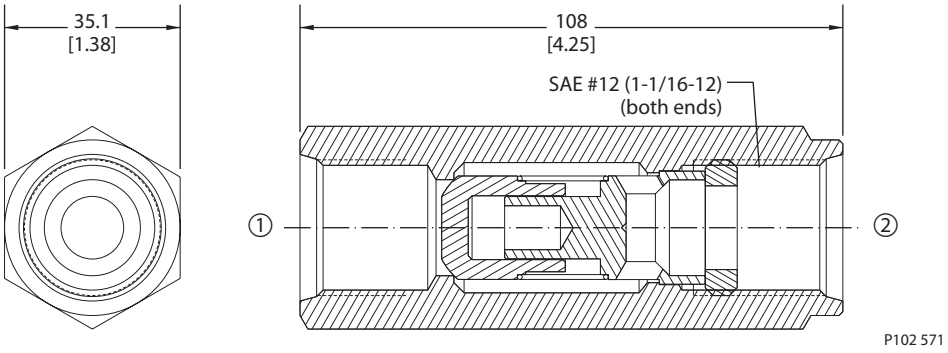
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	95 l/min [25 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.54 kg [1.19 lb]
Cavity	none

DIMENSIONS

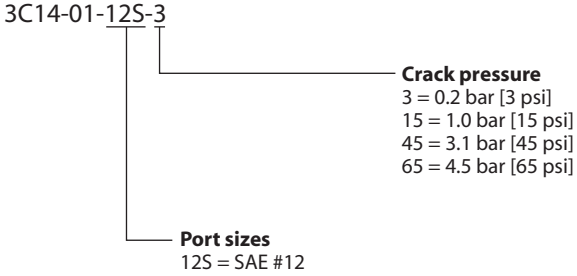
mm [in]

Cross-sectional view



P102 571

ORDERING INFORMATION



P102 583E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

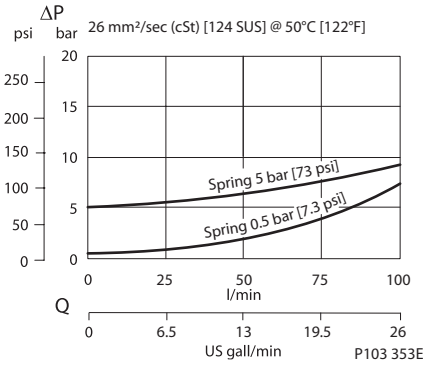
Cartridge Valves Technical Information
Check Valves
In-line
RS 13

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic

P102 001E

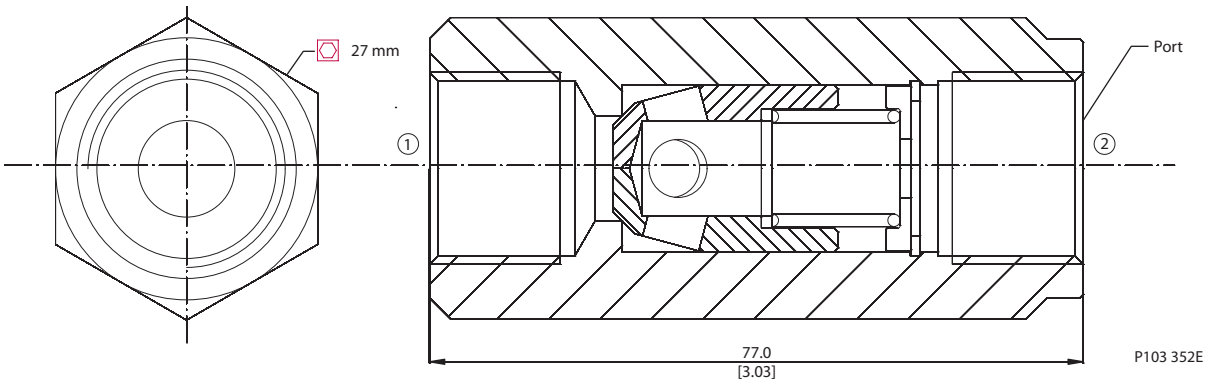
Specifications

Rated pressure	315 bar [4500 psi]
Rated flow at 7 bar [100 psi]	100 l/min [26 US gal/min]
Weight	0.21 kg [0.46 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

RS 13 / 0.5 - G

Ports
G = ½ BSP

Crack Pressure
0.5 = 0.5 bar [7 psi]
5 = 5 bar [73 psi]

P103 354E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

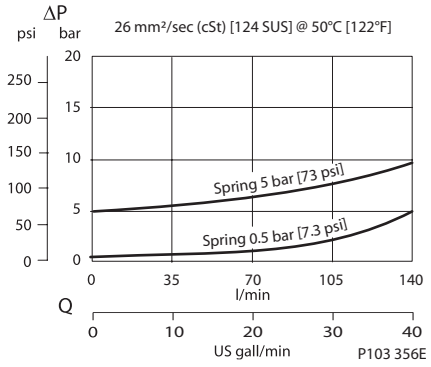
Cartridge Valves Technical Information
Check Valves
In-line
RS 19

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic

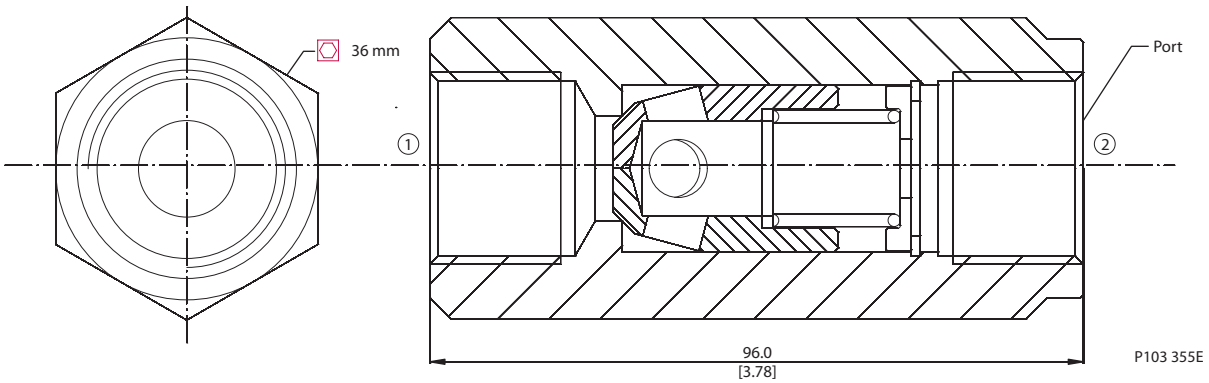
Specifications

Rated pressure	280 bar [4000 psi]
Rated flow at 7 bar [100 psi]	140 l/min [37 US gal/min]
Weight	0.43 kg [0.95 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

RS 19 / 0.5 - G

Ports
A = SAE #12
G = 3/4 BSP

Crack Pressure
0.5 = 0.5 bar [7 psi]
5 = 5 bar [73 psi]

P103 357E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

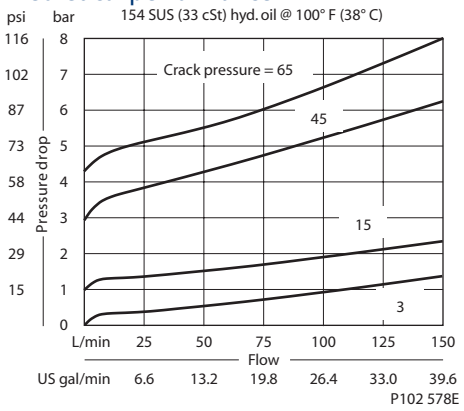
Cartridge Valves Technical Information
Check Valves
In-line
3C15-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 578E

Schematic

P102 001E

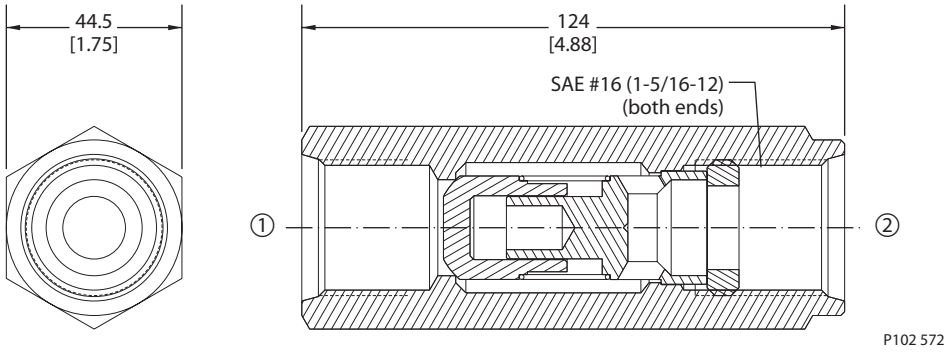
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	150 l/min [40 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	1.00 kg [2.20 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 572

ORDERING INFORMATION

3C15-01-16S-45

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Port sizes
16S = SAE #16

P102 584E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

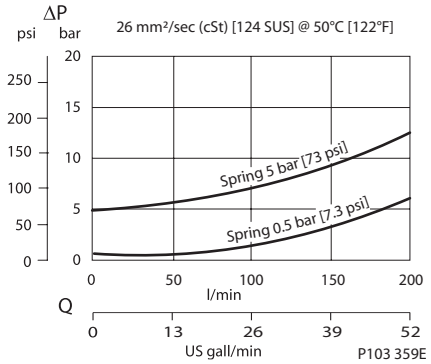
Cartridge Valves Technical Information
Check Valves
In-line
RS 25

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic

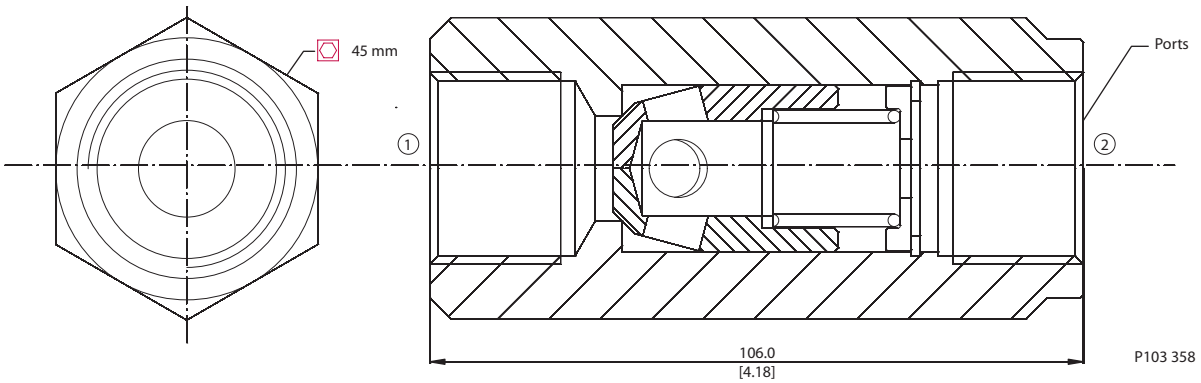
Specifications

Rated pressure	245 bar [3500 psi]
Rated flow at 7 bar [100 psi]	200 l/min [53 US gal/min]
Weight	0.88 kg [1.94 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

RS 25 / 0.5 - G

Ports
A = SAE #16
G=1 BSP

Crack Pressure
0.5 = 0.5 bar [7 psi]
5 = 5 bar [73 psi]

P103 360E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

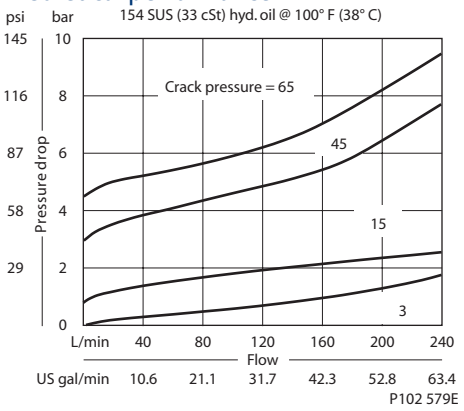
Cartridge Valves Technical Information
Check Valves
In-line
3C16-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 579E

Schematic

P102 001E

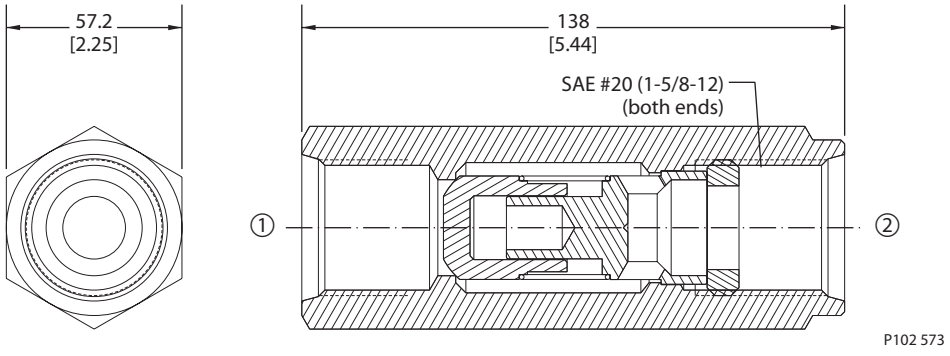
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	230 l/min [61 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	1.91 kg [4.21 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 573

ORDERING INFORMATION

3C16-01-20S-3

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Port sizes
20S = SAE #20

P102 585E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

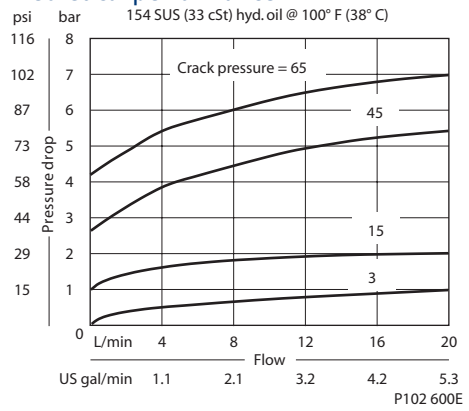
Cartridge Valves Technical Information
Check Valves
In-line
3CM11-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 600E

Schematic

P102 001E

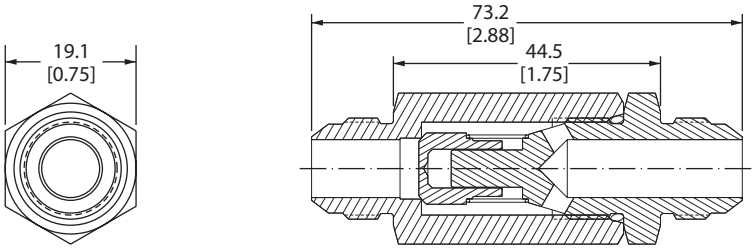
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	20 l/min [5 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.09 kg [0.20 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 594

ORDERING INFORMATION

3CM11-01-B-6F-6F-03

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Guide port
6F = SAE #6, 37° flare

Body port
6F = SAE #6, 37° flare

Seals
B = Buna-N
V = Viton

Seal kit
720063
720064

P102 606E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

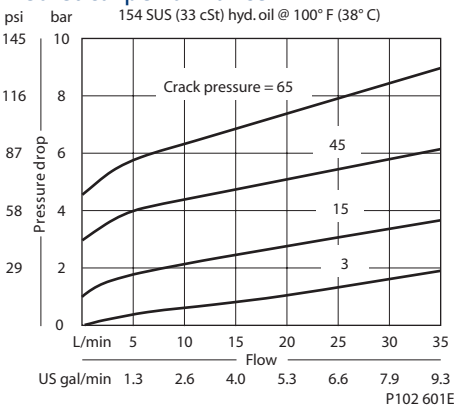
Cartridge Valves Technical Information
Check Valves
In-line
3CM12-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 601E

Schematic

P102 001E

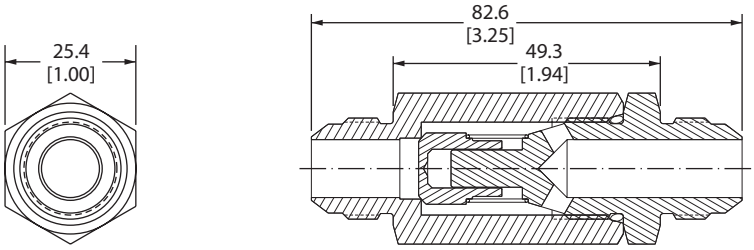
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	35 l/min [9 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.23 kg [0.51 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 595

ORDERING INFORMATION

3CM12-01-B-8F-8F-03

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Guide port
8F = SAE #8, 37° flare

Body port
8F = SAE #8, 37° flare

Seals — **Seal kit**
B = Buna-N — 720006
V = Viton — 720068

P102 607E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

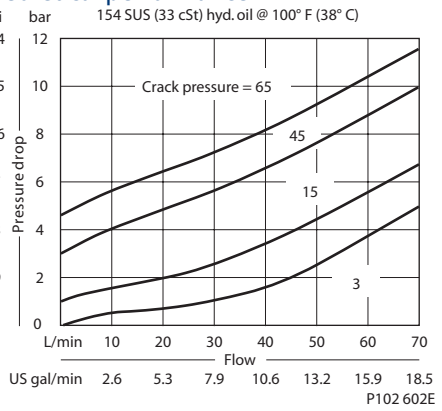
Cartridge Valves Technical Information
Check Valves
In-line
3CM13-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 602E

Schematic

P102 001E

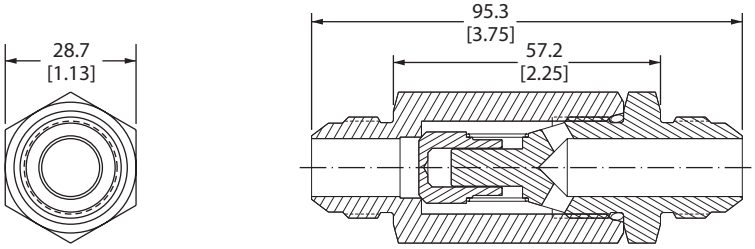
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	70 l/min [19 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.28 kg [0.62 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 596

ORDERING INFORMATION

3CM13-01-B-10F-10F-03

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Guide port
10F = SAE #10, 37° flare

Body port
10F = SAE #10, 37° flare

Seals
B = Buna-N
V = Viton

Seal kit
720063
720064

P102 608E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

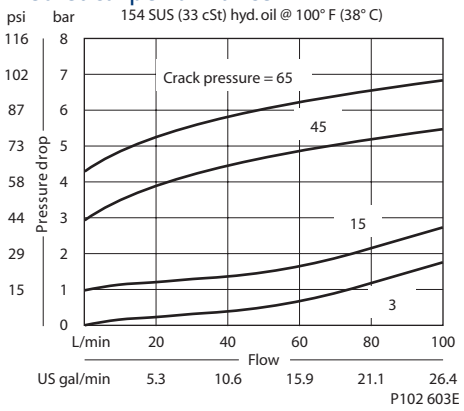
Cartridge Valves Technical Information
Check Valves
In-line
3CM14-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 603E

Schematic

P102 001E

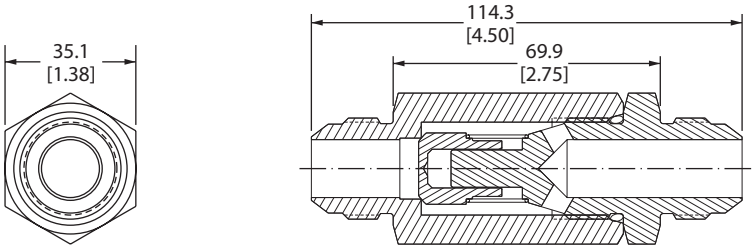
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	95 l/min [25 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.51 kg [1.12 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 597

ORDERING INFORMATION

3CM14-01-B-12F-12F-03

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Guide port
12F = SAE #12, 37° flare

Body port
12F = SAE #12, 37° flare

Seals — **Seal kit**
B = Buna-N — 720063
V = Viton — 720064

P102 609E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

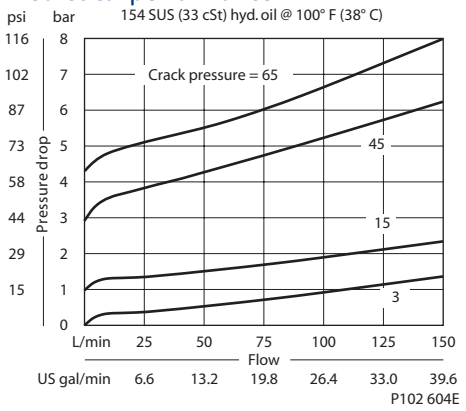
Cartridge Valves Technical Information
Check Valves
In-line
3CM15-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 604E

Schematic

P102 001E

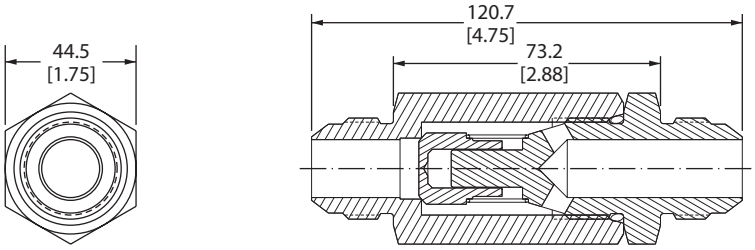
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	150 l/min [40 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	0.85 kg [1.87 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 598

ORDERING INFORMATION

3CM15-01-B-16F-16F-03

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Guide port
16F = SAE #16, 37° flare

Body port
16F = SAE #16, 37° flare

Seals
B = Buna-N
V = Viton

Seal kit
720063
720064

P102 610E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

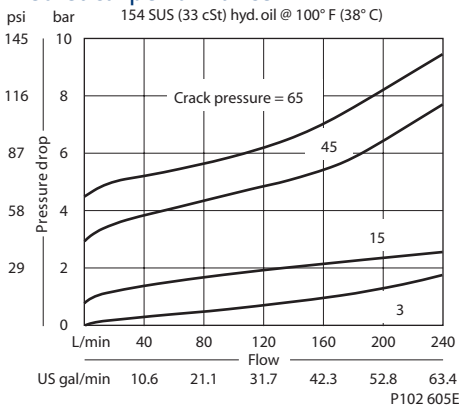
Cartridge Valves Technical Information
Check Valves
In-line
3CM16-01

OPERATION

This valve allows free flow from 1 to 2 and blocks flow from 2 to 1.

SPECIFICATIONS

Theoretical performance



P102 605E

Schematic

P102 001E

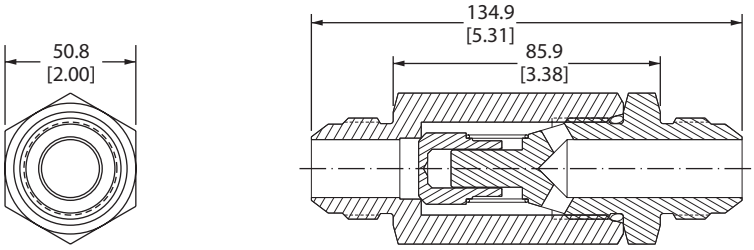
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	230 l/min [61 US gal/min]
Leakage	5 drops/min @ Rated pressure
Weight	1.47 kg [3.24 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 599

ORDERING INFORMATION

3CM16-01-B-20F-20F-03

Crack pressure
3 = 0.2 bar [3 psi]
15 = 1.0 bar [15 psi]
45 = 3.1 bar [45 psi]
65 = 4.5 bar [65 psi]

Guide port
20F = SAE #20, 37° flare

Body port
20F = SAE #20, 37° flare

Seals
B = Buna-N
V = Viton

Seal kit
720063
720064

P102 611E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

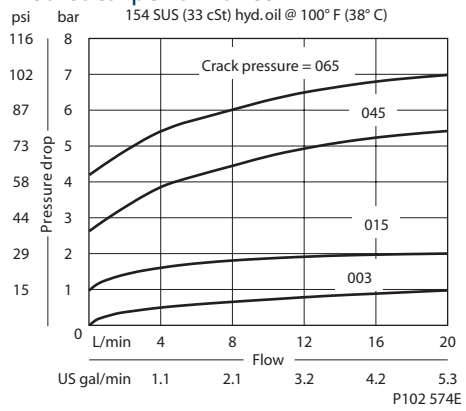
Cartridge Valves Technical Information
Check Valves
In-line
2RN11-01

OPERATION

This valve allows free flow from 1 to 2 and restricted flow from 2 to 1.

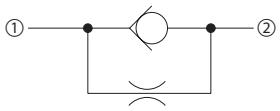
SPECIFICATIONS

Theoretical performance



P102 574E

Schematic



P102 592

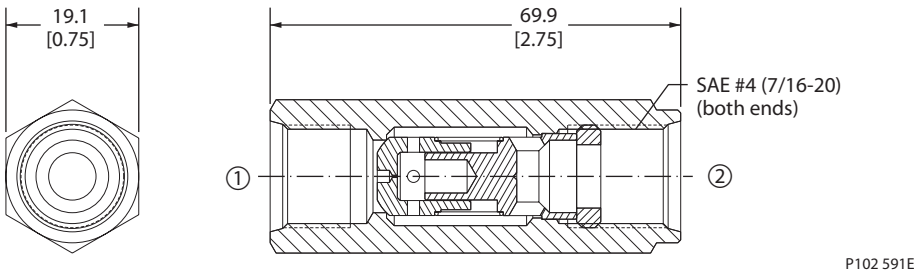
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	20 l/min [5 US gal/min]
Weight	0.11 kg [0.24 lb]
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 591E

ORDERING INFORMATION

2RN11-01-4S-003-021

Orifice size
021 = 0.53 mm [0.021 in]
030 = 0.76 mm [0.030 in]

Crack pressure
003 = 0.2 bar [3 psi]
015 = 1.0 bar [15 psi]
045 = 3.1 bar [45 psi]
065 = 4.5 bar [65 psi]

Port sizes
4S = SAE #4

P102 593E

Comatrol
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MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Check Valves
Notes

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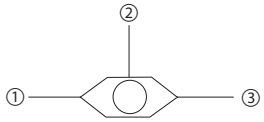
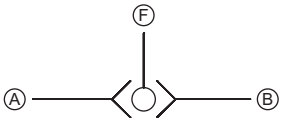
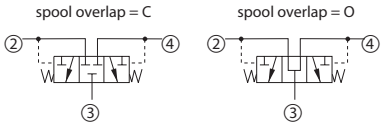
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
Quick Reference

Cartridge	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP124-1	CP04-3	Load Shuttle Valves, Normal direction	4 l/min [1 US gal/min]	210 bar [3000 psi]	03.4
	CP128-1	SDC08-3		10 l/min [3 US gal/min]	210 bar [3000 psi]	03.5
	SV 04	NCS04/3		15 l/min [4 US gal/min]	315 bar [4500 psi]	03.6
	CP120-4	SDC10-3		25 l/min [7 US gal/min]	330 bar [4800 psi]	03.7
	SV 06	NCS06/3		60 l/min [16 US gal/min]	315 bar [4500 psi]	03.8

In-line	Model No.	Cavity	Description	Flow*	Pressure	Page
	VS 06	none	Load shuttle Valve, In-line	35 l/min [9 US gal/min]	350 bar [5075 psi]	03.9
	VS 10	none		45 l/min [12 US gal/min]	350 bar [5075 psi]	03.10

Hot oil shuttle	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP720-3	SDC10-4	Hot Oil Shuttle	25 l/min [7 US gal/min]	350 bar [5000 psi]	03.11
	CP721-3	CP12-3M		90 l/min [24 US gal/min]	350 bar [5000 psi]	03.12

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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Cartridge Valves Technical Information
Shuttle Valves
Application Notes

OVERVIEW

There are two types of shuttle valves -- load shuttle valves and hot oil shuttle valves.

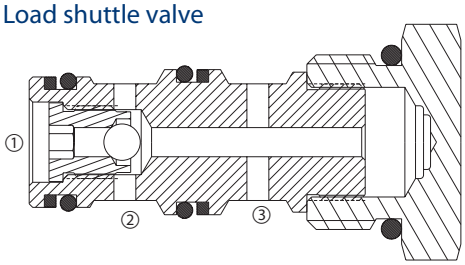
Shuttle valves

LOAD SHUTTLE VALVE

A load shuttle valve communicates the higher of two inlet pressures at 1 and 3 to the outlet at 2. A steel ball is used to seal the lower pressure. Load shuttles have several common applications including:

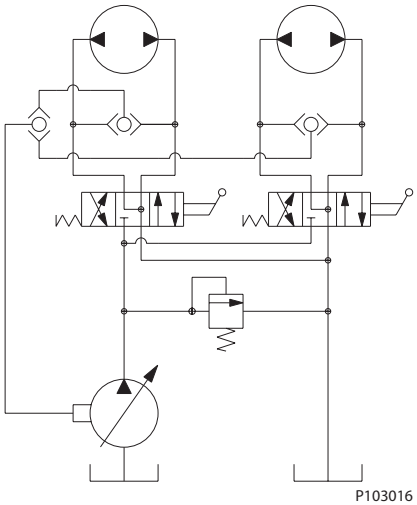
- Logic for load sensing circuits
- Bi-directional motor brake release valve

Load shuttle valve



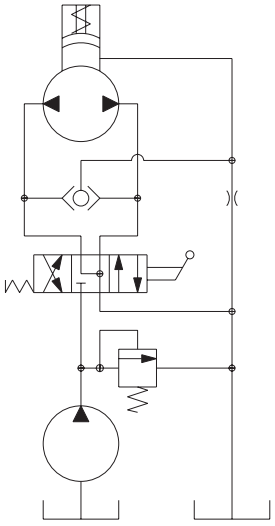
P103011

Load sensing circuit



P103016

Bi-directional motor brake release valve



P103017

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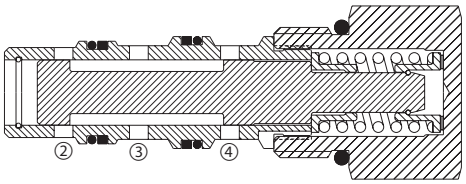
Cartridge Valves Technical Information
Shuttle Valves
Application Notes

HOT OIL SHUTTLE VALVE

Hot oil shuttles are spool-type valves that use internal piloting at 2 and 4 to direct oil from the lower of the two input pressures to the outlet at 3.

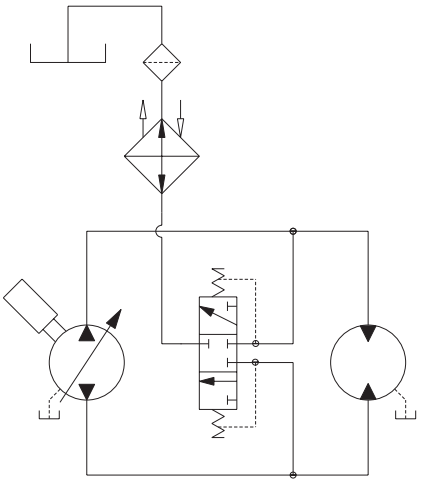
A common application for a hot oil shuttle is diverting fluid from the low pressure side of a closed-circuit hydrostatic loop for cooling and/or filtering.

Hot oil shuttle valve



P103018

Closed-circuit hydrostatic loop


P103019

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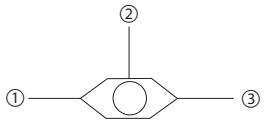
Cartridge Valves Technical Information
Shuttle Valves
Cartridge
CP124-1

OPERATION

This valve senses the higher of the two input pressures at ports 1 and 3 and routes it to the output port 2.

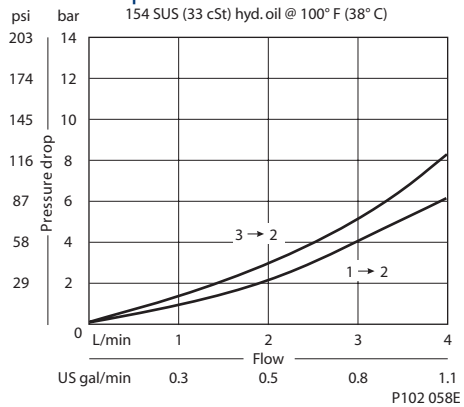
Schematic



P102 056E

SPECIFICATIONS

Theoretical performance



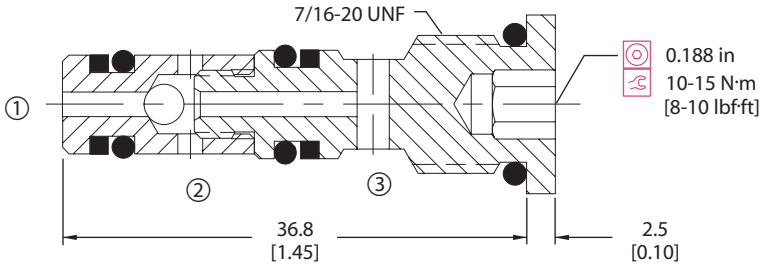
P102 058E

Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	4 l/min [1 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.02 kg [0.04 lb]
Cavity	CP04-3

DIMENSIONS
mm [in]

Cross-sectional view



P102 057E

ORDERING INFORMATION

CP124 - 1 - B - 4S

Seals

	Seal kit
B = Buna-N	120111
V = Viton	120282

Housing and ports

	Housing P/N
0 = No Housing	No Housing
2B = AL, 1/4 BSP	CP04-3-2B
4S = AL, #4 SAE	CP04-3-4S

Other housings available

P102 138E

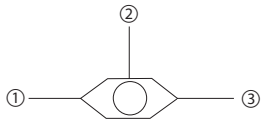
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
Cartridge
CP128-1

OPERATION

This valve senses the higher of the two input pressures at ports 1 and 3 and routes it to the output port 2.

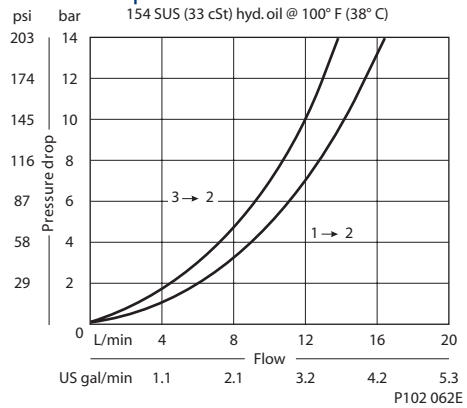
Schematic



P102 056E

SPECIFICATIONS

Theoretical performance



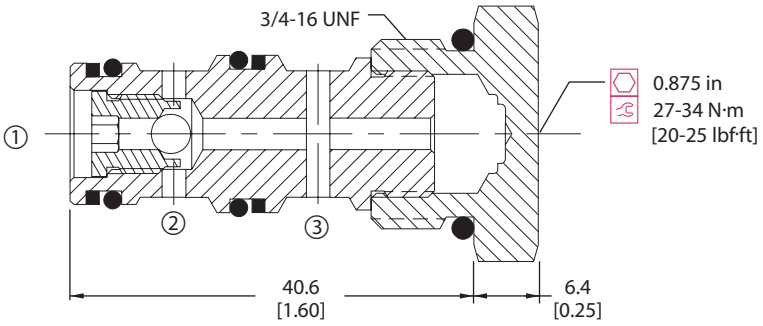
P102 062E

Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	10 l/min [3 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.06 kg [0.14 lb]
Cavity	SDC08-3

DIMENSIONS
mm [in]

Cross-sectional view



P102 061E

ORDERING INFORMATION

CP128 - 1 - B - 4S

Seals

	Seal kit
B = Buna-N	120238
V = Viton	120239

Housing and ports

		Housing P/N
0	= No Housing	No Housing
SE2B	= AL, 1/4 BSP	SDC08-3-SE-2B
SE3B	= AL, 3/8 BSP	SDC08-3-SE-3B
4S	= AL, #4 SAE	CP08-3-4S
6S	= AL, #6 SAE	CP08-3-6S

Other housings available

P102 109E

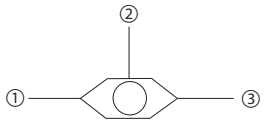
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
Cartridge
SV 04

OPERATION

This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

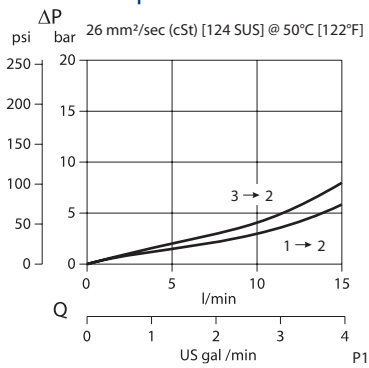
Schematic



P102 056E

SPECIFICATIONS

Theoretical performance



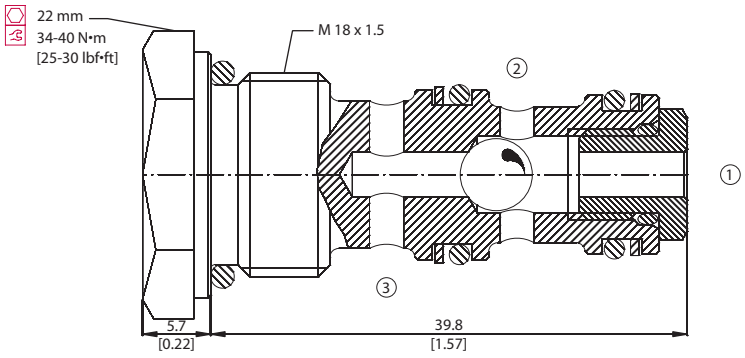
P103 332E

Specifications

Rated pressure	315 bar [4500 psi]
Rated flow at 7 bar [100 psi]	15 l/min [4 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.07 kg [0.15 lb]
Cavity	NCS04/3

DIMENSIONS
mm [in]

Cross-sectional view



P103 331

ORDERING INFORMATION

SV 04 - 00 - V

Housing and ports
00 = No Housing
SE1/4 = AL, 1/4 BSP
SE4S = AL, #4 SAE
SE6S = AL, #6 SAE
Other housings available

Housing P/N
No Housing
NCS04/3-SE-1/4
NCS04/3-SE-4S
NCS04/3-SE-6S

Seals **Seal kit**
Omit = Buna-N 230000160
V = Viton 230000450

P103333E

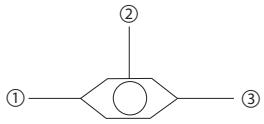
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
Cartridge
CP120-4

OPERATION

This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

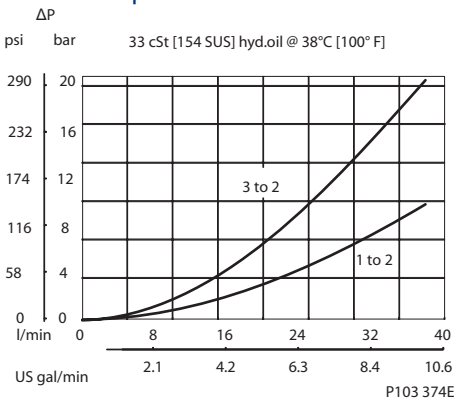
Schematic



P102 056E

SPECIFICATIONS

Theoretical performance



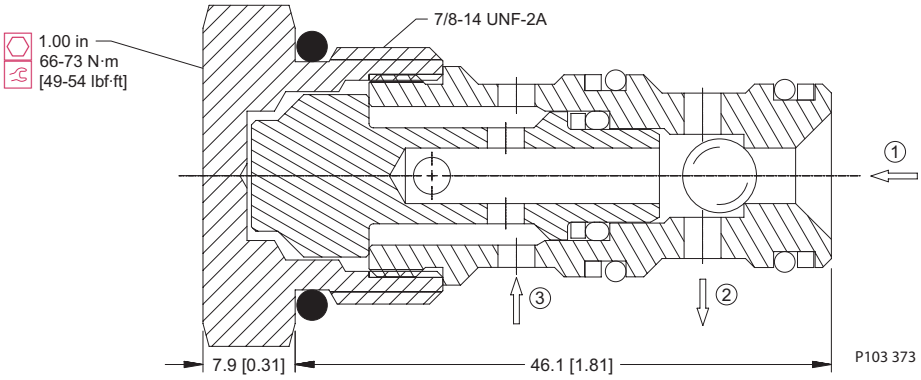
P103 374E

Specifications

Rated pressure	330 bar [4800 psi]
Rated flow at 7 bar [100 psi]	25 l/min [7 US gal/min]
Leakage	6 drops/min @
Weight	0.10 kg [0.22 lb]
Cavity	SDC10-3

DIMENSIONS
mm [in]

Cross-sectional view



P103 373

ORDERING INFORMATION

CP120 - 4 - B - 8S

Seals	Seal kit
B = Buna-N	120240
V = Viton	11043064

Housing and ports		**Housing P/N**
00	= No Housing	No Housing
SE3B	= AL, 3/8 BSP	SDC10-3-SE-3B
SE4B	= AL, 1/2 BSP	SDC10-3-SE-4B
6S	= AL, #6 SAE	CP10-3-6S
8S	= AL, #8 SAE	CP10-3-8S

Other housings available

P103 375E

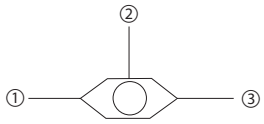
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
Cartridge
SV 06

OPERATION

This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

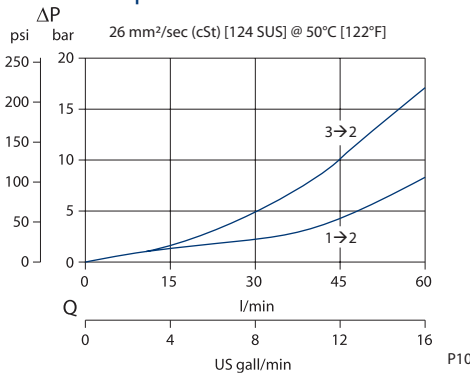
Schematic



P102 056E

SPECIFICATIONS

Theoretical performance



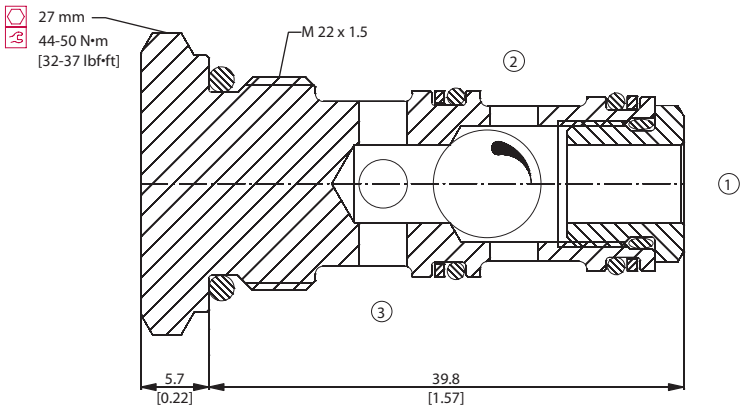
P1C

Specifications

Rated pressure	315 bar [4500 psi]
Rated flow at 7 bar [100 psi]	60 l/min [16 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.11 kg [0.24 lb]
Cavity	NCS06/3

DIMENSIONS
mm [in]

Cross-sectional view



P103 366

ORDERING INFORMATION

SV 06 - SE3/8 - V

Housing and ports	**Housing P/N**
00 = No Housing	No Housing
SE3/8 = AL, 3/8 BSP	NCS06/3-SE3/8
SE1/2 = AL, 1/2 BSP	NCS06/3-SE1/2
SE6S = AL, #6 SAE	NCS06/3-SE-6S
SE8S = AL, #8 SAE	NCS06/3-SE-8S

Other housings available

Seals	Seal Kit
V = Viton	230000110
Omit = Buna-N	230000070

P103 368E

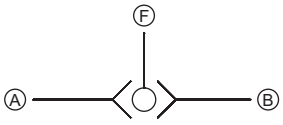
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
In-line
VS 06

OPERATION

This valve senses the higher of the two input pressures and routes it to the output port.

Schematic

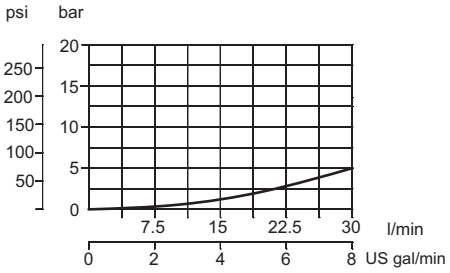


P104 559

SPECIFICATIONS

Theoretical performance

Pressure drop
26 cSt [121 SUS] hyd.oil at 50°C [122 °F]
Free flow from A⇒F or B⇒F



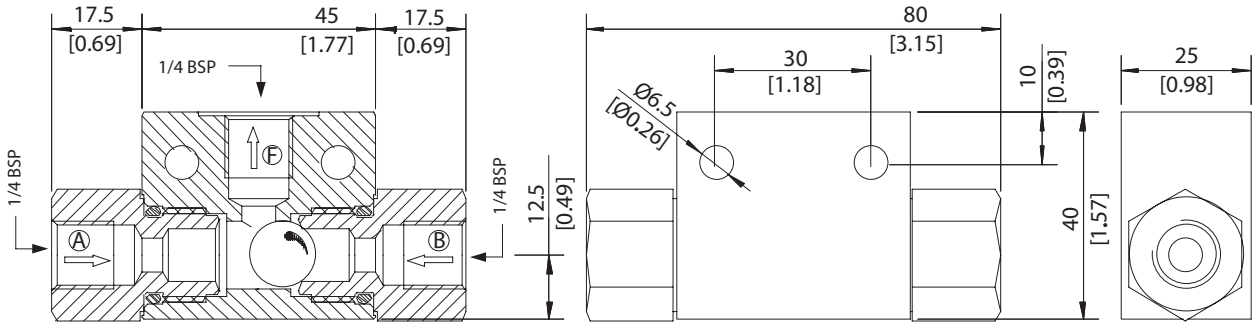
P104565

Specifications

Rated pressure	350 bar [5075 psi]
Rated flow at 7 bar [100 psi]	35 l/min [9 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.22 kg [0.49 lb]
Cavity	none

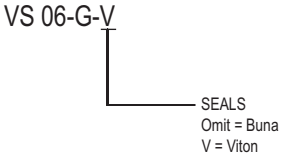
DIMENSIONS
mm [in]

Cross-sectional view



P104 564

ORDERING INFORMATION



P104 560E

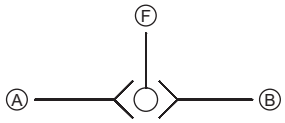
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
In-line
VS 10

OPERATION

This valve senses the higher of two input pressures and routes it to the output port.

Schematic

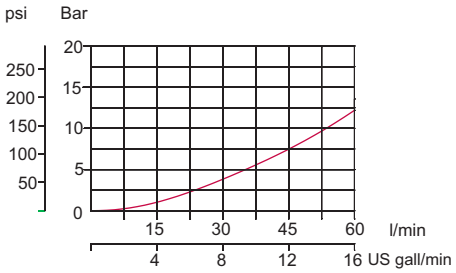


P104 559

SPECIFICATIONS

Theoretical performance

Pressure drop
26 cSt [121 SUS] hyd.oil at 50°C [122 °F]
Free flow from A⇒F or B⇒F



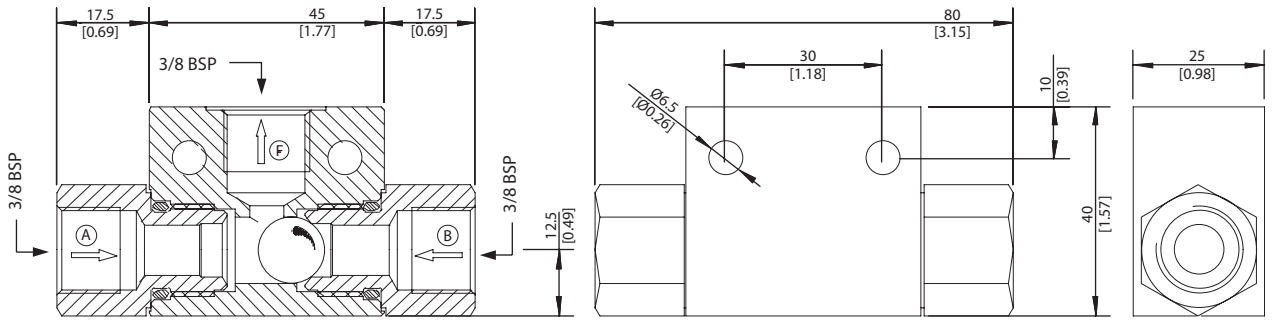
P104 567E

Specifications

Rated pressure	350 bar [5075 psi]
Rated flow at 7 bar [100 psi]	45 l/min [12 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.19 kg [0.42 lb]
Cavity	none

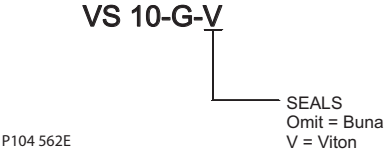
DIMENSIONS
mm [in]

Cross-sectional view



P104 566

ORDERING INFORMATION



P104 562E

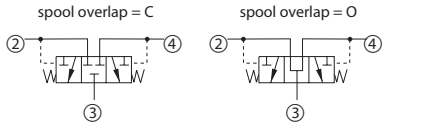
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
Hot Oil Shuttle
CP720-3

OPERATION

This valve has an internally piloted spool that directs flow from the lower pressure inlet, 2 or 4, to the output at 3.

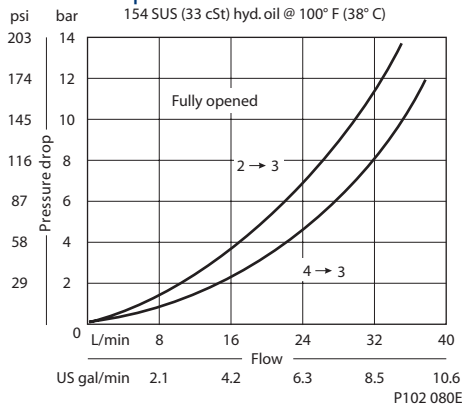
Schematic



P102 078E

SPECIFICATIONS

Theoretical performance



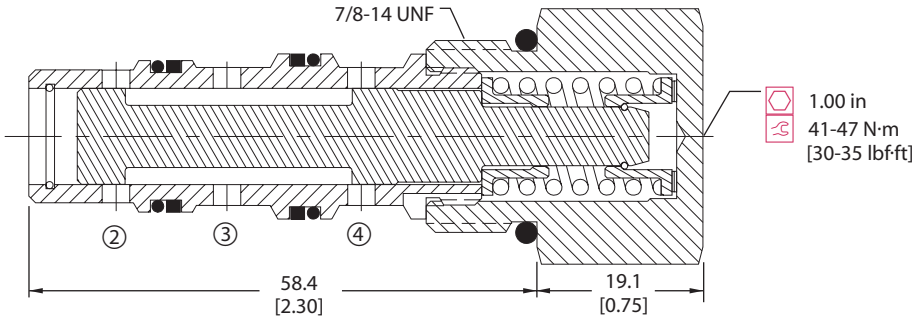
P102 080E

Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	25 l/min [7 US gal/min]
Leakage	82 cm³/min [5 in³/min] @ 207 bar [3000 psi]
Weight	0.15 kg [0.34 lb]
Cavity	SDC10-4

DIMENSIONS
mm [in]

Cross-sectional view



P102 079E

ORDERING INFORMATION

CP720 - 3 - B - 8S - 080 - C

Seals

	Seal kit
B = Buna-N	11032943
V = Viton	11032944

Housing and ports

0	= No Housing
L3B	= AL, 3/8 BSP
L4B	= AL, 1/2 BSP
6S	= AL, #6 SAE
8S	= AL, #8 SAE

Other housings available

Housing P/N

No Housing
SDC10-4-L-3B
SDC10-4-L-4B
CP10-4-6S-X1
CP10-4-8S-X1

Spool overlap

O = Open
C = Closed

Shift pressure

	bar	[psi]
050	= 3.4	[50]
080	= 5.5	[80]

P102 126E

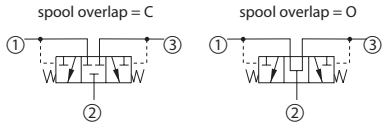
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Shuttle Valves
Hot Oil Shuttle
CP721-3

OPERATION

This valve has an internally piloted spool that directs flow from the lower pressure inlet, 1 or 3, to the output at 2.

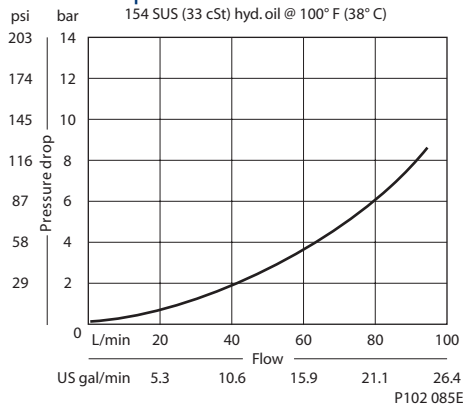
Schematic



P102 083E

SPECIFICATIONS

Theoretical performance



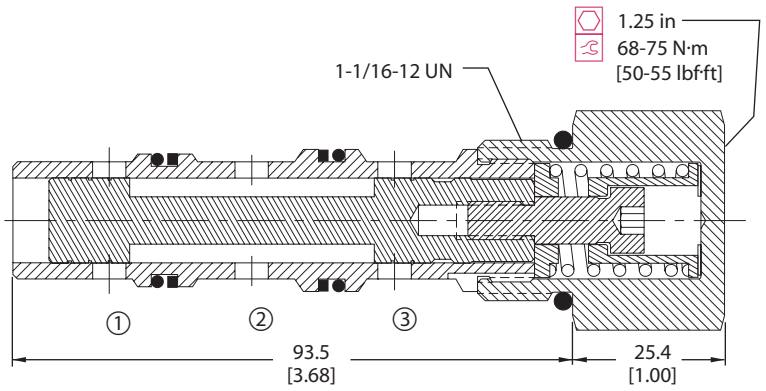
P102 085E

Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	90 l/min [24 US gal/min]
Leakage	82 cm³/min [5 in³/min] @ 207 bar [3000 psi]
Weight	0.34 kg [0.75 lb]
Cavity	CP12-3M

DIMENSIONS
mm [in]

Cross-sectional view



P102 084E

ORDERING INFORMATION

CP721 - 3 - B - 12S - 100 - C

Seals

B = Buna-N
V = Viton

Seal kit
120098
120099

Housing and ports

0 = No Housing
4B = AL, 1/2 BSP
6B = AL, 3/4 BSP
10S = AL, #10 SAE
12S = AL, #12 SAE
Other housings available

Housing P/N

No Housing
CP12-3M-4B
CP12-3M-6B
CP12-3M-10S
CP12-3M-12S

Spool overlap

O = Open
C = Closed

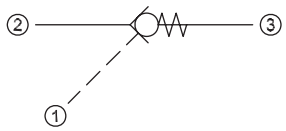
Shift pressure

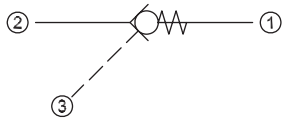
	bar	[psi]
025 =	1.6	[25]
050 =	3.4	[50]
100 =	6.9	[100]

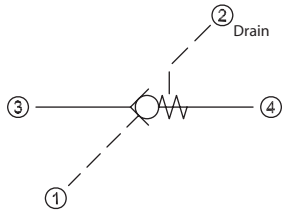
P102 106E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Quick reference

Pilot to Open	Model No.	Cavity	Description	Flow*	Pressure	Page
	RPC 04	NCS04/3	Pilot Operated Check Valve, Pilot to Open	12 l/min [3 US gal/min]	210 bar [3000 psi]	08.6
	RPC 06	NCS06/3		25 l/min [7 US gal/min]	315 bar [4500 psi]	08.7
	CP450-1	SDC10-3		30 l/min [8 US gal/min]	240 bar [3480 psi]	08.8
	RPC 12	NCS12/3		70 l/min [18 US gal/min]	315 bar [4500 psi]	08.9

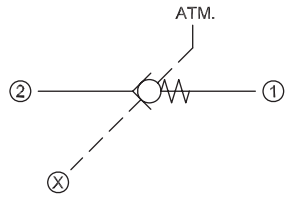
Pilot to Open	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP458-2	SDC08-3	Pilot Operated Check Valve, Reverse Pilot to Open	20 l/min [5 US gal/min]	210 bar [3000 psi]	08.10
	MC10-RO	SDC10-3S		45 l/min [12 US gal/min]	250 bar [3600 psi]	08.11
	CP451-2	CP12-3S		95 l/min [25 US gal/min]	210 bar [3000 psi]	08.12
	CP452-2	SDC16-3S		130 l/min [34 US gal/min]	210 bar [3000 psi]	08.13
	CP453-2	CP20-3S		230 l/min [61 US gal/min]	210 bar [3000 psi]	08.14

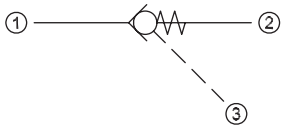
Pilot to Open	Model No.	Cavity	Description	Flow*	Pressure	Page
	RPV 06	NCS06/4	Pilot Operated Check Valve, Pilot-to-open with drain	30 l/min [8 US gal/min]	315 bar [4500 psi]	08.15

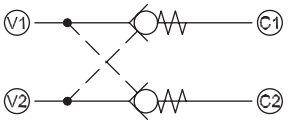
* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Quick reference

Symbol	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP453-5	SDC20-2	Pilot Operated Check Valve, Reverse Pilot-to-open with vent	250 l/min [66 US gal/min]	350 bar [5000 psi]	08.16

Pilot to Close	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP460-1	SDC10-3	Pilot Operated Check Valve, Pilot to Close	45 l/min [12 US gal/min]	210 bar [3000 psi]	08.17
	CP461-1	CP12-3S		115 l/min [30 US gal/min]	210 bar [3000 psi]	08.18
	CP462-1	SDC16-3S		190 l/min [50 US gal/min]	210 bar [3000 psi]	08.19

Dual Pilot-Operated Checks	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP410-1	none	Pilot Operated Check Valve, Catalog HIC	85 l/min [22 US gal/min]	210 bar [3000 psi]	08.20

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

Comatrol
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Cartridge Valves Technical Information
Pilot operated check valves
Application notes

MOTION CONTROL VALVES

Motion control valves, also referred to as load holding valves, are used to control the motion of a load in the following ways:

- Prevent a load from dropping in case of hose or tube failure.
- Prevent a load from drifting caused by directional control valve spool leakage.
- Provide smooth, modulated motion when the load is in a lowering or run-away mode.
- Provide smooth, modulated motion when the directional control valve is suddenly closed.

There are two basic types of motion control valves:

- Pilot-operated, or pilot-to-open check valves will satisfy the first two of the above requirements.
- Counterbalance valves will satisfy all four of the above requirements.

Pilot operated check valves

F102 009

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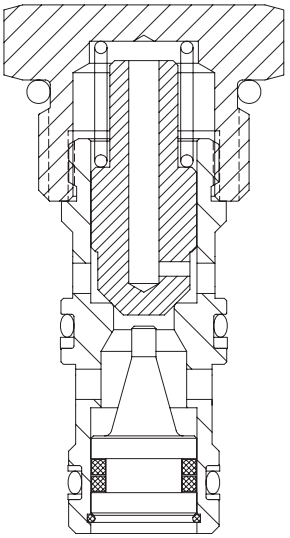
Cartridge Valves Technical Information
Pilot operated check valves
Application notes

PILOT-OPERATED CHECK VALVES

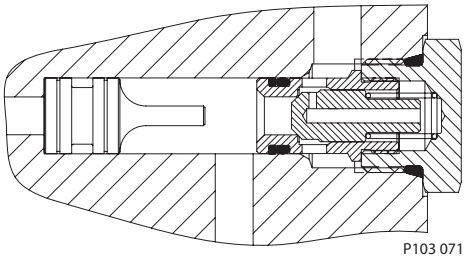
Pilot-operated, or pilot-to-open check valves will positively hold a pressurized load and will release the load upon application of a pressure signal to the pilot port. Pilot-operated check valves are available as individual cartridges, standard **C**artridge-**I**n-**B**ody (**CIB**) packages, or can be created in custom manifolds by using a standard check valve such as CV10-NP with a guided pilot piston. For more information on pilot pistons, see Accessories.

Individual cartridges



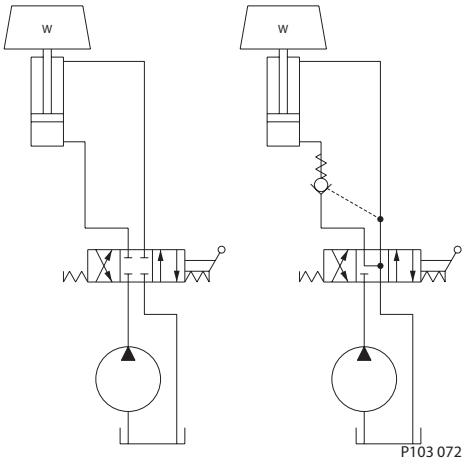
P103 070

Cartridge in body



P103 071

Typical circuit application



P103 072

A typical circuit application for pilot-operated check valves contains a pump, directional control valve, and an actuator. Without a pilot-operated check valve the load will drift down due to spool leakage if the directional control valve is centered with the load raised. Additionally there is no protection against the load dropping in the event of hydraulic line failure. Adding a pilot-operated check valve helps prevent cylinder drift and provides protection against hose or tube failure. In this circuit, moving the directional control valve to the right causes the cylinder to extend. When the directional control valve is centered, the pilot-operated check valve will prevent leakage and lock the cylinder in position. Moving the directional control valve to the right sends pressure/flow to the rod end of the cylinder. This pressure also acts on the pilot piston to open the check valve and allow the load to be lowered.

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Cartridge Valves Technical Information
Pilot operated check valves
Application notes

PILOT-OPERATED CHECK VALVES (continued)

The pressure required to pilot open the check valve can be calculated by:

$$P = \frac{W + (Pc \cdot Ab)}{(Ab \cdot R) - Ar}$$ cylinder retracts

$$P = \frac{W + (Pc \cdot Ar)}{(Ar \cdot R) - Ab}$$ cylinder extends

W = Load
Pc = Check valve crack pressure (typically 0.34-4.5 bar [5-65 psi]; consult catalog sheets for details)
Ab = Cylinder bore area
Ar = Cylinder rod area
R = Check valve pilot ratio (typically 3:1 or 4:1; consult catalog sheets for details)

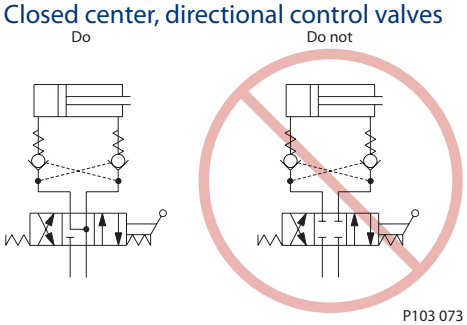
Note that these equations are idealized and do not consider any backpressure in the circuit, which is additive to the pressure required to pilot open the check valve.

Some additional guidelines for pilot-operated check valve applications:

- Use pilot-operated check valves for load holding, not for motion (speed) control. Pilot-operated check valves are on-off, non-modulating devices. Trying to use a pilot-operated check valve to control an overrunning load can result in severely unstable motion. For motion (speed) control of overrunning loads, use a counterbalance valve.

- Use caution when applying pilot-operated check valves to the rod end of a cylinder. Cylinders with large rod:bore diameter ratios may intensify rod pressure to a point where the required pilot pressure may be dangerously high— refer to the above equations. If intensification creates application concerns, consider using a counterbalance valve.

Closed center, directional control valves



P103 073

- Do not use pilot-operated check valves with closed-center, directional control valves. Pressure trapped between the directional control valve and the pilot-operated check valve can pilot the check valve open and result in undesired load motion.

- Locate pilot-operated check valves at or near the actuator to provide maximum load holding protection in the event of hydraulic line failure.

Comatrol
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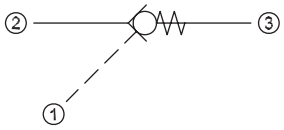
Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
RPC 04

OPERATION

This is a pilot-to-open check valve.

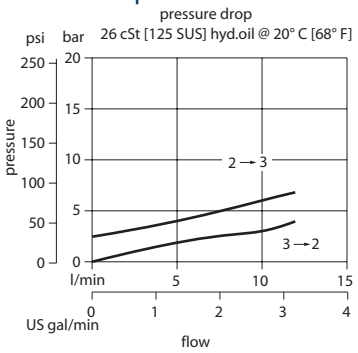
Schematic



P102 381E

SPECIFICATIONS

Theoretical performance



P103 679E

Specifications

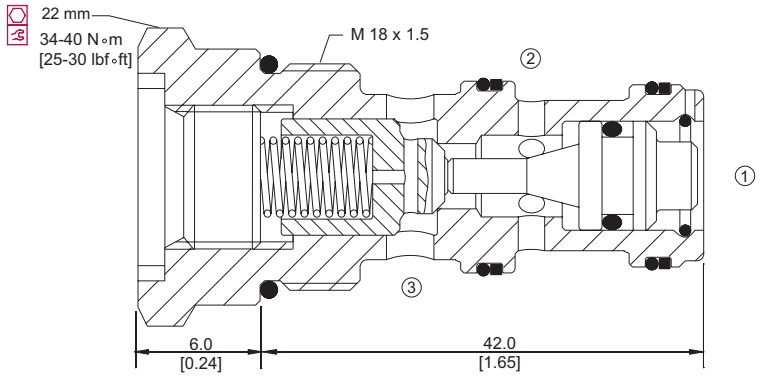
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	12 l/min [3 US gal/min]
Weight	0.06 kg [0.13 lb]
Pilot ratio	3.2:1
Cavity	NCS04/3

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P103 652

ORDERING INFORMATION

RPC 04 - 2.5 - OR - 00 - V

Pressure to open
0.5 = 0.5 bar [7 psi]
2.5 = 2.5 bar [36 psi]
5.0 = 5 bar [72 psi]

Piston seals
OR = Seal
Omit = No seal

Seals
V = Viton
Omit = Buna-N

Seal kit
230000450
230000160

Housing and ports

		Housing P/N
00	= No Housing	No Housing
SE1/4	= AL, 1/4 BSP	NCS04/3-SE-1/4
SE4S	= AL, #4 SAE	NCS04/3-SE-4S
SE6S	= AL, #6 SAE	NCS04/3-SE-6S

Other housings available

P103 706E

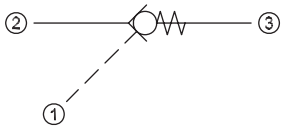
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
RPC 06

OPERATION

This is a pilot-to-open check valve.

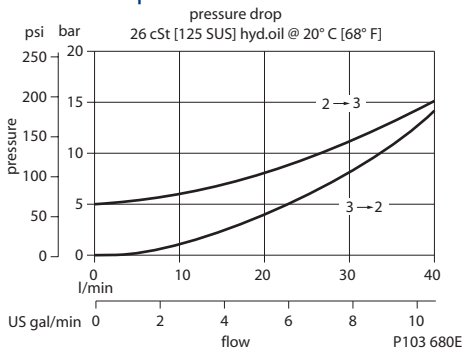
Schematic



P102 381E

SPECIFICATIONS

Theoretical performance



P103 680E

Specifications

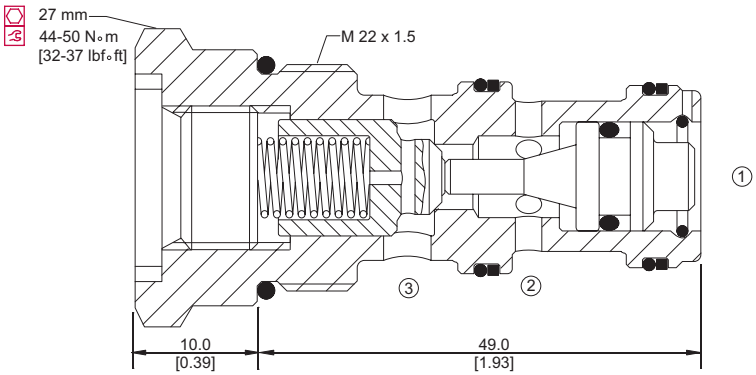
Rated pressure	315 bar [4500 psi]
Rated flow at 7 bar [100 psi]	25 l/min [7 US gal/min]
Weight	0.10 kg [0.22 lb]
Pilot ratio	3.4:1
Cavity	NCS06/3

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P103 653

ORDERING INFORMATION

RPC 06 - 5 - OR - 00 - V

Pressure to open
0.5 = 0.5 bar [7 psi]
5 = 5 bar [73 psi]

Piston seals
OR = Seals
Omit = No seals

Seals
V = Viton
Omit = Buna-N

Seal kit
230000110
230000070

Housing and ports

		Housing P/N
00	= No Housing	No Housing
SE3/8	= AL, 3/8 BSP	NCS06/3-SE-3/8
SE3/4	= AL, 3/4 BSP	NCS06/3-SE-1/2
SE6S	= AL, #6 SAE	NCS06/3-SE-6S
SE8S	= AL, #8 SAE	NCS06/3-SE-8S

Other housings available

P103 707E

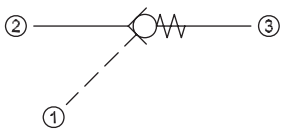
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
CP450-1

OPERATION

This valve is a pilot-to-open check valve.

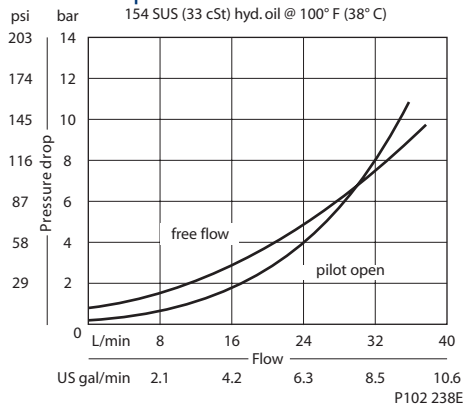
Schematic



P102 381E

SPECIFICATIONS

Theoretical performance



P102 238E

Specifications

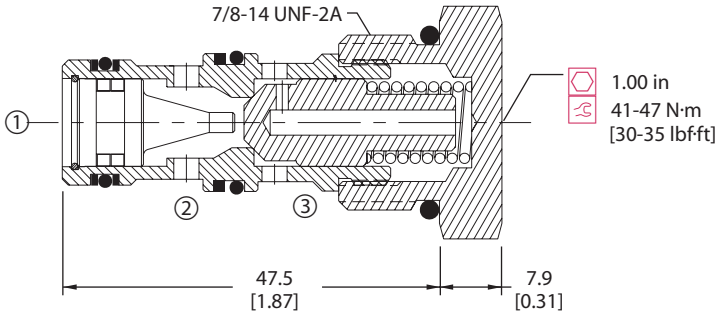
Rated pressure	240 bar [3480 psi]
Rated flow at 7 bar [100 psi]	30 l/min [8 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.09 kg [0.20 lb]
Pilot ratio	3.0:1
Cavity	SDC10-3

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P102 236E

ORDERING INFORMATION

CP450 - 1 - B - 8S - 015 - 0

Seals

	Seal kit
B = Buna-N	120570
V = Viton	120571

Body and ports

	Body P/N
0 = Cartridge	No body
6S = Aluminum, #6 SAE	CP10-3-6S
8S = Aluminum, #8 SAE	CP10-3-8S
SE3B = Aluminum, 3/8 BSP	SDC10-3-SE-3B
SE4B = Aluminum, 1/2 BSP	SDC10-3-SE-4B

Piston seals
0 = No seals
S = Seals included

Cracking Pressure

bar	[psi]
065 = 4.48	[65]
115 = 7.90	[115]
200 = 13.8	[200]
315 = 21.8	[315]

P102 067E

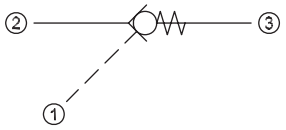
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
RPC 12

OPERATION

This is a pilot-to-open check valve.

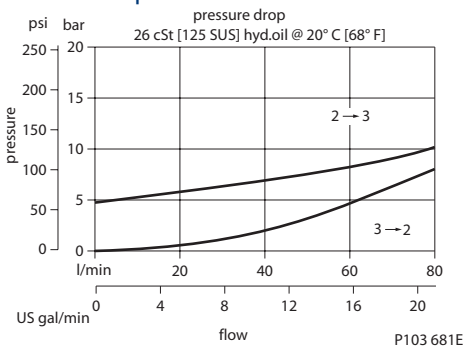
Schematic



P102 381E

SPECIFICATIONS

Theoretical performance



P103 681E

Specifications

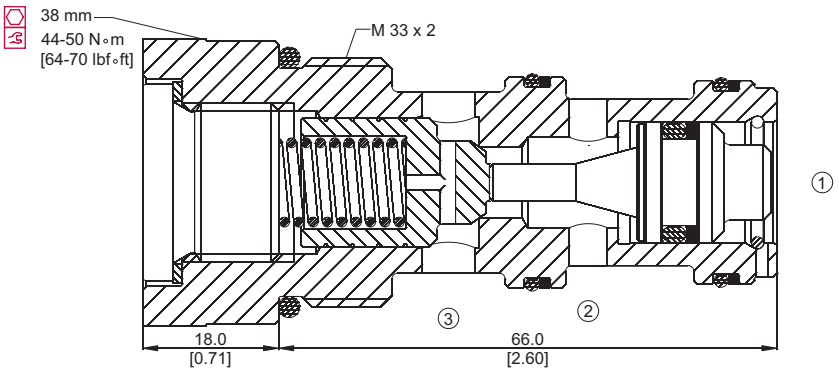
Rated pressure	315 bar [4500 psi]
Rated flow at 7 bar [100 psi]	70 l/min [18 US gal/min]
Weight	0.20 kg [0.44 lb]
Pilot ratio	2.8:1
Cavity	NCS12/3

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P103 654

ORDERING INFORMATION

RPC 12 - 5 - OR - 00 - V

Pressure to open
0.5 = 0.5 bar [7 psi]
5 = 5 bar [73 psi]

Piston seals
OR = Seals
Omit = No seals

Housing and ports

		Housing P/N
00	= No Housing	No Housing
SE1/2	= AL, 1/2 BSP	NCS12/3-SE-1/2
SE3/4	= AL, 3/4 BSP	NCS12/3-SE-3/4
SE8S	= AL, #8 SAE	NCS12/3-SE-8S
SE12S	= AL, #12 SAE	NCS12/3-SE-12S

Other housings available

Seals
V = Viton
Omit = Buna-N

Seal kit
230000360
230000130

P103 708E

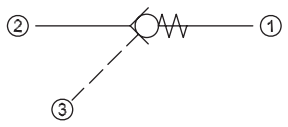
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
CP458-2

OPERATION

This valve is a pilot-to-open check valve.

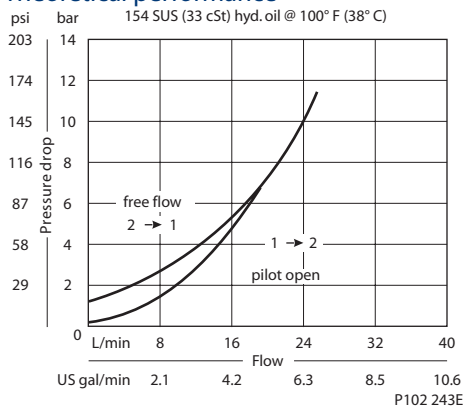
Schematic



P102 377E

SPECIFICATIONS

Theoretical performance



P102 243E

Specifications

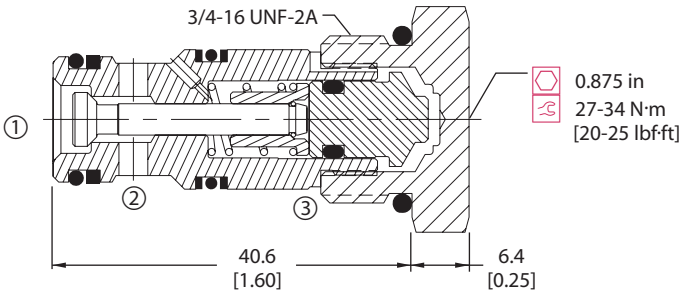
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	20 l/min [5 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.07 kg [0.15 lb]
Pilot ratio	2.8:1
Cavity	SDC08-3

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P102 242E

ORDERING INFORMATION

CP458 - 2 - B - 6S - 065 - 0

Seals
B = Buna-N
V = Viton

Seal kit
120250
120253

Housing and ports

			Housing P/N
0	=	No Housing	No Housing
SE2B	=	Al, 1/4 BSP	SDC08-3-SE-2B
SE3B	=	Al, 3/8 BSP	SDC08-3-SE-3B
4S	=	Al, #4 SAE	CP08-3-4S
6S	=	Al, #6 SAE	CP08-3-6S

Other housings available

Piston seals
0 = No seals
S = Seals included

Crack Pressure

bar	[psi]
065 = 4.48	[65]

P102 076E

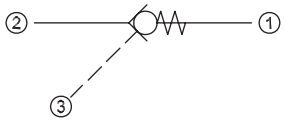
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
MC10-RO

OPERATION

This is a pilot-to-open check valve.

Schematic

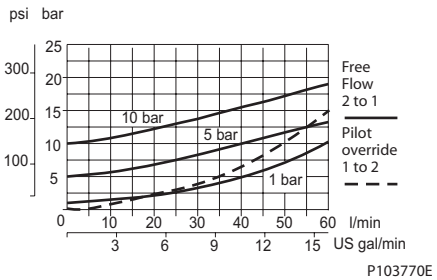


P102 377E

SPECIFICATIONS

Theoretical performance

26 cSt [121 SUS] hyd.oil at 50°C [122°F]



P103770E

Specifications

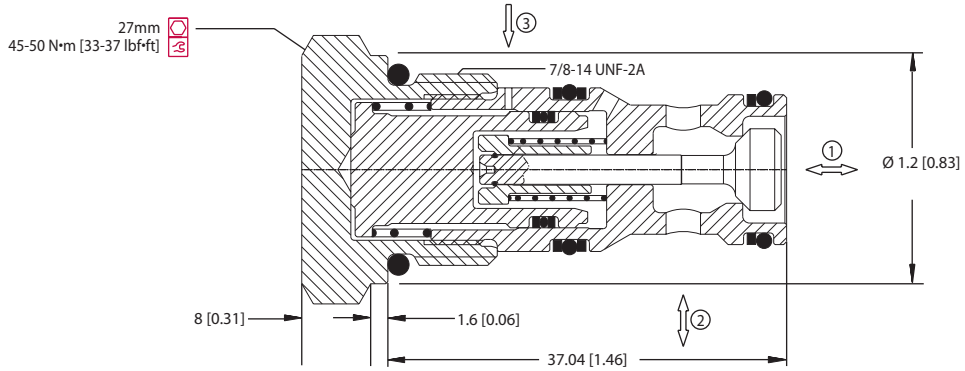
Rated pressure	250 bar [3600 psi]
Rated flow at 7 bar [100 psi]	45 l/min [12 US gal/min]
Leakage	6 drops/min @
Weight	0.12 kg [0.26 lb]
Pilot ratio	3.0:1
Cavity	SDC10-3S

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P103 753

ORDERING INFORMATION

MC10-RO-5-OR-A-B-6S

Crack Pressure
1 = 1 bar [15 psi]
5 = 5 bar [73 psi]
10 = 10 bar [145 psi]

Piston seals
Omit = No seal
OR = Seals included

Housing and ports			**Housing P/N**
00	=	No Housing	No Housing
SE3B	=	Al, 3/8 BSP	SDC10-3S-SE-3B
SE4B	=	Al, 1/2 BSP	SDC10-3S-SE-4B
6S	=	Al, #6 SAE	SDC10-3S-6S/6S
8S	=	Al, #8 SAE	SDC10-3S-8S/6S

Other housings available

Seals	**Seal kit**
B = Buna-N	35401419
V = Viton	35401519

P103 771E

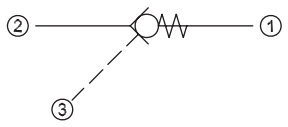
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
CP451-2

OPERATION

This valve is a pilot-to-open check valve.

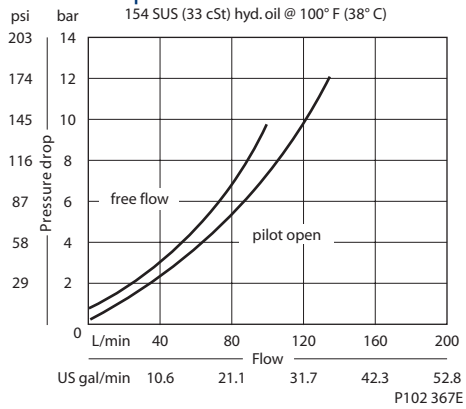
Schematic



P102 377E

SPECIFICATIONS

Theoretical performance



P102 367E

Specifications

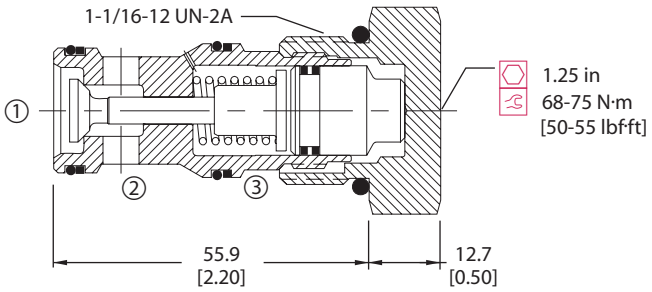
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	95 l/min [25 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.21 kg [0.46 lb]
Pilot ratio	3:1
Cavity	CP12-3S

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P102 354E

ORDERING INFORMATION

CP451 - 2 - B - 12S - 065 - 0

Seals

	Seal kit
B = Buna-N	120204
V = Viton	120205

Housing and ports

		Housing P/N
0	= No Housing	No Housing
4B	= Al, 1/2 BSP	CP12-3S-4B/2B
6B	= Al, 3/4 BSP	CP12-3S-6B/2B
10S	= Al, #10 SAE	CP12-3S-10S/4S
12S	= Al, #12 SAE	CP12-3S-12S/4S

Other housings available

Piston seals
0 = No seals
S = Seals included

Crack Pressure

bar	[psi]
065 = 4.48	[65]

P102 063E

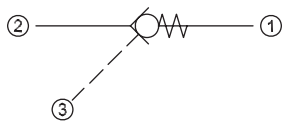
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
CP452-2

OPERATION

This valve is a pilot-to-open check valve.

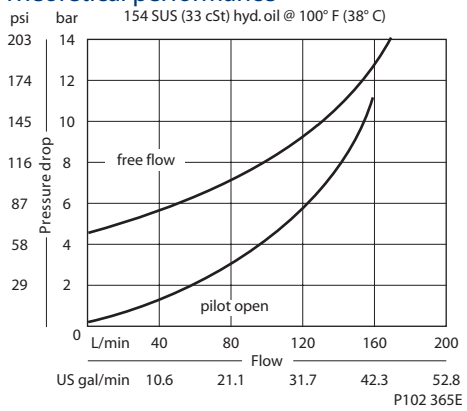
Schematic



P102 377E

SPECIFICATIONS

Theoretical performance



P102 365E

Specifications

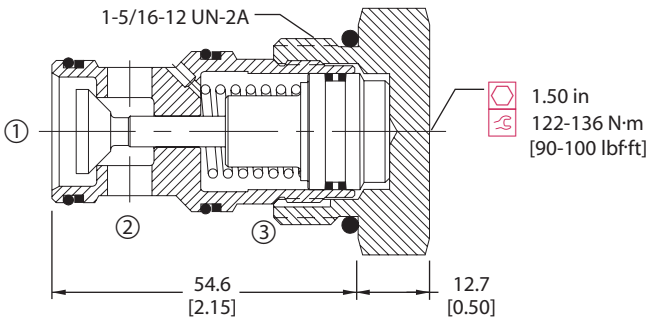
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	130 l/min [34 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.29 kg [0.64 lb]
Pilot ratio	3:1
Cavity	SDC16-3S

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P102 352E

ORDERING INFORMATION

CP452 - 2 - B - 16S - 065 - 0

Seals
B = Buna-N
V = Viton

Seal kit
120033
120034

Housing and ports

		Housing P/N
0	= No Housing	No Housing
6B	= Al, 3/4 BSP	CP16-3S-6B/2B
8B	= Al, 1 BSP	CP16-3S-8B/2B
12S	= Al, #12 SAE	CP16-3S-12S/4S
16S	= Al, #16 SAE	CP16-3S-12S/4S

Other housings available

Piston seals
0 = No seals
S = Seals included

Crack Pressure

bar	[psi]
065 = 4.48	[65]

P102 081E

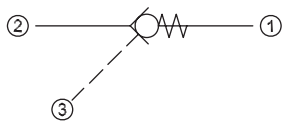
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open
CP453-2

OPERATION

This valve is a pilot-to-open check valve.

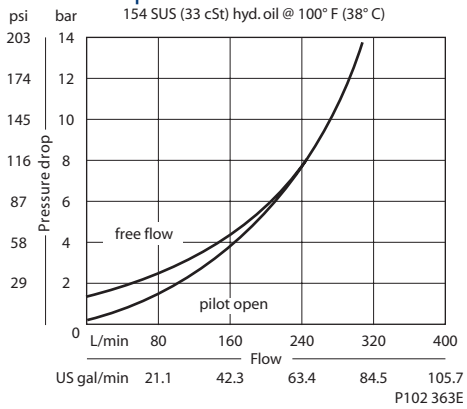
Schematic



P102 377E

SPECIFICATIONS

Theoretical performance



P102 363E

Specifications

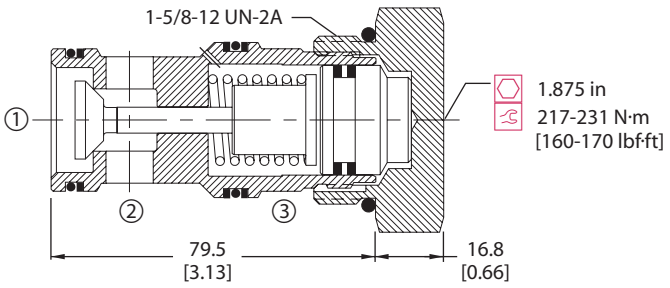
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	230 l/min [61 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.66 kg [1.46 lb]
Pilot ratio	3:1
Cavity	CP20-3S

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P102 350E

ORDERING INFORMATION

CP453 - 2 - B - 20S - 065 - 0

Seals
B = Buna-N
V = Viton

Seal kit
120380
120381

Housing and ports
0 = No Housing
8B = Al, 1 BSP
10B = Al, 1-1/4 BSP
16S = Al, #16 SAE
20S = Al, #20 SAE
Other housings available

Housing P/N
No Housing
CP20-3S-8B/2B
CP20-3S-10B/2B
CP20-3S-16S/4S
CP20-3S-20S/4S

Piston seals
0 = No seals
S = Seals included

Crack Pressure

	bar	[psi]
065	= 4.48	[65]

P102 086E

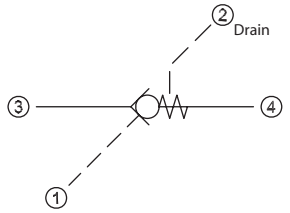
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open with Drain
RPV 06

OPERATION

This is a pilot-to-open check valve with an internal drain.

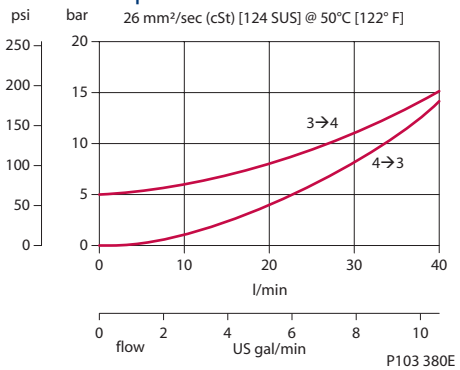
Schematic



P103 511

SPECIFICATIONS

Theoretical performance



P103 380E

Specifications

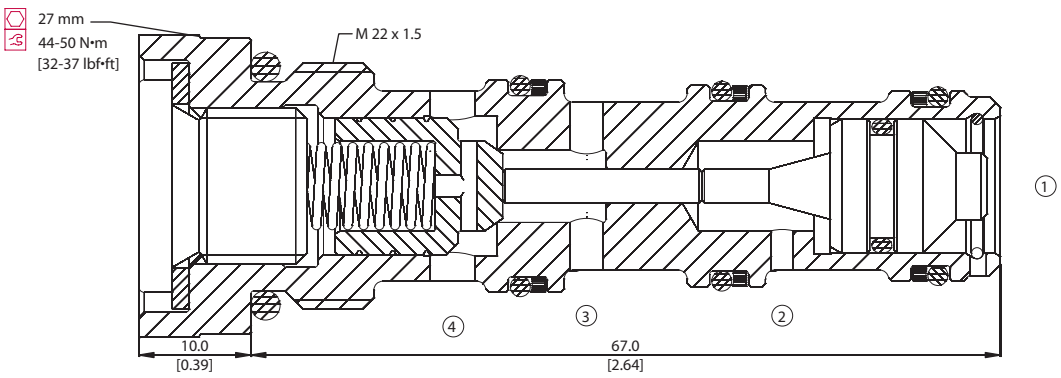
Rated pressure	315 bar [4500 psi]
Rated flow at bar [psi]	30 l/min [8 US gal/min]
Weight	0.13 kg [0.29 lb]
Pilot ratio	3.4:1
Cavity	NCS06/4

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P103 379

ORDERING INFORMATION

RPV 06 - 5 - OR - 00 - V

Seals
V = Viton
Omit = Buna-N

Seal Kit
Consult factory
230000080

Piston seals
OR = Seals
Omit = No seals

Housing and ports

		Housing P/N
00	= No Housing	No Housing
L3/8	= AL, 3/8 BSP	NCS06/4-L-3/8
L3/4	= AL, 3/4 BSP	NCS06/4-L-1/2
L6S	= AL, #6 SAE	NCS06/4-L-6S
L8S	= AL, #8 SAE	NCS06/4-L-8S

Other housings available

P103 381E

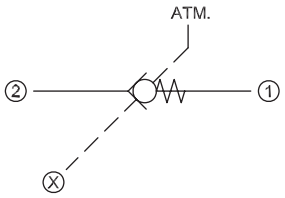
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Open with Drain
CP453-5

OPERATION

This is a pilot-to-open check valve with an external pilot connection.

Schematic

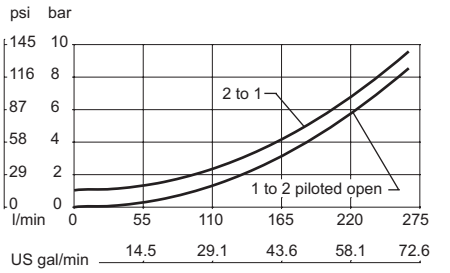


P103 509

SPECIFICATIONS

Theoretical performance

33 cSt [154 SUS] hyd.oil @ 38°C [100° F]



P103766E

Specifications

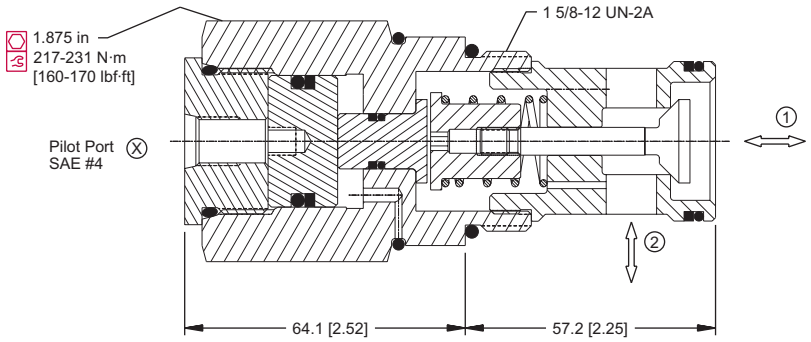
Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	250 l/min [66 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	1.23 kg [2.71 lb]
Pilot ratio	4:1
Cavity	SDC20-2

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P103 751

ORDERING INFORMATION

CP453-5-B-16S-4-065

Seals

	Seal kit
B = Buna-N	120011
V = Viton	120012

Housing and ports

		Housing P/N
0	= No Housing	No Housing
8B	= AL, 1 BSP	CP20-2-8B
10B	= AL, 1-1/4 BSP	CP20-2-10B
16S	= AL, #16 SAE	CP20-2-16S
20S	= AL, #20 SAE	CP20-3-20S

Other housings available

Crack Pressure

	bar	[psi]
065 =	4.3	65
100 =	6.9	100

Pilot ratio

4 = 4:1

P103 767E

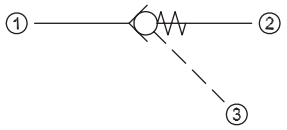
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Close
CP460-1

OPERATION

This valve is a pilot-to-close check valve.

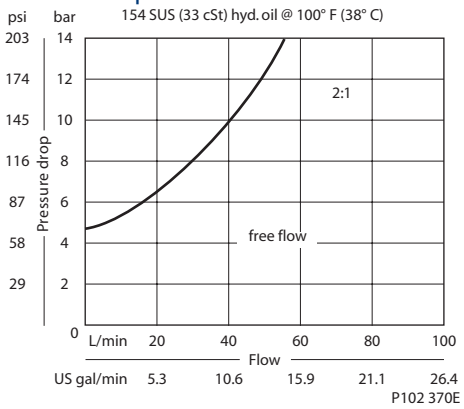
Schematic



P102 378E

SPECIFICATIONS

Theoretical performance



P102 370E

Specifications

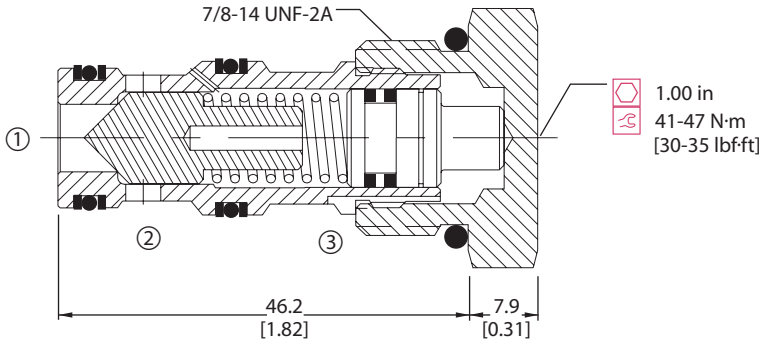
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	22 l/min [5.8 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.10 kg [0.21 lb]
Pilot ratio	2:1
Cavity	SDC10-3

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P102 356E

ORDERING INFORMATION

CP460 - 1 - B - 8S - 2 - 065 - 0

Seals

	Seal kit
B = Buna-N	120009
V = Viton	120010

Housing and ports

			Housing P/N
0	=	No Housing	No Housing
SE3B	=	Al, 3/8 BSP	SDC10-3-SE-3B
SE4B	=	Al, 1/2 BSP	SDC10-3-SE-4B
6S	=	Al, #6 SAE	CP10-3-6S
8S	=	Al, #8 SAE	CP10-3-8S

Other housings available

Piston seals
0 = No seals
S = Seals included

Crack Pressure

bar	[psi]
065 = 4.48	[65]

Pilot ratio
2 = 2:1

P102 072E

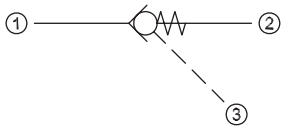
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Close
CP461-1

OPERATION

This valve is a pilot-to-close check valve.

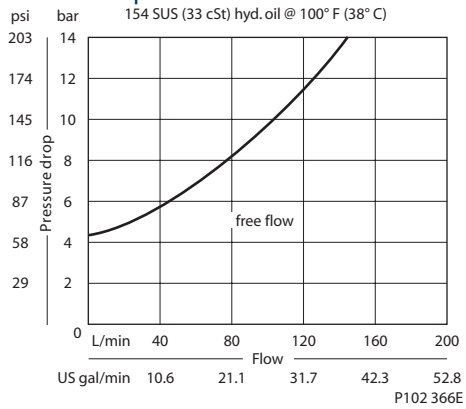
Schematic



P102 378E

SPECIFICATIONS

Theoretical performance



P102 366E

Specifications

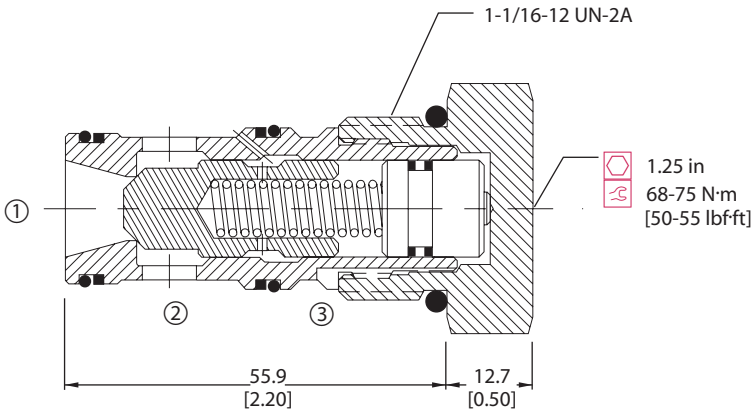
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	60 l/min [16 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.21 kg [0.47 lb]
Pilot ratio	2.3:1
Cavity	CP12-3S

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P102 353E

ORDERING INFORMATION

CP461 - 1 - B - 12S - 065 - 0

Seals

	Seal kit
B = Buna-N	120335
V = Viton	120336

Housing and ports

		Housing P/N
0	= No Housing	No Housing
4B	= Al, 1/2 BSP	CP12-3S-4B/2B
6B	= Al, 3/4 BSP	CP12-3S-6B/2B
10S	= Al, #10 SAE	CP12-3S-10S/4S
12S	= Al, #12 SAE	CP12-3S-12S/4S

Other housings available

Piston seals
0 = No seals
S = Seals included

Crack Pressure

bar	[psi]]
065 = 4.48	[65]

P102 077E

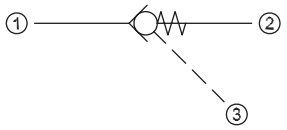
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Pilot to Close
CP462-1

OPERATION

This valve is a pilot-to-close check valve.

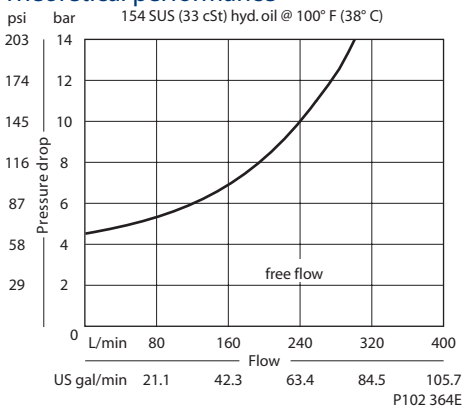
Schematic



P102 378E

SPECIFICATIONS

Theoretical performance



P102 364E

Specifications

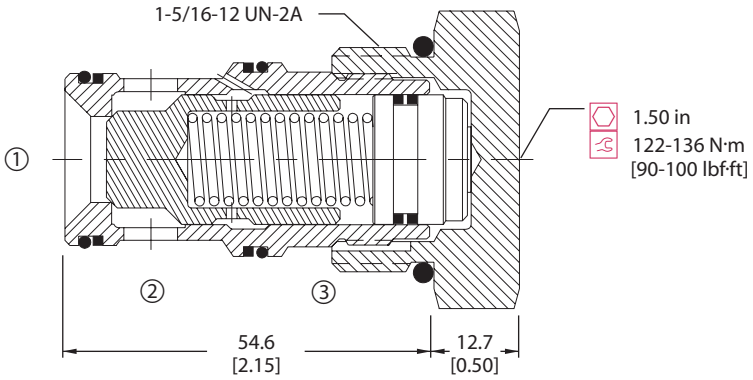
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	190 l/min [50 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.29 kg [0.64 lb]
Pilot ratio	2.3:1
Cavity	SDC16-3S

Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view



P102 351E

ORDERING INFORMATION

CP462 - 1 - B - 16S - 065 - 0

Seals

	Seal kit
B = Buna-N	120033
V = Viton	120034

Housing and ports

		Housing P/N
00	=	No Housing
6B	=	Al, 3/4 BSP
8B	=	Al, 1 BSP
12S	=	Al, #12 SAE
16S	=	Al, #16 SAE

Other housings available

Housing P/N
No Housing
CP16-3S-6B/2B
CP16-3S-8B/2B
CP16-3S-12S/4S
CP16-3S-12S/4S

Piston seals
0 = No seals
S = Seals included

Crack Pressure

	bar	[psi]
065	= 4.48	[65]

P102 082E

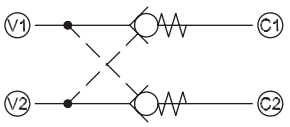
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Pilot operated check valves
Dual Pilot-Operated Checks
CP410-1

OPERATION

This is a dual pilot operated check valve, which uses two CV10-NP check valves.

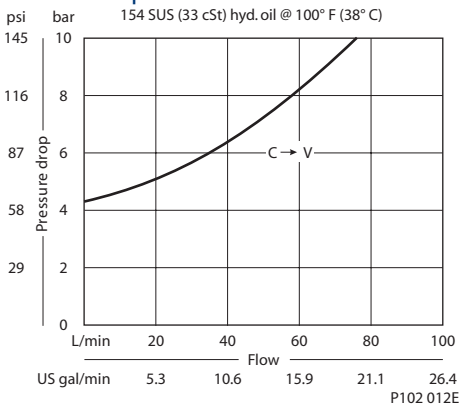
Schematic



P102 383E

SPECIFICATIONS

Theoretical performance



P102 012E

Specifications

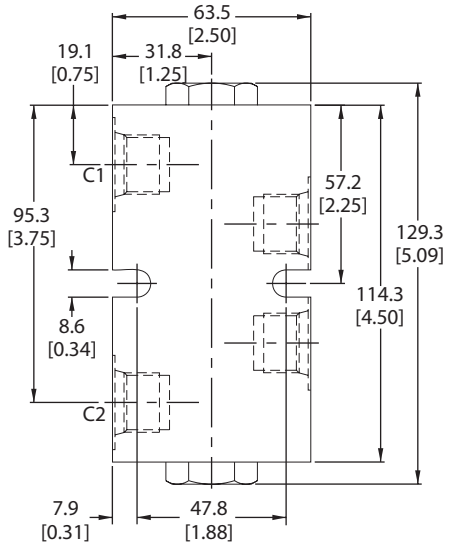
Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	85 l/min [22 US gal/min]
Leakage	6 drops/min @ Rated pressure
Weight	0.67 kg [1.48 lb]
Pilot ratio	4:1
Cavity	none

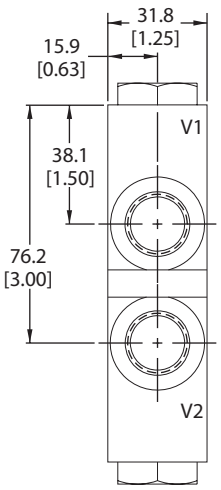
Note: A piston seal requires a 4.5 bar [65 psi] or greater return spring.

DIMENSIONS

mm [in]

Cross-sectional view





P102 346E

ORDERING INFORMATION

CP410 - 1 - B - 8S - 0 - 065

Seals

	Seal kit	W/ piston seals
B = Buna-N	120072	120176
V = Viton	120161	120177

Housing and ports

	Housing P/N
6S = Aluminum, #6 SAE	220099
8S = Aluminum, #8 SAE	220100
3B = Al, 3/8 BSP	221794
4B = Al, 1/2 BSP	221652

Piston seals
0 = No seals
S = Seals included

Crack Pressure

	bar	[psi]
065	= 4.50	[65]

P102 088E

Comatrol
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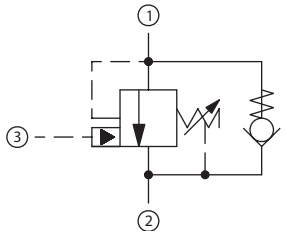
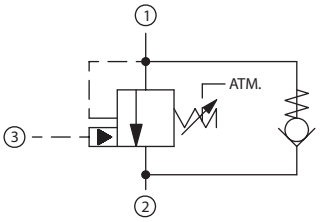
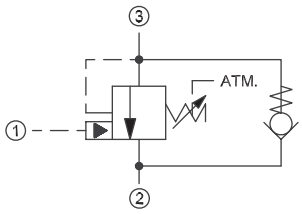
Cartridge Valves Technical Information
Counterbalance valves
Quick reference

Hydraulic Vent	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP448-1	CP08-3L	Counterbalance Valve, Hydraulic Vent	20 l/min [5 US gal/min]	350 bar [5000 psi]	09.6
	CB10-HV	SDC10-3S		60 l/min [16 US gal/min]	350 bar [5000 psi]	09.7
	CP441-1	CP12-3S		115 l/min [30 US gal/min]	350 bar [5000 psi]	09.8
	CP443-1	CP20-3S		190 l/min [50 US gal/min]	350 bar [5000 psi]	09.9

Atmospheric Vent	Model No.	Cavity	Description	Flow*	Pressure	Page
	CB10-AV	SDC10-3S	Counterbalance Valve, Atmospheric Vent	60 l/min [16 US gal/min]	350 bar [5000 psi]	09.10

Atmospheric Vent	Model No.	Cavity	Description	Flow*	Pressure	Page
	VCB 12-CN	NCS12/3	Counterbalance Valve, Atmospheric Vent	140 l/min [37 US gal/min]	350 bar [5000 psi]	09.11

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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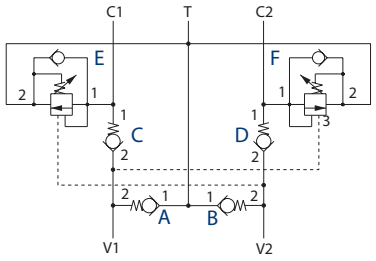
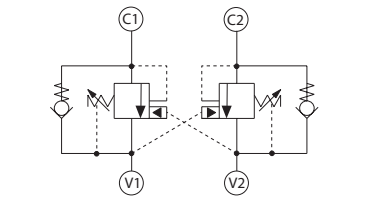
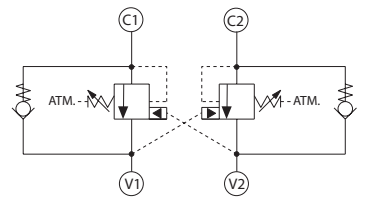
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Counterbalance valves
Quick reference

Dual Counterbalance	Model No.	Cavity	Description	Flow*	Pressure	Page
	1EEC11-1	None	Dual-Counterbalance Valve, with Makeup Checks, Catalog HIC	57 l/min [15 US gal/min]	345 bar [5000 psi]	09.12

Dual Counterbalance	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP448-2	None	Counterbalance Valve, Hydraulic Vent, Catalog HIC	20 l/min [5 US gal/min]	350 bar [5000 psi]	09.13
	DCB10-HV	None		60 l/min [16 US gal/min]	350 bar [5075 psi]	09.14
	CP441-2	None		115 l/min [30 US gal/min]	350 bar [5000 psi]	09.15

Dual Counterbalance	Model No.	Cavity	Description	Flow*	Pressure	Page
	DCB10-AV	None	Counterbalance Valve, Atmospheric Vent, Catalog HIC	60 l/min [16 US gal/min]	350 bar [5075 psi]	09.16

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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Cartridge Valves Technical Information
Counterbalance valves
Application notes

MOTION CONTROL VALVES

Motion control valves, also referred to as load holding valves, are used to control the motion of a load in the following ways:

- Prevent a load from dropping in case of hose or tube failure.
- Prevent a load from drifting caused by directional control valve spool leakage.
- Provide smooth, modulated motion when the load is in a lowering or run-away mode.
- Provide smooth, modulated motion when the directional control valve is suddenly closed.

There are two basic types of motion control valves:

- Pilot-operated, or pilot-to-open check valves will satisfy the first two of the above requirements.
- Counterbalance valves will satisfy all four of the above requirements.

Counterbalance valves

F102 005

COUNTERBALANCE VALVES

A counterbalance valve provides several functions:

- Free flow in one direction.
- Leak-free load holding.
- Protection against hydraulic line failure.
- Protection against pressure shocks caused by external forces or overrunning loads
- Cavitation-free motion control to match speed to pump flow when a load could cause loss of control of an actuator (cylinder or motor).
- Smooth, modulated motion control when the directional valve is suddenly closed.

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Cartridge Valves Technical Information
Counterbalance valves
Application notes

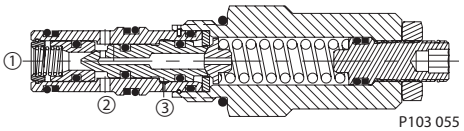
COUNTERBALANCE VALVES (continued)

Counterbalance valves will positively hold a pressurized load and will control the motion of the load based on application of a pressure signal to the pilot port. Counterbalance valves are available as individual cartridges or standard cartridge-in-body (CIB) packages.

A typical circuit application for a counterbalance valve contains a pump, directional control valve, and an actuator. Without a counterbalance valve the load will drift down due to spool leakage if the directional control valve is centered with the load raised. Additionally there is no protection against the load dropping in the event of hydraulic line failure.

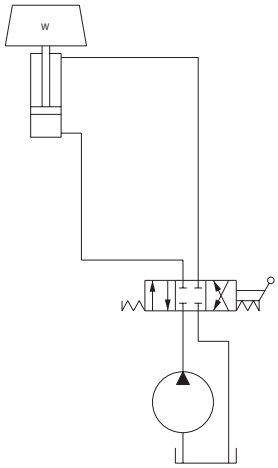
Adding a counterbalance valve controls motion and provides protection against hose or tube failure. In this circuit, moving the directional control valve to the left causes the cylinder to extend, raising the load with free flow going through the check valve portion of the counterbalance valve. When the directional control valve is centered, the counterbalance valve will prevent leakage and lock the load in position. Moving the directional control valve to the right sends flow/pressure to the rod end of the cylinder. This pressure also acts to pilot open the counterbalance valve and allows the load to be lowered. Should the load cause the cylinder to run away from the pump, pilot pressure to the counterbalance valve will decrease and the counterbalance valve will modulate to match the cylinder speed to the pump flow.

Individual cartridge counterbalance valve



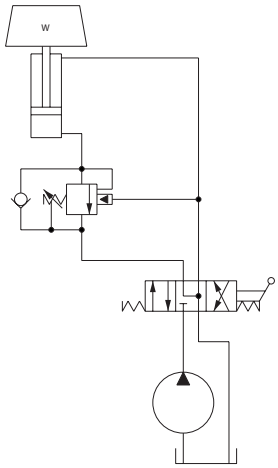
P103 055

Circuit without a counterbalance valve



P103 121

Circuit with a counterbalance valve



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Cartridge Valves Technical Information
Counterbalance valves
Application notes

COUNTERBALANCE VALVES (continued)

The pressure required to pilot open the counterbalance valve can be calculated as follows:

$$P = \frac{(Ps \cdot Ab) - W}{(Ab \cdot R) + Ar}$$ (load retracts cylinder)

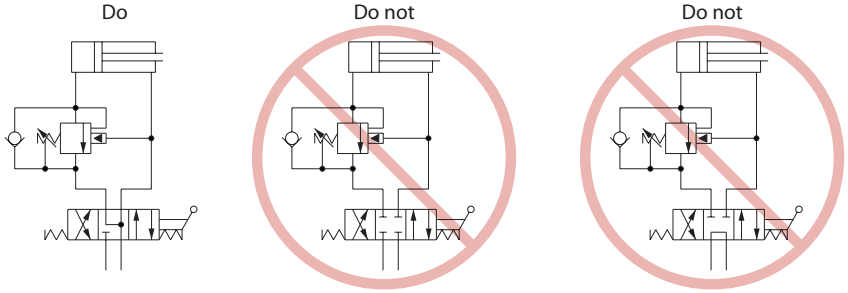
$$P = \frac{(Ps \cdot Ar) - W}{(Ar \cdot R) + Ab}$$ (load extends cylinder)

W = Load
Ps = Counterbalance valve relief setting; see below for more information
Ab = Cylinder bore area
Ar = Cylinder rod area
R = Counterbalance valve pilot ratio; see below for more information

Note that these equations are idealized and do not consider any backpressure in the circuit, which is additive to the pressure required to pilot open the check valve.

Some additional guidelines for counterbalance valve applications:

- Specify the counterbalance valve relief setting high enough to stop any motion (flow) at the maximum expected actuator pressure. Generally it is recommended to use a setting of 1.3 multiplied by the maximum load pressure.
- Use low pilot ratios (3:1 and 4.5:1) for applications where loads may vary widely. Low pilot ratios require higher pilot pressure and are less efficient but provide stable, precise control for varying loads.
- Use high pilot ratios (8:1 and 10:1) for applications where loads are relatively constant. High pilot ratio valves require lower pilot pressure, have faster response, and are more efficient, but lack stability and precision in response to varying loads.
- Do not oversize counterbalance valves. There is no pressure drop operating limit for counterbalance valves and in fact some pressure drop is required to maintain valve operation.
- Locate counterbalance valves at or near the actuator to provide maximum load holding protection in the event of hydraulic line failure.
- Do not use counterbalance valves with closed-center directional control valves. Pressure trapped between the directional control valve and the actuator can pilot the counterbalance valve open and result in undesired load motion.
- Do not use counterbalance valves with tandem-center directional control valves. Backpressure in the system can prevent the counterbalance valve from opening.



P103 056E

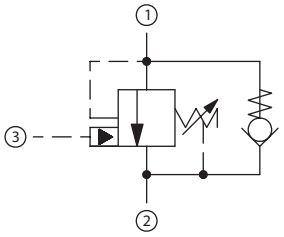
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Counterbalance valves
Hydraulic Vent
CP448-1

OPERATION

This is a pilot-operated counterbalance valve.

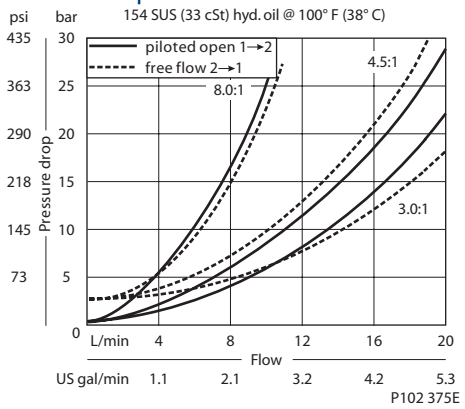
Schematic



P102 376E

SPECIFICATIONS

Theoretical performance



P102 375E

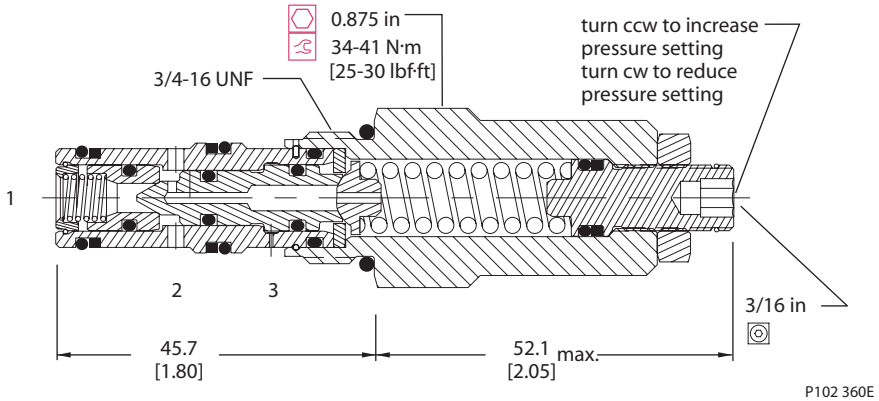
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 22 bar [319 psi]	20 l/min [5 US gal/min]
Leakage	10 drops/min @ 70% of crack pressure
Weight	0.16 kg [0.36 lb]
Pilot ratio	3:1, 4.5:1, 8:1
Cavity	CP08-3L

DIMENSIONS

mm [in]

Cross-sectional view



P102 360E

ORDERING INFORMATION

CP448 - 1 - B - 6S - E - B - 150 - 4.5 - 040

Seals
B = Buna-N
V = Viton

Housing and ports
0 = No Housing
2B = AL, 1/4 BSP
3B = AL, 3/8 BSP
4S = AL, #4 SAE
6S = AL, #6 SAE
Other housings available

Seal kit
120238
120239

Housing P/N
No Housing
CP08-3L-2B
CP08-3L-3B
CP08-3L-4S
CP08-3L-6S

Adjustment option
E = External

Pressure range

Pilot ratio 3.0

	bar	[psi]
A =	41-103	[600-1500]
Std. setting	69	[1000]
B =	69-207	[1000-3000]
Std. setting	103	[1500]
C =	124-345	[1800-5000]
Std. setting	172	[2500]

Pilot ratio 4.5

	bar	[psi]
A =	55-172	[800-2500]
Std. setting	103	[1500]
B =	103-345	[1500-5000]
Std. setting	172	[2500]

Pilot ratio 8.0

	bar	[psi]
A =	103-345	[1500-5000]
Std. setting	172	[2500]

Pilot ratio
3.0:1
4.5:1
8.0:1

Crack pressure
Code x 10 = psi
Example: 150 = 1500 psi
XXX = Std. setting w/no stamping

Free flow check crack pressure

	bar	[psi]
040 =	2.76	[40]

P102 102E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

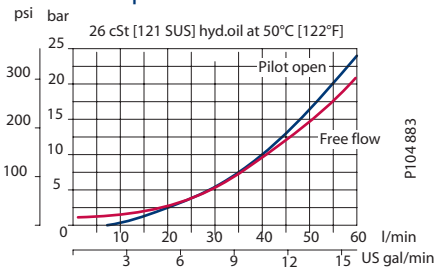
Cartridge Valves Technical Information
Counterbalance valves
Hydraulic Vent
CB10-HV

OPERATION

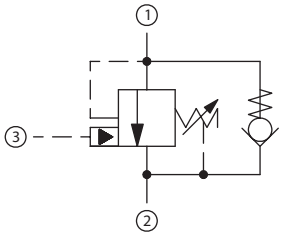
This is a pilot-operated counterbalance valve.

SPECIFICATIONS

Theoretical performance



Schematic



P102 376E

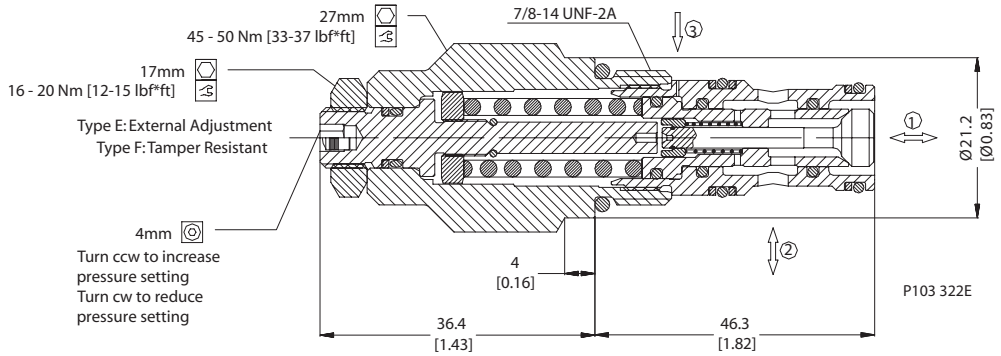
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 22 bar [319 psi]	60 l/min [16 US gal/min]
Leakage	10 drops/min @ 70% of crack pressure
Weight	0.22 kg [0.47 lb]
Pilot ratio	1.5:1, 3:1, 4.5:1, 10:1
Cavity	SDC10-3S

DIMENSIONS

mm [in]

Cross-sectional view



P103 322E

ORDERING INFORMATION

CB10-HV-1-A-1-E-70-B-XXXX

Spring Range
For Pilot Ratio Z (1.5:1)
1 = 20-70 bar [290-1015 psi]
2 = 30-90 bar [435-1305 psi]
3 = 50-140 bar [725-2030 psi]
For Pilot Ratio A (3:1)
1 = 35-110 bar [507-1595 psi]
2 = 60-150 bar [870-2175 psi]
3 = 80-230 bar [1160-3335 psi]
For Pilot Ratio B (4.5:1)
1 = 55-180 bar [797-2610 psi]
2 = 75-240 bar [1087-3480 psi]
3 = 90-350 bar [1305- 5075 psi]
For Pilot Ratio C (10:1)
1 = 90-350 bar [1305-5075 psi]

Pilot Ratio
Z = 1.5 to 1
A = 3 to 1
B = 4.5 to 1
C = 10 to 1

Adjustment type
E = external adjustment
F = tamper resistant

Std. setting
45 = 45 bar [650 psi] Set in Spring 1 For Pilot Ratio Z
60 = 60 bar [870 psi] Set in Spring 2 For Pilot Ratio Z
70 = 70 bar [1015 psi] Set in Spring 1 For Pilot Ratio A
100 = 100 bar [1450 psi] Set in Spring 3 For Pilot Ratio Z
100 = 100 bar [1450 psi] Set in Spring 1 For Pilot Ratio B
100 = 100 bar [1450 psi] Set in Spring 2 For Pilot Ratio A,B
175 = 175 bar [2537 psi] Set in Spring 3 For Pilot Ratio A,B
175 = 175 bar [2537 psi] Set in Spring 1 For Pilot Ratio C

Body and ports
00 = Cartridge only
6S = Aluminium, #6 SAE
8S = Aluminium, #8 SAE
SE3B = Aluminium, 3/8" BSPP
SE4B = Aluminium, 1/2" BSPP

Body Nomenclature
No Body
SDC10-3S-6S
SDC10-3S-8S
SDC10-3S-SE3B
SDC10-3S-SE4B

Seals
B = Buna-N
V = Viton

Seal kit
230001020
35401519

P103 324E

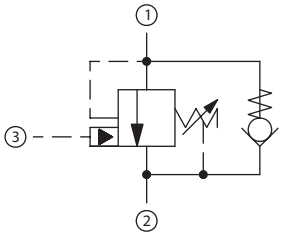
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Counterbalance valves
Hydraulic Vent
CP441-1

OPERATION

This is a pilot-operated counterbalance valve.

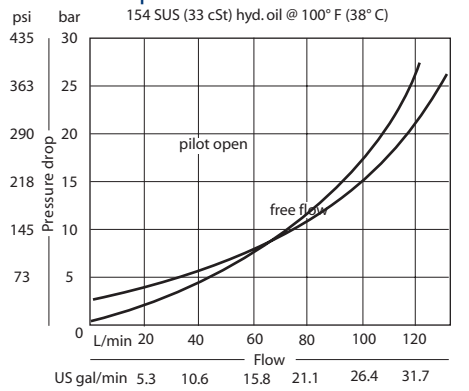
Schematic



P102 376E

SPECIFICATIONS

Theoretical performance



P102 369E

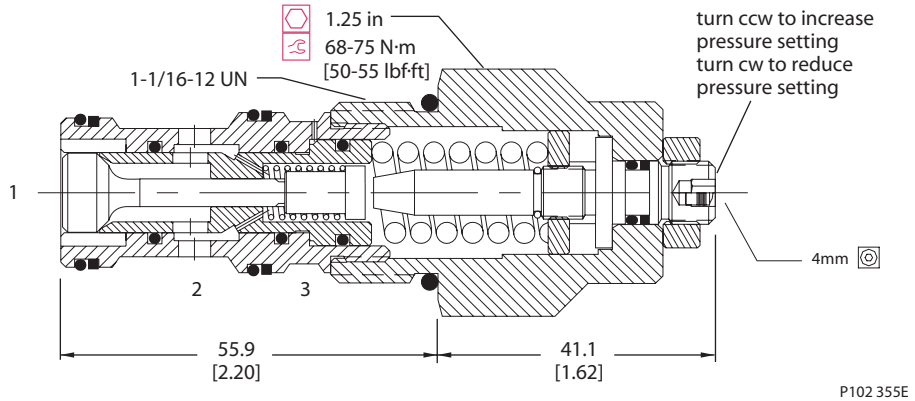
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 22 bar [319 psi]	115 l/min [30 US gal/min]
Leakage	10 drops/min @ 70% of crack pressure
Weight	0.22 kg [0.48 lb]
Pilot ratio	3:1, 4.5:1, 10:1
Cavity	CP12-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 355E

ORDERING INFORMATION

CP441 - 1 - B - 12S - E - B - 250 - 4.5 - 015

Seals
B = Buna-N
V = Viton

Housing and ports
0 = No Housing
4B = AL, 1/2 BSP
6B = AL, 3/4 BSP
10S = AL, #10 SAE
12S = AL, #12 SAE
Other housings available

Seal kit
120335
120336

Housing P/N
No Housing
CP12-3S-4B/2B
CP12-3S-6B/2B
CP12-3S-10S/4S
CP12-3S-12S/4S

Adjustment option
E = External adjustment

Pressure range

Pilot ratio 3.0

	bar	[psi]
A =	34-103	[500-1500]
Std. setting	69	[1000]
B =	103-207	[1500-3000]
Std. setting	172	[2500]

Pilot ratio 4.5

	bar	[psi]
A =	34-138	[500-2000]
Std. setting	103	[1500]
B =	103-345	[1500-5000]
Std. setting	207	[3000]

Pilot ratio 10.0

	bar	[psi]
A =	69-345	[1000-5000]
Std. setting	172	[2500]

Pilot ratio
3.0:1
4.5:1
10.0:1

Free flow check Crack Pressure

	bar	[psi]
005 =	.34	[5]
015 =	1.03	[15]

Crack pressure
Code x 10 = psi
Example: 250 = 2500 psi
XXX=Std. setting w/no stamping

P102 097E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

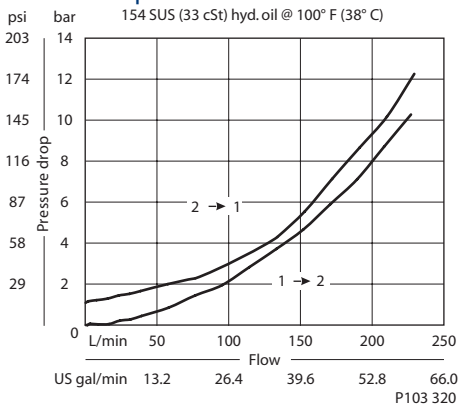
Cartridge Valves Technical Information
Counterbalance valves
Hydraulic Vent
CP443-1

OPERATION

This is a pilot-operated counterbalance valve.

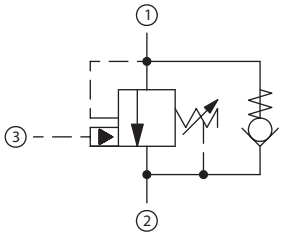
SPECIFICATIONS

Theoretical performance



P103 320

Schematic



P102 376E

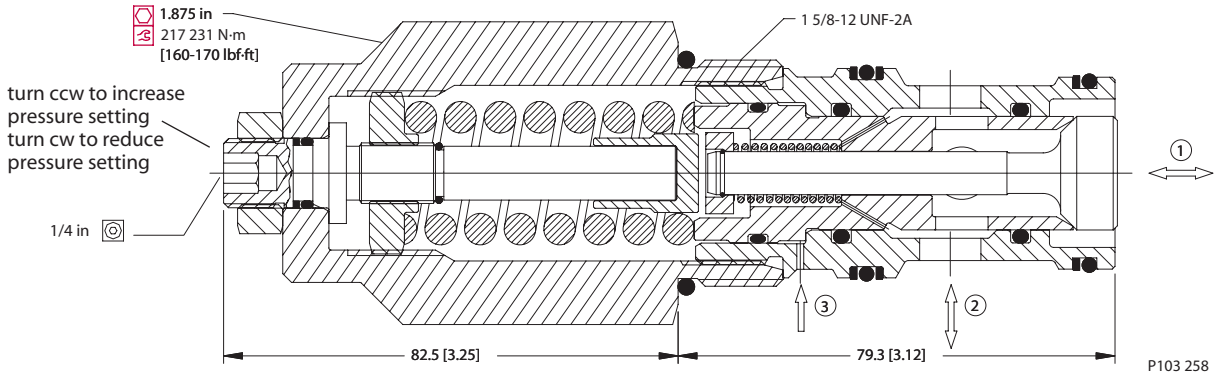
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	190 l/min [50 US gal/min]
Leakage	10 drops/min @ 70% of crack pressure
Weight	1.22 kg [2.69 lb]
Pilot ratio	3:1, 4.5:1, 10:1
Cavity	CP20-3S

DIMENSIONS

mm [in]

Cross-sectional view



P103 258

ORDERING INFORMATION

CP443 - 1 - B - 16S - E - A - 100 - 3.0 - 015

Seals
B = Buna-N
V = Viton

Seal kit
120380
120381

Housing and ports
0 = No Housing
8B = AL, 1 BSP
10B = AL, 1-1/4 BSP
16S = AL, #16 SAE
20S = AL, #20 SAE
Other housings available

Housing P/N
No Housing
CP20-3S-8B/2B
CP20-3S-10B/2B
CP20-3S-16S/4S
CP20-3S-20S/4S

Adjustment option
E = External

Pressure range

Pilot ratio 3.0

	bar	[psi]
A =	34-103	[500-1500]
Std setting	69	[1000]
B =	103-207	[1500-3000]
Std setting	172	[2500]

Pilot ratio 4.5

	bar	[psi]
A =	34-138	[500-2000]
Std setting	103	[1500]
B =	103-345	[1500-5000]
Std setting	207	[3000]

Pilot ratio 10.0

	bar	[psi]
A =	69-345	[1000-5000]
Std setting	172	[2500]

P103 257

Cracking pressure
Code x 10 = psi
Example: 100 = 1000 psi
XXX = Std. setting w/no stamping

Pilot ratio
3.0 = 3.0:1
4.5 = 4.5:1
10.0 = 10.0:1

Free flow check Cracking Pressure

	bar	[psi]
015 =	1.00	[15]

Comatrol
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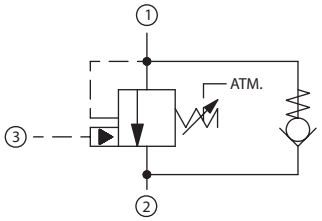
Cartridge Valves Technical Information
Counterbalance valves
Atmospheric Vent
CB10-AV

OPERATION

This is a pilot-operated counterbalance valve with an atmospheric vent.

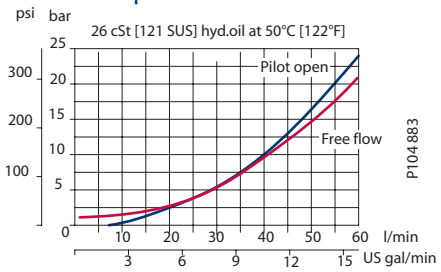
Schematic



P103 325

SPECIFICATIONS

Theoretical performance



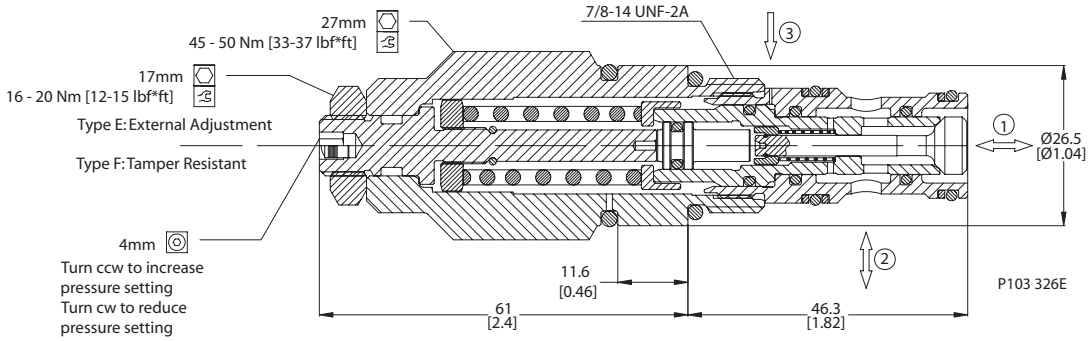
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 22 bar [319 psi]	60 l/min [16 US gal/min]
Leakage	10 drops/min @ 70% of crack pressure
Weight	0.27 kg [0.60 lb]
Pilot ratio	1.5:1, 3:1, 4.5:1, 10:1
Cavity	SDC10-3S

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

CB10-AV-1-A-1-E-70-B-XXXX

Spring Range
For Pilot Ratio Z (1.5:1)
1 = 20-70 bar [290-1015 psi]
2 = 30-90 bar [435-1305 psi]
3 = 50-140 bar [725-2030 psi]
For Pilot Ratio A (3:1)
1 = 35-110 bar [507-1595 psi]
2 = 60-150 bar [870-2175 psi]
3 = 80-230 bar [1160-3335 psi]
For Pilot Ratio B (4.5:1)
1 = 55-180 bar [797-2610 psi]
2 = 75-240 bar [1087-3480 psi]
3 = 90-350 bar [1305- 5075 psi]
For Pilot Ratio C (10:1)
1 = 90-350 bar [1305-5075 psi]

Pilot Ratio
Z = 1.5 to 1
A = 3 to 1
B = 4.5 to 1
C = 10 to 1

Adjustment type
E = external adjustment
F = tamper resistant

Std. setting
45 = 45 bar [650 psi] Set in Spring 1 For Pilot Ratio Z
60 = 60 bar [870 psi] Set in Spring 2 For Pilot Ratio Z
70 = 70 bar [1015 psi] Set in Spring 1 For Pilot Ratio A
100 = 100 bar [1450 psi] Set in Spring 3 For Pilot Ratio Z
100 = 100 bar [1450 psi] Set in Spring 1 For Pilot Ratio B
100 = 100 bar [1450 psi] Set in Spring 2 For Pilot Ratio A,B
175 = 175 bar [2537 psi] Set in Spring 3 For Pilot Ratio A,B
175 = 175 bar [2537 psi] Set in Spring 1 For Pilot Ratio C

Body and ports
00 = Cartridge only
6S = Aluminium, #6 SAE
8S = Aluminium, #8 SAE
SE3B = Aluminium, 3/8" BSPP
SE4B = Aluminium, 1/2" BSPP

Seals
B = Buna-N
V = Viton

Body Nomenclature
No Body
SDC10-3S-6S
SDC10-3S-8S
SDC10-3S-SE3B
SDC10-3S-SE4B

Seal kit
230001020
35401519

P103 327E

Comatrol
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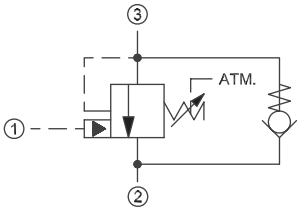
Cartridge Valves Technical Information
Counterbalance valves
Atmospheric Vent
VCB 12-CN

OPERATION

This is a pilot-operated counterbalance valve with an atmospheric vent.

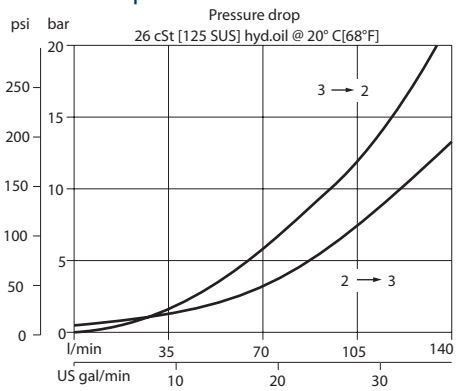
Schematic



P103 502

SPECIFICATIONS

Theoretical performance



P103 758E

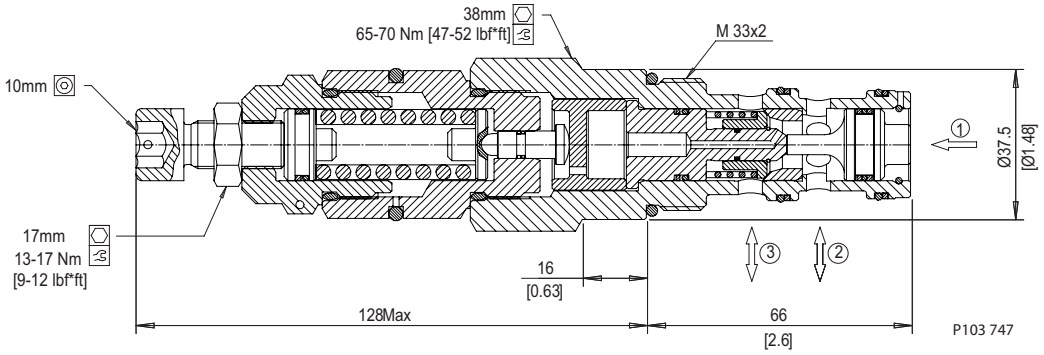
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 22 bar [319 psi]	140 l/min [37 US gal/min]
Weight	0.93 kg [2.05 lb]
Pilot ratio	4.7:1, 5.9:1, 6.9:1
Cavity	NCS12/3

DIMENSIONS

mm [in]

Cross-sectional view



P103 747

ORDERING INFORMATION

VCB 12-CN-2-A-SE3/8-V

Spring range
Pilot ratio A & C
1 = 25 to 140 bar [363 to 2031 psi]
2 = 70 to 250 bar [1015 to 3626 psi]
3 = 105 to 350 bar [1523 to 5076 psi]

Pilot ratio B
1 = 25 to 120 bar [363 to 1740 psi]
2 = 60 to 200 bar [870 to 2901 psi]
3 = 90 to 280 bar [1305 to 4061 psi]

Pilot ratio:
A = 6.9:1
B = 4.7:1

Seals

	Seal kit
Omit = Buna N	230000130
V = Viton	230000360

Housing and ports

00	=	No Housing
SE1/2	=	AL, 1/2 BSP
SE3/4	=	AL, 3/4 BSP
SE8S	=	AL, #8 SAE
SE12S	=	AL, #12 SAE

Other housings available

Housing P/N
No Housing
NCS12/3-SE-1/2
NCS12/3-SE-3/4
NCS12/3-SE-8S
NCS12/3-SE-12S

To order this valve with a specific factory setting, contact your Sauer-Danfoss representative

P103 859

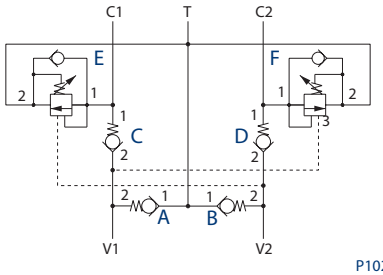
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Counterbalance valves
Dual Counterbalance
1EEC11

OPERATION

This valve is a dual counterbalance valve with make up checks.

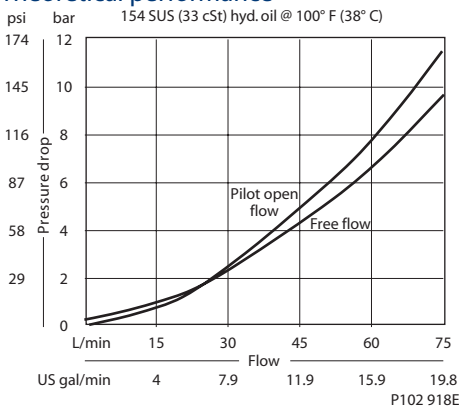
Schematic



P102 686

SPECIFICATIONS

Theoretical performance



P102 918E

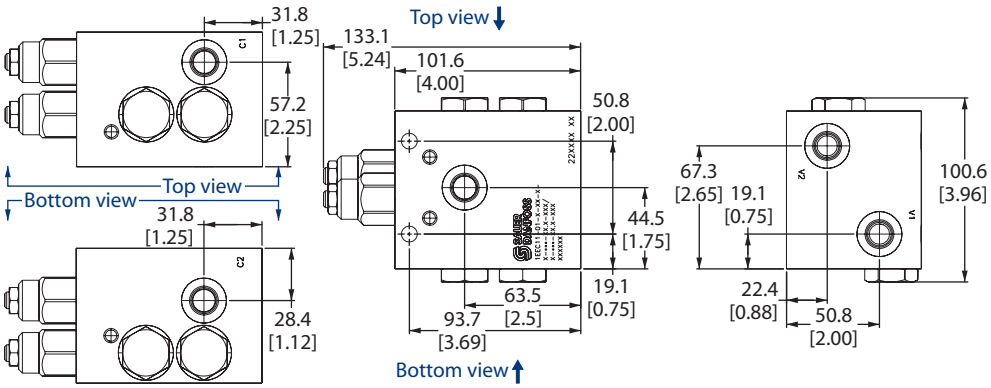
Specifications

Rated pressure	345 bar [5000 psi]
Rated flow at 7 bar [100 psi]	57 l/min [15 US gal/min]
Weight	2.04 kg [4.50 lb]
Pilot ratio	3:1, 4.5:1, or 10:1
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 684

ORDERING INFORMATION

1EEC11-01-B-85-E-A- 100 - 3.0 - 005

Seals
B = Buna-N
V = Viton

Body and ports
6S = #6 SAE (T, C and V ports)
8S = #8 SAE (T, C and V ports)

Relief adjustment option
E = External adjustment
K = Knob adjustment

Pressure range

	Pilot ratio 3.0	Pilot ratio 4.5	Pilot ratio 10.0
A = Standard setting	34-103 bar [500-1500 psi] 69 bar [1000 psi]	34-172 bar [500-2500 psi] 103 bar [1500 psi]	103-345 bar [1500-5000 psi] 172 bar [2500 psi]
B = Standard setting	69-172 bar [1000-2500 psi] 103 bar [1500 psi]	69-241 bar [1000-3500 psi] 103 bar [1500 psi]	
C = Standard setting	103-241 bar [1500-3500 psi] 172 bar [2500 psi]	103-345 bar [1500-5000 psi] 172 bar [2500 psi]	

Pilot ratio

Free flow check cracking pressure
005 = 0.34 bar [5 psi]
015 = 1.03 bar [15 psi]

P102 685E

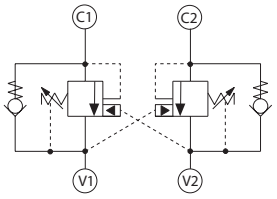
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Counterbalance valves
Dual Counterbalance
CP448-2

OPERATION

This valve is a dual counterbalance valve. It uses two CP448-1 cartridges.

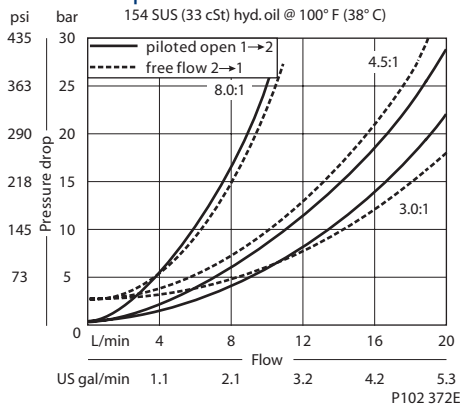
Schematic



P102 379E

SPECIFICATIONS

Theoretical performance



P102 372E

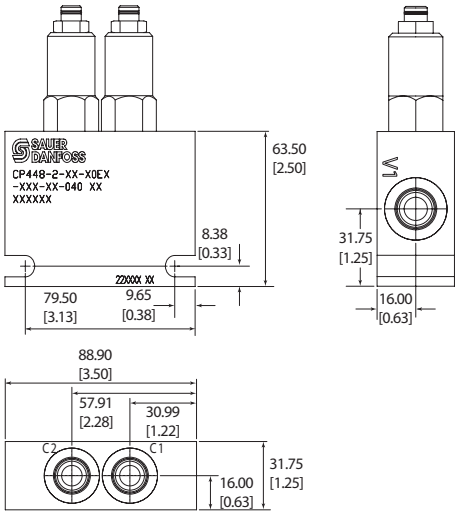
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 22 bar [319 psi]	20 l/min [5 US gal/min]
Weight	0.78 kg [1.72 lb]
Pilot ratio	3:1, 4.5:1, 8:1
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 749

ORDERING INFORMATION

CP448-2-4S-B-0-E-B-150-4.5-040

Check crack pressure
040 = 2.8 bar [40 psi]

Pilot ratio — 1.5 — 3.0 — 4.5 — 8.0

Pressure range

	1.5	3.0	4.5	8.0
A	14-55 bar [200-300 psi]	41-124 bar [600-1800 psi]	55-186 bar [800-2700 psi]	103-345 bar [1500-5000 psi]
B	34-117 bar [500-1700 psi]	69-241 bar [1000-3500 psi]	103-345 bar [1500-5000 psi]	
C	55-207 bar [800-3000 psi]	124-345 bar [1800-5000 psi]		

Crack pressure
Code x 10 = psi
Example: 050 = 500 psi

Adjustment option
E = External

Seals

	Seal kits
B = Buna N	120238
V = Viton	120239

Housing and ports
4S = AL, #4 SAE
6S = AL, #6 SAE
other housings available, consult factory

P102 750E

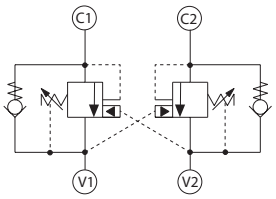
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Counterbalance valves
Dual Counterbalance
DCB10-HV

OPERATION

This is a dual counterbalance valve with hydraulic vent. This assembly uses the CB10-HV valve.

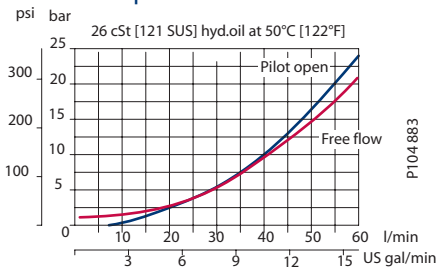
Schematic



P102 379E

SPECIFICATIONS

Theoretical performance



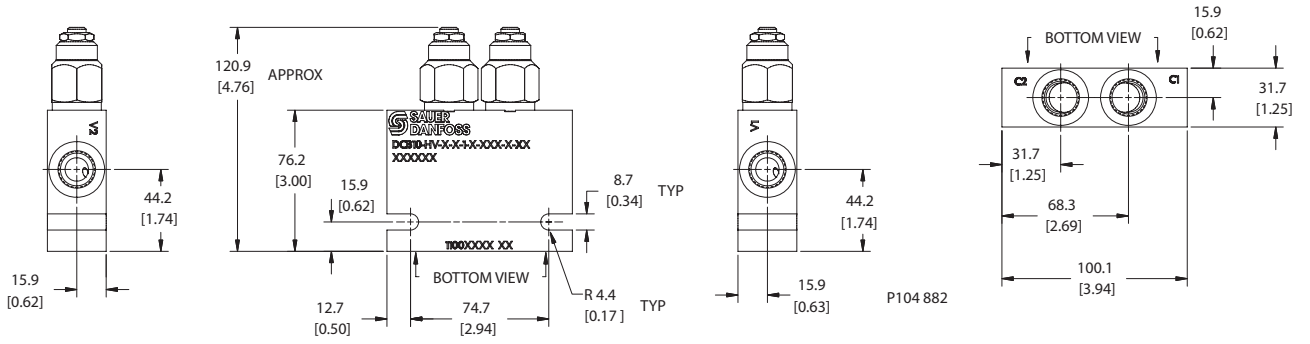
Specifications

Rated pressure	350 bar [5075 psi]
Rated flow at 22 bar [319 psi]	60 l/min [16 US gal/min]
Leakage	10 drops/min @ at 70% of crack pressure
Weight	0.90 kg [1.98 lb]
Pilot ratio	1.5:1, 3.0:1, 4.5:1, 10.0:1
Cavity	None

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

DCB10-HV-1-B-1-E-100-B-8S

Spring range
For plot ratio Z (1.5:1)
1 = 20-70 bar [290-1015 psi]
2 = 30-90 bar [435-1305 psi]
3 = 50-140 bar [725-2030 psi]
For pilot ratio A (3:1)
1 = 35-110 bar [507-1595 psi]
2 = 60-150 bar [870-2175 psi]
3 = 80-230 bar [1160-3335 psi]
For pilot ratio B (4.5:1)
1 = 55-180 bar [797-2610 psi]
2 = 75-240 bar [1087-3480 psi]
3 = 90-350 bar [1305- 5075 psi]
For pilot ratio C (10:1)
1 = 90-350 bar [1305-5075 psi]

Pilot ratio
Z = 1.5 to 1
A = 3 to 1
B = 4.5 to 1
C = 10 to 1

Check crack pressure
1 = 1 bar (14.5 psi)

Adjust type
E = External adjustment
F = Tamper resistant

Body and ports — **Body P/N**

6S = Aluminium, #6 SAE	11002669
8S = Aluminium, #8 SAE	11001779
SE3B = Aluminium, 3/8" BSPP	11008008
SE4B = Aluminium, 1/2" BSPP	11008009
S6S = Steel, #6 SAE	11009171
S6S = Steel, #8 SAE	11009170

Seals — Seal kit

B = Buna-N	11002672
V = Viton	11002673

Std. setting

45 = 45 bar	[650 psi]	Set in Spring 1 For Pilot Ratio Z
60 = 60 bar	[870 psi]	Set in Spring 2 For Pilot Ratio Z
70 = 70 bar	[1015 psi]	Set in Spring 1 For Pilot Ratio A
100 = 100 bar	[1450 psi]	Set in Spring 3 For Pilot Ratio Z
100 = 100 bar	[1450 psi]	Set in Spring 1 For Pilot Ratio B
100 = 100 bar	[1450 psi]	Set in Spring 2 For Pilot Ratio A,B
175 = 175 bar	[2537 psi]	Set in Spring 3 For Pilot Ratio A,B
175 = 175 bar	[2537 psi]	Set in Spring 1 For Pilot Ratio C

P104 884

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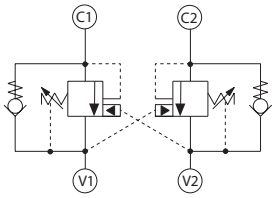
Cartridge Valves Technical Information
Counterbalance valves
Dual Counterbalance
CP441-2

OPERATION

This valve is a dual counterbalance valve. It uses two CP441-1 cartridges.

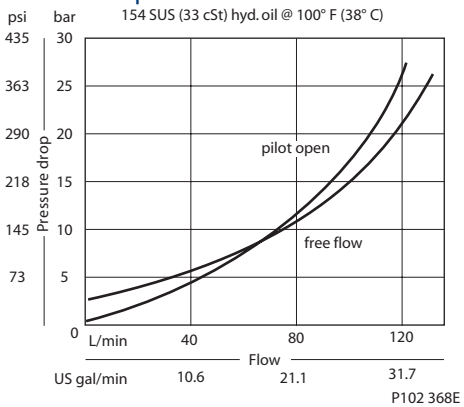
Schematic



P102 379E

SPECIFICATIONS

Theoretical performance



P102 368E

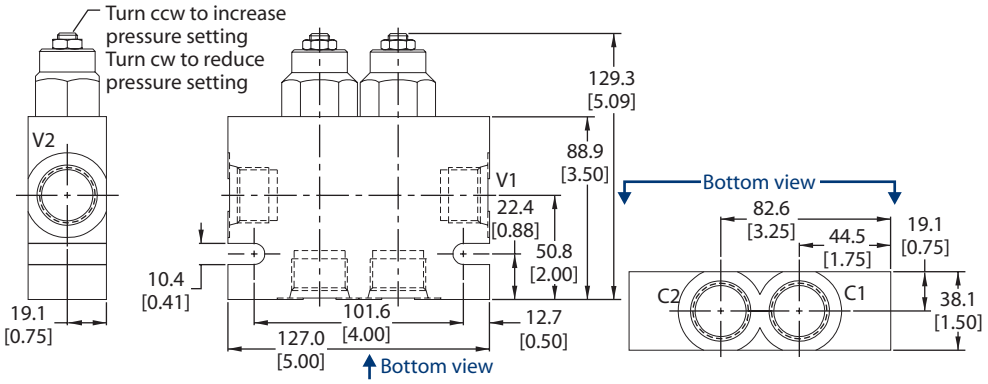
Specifications

Rated pressure	350 bar [5000 psi]
Rated flow at 7 bar [100 psi]	115 l/min [30 US gal/min]
Weight	1.26 kg [2.77 lb]
Pilot ratio	3:1, 4.5:1, 10:1
Cavity	none

DIMENSIONS

mm [in]

Cross-sectional view



P102 348E

ORDERING INFORMATION

CP441 - 2 - 12S - B - E - B - 250 - 4.5 - 015

Housing and ports / **Housing P/N**
10S = AL, #10 SAE 220752
12S = AL, #12 SAE 220753
6B = AL, 3/4 BSP
4B = AL, 1/2 BSP
other housings available, consult factory

Seals / **Seal kit**
B = Buna-N 120414
V = Viton 120415

Adjustment option
E = External adjustment

Pressure range

Pilot ratio 3.0

	bar	[psi]
A =	34-103	[500-1500]
Std. setting	69	[1000]
B =	103-207	[1500-3000]
Std. setting	103	[1500]

Pilot ratio 4.5

	bar	[psi]
A =	34-138	[500-2000]
Std. setting	103	[1500]
B =	103-345	[1500-5000]
Std. setting	103	[1500]

Pilot ratio 10.0

	bar	[psi]
A =	69-345	[1000-5000]
Std. setting	172	[2500]
B =	N/a	N/a

Crack pressure
Code x 10 = psi
Example: 250 = 2500 psi

Free flow check
Cracking pressure

	bar	[psi]
005 =	.34	[5]
015 =	1.03	[15]

Pilot ratio

P102 089E

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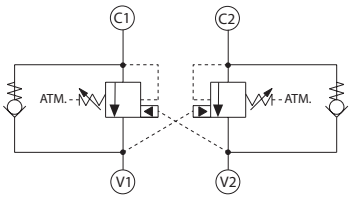
Cartridge Valves Technical Information
Counterbalance valves
Dual Counterbalance
DCB10-AV

OPERATION

This is a dual counterbalance valve with atmospheric vent. This assembly uses the CB10-AV valve.

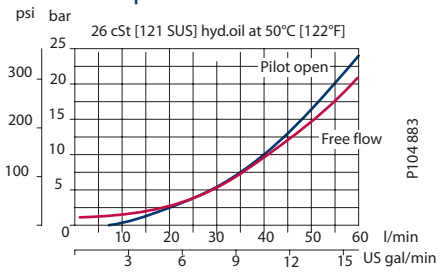
Schematic



P104 885

SPECIFICATIONS

Theoretical performance



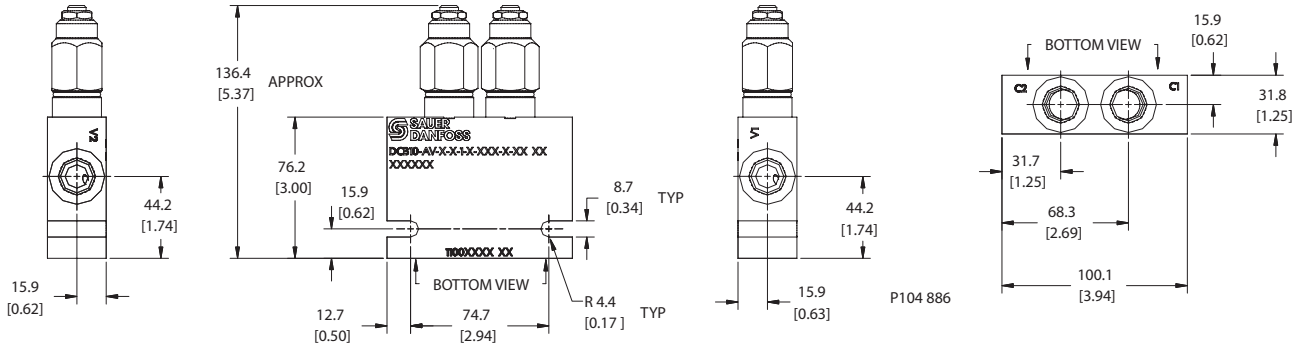
Specifications

Rated pressure	350 bar [5075 psi]
Rated flow at 22 bar [319 psi]	60 l/min [16 US gal/min]
Leakage	10 drops/min @ at 70% of crack pressure
Weight	0.90 kg [1.98 lb]
Pilot ratio	1.5:1, 3.0:1, 4.5:1, 10.0:1
Cavity	None

DIMENSIONS

mm [in]

Cross-sectional view



P104 886

ORDERING INFORMATION

DCB10-AV-1-B-1-E-100-B-8S

Spring range
For plot ratio Z (1.5:1)
1 = 20-70 bar [290-1015 psi]
2 = 30-90 bar [435-1305 psi]
3 = 50-140 bar [725-2030 psi]
For pilot ratio A (3:1)
1 = 35-110 bar [507-1595 psi]
2 = 60-150 bar [870-2175 psi]
3 = 80-230 bar [1160-3335 psi]
For pilot ratio B (4.5:1)
1 = 55-180 bar [797-2610 psi]
2 = 75-240 bar [1087-3480 psi]
3 = 90-350 bar [1305- 5075 psi]
For pilot ratio C (10:1)
1 = 90-350 bar [1305-5075 psi]

Pilot ratio
Z = 1.5 to 1
A = 3 to 1
B = 4.5 to 1
C = 10 to 1

Check crack pressure
1 = 1 bar (14.5 psi)

Adjust type
E = External adjustment
F = Tamper resistant

Body and ports

	Body P/N
6S = Aluminium, #6 SAE	11002669
8S = Aluminium, #8 SAE	11001779
SE3B = Aluminium, 3/8" BSPP	11008008
SE4B = Aluminium, 1/2" BSPP	11008009
S6S = Steel, #6 SAE	11009171
S6S = Steel, #8 SAE	11009170

Seals

	Seal kit
B = Buna-N	11002672
V = Viton	11002673

Std. setting
45 = 45 bar [650 psi] Set in Spring 1 For Pilot Ratio Z
60 = 60 bar [870 psi] Set in Spring 2 For Pilot Ratio Z
70 = 70 bar [1015 psi] Set in Spring 1 For Pilot Ratio A
100 = 100 bar [1450 psi] Set in Spring 3 For Pilot Ratio Z
100 = 100 bar [1450 psi] Set in Spring 1 For Pilot Ratio B
100 = 100 bar [1450 psi] Set in Spring 2 For Pilot Ratio A,B
175 = 175 bar [2537 psi] Set in Spring 3 For Pilot Ratio A,B
175 = 175 bar [2537 psi] Set in Spring 1 For Pilot Ratio C

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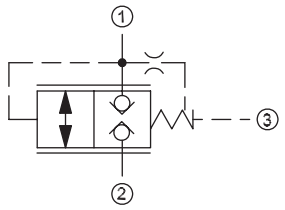
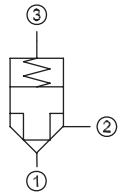
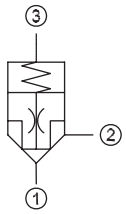
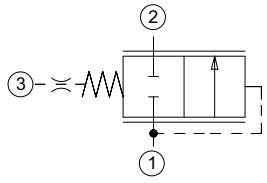
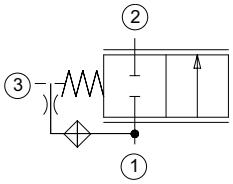
Cartridge Valves Technical Information
Logic Elements
Quick Reference

Logic Element, Poppet Type	Model No.	Cavity	Description	Flow*	Pressure	Page
	VLP 12/P2	NCS12/3	Logic Element Poppet, Double Blocking Closed, Vent to Open	160 l/min [42 US gal/min]	315 bar [4500 psi]	13.10

Logic Element, Poppet Type	Model No.	Cavity	Description	Flow*	Pressure	Page
	VLP 12/A5	NCS12/3	Logic Element Poppet, Normally Closed, Pilot to Close	160 l/min [42 US gal/min]	315 bar [4500 psi]	13.11

Logic Element, Poppet Type	Model No.	Cavity	Description	Flow*	Pressure	Page
	VLP 12/C2	NCS12/3	Logic Element Poppet, Normally Closed, Vent to Open	160 l/min [42 US gal/min]	315 bar [4500 psi]	13.12

Logic Element, Spool Type	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP700-1	SDC10-3	Logic Element, Normally Closed, Pilot to Close	50 l/min [13 US gal/min]	210 bar [3000 psi]	13.13
	CP701-1	CP12-3S		150 l/min [40 US gal/min]	210 bar [3000 psi]	13.14
	CP702-1	SDC16-3S		190 l/min [50 US gal/min]	210 bar [3000 psi]	13.15
	LE20-CPC	CP20-3S		320 l/min [85 US gal/min]	207 bar [3000 psi]	13.16

Logic Element, Spool Type	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP700-2	SDC10-3	Logic Element, Normally Closed, Vent to Open	50 l/min [13 US gal/min]	210 bar [3000 psi]	13.17
	CP701-2	CP12-3S		150 l/min [40 US gal/min]	210 bar [3000 psi]	13.18
	CP702-2	SDC16-3S		190 l/min [50 US gal/min]	210 bar [3000 psi]	13.19
	CP703-2	CP20-3S		320 l/min [85 US gal/min]	210 bar [3000 psi]	13.20

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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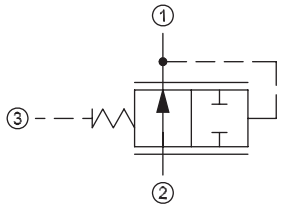
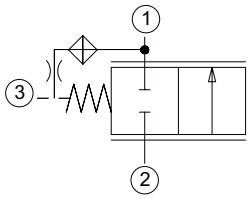
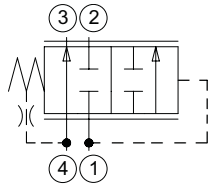
Cartridge Valves Technical Information
Logic Elements
Quick Reference

Logic Element, Spool Type	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP700-4	SDC10-3	Logic Element, Normally Open, Pilot to Open	40 l/min [11 US gal/min]	210 bar [3000 psi]	13.21
	CP701-4	CP12-3S		75 l/min [20 US gal/min]	210 bar [3000 psi]	13.22
	CP702-4	SDC16-3S		114 l/min [30 US gal/min]	210 bar [3000 psi]	13.23
	CP703-4	CP20-3S		200 l/min [53 US gal/min]	210 bar [3000 psi]	13.24

Logic Element, Spool Type	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP700-3	SDC10-3	Logic Element, Normally Open, Vent to Close	40 l/min [11 US gal/min]	210 bar [3000 psi]	13.25
	CP701-3	CP12-3S		80 l/min [21 US gal/min]	210 bar [3000 psi]	13.26
	CP702-3	SDC16-3S		115 l/min [30 US gal/min]	210 bar [3000 psi]	13.27

Pressure Compensator	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP310-4	SDC10-4	Pressure Compensator, Flow Control, Priority	40 l/min [11 US gal/min]	210 bar [3000 psi]	13.28
	CP311-4	CP12-4		60 l/min [16 US gal/min]	210 bar [3000 psi]	13.29
	CP312-4	CP16-4		130 l/min [34 US gal/min]	210 bar [3000 psi]	13.30
	CP313-4	SDC20-4		340 l/min [90 US gal/min]	210 bar [3000 psi]	13.31

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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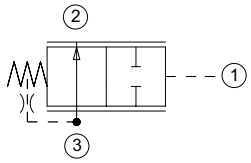
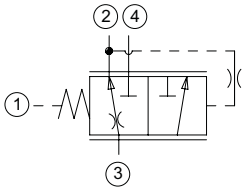
Cartridge Valves Technical Information
Logic Elements
Quick Reference

Pressure Compensator	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP300-4	SDC10-3	Pressure Compensator, Flow Control, restrictive	40 l/min [11 US gal/min]	210 bar [3000 psi]	13.32
	CP301-4	CP12-3		90 l/min [24 US gal/min]	210 bar [3000 psi]	13.33
	CP302-4	SDC16-3		130 l/min [34 US gal/min]	210 bar [3000 psi]	13.34
	CP303-4	SDC20-3		284 l/min [75 US gal/min]	210 bar [3045 psi]	13.35

Pressure Compensator	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP310-6	SDC10-4	Pressure Compensator, Load Sense, Priority, Static	40 l/min [11 US gal/min]	210 bar [3000 psi]	13.36
	CP312-6	CP16-4		125 l/min [33 US gal/min]	210 bar [3000 psi]	13.37
	CP313-6	SDC20-4		200 l/min [53 US gal/min]	210 bar [3000 psi]	13.38
	PC12-LPS	CP12-4		75 l/min [20 US gal/min]	207 bar [3000 psi]	13.39

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

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Cartridge Valves Technical Information
Logic Elements
Application Notes

OVERVIEW

Logic elements are multi-purpose devices. These valves, when used with other cartridge valves, can create a wide variety of circuits for control of pressure, flow, and direction.

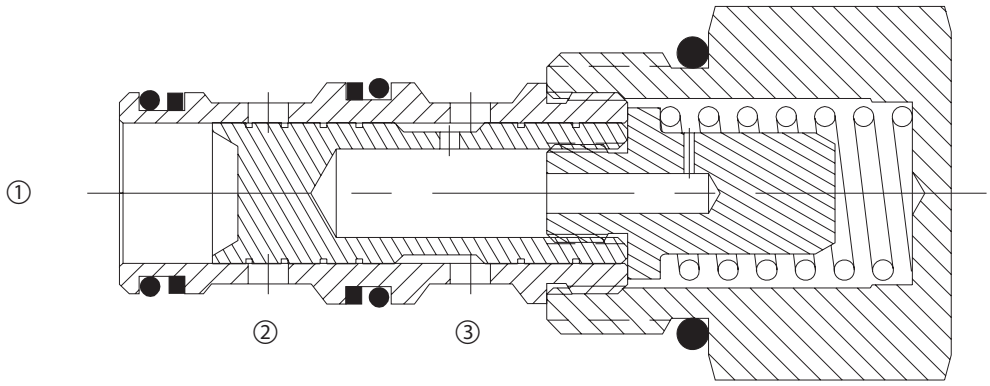
Differential sensing valves

F102 006

SPRING BIASED, NORMALLY CLOSED, DIFFERENTIAL SENSING VALVES

Spring-biased, normally-closed differential sensing valves include: CP700-1, CP700-1L, CP701-1, and CP702-1. These valves are normally closed and will modulate based on the spring control pressure, inlet pressure at port , and pilot pressure at port .

Spring biased, normally closed, differential sensing valve cross section



P103 088

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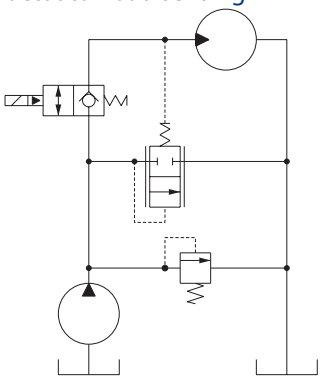
Cartridge Valves Technical Information
Logic Elements
Application Notes

SPRING BIASED, NORMALLY CLOSED, DIFFERENTIAL SENSING VALVES (continued)

Common applications

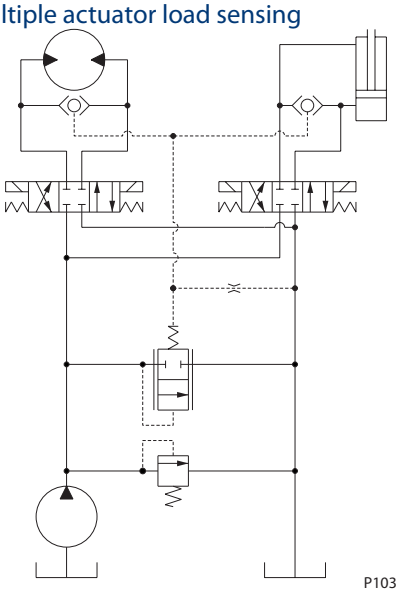
- Load-sensing for a fixed-displacement pump with single or multiple actuators.
- Bypass-type pressure-compensated flow control.

Single actuator load sensing



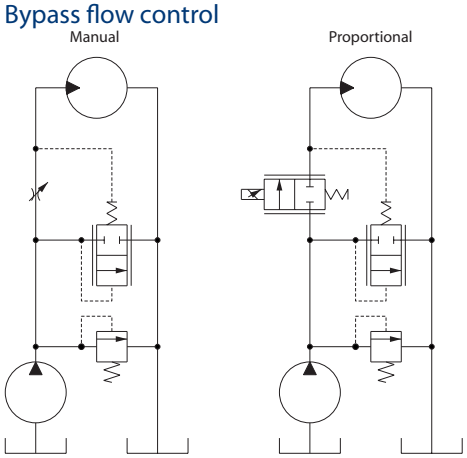
P103 089

Multiple actuator load sensing



P103 090

Bypass flow control



P103 091E

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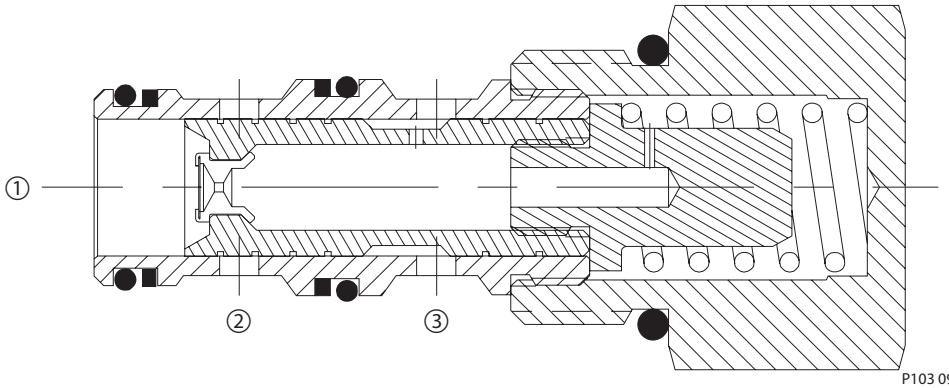
Cartridge Valves Technical Information
Logic Elements
Application Notes

SPRING BIASED, NORMALLY CLOSED, VENT TO OPEN DIFFERENTIAL SENSING VALVES

Spring-biased, normally-closed, vent-to-open differential sensing valves include: CP700-2, CP700-2L, CP701-2, and CP702-2. These valves are normally closed and will modulate based on the spring control pressure, inlet pressure at port , and pilot pressure at port .

Spring biased, normally closed, vent to open differential sensing valve

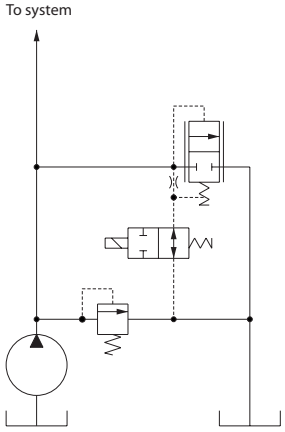


P103 093

Common applications include:

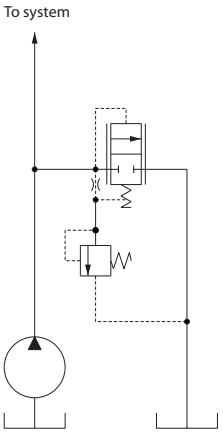
- Pump unloading.
- Pilot-operated relief valve.
- Sequence valve.
- Selector circuit.

Pump unloading



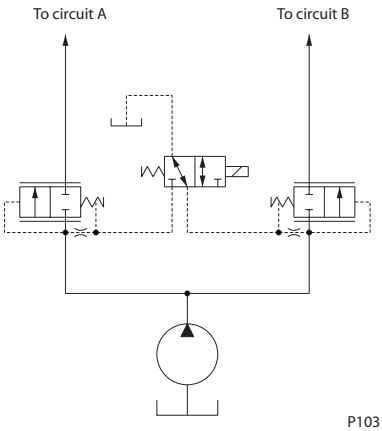
P103 094E

Pilot-operated relief valve



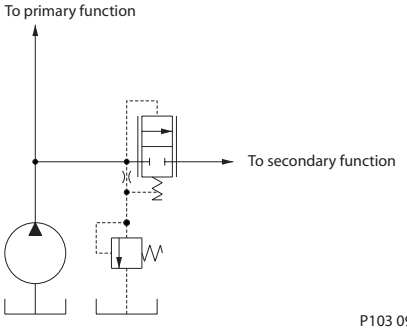
P103 095E

Selector valve



P103 097E

Pilot-operated sequence valve



P103 096E

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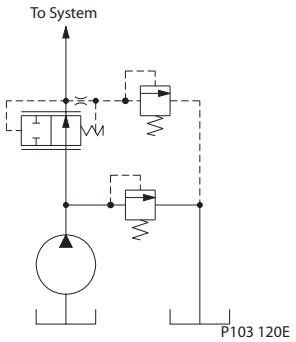
Cartridge Valves Technical Information
Logic Elements
Application Notes

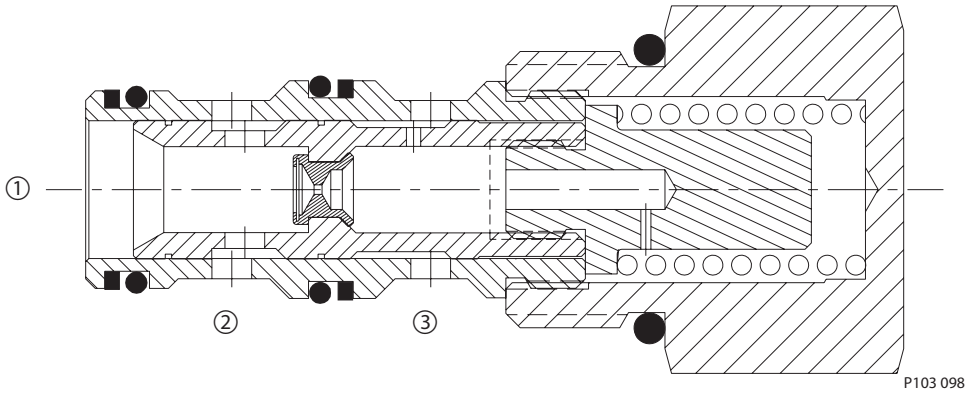
SPRING BIASED, NORMALLY OPEN, VENT TO CLOSE, DIFFERENTIAL SENSING VALVES

Spring-biased, normally-open, vent-to-close differential sensing valves include: CP700-3, CP701-3, and CP702-3. These valves are normally open and will modulate based on spring control pressure, outlet pressure at port , and pilot pressure at port . One application for this valve is to create a high-flow pressure reducing valve when using a small relief valve (like CP208-1), or a proportional relief valve (like CP558-20) as a pilot element.

Pilot-operated pressure reducing valve



Spring biased, normally open, vent to close, differential sensing valve



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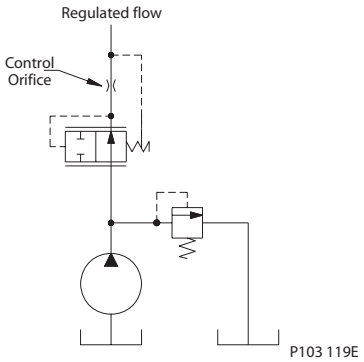
Cartridge Valves Technical Information
Logic Elements
Application Notes

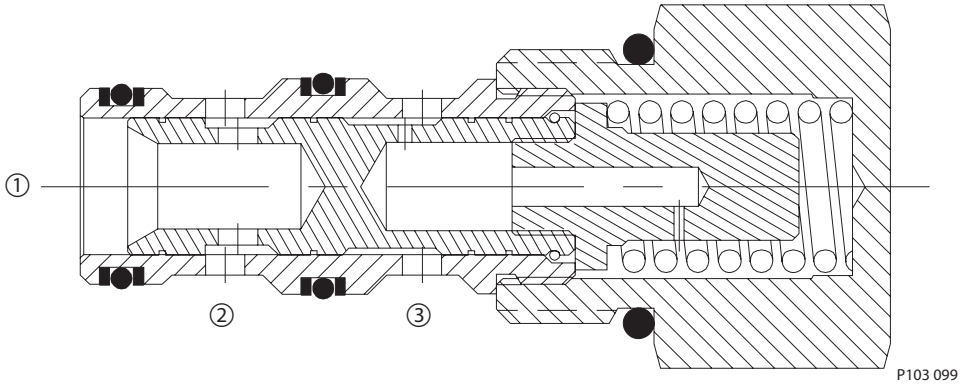
SPRING BIASED, NORMALLY OPEN, DIFFERENTIAL SENSING VALVES

Spring-biased, normally-open differential sensing valves include: CP700-4, CP701-4, and CP702-4. These valves are normally open and will modulate based on spring control pressure, outlet pressure at port , and pilot pressure at port . One application for this valve is as a pressure compensator when used with a fixed or adjustable orifice to create a pressure-compensated flow control.

Pressure compensator



Spring biased, normally open, differential sensing valve



Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Application Notes

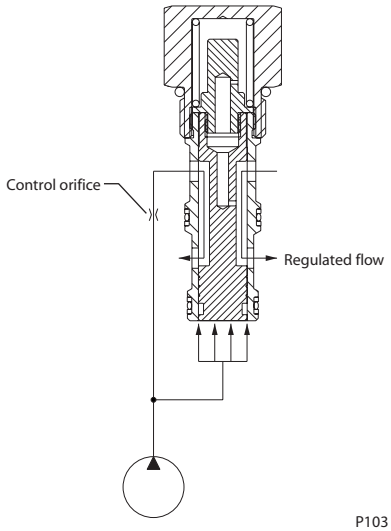
PRESSURE COMPENSATING, DIFFERENTIAL SENSING VALVES

Pressure compensators offer the circuit designer capability to add pressure compensation to any fixed or variable orifice. This ensures that flow, and resulting actuator speed, are maintained regardless of system and working pressures. Note that a pressure compensator is required when using Sauer-Danfoss direct-acting proportional flow controls; see *Proportional valve application notes* for more information.

Restrictive-type

Restrictive-type pressure compensators are three-ported valves that work in series with a fixed or variable control orifice. The pressure compensator is located downstream of the orifice and is spring-biased to an open position as shown. The spool "senses" the pressure on either side of the control orifice and will vary it's restriction in order to maintain a constant pressure differential across the control orifice, hence maintaining a constant flow rate.

Restrictive-type pressure compensator operation



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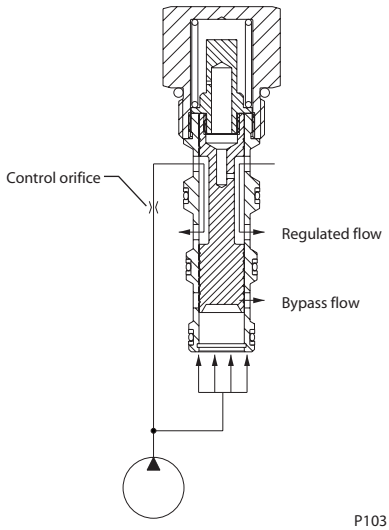
Priority-type

Priority-type pressure compensators are four-ported valves that work in series with a fixed or variable control orifice. As with the restrictive-type valves, these valves maintain a constant pressure differential across the control orifice. However, rather than restricting flow when the differential pressure becomes too high, the priority-type pressure compensators open a fourth bypass port for all flow in excess of that demanded by the control orifice. Note that if the bypass port is blocked, the valve will function as a restrictive-type pressure compensator.

Priority-type pressure compensator operation



P103 101E

SUMMARY

All of these circuits are particularly effective to control high flows while using small (e.g. 8 series) solenoid and relief valves as pilot elements. The above examples are typical circuits but are by no means the only applications for these valves. Effective use of differential sensing valves is a key to designing cost-effective circuits, and is limited only by the imagination of the designer.

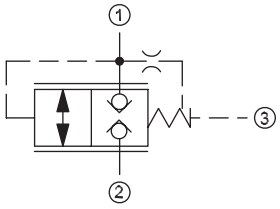
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Poppet Type
VLP 12/P2

OPERATION

This is a poppet-type logic element with multi-function potential when used with other direction control devices.

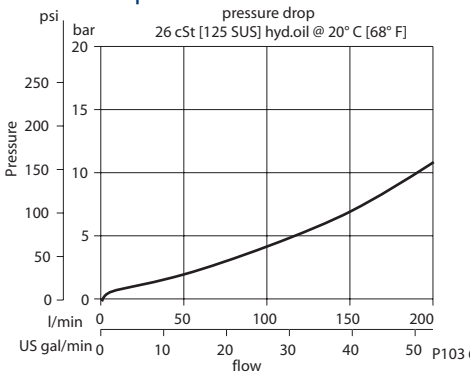
Schematic



P103 505

SPECIFICATIONS

Theoretical performance



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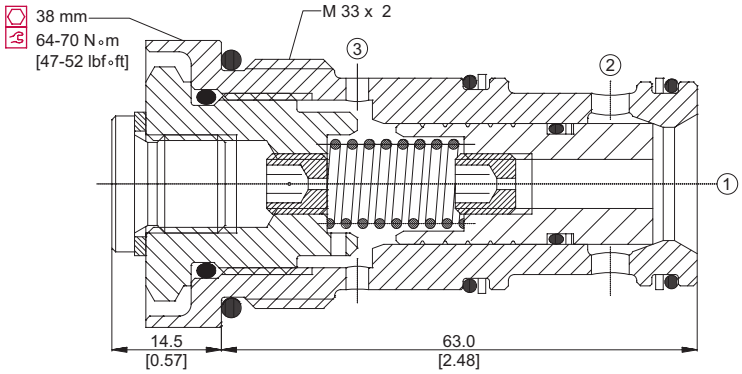
Specifications

Rated pressure	315 bar [4500 psi]
Rated flow at 7 bar [100 psi]	160 l/min [42 US gal/min]
Weight	0.30 kg [0.66 lb]
Cavity	NCS12/3
Bias spring	2 bar [29 psi]

DIMENSIONS

mm [in]

Cross-sectional view



P103 662

ORDERING INFORMATION

VLP 12/P2 - B - SE8S - V

Seals

			Seal kit
V	=	Viton	230000360
Omit	=	Buna-N	230000130

Housing and ports

			Housing P/N
00	=	No Housing	No Housing
SE1/2	=	AL,1/2 BSP	NCS12/3-SE-1/2
SE3/4	=	AL,3/4 BSP	NCS12/3-SE-3/4
SE8S	=	AL, #8 SAE	NCS12/3-SE-8S
SE12S	=	AL, #12SAE	NCS12/3-SE-12S

Other housings available

P103 715E

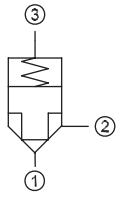
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Poppet Type
VLP 12/A5

OPERATION

This is a poppet-type logic element with multi-function potential when used with other direction control devices.

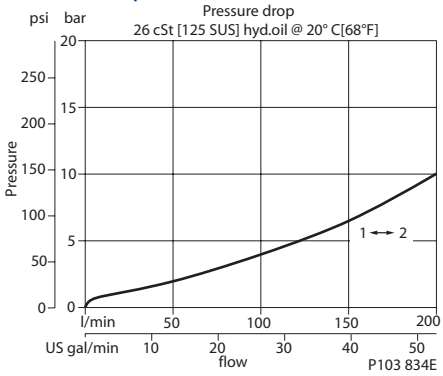
Schematic



P103 503

SPECIFICATIONS

Theoretical performance



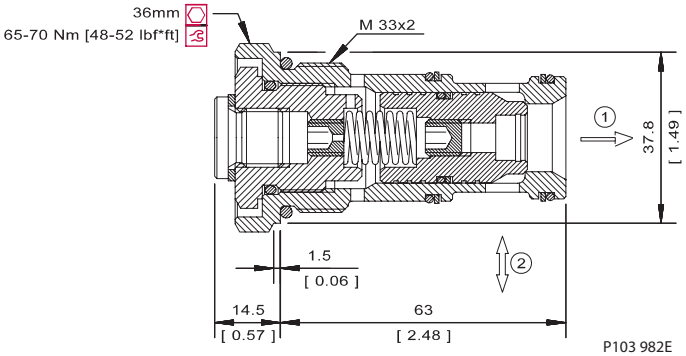
Specifications

Rated pressure	315 bar [4500 psi]
Rated flow at 7 bar [100 psi]	160 l/min [42 US gal/min]
Weight	0.30 kg [0.66 lb]
Cavity	NCS12/3
Bias spring	2 bar [29 psi]

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

VLP 12/A5 - B - SE8S - V

Seals

			Seal kit
V	=	Viton	230000360
Omit	=	Buna-N	230000130

P103 835E

Housing and ports			**Housing P/N**
00	=	No Housing	No Housing
SE1/2	=	AL,1/2 BSP	NCS12/3-SE-1/2
SE3/4	=	AL,3/4 BSP	NCS12/3-SE-3/4
SE8S	=	AL, #8 SAE	NCS12/3-SE-8S
SE12S	=	AL, #12SAE	NCS12/3-SE-12S

Other housings available

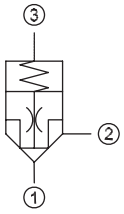
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Poppet Type
VLP 12/C2

OPERATION

This is a poppet-type logic element with multi-function potential when used with other direction control devices.

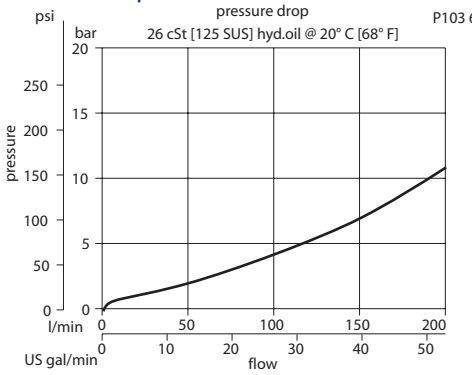
Schematic



P103 504

SPECIFICATIONS

Theoretical performance



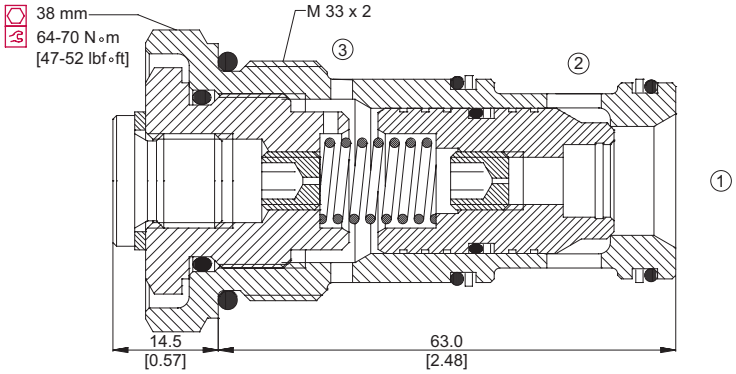
Specifications

Rated pressure	315 bar [4500 psi]
Rated flow at 7 bar [100 psi]	160 l/min [42 US gal/min]
Weight	0.30 kg [0.66 lb]
Cavity	NCS12/3
Bias spring	2 bar [29 psi]

DIMENSIONS

mm [in]

Cross-sectional view



P103 661

ORDERING INFORMATION

VLP 12/C2 - B - SE8S - V

Seals

			Seal kit
V	=	Viton	230000360
Omit	=	Buna-N	230000130

Housing and ports

			Housing P/N
00	=	No Housing	No Housing
SE1/2	=	AL,1/2 BSP	NCS12/3-SE-1/2
SE3/4	=	AL,3/4 BSP	NCS12/3-SE-3/4
SE8S	=	AL, #8 SAE	NCS12/3-SE-8S
SE12S	=	AL, #12SAE	NCS12/3-SE-12S

Other housings available

P103 740E

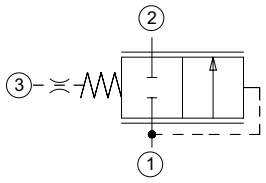
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP700-1

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

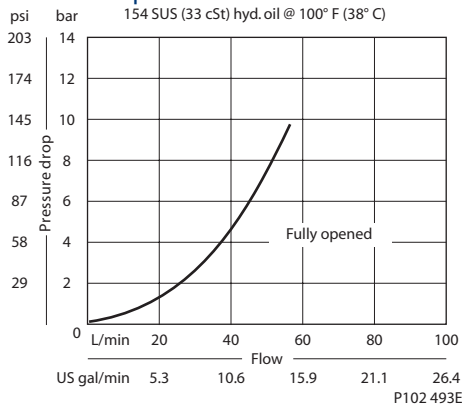
Schematic



P102 488E

SPECIFICATIONS

Theoretical performance



P102 493E

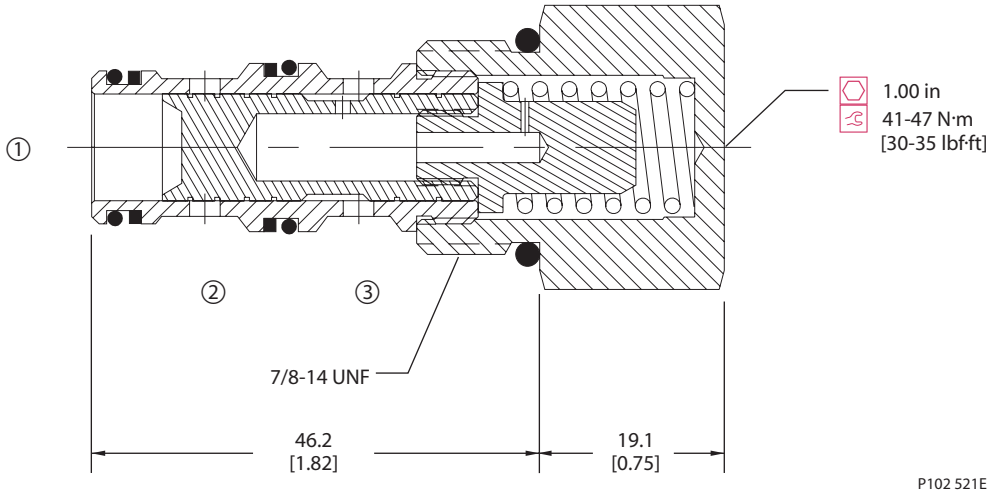
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	50 l/min [13 US gal/min]
Weight	0.12 kg [0.27 lb]
Cavity	SDC10-3

DIMENSIONS

mm [in]

Cross-sectional view



P102 521E

ORDERING INFORMATION

CP700 - 1 - B - 8S - 080

Seals

	Seal kit
B = Buna-N	120027
V = Viton	120028

Housing and ports

	Housing P/N
0 = No Housing	No Housing
SE3B = AL,3/8 BSP	SDC10-3-SE-3B
SE4B = AL, 1/2 BSP	SDC10-3-SE-4B
6S = AL, #6 SAE	CP10-3-6S
8S = AL, #8 SAE	CP10-3-8S

Other housings available

Differential Control Pressure

bar	[psi]
040 = 2.8	[40]
080 = 5.5	[80]
110 = 7.6	[110]
150 = 10.3	[150]
190 = 13.1	[190]

P102 025E

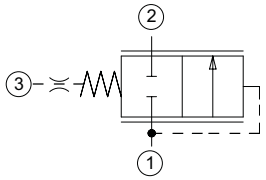
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP701-1

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

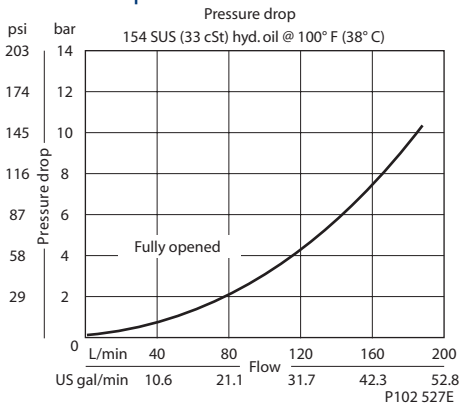
Schematic



P102 488E

SPECIFICATIONS

Theoretical performance



P102 527E

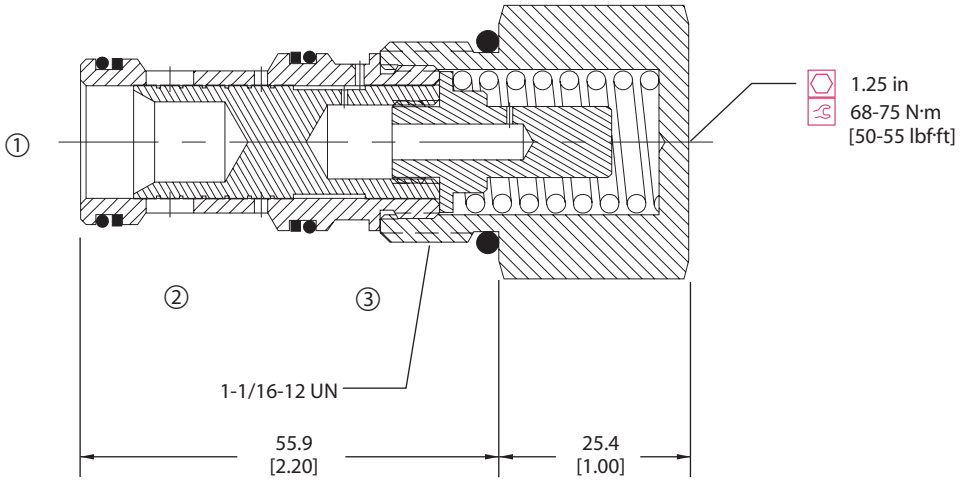
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	150 l/min [40 US gal/min]
Weight	0.26 kg [0.57 lb]
Cavity	CP12-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 513E

ORDERING INFORMATION

CP701 - 1 - B - 12S - 080

Seals

B = Buna-N
V = Viton

Seal kit
120335
120336

Housing and ports

0 = No housing
4B = AL, 1/2 BSP
6B = AL, 3/4 BSP
10S = AL, #10 SAE
12S = AL, #12 SAE

Housing P/N

No housing
CP12-3S-4B/2B = 1/4 BSP
CP12-3S-6B/2B = 1/4 BSP
CP12-3S-10S/4S = #4 SAE
CP12-3S-12S/4S = #4 SAE

Pilot port

Differential Control Pressure

bar	[psi]
030 = 2.1	[30]
050 = 3.5	[50]
080 = 5.5	[80]
100 = 6.9	[100]
150 = 10.3	[150]
170 = 11.7	[170]

P102 042E

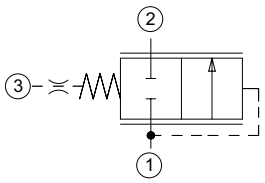
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP702-1

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

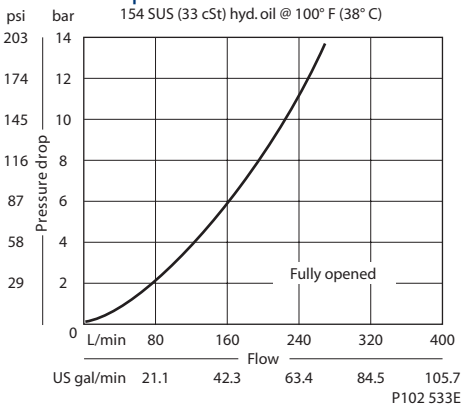
Schematic



P102 488E

SPECIFICATIONS

Theoretical performance



P102 533E

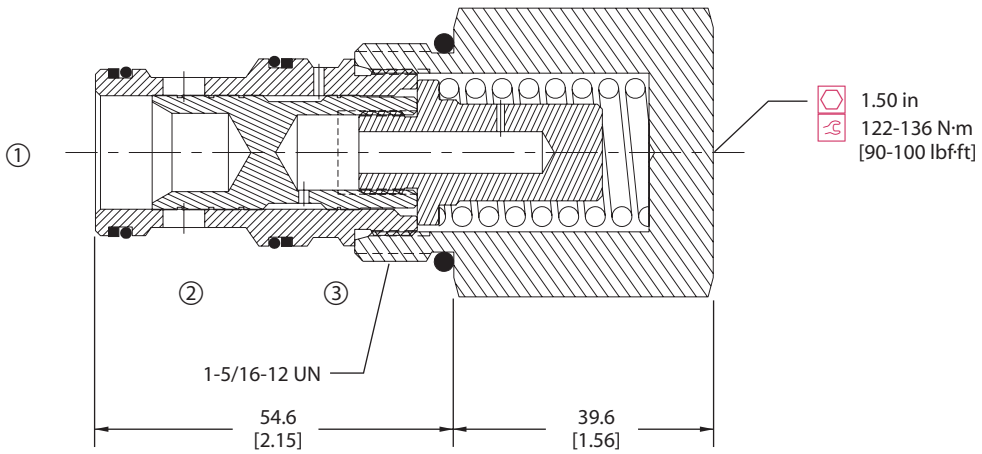
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	190 l/min [50 US gal/min]
Weight	0.38 kg [0.83 lb]
Cavity	SDC16-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 507E

ORDERING INFORMATION

CP702 - 1 - B - 16S - 080

Seals

	Seal kit
B = Buna-N	120033
V = Viton	120034

Housing and ports

	Housing P/N	Pilot port
0 = No housing	No housing	
6B = AL,3/4 BSP	CP16-3S-6B/2B	= 1/4 BSP
8B = AL, 1 BSP	CP16-3S-8B/2B	= 1/4 BSP
12S = AL, #12 SAE	CP16-3S-12S/4S	= #4 SAE
16S = AL, #16 SAE	CP16-3S-12S/4S	= #4 SAE

Other housings available

Differential Control Pressure

	bar	[psi]
040 =	2.8	[40]
080 =	5.5	[80]
110 =	7.6	[110]
150 =	10.3	[150]
170 =	11.7	[170]

P102 054E

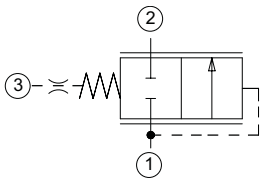
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
LE20-CPC

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

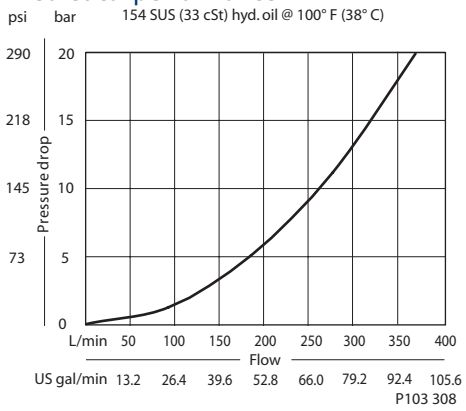
Schematic



P102 488E

SPECIFICATIONS

Theoretical performance



P103 308

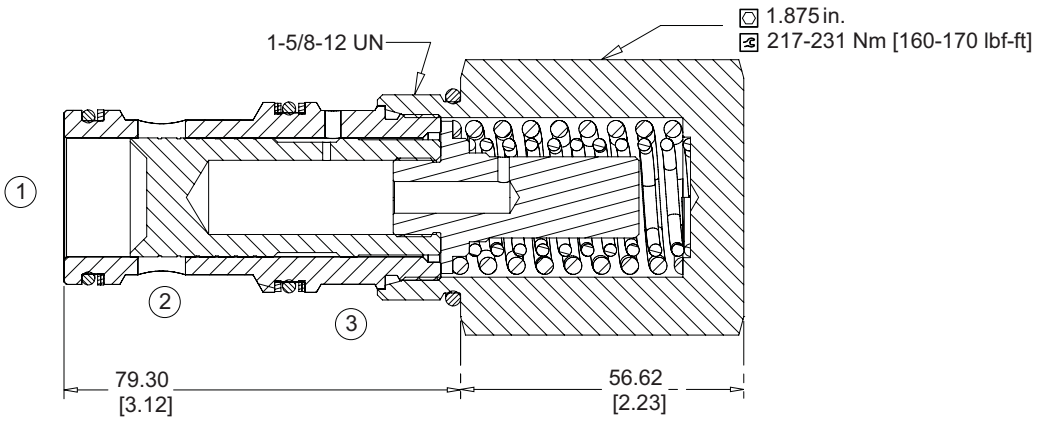
Specifications

Rated pressure	207 bar [3000 psi]
Rated flow at 7 bar [100 psi]	320 l/min [85 US gal/min]
Weight	1.19 kg [2.62 lb]
Cavity	CP20-3S

DIMENSIONS

mm [in]

Cross-sectional view



P108 372E

ORDERING INFORMATION

LE20-CPC-5.5-B-00

Differential Control Pressure
5.5 = 5.5 bar [80 psi]
7.0 = 7 bar [100 psi]
10.0 = 10.0 bar [150 psi]

Housing and ports	Housing Part #	Pilot Port
00 = No Housing	No Housing	
DG8B = Al, 1 BSP	CP20-3S-8B/2B	1/4 BSP
DG10B = Al, 1-1/4 BSP	CP20-3S-10B/2B	1/4 BSP
16S = Al, #16 SAE	CP20-3S-16S/4S	#4 SAE
20S = Al, #20 SAE	CP20-3S-20S/4S	#4 SAE

Seals	Seal Kit
B = Buna-N	120380
V = Viton	120381

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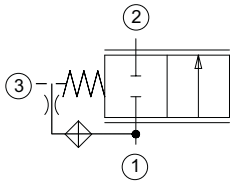
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP700-2

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

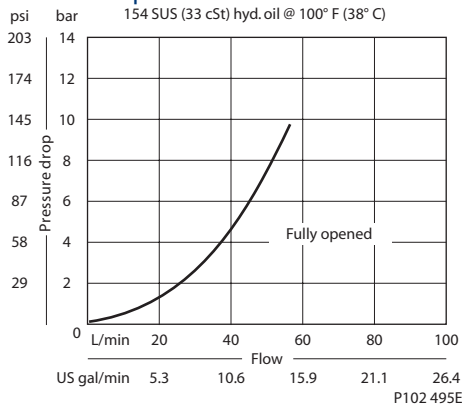
Schematic



P102 487E

SPECIFICATIONS

Theoretical performance



P102 495E

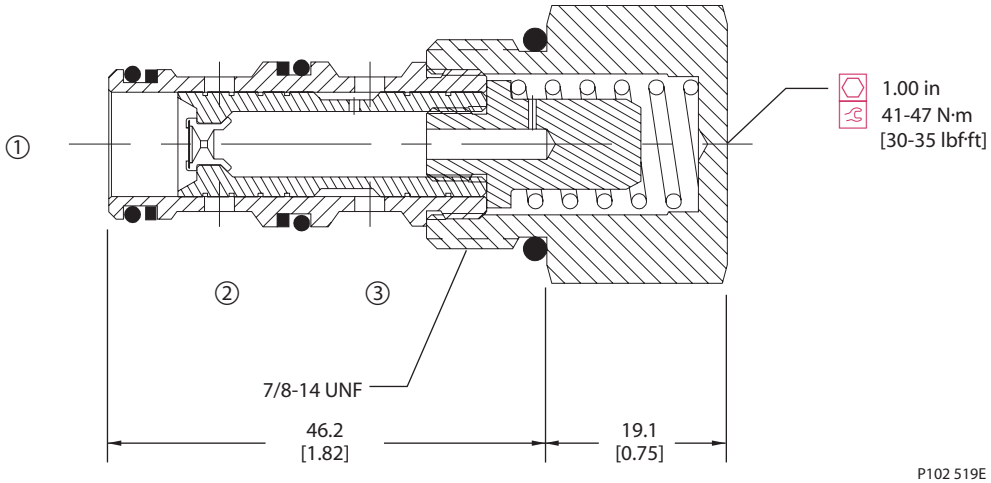
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	50 l/min [13 US gal/min]
Weight	0.13 kg [0.28 lb]
Cavity	SDC10-3

DIMENSIONS

mm [in]

Cross-sectional view



P102 519E

ORDERING INFORMATION

CP700 - 2 - B - 8S - 080

Seals

B = Buna-N
V = Viton

Seal kit
120027
120028

Housing and ports

		Housing P/N
0	= No Housing	No Housing
SE3B	= AL,3/8 BSP	SDC10-3-SE-3B
SE4B	= AL, 1/2 BSP	SDC10-3-SE-4B
6S	= AL, #6 SAE	CP10-3-6S
8S	= AL, #8 SAE	CP10-3-8S

Other housings available

Differential Control Pressure

	bar	[psi]
040	= 2.8	[40]
080	= 5.5	[80]
110	= 7.6	[110]
150	= 10.3	[150]
190	= 11.7	[190]

P102 029E

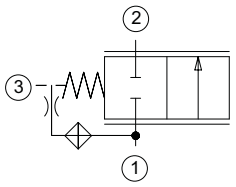
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP701-2

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

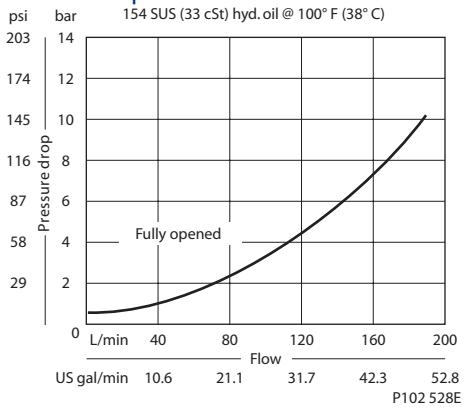
Schematic



P102 487E

SPECIFICATIONS

Theoretical performance



P102 528E

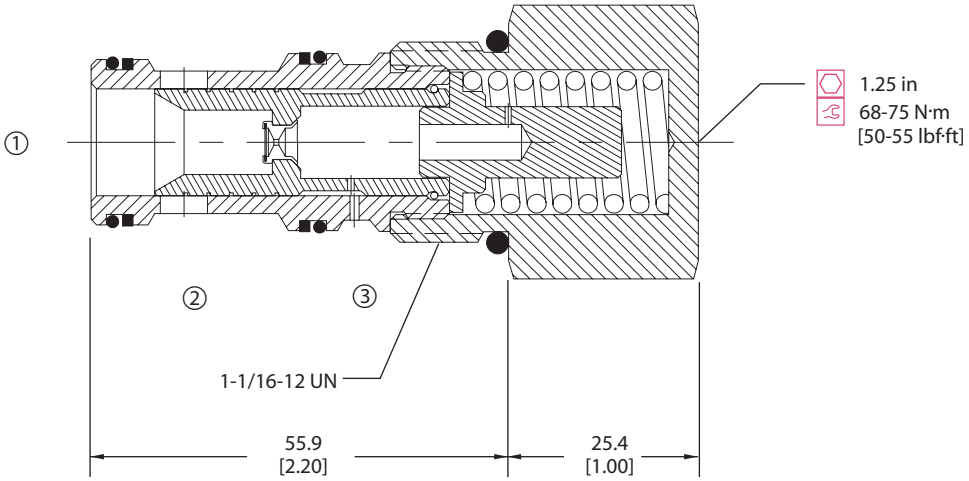
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	150 l/min [40 US gal/min]
Weight	0.26 kg [0.57 lb]
Cavity	CP12-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 512E

ORDERING INFORMATION

CP701 - 2 - B - 12S - 080

Seals

B = Buna-N
V = Viton

Seal kit
120335
120336

Housing and ports

0 = No housing
4B = AL, 1/2 BSP
6B = AL, 3/4 BSP
10S = AL, #10 SAE
12S = AL, #12 SAE
other housings available

Housing P/N **Pilot port**

No houisng
CP12-3S-4B/2B = 1/4 BSP
CP12-3S-6B/2B = 1/4 BSP
CP12-3S-10S/4S = #4 SAE
CP12-3S-12S/4S = #4 SAE

Differential Control Pressure

	bar	[psi]
030	= 2.1	[30]
050	= 3.5	[50]
080	= 5.5	[80]
100	= 6.9	[100]
150	= 10.3	[150]

P102 043E

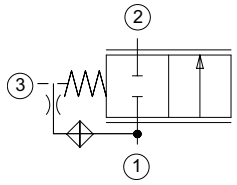
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP702-2

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

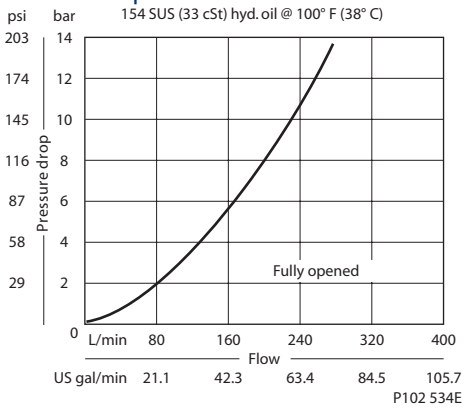
Schematic



P102 487E

SPECIFICATIONS

Theoretical performance



P102 534E

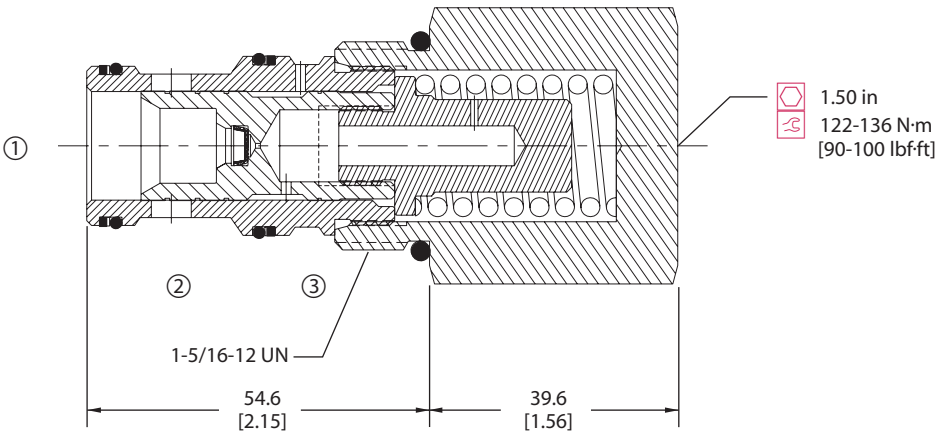
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	190 l/min [50 US gal/min]
Weight	0.38 kg [0.83 lb]
Cavity	SDC16-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 506E

ORDERING INFORMATION

CP702 - 2 - B - 16S - 080

Seals

	Seal kit
B = Buna-N	120033
V = Viton	120034

Housing and ports

	Housing P/N	Pilot port
0 = No housing	No housing	
6B = AL, 3/4 BSP	CP16-3S-6B/2B	= 1/4 BSP
8B = AL, 1 BSP	CP16-3S-8B/2B	= 1/4 BSP
12S = AL, #12 SAE	CP16-3S-12S/4S	= #4 SAE
16S = AL, #16 SAE	CP16-3S-12S/4S	= #4 SAE

Other housings available

Differential Control Pressure

bar	[psi]
040 = 2.8	[40]
080 = 5.5	[80]
110 = 7.6	[110]
150 = 10.3	[150]
170 = 11.7	[170]

P102 055E

Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

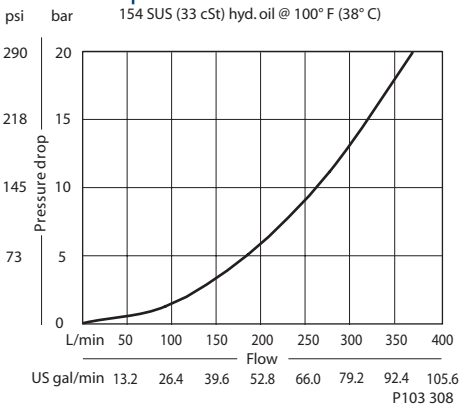
Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP703-2

OPERATION

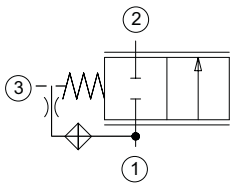
This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

SPECIFICATIONS

Theoretical performance



Schematic



P102 487E

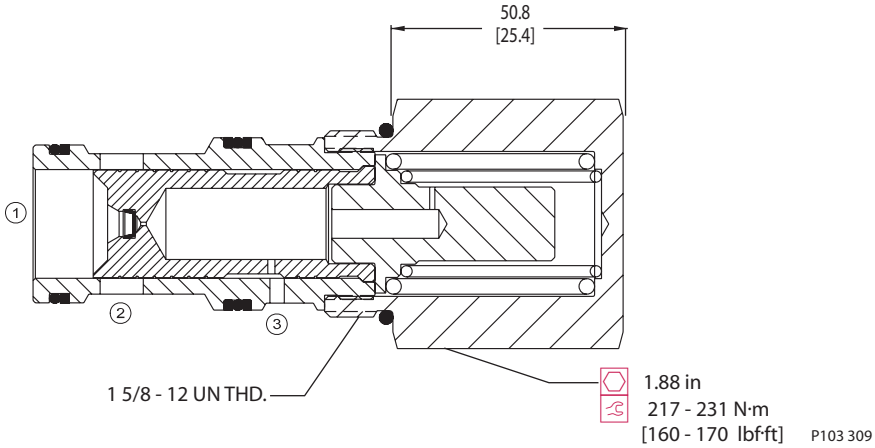
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	320 l/min [85 US gal/min]
Weight	1.18 kg [2.60 lb]
Cavity	CP20-3S

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

CP703 - 2 - B - 16S - 080

Seals

B = Buna-N
V = Viton

Seal kit
120380
120381

Housing and ports

0 = No housing
8B = AL, 1 BSP
10B = AL, 1-1/4 BSP
16S = AL, #16 SAE
20S = AL, #20 SAE
other housings available

Housing P/N **Pilot port**

No housing
CP20-3S-8B/2B = 1/4 BSP
CP20-3S-10B/2B = 1/4 BSP
CP20-3S-16S/4S = #4 SAE
CP20-3S-20S/4S = #4 SAE

Differential control pressure

	bar	[psi]
050 =	3.4	[50]
080 =	5.5	[80]
100 =	6.9	[100]
130 =	9.0	[130]
150 =	10.3	[150]

P103 307

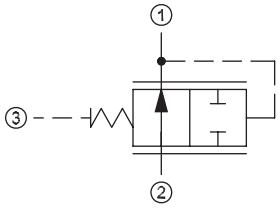
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP700-4

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

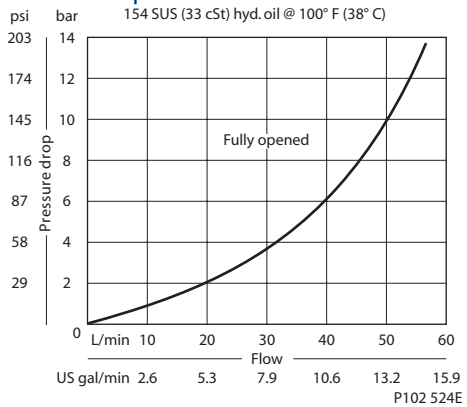
Schematic



P102 429E

SPECIFICATIONS

Theoretical performance



P102 524E

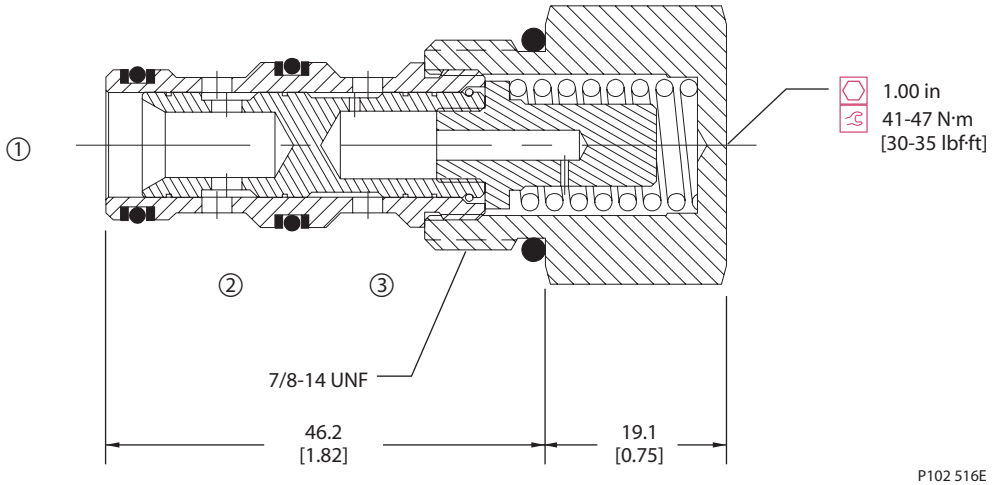
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	40 l/min [11 US gal/min]
Weight	0.13 kg [0.28 lb]
Cavity	SDC10-3

DIMENSIONS

mm [in]

Cross-sectional view



P102 516E

ORDERING INFORMATION

CP700 - 4 - B - 8S - 080

Seals

B = Buna-N
V = Viton

Seal kit
120009
120010

Housing and ports

0 = No Housing
SE3B = AL,3/8 BSP
SE4B = AL, 1/2 BSP
6S = AL, #6 SAE
8S = AL, #8 SAE
Other housings available

Housing P/N

No Housing
SDC10-3-SE-3B
SDC10-3-SE-4B
CP10-3-6S
CP10-3-8S

Differential Control Pressure

	bar	[psi]
040	= 2.8	[40]
080	= 5.5	[80]
110	= 7.6	[110]
150	= 10.3	[150]
200	= 13.8	[200]

P102 034E

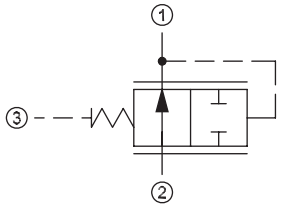
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP701-4

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

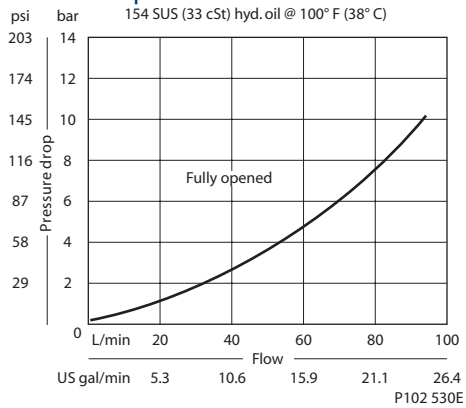
Schematic



P102 429E

SPECIFICATIONS

Theoretical performance



P102 530E

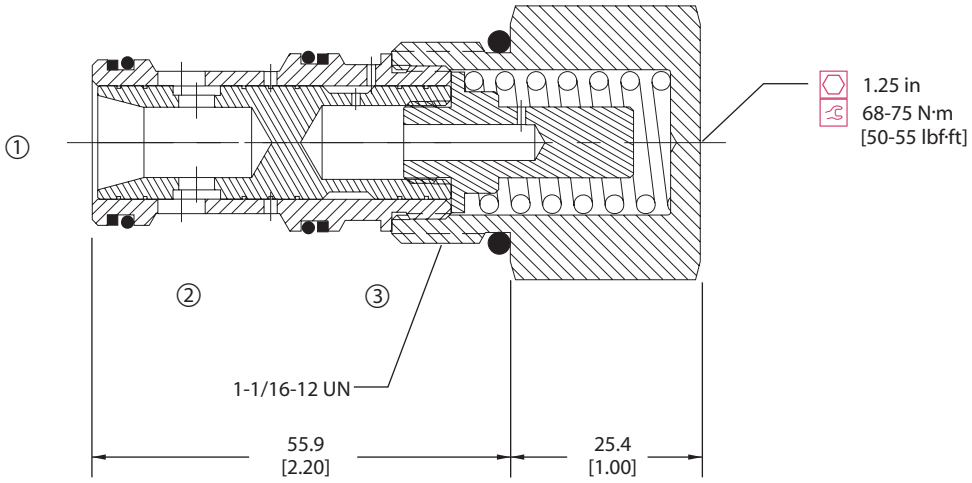
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	75 l/min [20 US gal/min]
Weight	0.26 kg [0.57 lb]
Cavity	CP12-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 510E

ORDERING INFORMATION

CP701 - 4 - B - 12S - 080

Seals

	Seal kit
B = Buna-N	120335
V = Viton	120336

Housing and ports

	Housing P/N	Pilot port
0 = No housing	No houisng	
4B = AL, 1/2 BSP	CP12-3S-4B/2B	= 1/4 BSP
6B = AL, 3/4 BSP	CP12-3S-6B/2B	= 1/4 BSP
10S = AL, #10 SAE	CP12-3S-10S/4S	= #4 SAE
12S = AL, #12 SAE	CP12-3S-12S/4S	= #4 SAE

Differential Control Pressure

bar	[psi]
030 = 2.1	[30]
050 = 3.5	[50]
080 = 5.5	[80]
100 = 6.9	[100]
150 = 10.3	[150]

P102 047E

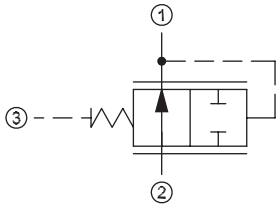
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP702-4

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

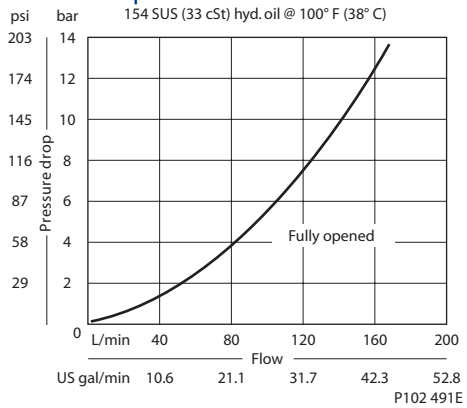
Schematic



P102 429E

SPECIFICATIONS

Theoretical performance



P102 491E

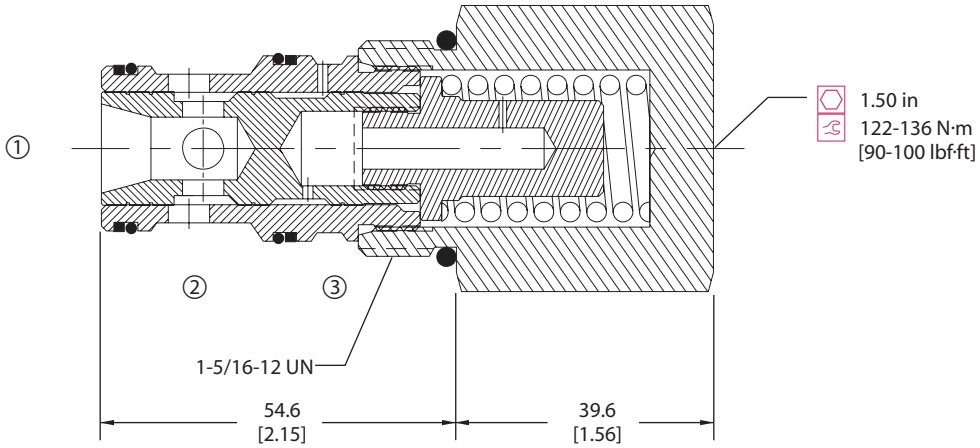
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	114 l/min [30 US gal/min]
Weight	0.38 kg [0.83 lb]
Cavity	SDC16-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 523E

ORDERING INFORMATION

CP702 - 4 - B - 16S - 080

Seals

	Seal kit
B = Buna-N	120033
V = Viton	120034

Housing and ports

	Housing P/N	Pilot port
0 = No housing	No housing	
6B = AL, 3/4 BSP	CP16-3S-6B/2B	= 1/4 BSP
8B = AL, 1 BSP	CP16-3S-8B/2B	= 1/4 BSP
12S = AL, #12 SAE	CP16-3S-12S/4S	= #4 SAE
16S = AL, #16 SAE	CP16-3S-12S/4S	= #4 SAE

Other housings available

Differential Control Pressure

	bar	[psi]
040 =	2.8	[40]
080 =	5.5	[80]
110 =	7.6	[110]
150 =	10.3	[150]
190 =	13.1	[190]

P102 020E

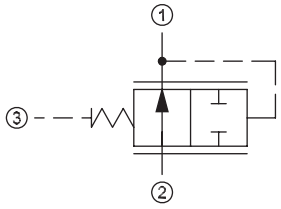
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP703-4

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

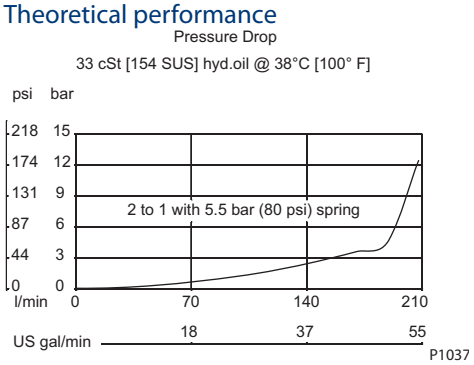
Schematic



P102 429E

SPECIFICATIONS

Theoretical performance



P1037

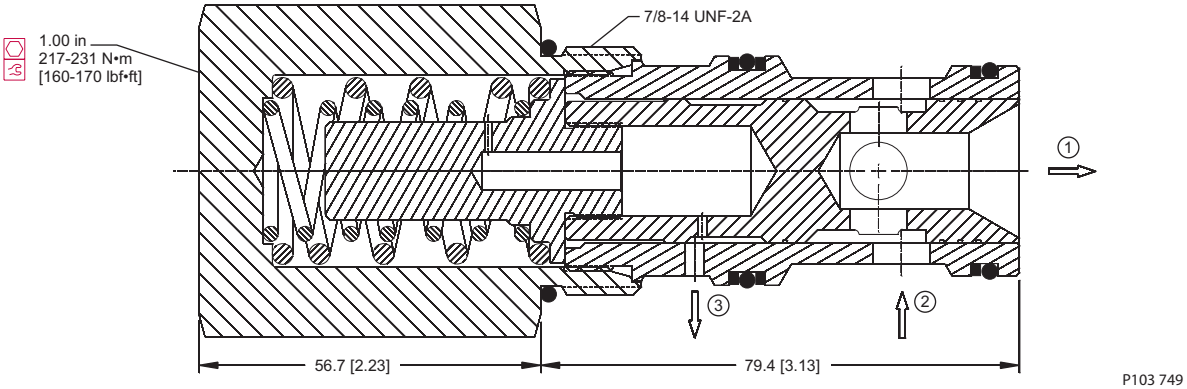
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	200 l/min [53 US gal/min]
Weight	1.18 kg [2.60 lb]
Cavity	CP20-3S

DIMENSIONS

mm [in]

Cross-sectional view



P103 749

ORDERING INFORMATION

CP703-4-B-8B-050

Seals

		Seal kit
B	= Buna-N	120380
V	= Viton	120381

Housing and ports

0	=	No housing
8B	=	AL, 1 BSP
10B	=	AL, 1-1/4 BSP
16S	=	AL, #16 SAE
20S	=	AL, #20 SAE

other housings available

Housing P/N	**Pilot port**
No houisng	
CP20-3S-8B/2B	= 1/4 BSP
CP20-3S-10B/2B	= 1/4 BSP
CP20-3S-16S/4S	= #4 SAE
CP20-3S-20S/4S	= #4 SAE

Differential Control Pressure

		bar	[psi]
050	=	3.5	[50]
080	=	5.5	[80]
100	=	6.9	[100]
130	=	9.0	[130]
150	=	10.3	[150]

P103 763E

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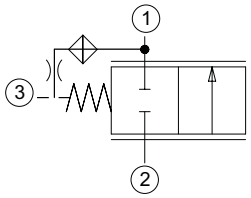
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP700-3

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

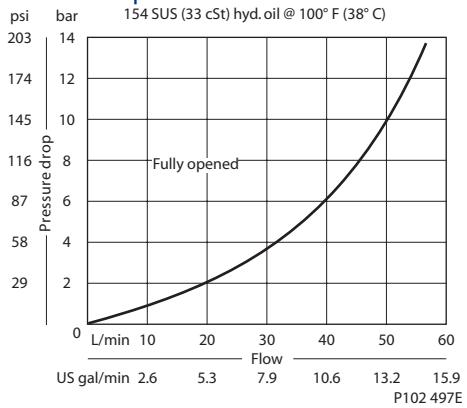
Schematic



P102 486E

SPECIFICATIONS

Theoretical performance



P102 497E

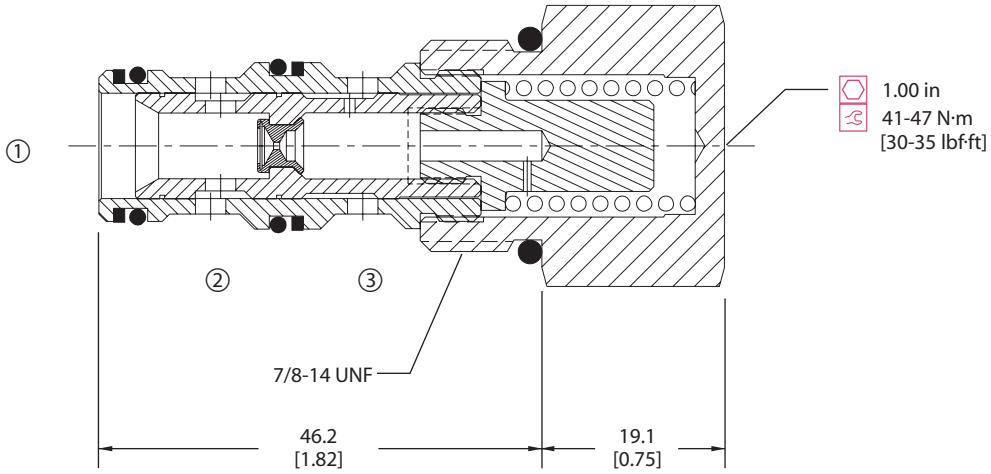
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	40 l/min [11 US gal/min]
Weight	0.13 kg [0.28 lb]
Cavity	SDC10-3

DIMENSIONS

mm [in]

Cross-sectional view



P102 517E

ORDERING INFORMATION

CP700 - 3 - B - 8S - 080

Seals

	Seal kit
B = Buna-N	120027
V = Viton	120028

Housing and ports

	Housing P/N
0 = No Housing	No Housing
SE3B = AL,3/8 BSP	SDC10-3-SE-3B
SE4B = AL, 1/2 BSP	SDC10-3-SE-4B
6S = AL, #6 SAE	CP10-3-6S
8S = AL, #8 SAE	CP10-3-8S

Other housings available

Differential Control Pressure

	bar	[psi]
040 =	2.8	[40]
080 =	5.5	[80]
110 =	7.6	[110]
150 =	10.3	[150]
200 =	13.8	[200]

P102 033E

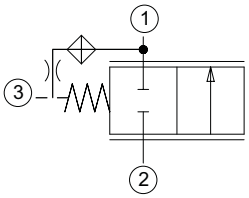
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP701-3

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

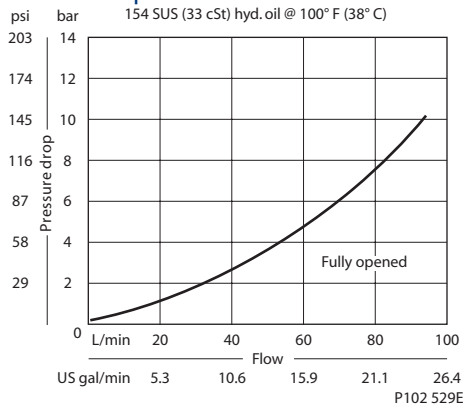
Schematic



P102 486E

SPECIFICATIONS

Theoretical performance



P102 529E

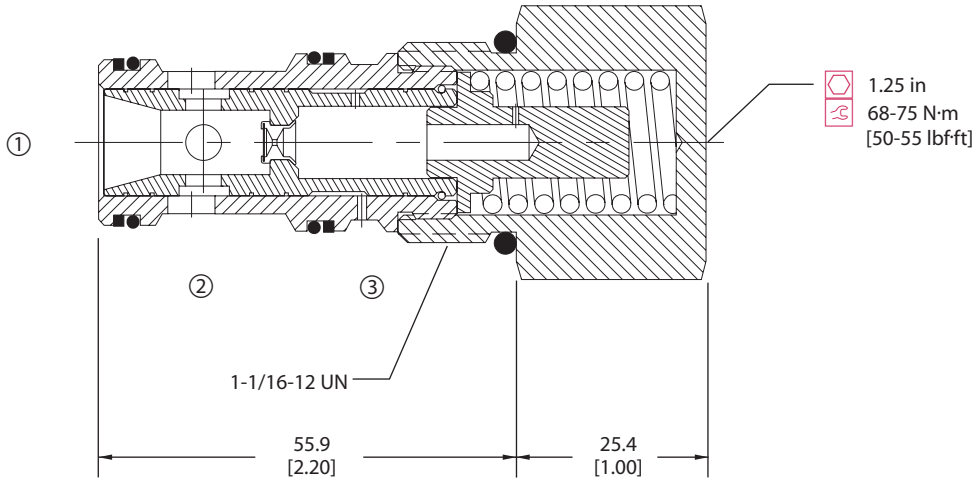
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	80 l/min [21 US gal/min]
Weight	0.26 kg [0.57 lb]
Cavity	CP12-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 511E

ORDERING INFORMATION

CP701 - 3 - B - 12S - 080

Seals

	Seal kit
B = Buna-N	120335
V = Viton	120336

Housing and ports

	Housing P/N	**Pilot port**
0 = No housing	No housing	
4B = AL, 1/2 BSP	CP12-3S-4B/2B	= 1/4 BSP
6B = AL, 3/4 BSP	CP12-3S-6B/2B	= 1/4 BSP
10S = AL, #10 SAE	CP12-3S-10S/4S	= #4 SAE
12S = AL, #12 SAE	CP12-3S-12S/4S	= #4 SAE

Differential Control Pressure

	bar	[psi]
030	= 2.1	[30]
050	= 3.5	[50]
080	= 5.5	[80]
100	= 6.9	[100]
150	= 10.3	[150]

P102 046E

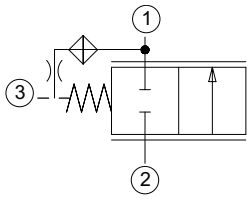
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Logic Element, Spool Type
CP702-3

OPERATION

This is a spool-type logic element with multi-function potential when used with other pressure, flow, or direction control devices.

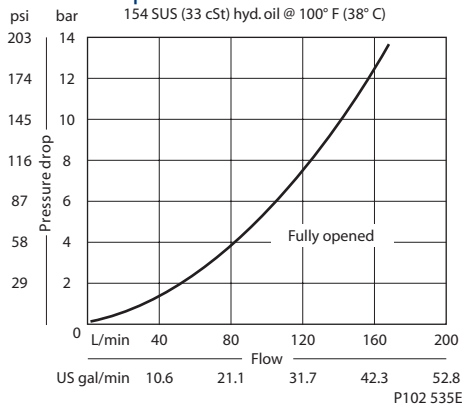
Schematic



P102 486E

SPECIFICATIONS

Theoretical performance



P102 535E

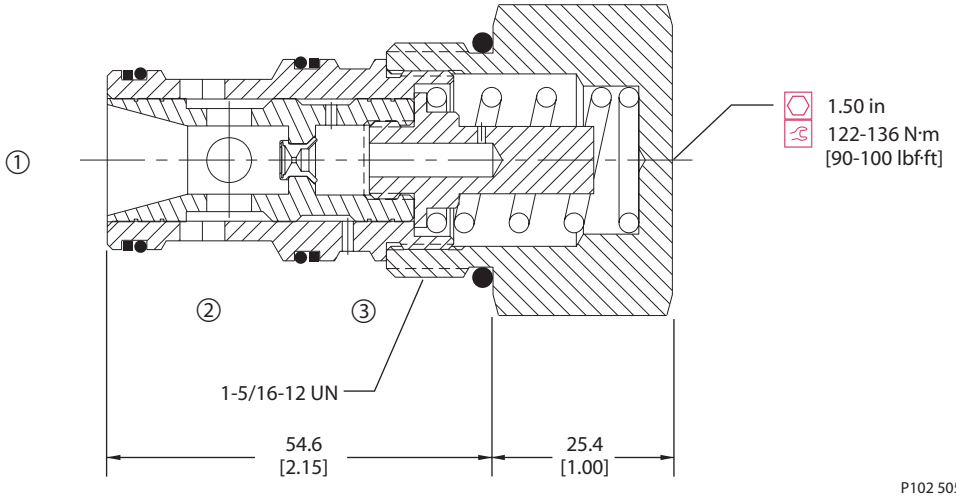
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	115 l/min [30 US gal/min]
Weight	0.38 kg [0.83 lb]
Cavity	SDC16-3S

DIMENSIONS

mm [in]

Cross-sectional view



P102 505E

ORDERING INFORMATION

CP702 - 3 - B - 16S - 080

Seals

	Seal kit
B = Buna-N	120033
V = Viton	120034

Housing and ports

	Housing P/N	Pilot port
0 = No housing	No housing	
6B = AL,3/4 BSP	CP16-3S-6B/2B	= 1/4 BSP
8B = AL, 1 BSP	CP16-3S-8B/2B	= 1/4 BSP
12S = AL, #12 SAE	CP16-3S-12S/4S	= #4 SAE
16S = AL, #16 SAE	CP16-3S-12S/4S	= #4 SAE

Other housings available

Differential Control Pressure

	bar	[psi]
040 =	2.8	[40]
080 =	5.5	[80]
110 =	7.6	[110]
150 =	10.3	[150]
190 =	13.1	[190]

P102 059E

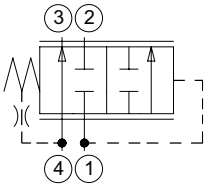
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP310-4

OPERATION

This valve is a priority type pressure compensator.

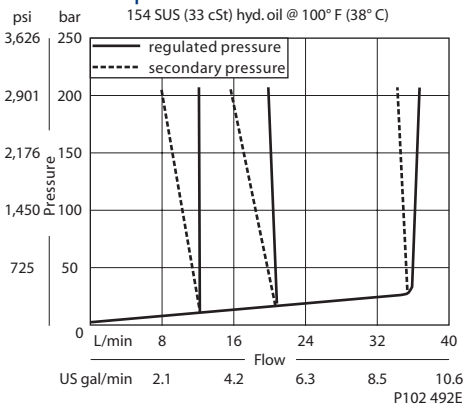
Schematic



P102 489E

SPECIFICATIONS

Theoretical performance



P102 492E

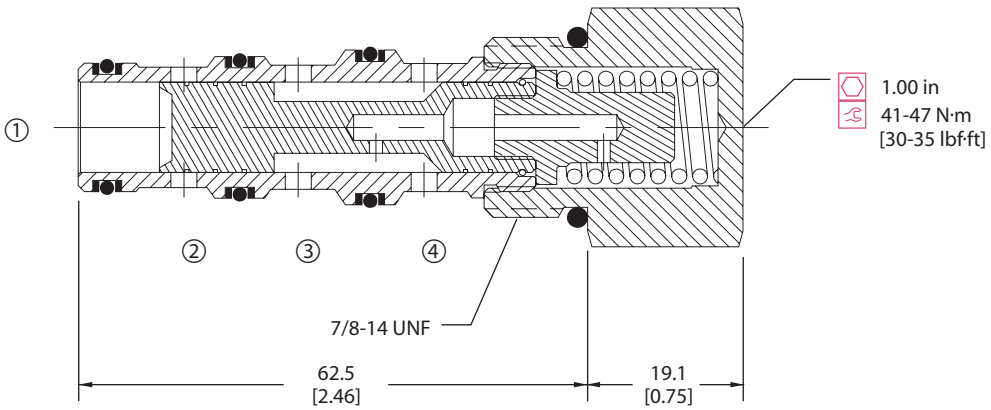
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	40 l/min [11 US gal/min]
Weight	0.15 kg [0.32 lb]
Cavity	SDC10-4

DIMENSIONS

mm [in]

Cross-sectional view



P102 522E

ORDERING INFORMATION

CP310 - 4 - B - 8S - 080

Seals

B = Buna-N	Seal kit
V = Viton	120023
	120024

Housing and ports

0 = No Housing	No Housing
L3B = AL,3/8 BSP	SDC10-4-L-3B
L4B = AL, 1/2 BSP	SDC10-4-L-4B
6S = AL, #6 SAE	CP10-4-6S
8S = AL, #8 SAE	CP10-4-8S

Other housings available

Housing P/N

Differential Control Pressure

bar	[psi]
040 = 2.8	[40]
080 = 5.5	[80]
110 = 7.6	[110]
150 = 10.3	[150]
190 = 13.1	[190]

P102 022E

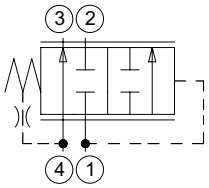
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP311-4

OPERATION

This valve is a priority type pressure compensator.

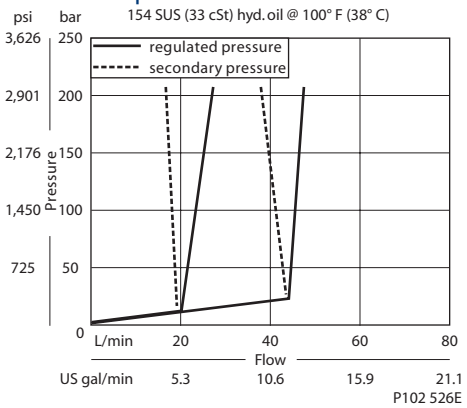
Schematic



P102 489E

SPECIFICATIONS

Theoretical performance



P102 526E

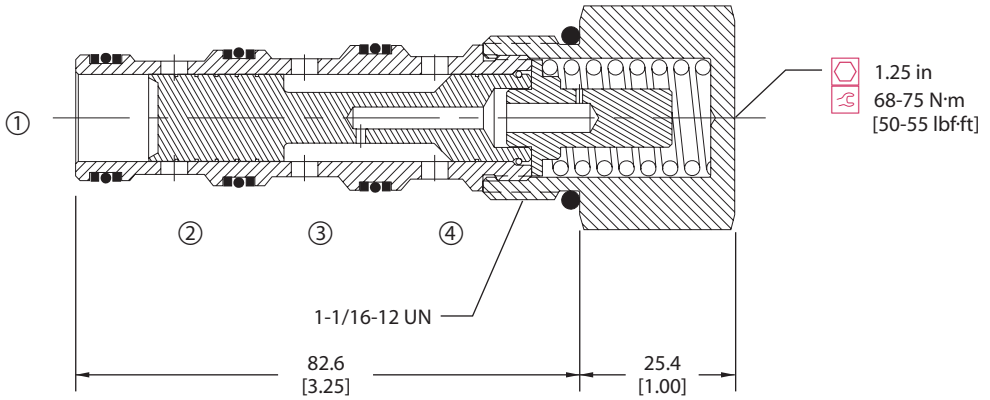
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	60 l/min [16 US gal/min]
Weight	0.31 kg [0.69 lb]
Cavity	CP12-4

DIMENSIONS

mm [in]

Cross-sectional view



P102 514E

ORDERING INFORMATION

CP311 - 4 - B - 10S - 080

Seals

B = Buna-N
V = Viton

Seal kit
120262
120263

Housing and ports

0 = No housing
10S = AL, #10 SAE
12S = AL, #12 SAE
3B = AL, 1/2 BSP
4B = AL, 3/4 BSP
Other housings available

Housing P/N

No houisng
CP12-4-10S
CP12-4-12S
CP12-4-3B
CP12-4-4B

Differential Control Pressure

	bar	[psi]
050	= 3.5	[50]
080	= 5.5	[80]
100	= 6.9	[100]
150	= 10.3	[150]

P102 039E

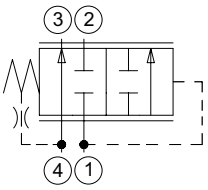
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP312-4

OPERATION

This valve is a priority type pressure compensator.

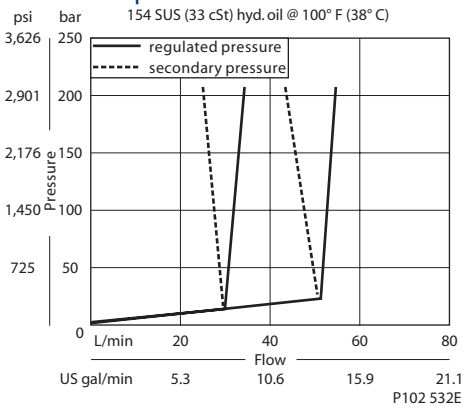
Schematic



P102 489E

SPECIFICATIONS

Theoretical performance



P102 532E

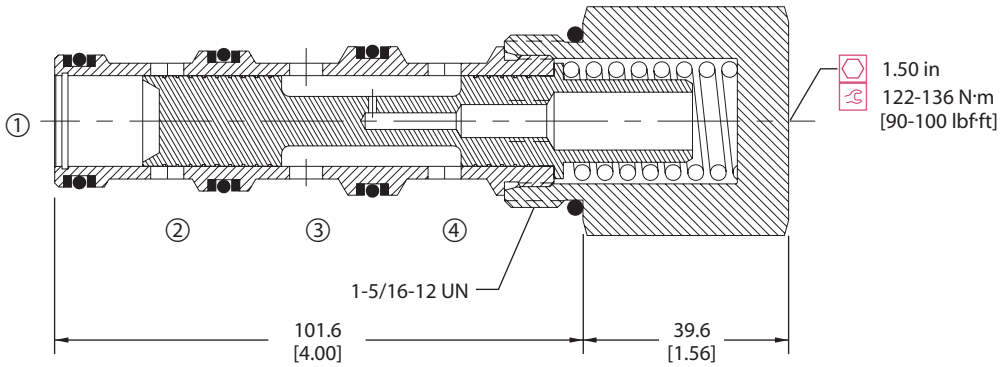
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	130 l/min [34 US gal/min]
Weight	0.60 kg [1.32 lb]
Cavity	CP16-4

DIMENSIONS

mm [in]

Cross-sectional view



P102 508E

ORDERING INFORMATION

CP312 - 4 - B - 16S - 080

Seals

B = Buna-N
V = Viton

Seal kit
120025
120026

Housing and ports

0 = No housing
6B = AL, 3/4 BSP
8B = AL, 1 BSP
12S = AL, #12 SAE
16S = AL, #16 SAE
Other housings available

Housing P/N

No houisng
CP16-4-6B
CP16-4-8B
CP16-4-12S
CP16-4-16S

Differential Control Pressure

	bar	[psi]
040	= 2.8	[40]
080	= 5.5	[80]
110	= 7.6	[110]
150	= 10.3	[150]

P102 051E

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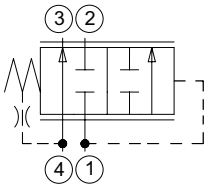
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP313-4

OPERATION

This valve is a priority type pressure compensator.

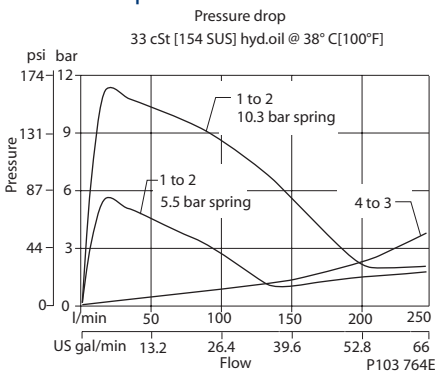
Schematic



P102 489E

SPECIFICATIONS

Theoretical performance



P103 764E

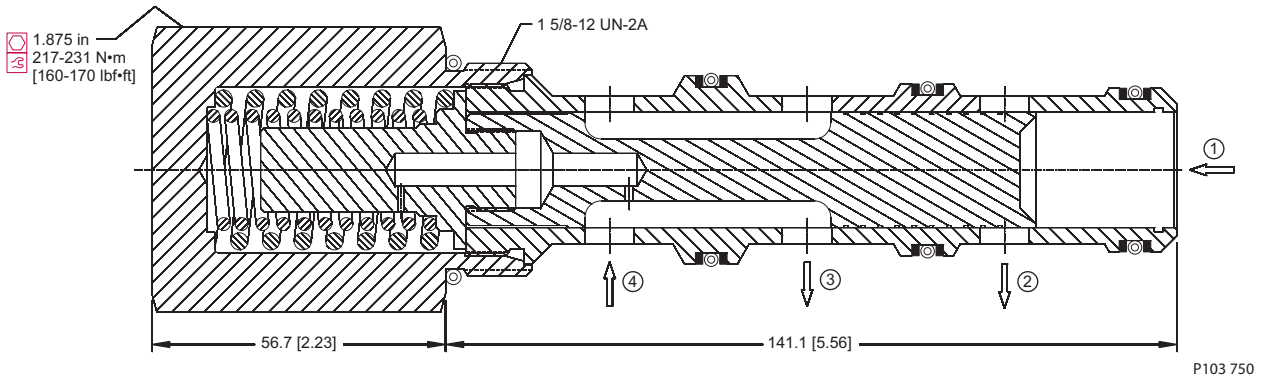
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	340 l/min [90 US gal/min]
Weight	1.30 kg [2.80 lb]
Cavity	SDC20-4

DIMENSIONS

mm [in]

Cross-sectional view



P103 750

ORDERING INFORMATION

CP313-4-B-16S-130

Seals

	Seal kits
B = Buna-N	120181
V = Viton	120182

Housing and ports

0	=	No Housing
8B	=	AL,1 BSP
10B	=	AL, 1-1/4 BSP
16S	=	AL, #16 SAE
20S	=	AL, #20 SAE

Other housings available

Housing P/N

No Housing
CP20-4-8B
CP20-4-10B
CP20-4-16S
CP20-4-20S

Differential control pressure

	bar	[psi]
050 =	3.4	50
080 =	5.5	80
100 =	6.9	100
130 =	9.0	130
150 =	10.3	150

P103 765E

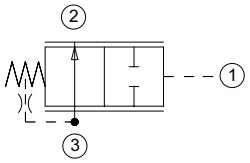
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP300-4

OPERATION

This valve is a restrictive type pressure compensator.

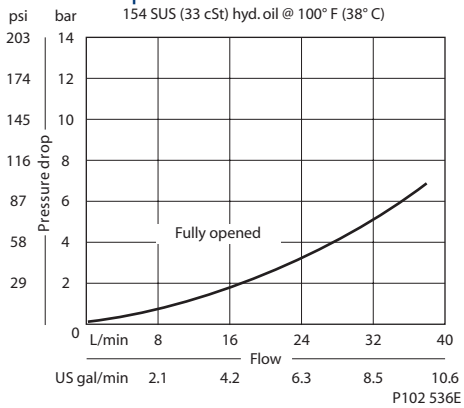
Schematic



P102 490E

SPECIFICATIONS

Theoretical performance



P102 536E

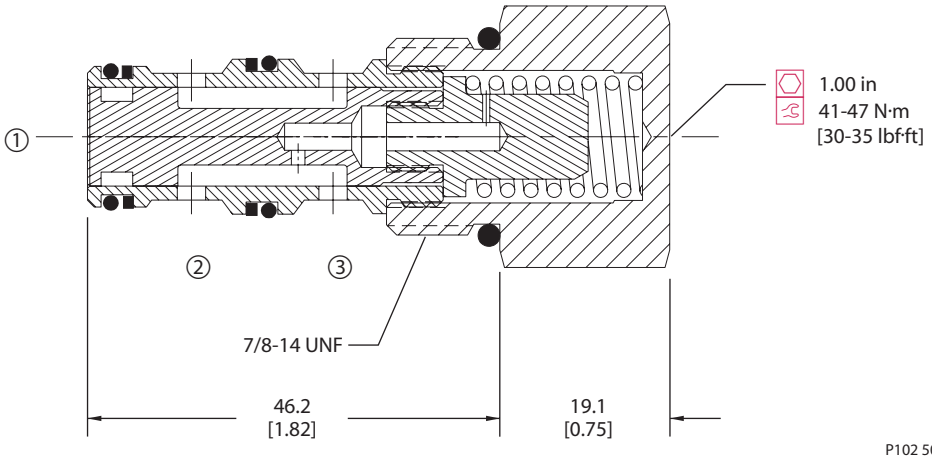
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	40 l/min [11 US gal/min]
Weight	0.13 kg [0.29 lb]
Cavity	SDC10-3

DIMENSIONS

mm [in]

Cross-sectional view



P102 504E

ORDERING INFORMATION

CP300 - 4 - B - 8S - 0 - 080

Seals

	Seal kit
B = Buna-N	120027
V = Viton	120028

Housing and ports

	Housing P/N
0 = No Housing	No Housing
SE3B = AL,3/8 BSP	SDC10-3-SE-3B
SE4B = AL, 1/2 BSP	SDC10-3-SE-4B
6S = AL, #6 SAE	CP10-3-6S
8S = AL, #8 SAE	CP10-3-8S

Other housings available

Differential Control Pressure

	bar	[psi]
040	= 2.8	[40]
080	= 5.5	[80]
110	= 7.6	[110]
150	= 10.3	[150]
190	= 13.1	[190]

P102 060E

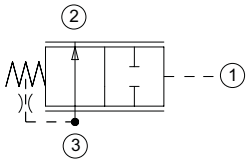
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP301-4

OPERATION

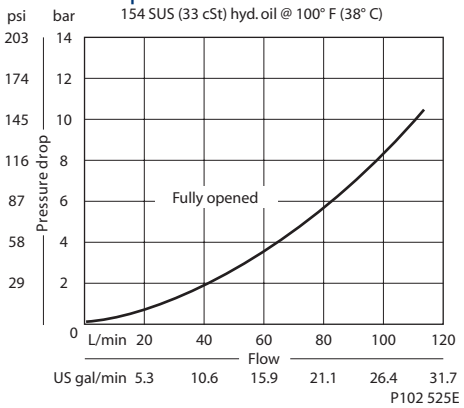
This valve is a restrictive type pressure compensator.

Schematic



P102 490E

Theoretical performance



P102 525E

SPECIFICATIONS

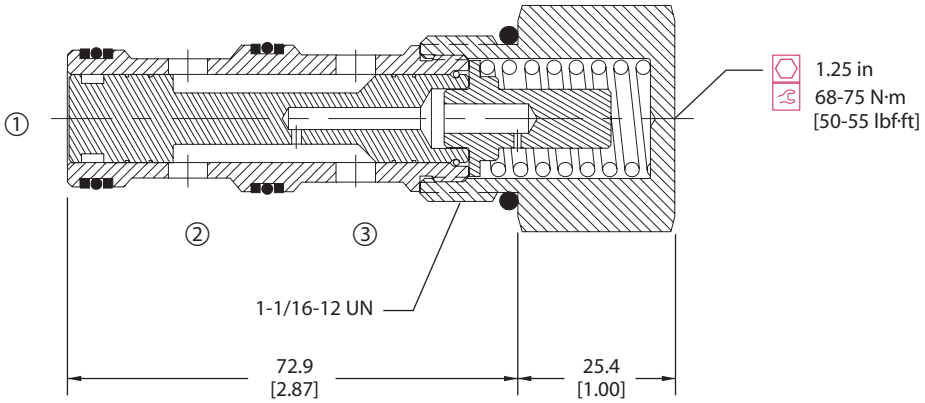
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	90 l/min [24 US gal/min]
Weight	0.30 kg [0.67 lb]
Cavity	CP12-3

DIMENSIONS

mm [in]

Cross-sectional view



P102 515E

ORDERING INFORMATION

CP301 - 4 - B - 12S - 0 - 080

Seals

B = Buna-N
V = Viton

Seal kit
120053
120052

Housing and ports

0 = No housing
10S = AL, #10 SAE
12S = AL, #12 SAE
4B = AL, 1/2 BSP
6B = AL, 3/4 BSP

Housing P/N

No housing
CP12-3-10S
CP12-3-12S
CP12-3-4B
CP12-3-6B

Differential Control Pressure

	bar	[psi]
050	= 3.5	[50]
080	= 5.5	[80]
100	= 6.9	[100]
150	= 10.3	[150]
190	= 13.1	[190]

P102 038E

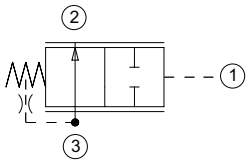
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP302-4

OPERATION

This valve is a restrictive type pressure compensator.

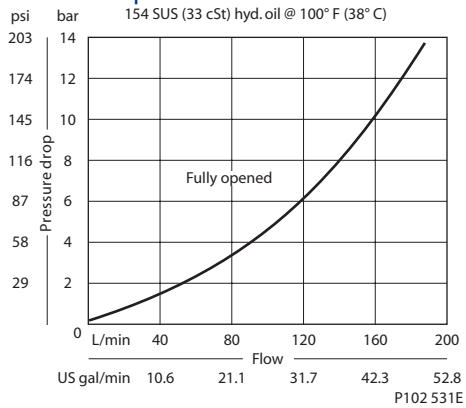
Schematic



P102 490E

SPECIFICATIONS

Theoretical performance



P102 531E

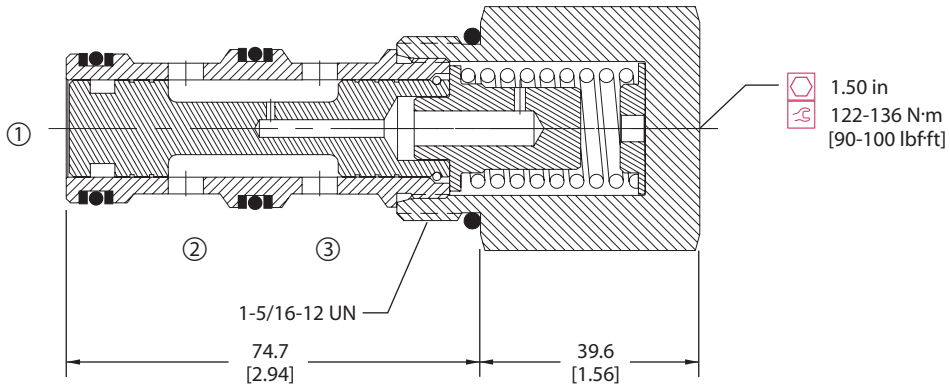
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	130 l/min [34 US gal/min]
Weight	0.56 kg [1.24 lb]
Cavity	SDC16-3

DIMENSIONS

mm [in]

Cross-sectional view



P102 509E

ORDERING INFORMATION

CP302 - 4 - B - 16S - 0 - 080

Seals

	Seal kit
B = Buna-N	120202
V = Viton	120203

Housing and ports

	Housing P/N
0 = No housing	No housing
SE6B = AL,3/4 BSP	SDC16-3-SE-6B
SE8B = AL, 1 BSP	SDC16-3-SE-8B
12S = AL, #12 SAE	CP16-3-12S
16S = AL, #16 SAE	CP16-3-16S

Other housings available

Differential Control Pressure

bar	[psi]
040 = 2.8	[40]
080 = 5.5	[80]
100 = 6.9	[100]
150 = 10.3	[150]
230 = 15.9	[230]

P102 050E

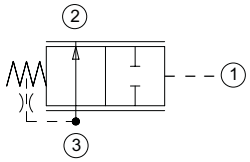
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP303-4

OPERATION

This is a restrictive-type pressure-compensator.

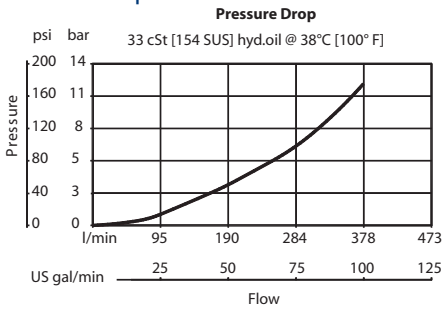
Schematic



P102 490E

SPECIFICATIONS

Theoretical performance



P104 889

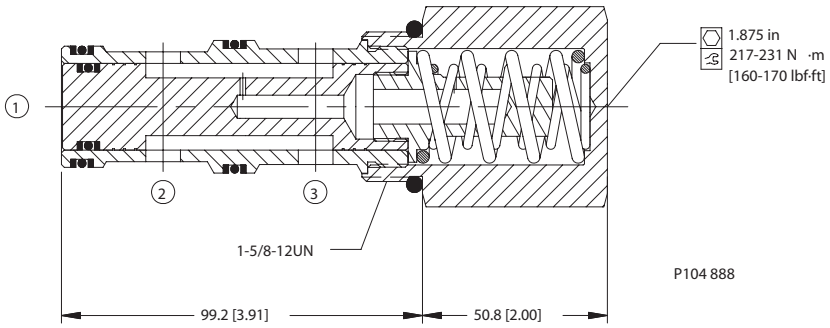
Specifications

Rated pressure	210 bar [3045 psi]
Rated flow at 7 bar [100 psi]	284 l/min [75 US gal/min]
Weight	1.11 kg [2.45 lb]
Cavity	SDC20-3

DIMENSIONS

mm [in]

Cross-sectional view



P104 888

ORDERING INFORMATION

CP303-4-B-16S-0-150

Seals

B = BUNA-N
V = VITON

Seal kit
120200
120201

Housing and ports

0	=	Cartridge only
16S	=	AL, #16 SAE
20S	=	AL, #20 SAE
8B	=	AL, 1 BSP
10B	=	AL, 1-1/4 BSP

other housings available

Housing P/N

No Body
CP20-3-16S
CP20-3-20S
CP20-3-3B
CP20-3-4B

Differential Control Pressure

		bar	[psi]
050	=	3.4	[50]
080	=	5.5	[80]
100	=	6.9	[100]
130	=	9.0	[130]
150	=	10.3	[150]

P104 890

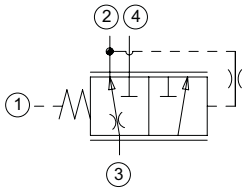
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP310-6

OPERATION

This is a static load sense priority valve.

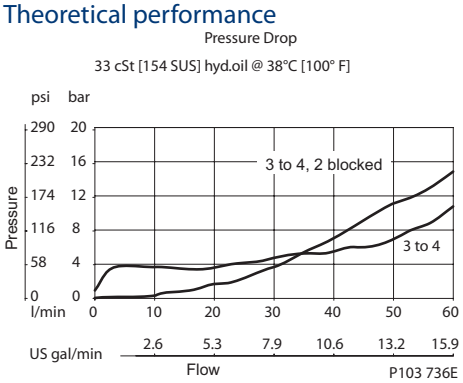
Schematic



P103 495

SPECIFICATIONS

Theoretical performance



P103 736E

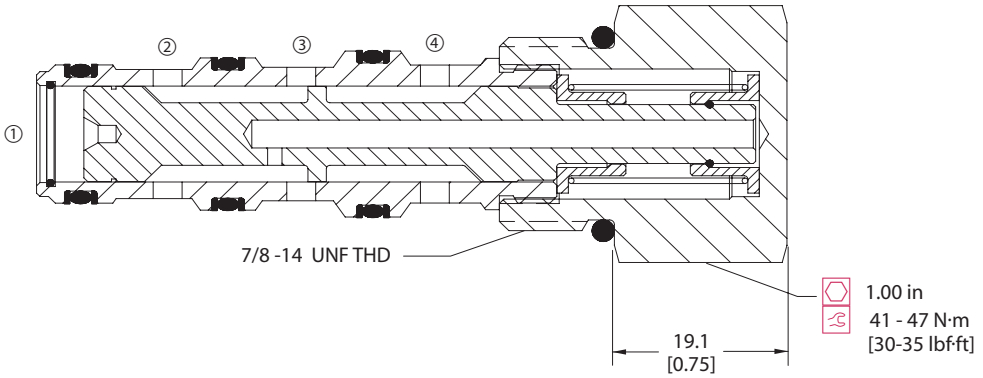
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	40 l/min [11 US gal/min]
Weight	0.15 kg [0.33 lb]
Cavity	SDC10-4

DIMENSIONS

mm [in]

Cross-sectional view



P103 291

ORDERING INFORMATION

CP310 - 6 - B - 8S - 080

Seals

	Seal kit
B = Buna-N	120023
V = Viton	120024

Housing and ports

	Housing P/N
0 = No Housing	No Housing
L3B = AL,3/8 BSP	SDC10-4-L-3B
L4B = AL, 1/2 BSP	SDC10-4-L-4B
6S = AL, #6 SAE	CP10-4-6S
8S = AL, #8 SAE	CP10-4-8S

Other housings available

Compensator Spring

	bar	[psi]
080 =	5.5	[80]

P103 295

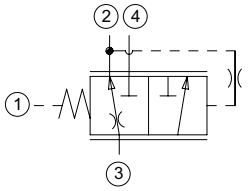
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP312-6

OPERATION

This is a static load sense priority valve.

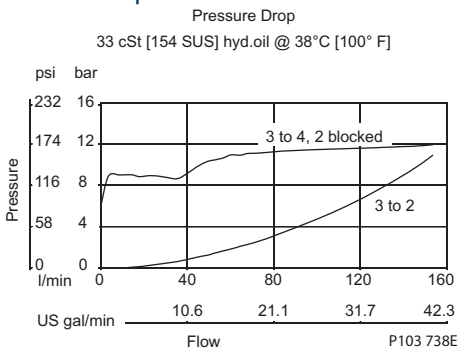
Schematic



P103 495

SPECIFICATIONS

Theoretical performance



P103 738E

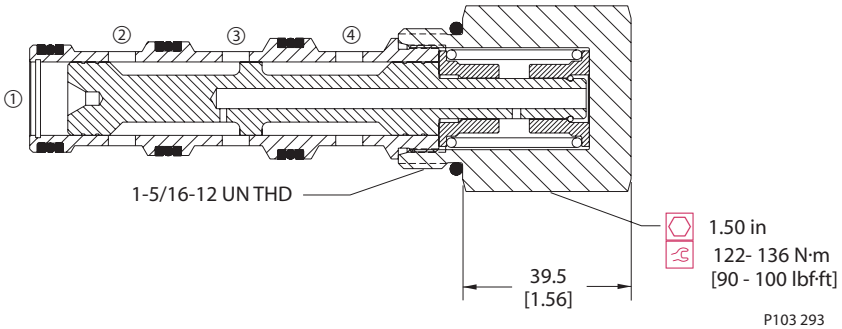
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	125 l/min [33 US gal/min]
Weight	0.63 kg [1.39 lb]
Cavity	CP16-4

DIMENSIONS

mm [in]

Cross-sectional view



P103 293

ORDERING INFORMATION

CP312 - 6 - B - 12S - 080

Seals

	Seal kit
B = Buna-N	120025
V = Viton	120026

Housing and ports

	Housing P/N
0 = No housing	No housing
6B = AL, 3/4 BSP	CP16-4-6B
8B = AL, 1 BSP	CP16-4-8B
12S = AL, #12 SAE	CP16-4-12S
16S = AL, #16 SAE	CP16-4-16S

Other housings available

Compensator Spring

	bar	[psi]
080 =	5.5	[80]

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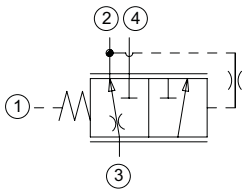
Comatrol
RESPONSIVENESS IN MOTION
MEMBER OF THE SAUER-DANFOSS GROUP

Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
CP313-6

OPERATION

This is a static load sense priority valve.

Schematic



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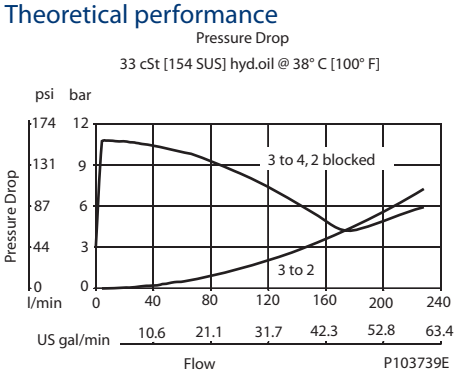
SPECIFICATIONS

Theoretical performance



P103739E

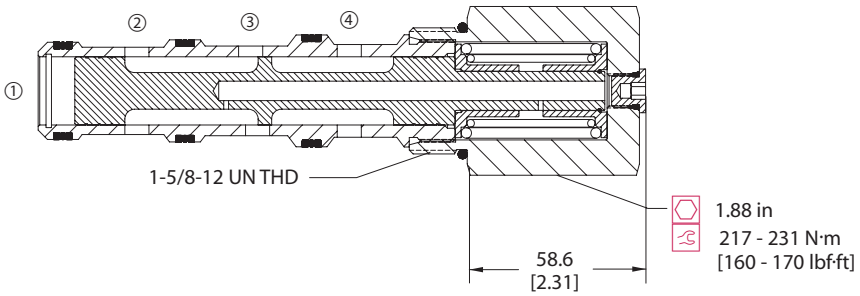
Specifications

Rated pressure	210 bar [3000 psi]
Rated flow at 7 bar [100 psi]	200 l/min [53 US gal/min]
Weight	1.33 kg [2.93 lb]
Cavity	SDC20-4

DIMENSIONS

mm [in]

Cross-sectional view



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ORDERING INFORMATION

CP313 - 6 - B - 16S - 080

Seals

	Seal kit
B = Buna-N	120181
V = Viton	120182

Housing and ports

	Housing P/N
0 = No Housing	No Housing
8B = AL,1 BSP	CP20-4-8B
10B = AL, 1-1/4 BSP	CP20-4-10B
16S = AL, #16 SAE	CP20-4-16S
20S = AL, #20 SAE	CP20-4-20S

Other housings available

Compensator Spring

	bar	[psi]
050 =	3.4	[50]
080 =	5.5	[80]
100 =	6.9	[100]
130 =	9.0	[130]
150 =	10.3	[150]

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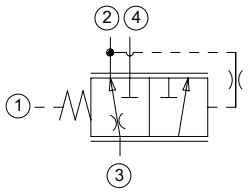
Cartridge Valves Technical Information
Logic Elements
Pressure Compensator
PC12-LPS

OPERATION

This is a static load sense priority valve.

Schematic



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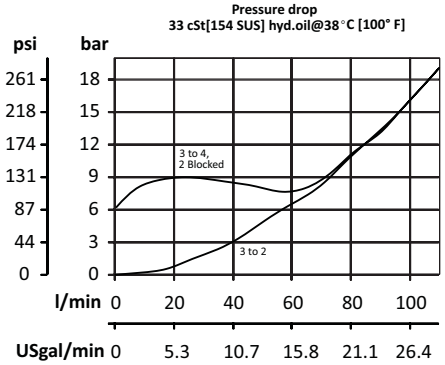
SPECIFICATIONS

Theoretical performance



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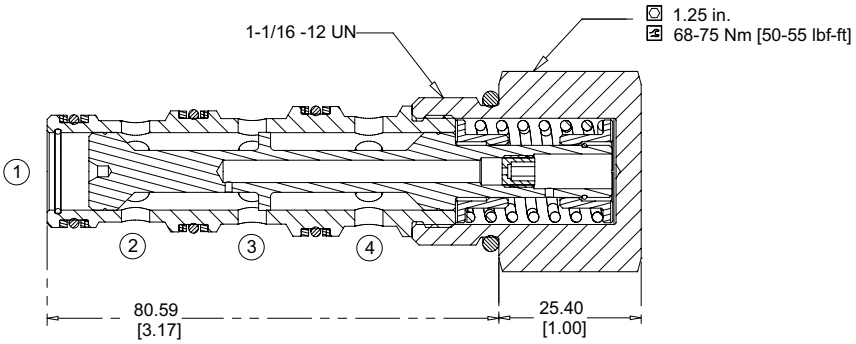
Specifications

Rated pressure	207 bar [3000 psi]
Rated flow at 7 bar [100 psi]	75 l/min [20 US gal/min]
Weight	0.31 kg [0.68 lb]
Cavity	CP12-4

DIMENSIONS

mm [in]

Cross-sectional view



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ORDERING INFORMATION

PC12-LPS-5.5-B-00

Differential Control Pressure
5.5 = 5.5 bar [80 psi]
7.0 = 7 bar [100 psi]
10.0 = 10.0 bar [150 psi]

Housing and ports	Housing Part #
00 = No Housing	No Housing
DG3B = AI, 1/2 BSP	CP12-4-3B
DG4B = AI, 3/4 BSP	CP12-4-4B
10S = AI, #10 SAE	CP12-4-10S
12S = AI, #12 SAE	CP12-4-12S

Seals	Seal Kit
B = Buna-N	120262
V = Viton	120263

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Cartridge Valves Technical Information
Logic Elements
Notes