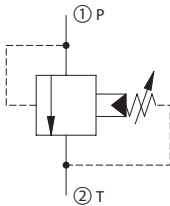
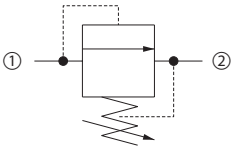


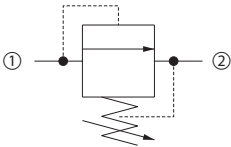
Cartridge Valves Technical Information

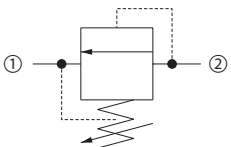
Relief Valves

Quick Reference

| Thermal Relief | Model No. | Cavity | Description | Flow* | Pressure | Page |
|---|-----------|---------|---|-----------------------------------|-----------------------|------|
|  | CP208-4 | SDC08-2 | Relief Valve, Thermal Relief, Poppet Type | 1.1 l/min [0.3 US gal/ min] | 415 bar [6000 psi] | 04.6 |

| Direct Acting | Model No. | Cavity | Description | Flow* | Pressure | Page |
|---|-----------|---------|---------------------------------|----------------------------|-----------------------|------|
|  | CP208-3 | SDC08-2 | Relief Valve, Direct Acting, | 30 l/min [8 US gal/min] | 250 bar [3600 psi] | 04.7 |
| | CP200-3 | SDC10-2 | Poppet Type | 30 l/min [8 US gal/min] | 250 bar [3600 psi] | 04.8 |

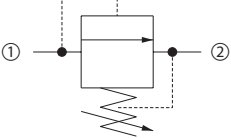
| Direct Acting | Model No. | Cavity | Description | Flow* | Pressure | Page |
|---|-----------|---------|---------------------------------|-----------------------------|-----------------------|-------|
|  | RV08-DR | SDC08-2 | Relief Valve, Direct Acting, | 30 l/min [8 US gal/min] | 250 bar [3600 psi] | 04.9 |
| | VEN 06 | NCS06/2 | Poppet Type | 40 l/min [11 US gal/min] | 250 bar [3600 psi] | 04.10 |
| | VME 06 | VME 06 | | 40 l/min [11 US gal/min] | 315 bar [4500 psi] | 04.11 |
| | VME 07 | VME 07 | | 50 l/min [13 US gal/min] | 315 bar [4500 psi] | 04.12 |
| | VME 08 | VME 08 | | 80 l/min [21 US gal/min] | 315 bar [4500 psi] | 04.13 |

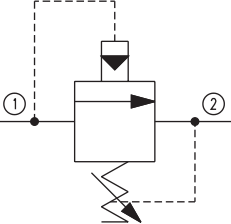
| Differential Area | Model No. | Cavity | Description | Flow* | Pressure | Page |
|---|-----------|---------|-------------------------------------|------------------------------|-----------------------|-------|
|  | CP200-2 | SDC10-2 | Relief Valve, Differential Area, | 40 l/min [11 US gal/min] | 350 bar [5000 psi] | 04.14 |
| | CP208-1 | SDC08-2 | Poppet Type, | 40 l/min [11 US gal/min] | 250 bar [3600 psi] | 04.15 |
| | CP200-1 | SDC10-2 | | 75 l/min [20 US gal/min] | 250 bar [3600 psi] | 04.16 |
| | CP201-1 | CP12-2 | | 150 l/min [40 US gal/min] | 250 bar [3600 psi] | 04.17 |

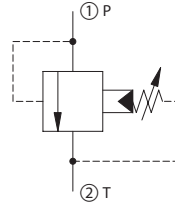
Cartridge Valves Technical Information

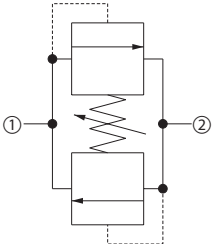
Relief Valves

Quick Reference

| Direct Acting | Model No. | Cavity | Description | Flow* | Pressure | Page |
|---|-----------|---------|---------------------------------|-----------------------------|-----------------------|-------|
|  | CP210-1 | SDC10-2 | Relief Valve, Direct Acting, | 45 l/min [12 US gal/min] | 210 bar [3000 psi] | 04.18 |
| | CP211-1 | CP12-2 | Spool Type, | 75 l/min [20 US gal/min] | 40 bar [600 psi] | 04.19 |

| Pilot Operated | Model No. | Cavity | Description | Flow* | Pressure | Page |
|---|-----------|---------|----------------------------------|------------------------------|-----------------------|-------|
|  | CP210-2 | SDC10-2 | Relief Valve, Pilot Operated, | 115 l/min [30 US gal/min] | 350 bar [5000 psi] | 04.20 |
| | CP211-2 | CP12-2 | Spool Type | 190 l/min [50 US gal/min] | 350 bar [5000 psi] | 04.21 |

| Pilot Operated | Model No. | Cavity | Description | Flow* | Pressure | Page |
|--|-----------|---------|---|------------------------------|-----------------------|-------|
|  | RV10-POP | SDC10-2 | Relief Valve, Pilot Operated, Poppet Type | 120 l/min [32 US gal/min] | 250 bar [3625 psi] | 04.22 |

| Bi-Directional | Model No. | Cavity | Description | Flow* | Pressure | Page |
|---|-----------|---------|---------------------------------|-----------------------------|-----------------------|-------|
|  | CP200-7 | SDC10-2 | Relief Valve, Bi-directional | 40 l/min [11 US gal/min] | 250 bar [3600 psi] | 04.23 |

Cartridge Valves Technical Information

Relief Valves

Quick Reference

| Differential Area | Model No. | Cavity | Description | Flow* | Pressure | Page |
|-------------------|-----------|---------|--|------------------------------|-----------------------|-------|
| | VSB 06-EN | NCS06/2 | Relief Valve, Differential Area, | 80 l/min [21 US gal/min] | 350 bar [5000 psi] | 04.24 |
| | VSB 12-EN | NCS12/2 | Poppet Type with Reverse, Free Flow Check | 140 l/min [37 US gal/min] | 350 bar [5000 psi] | 04.25 |

| Differential Area | Model No. | Cavity | Description | Flow* | Pressure | Page |
|-------------------|-----------|---------|---|------------------------------|-----------------------|-------|
| | VSB 06-CN | NCS06/2 | Relief Valve, Differential Area, | 80 l/min [21 US gal/min] | 350 bar [5000 psi] | 04.26 |
| | VSB 12-CN | NCS12/2 | Poppet Type with Reverse Free Flow Check, Atmospheric Venting | 140 l/min [37 US gal/min] | 350 bar [5000 psi] | 04.27 |

| Cross-Over | Model No. | Cavity | Description | Flow* | Pressure | Page |
|------------|-----------|--------|-----------------------------|------------------------------|-----------------------|-------|
| | VA-E 06 | none | Relief Valve, Cross-Over | 40 l/min [11 US gal/min] | 210 bar [3045 psi] | 04.28 |
| | CP220-1 | none | | 75 l/min [20 US gal/min] | 250 bar [3600 psi] | 04.29 |
| | CP221-1 | none | | 190 l/min [50 US gal/min] | 250 bar [3600 psi] | 04.30 |

Cartridge Valves Technical Information

Relief Valves

Application Notes

APPLICATIONS

Relief valves are used as pressure limiting devices to protect hydraulic systems and components. They are available in direct-acting poppet, differential area poppet, bi-directional poppet, and pilot-operated spool types.

Relief valves



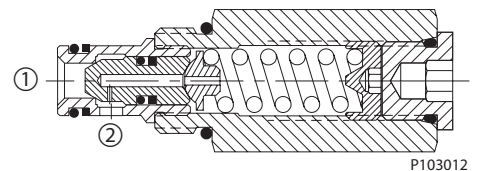
F102 012

OPERATION

Direct-acting poppet

The direct-acting poppet blocks flow from 1 to 2 until sufficient pressure is present at 1 to force the spring-opposed poppet from its seat. This pressure is commonly known as the crack pressure. The valve will remain open until the pressure drops to a level allowing the spring to close the valve. This pressure is known as the re-seat pressure and is typically 70-80% of the crack pressure. The difference between crack and re-seat pressure is commonly referred to as hysteresis.

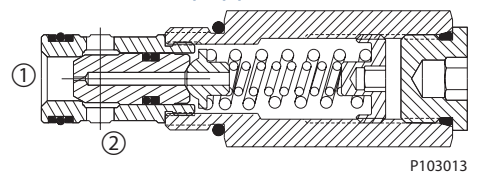
Direct acting poppet relief valve



Differential-area poppet

The differential area poppet operates in the same manner except flow is blocked from 2 to 1 until sufficient pressure is present at 2 to force the spring-opposed poppet from its seat.

Differential area poppet relief valve



Advantages of direct-acting poppet and differential area poppet relief valves are:

- Fast response
- Contamination tolerant
- Low leakage
- Low cost

Cartridge Valves Technical Information

Relief Valves

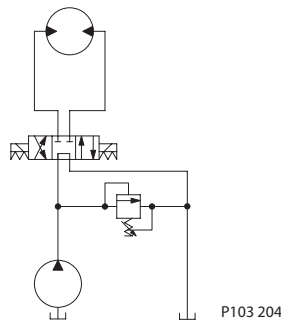
Application Notes

OPERATION (continued)

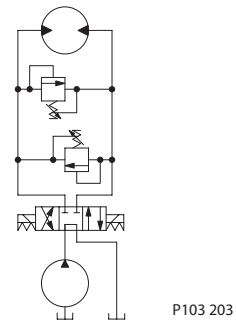
Because of these features some common applications for direct-acting and differential area poppet relief valves are:

- Main system relief valve if flow is relatively constant, or as a safety relief valve for “spike clipping” to protect components from overpressure
- Work port cross-over relief to protect a cylinder or motor from overpressure

System Relief Valve



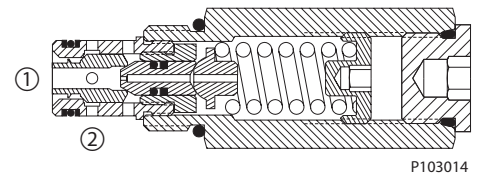
Work Port Cross-Relief Valves



Bi-directional poppet

The bi-directional poppet is a dual cross-over relief in a single cartridge. When pressure at 1 exceeds the nominal setting, the lower poppet acts as a direct-acting relief valve and opens flow from 1 to 2. When pressure at 2 exceeds the nominal setting, the upper poppet acts as a differential area relief valve and opens flow from 2 to 1. Note that the valve is designed so that the crack pressure is the same in either direction.

Bi-directional poppet relief valve

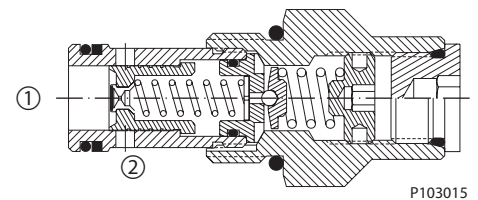


A common application for a bi-directional relief valve is as a work port cross-over relief where one bi-directional valve can replace two direct-acting valves.

Pilot operated spool

The pilot operated spool blocks flow from 1 to 2 until sufficient pressure is present at 1 to force the pilot poppet off its seat. This creates a pressure differential across the spool that causes the spool to shift and open flow from 1 to 2.

Pilot operated spool relief valve



Advantages of pilot-operated relief valves are:

- Smooth, stable response
- High flow and high pressure capability
- Precise pressure control with varying flow rates. Low pressure rise
- Low hysteresis

A common application for pilot-operated relief valves is as a main system relief where high pressure or flow capability and/or extremely precise pressure control is required.

Cartridge Valves Technical Information

Relief Valves

Thermal Relief

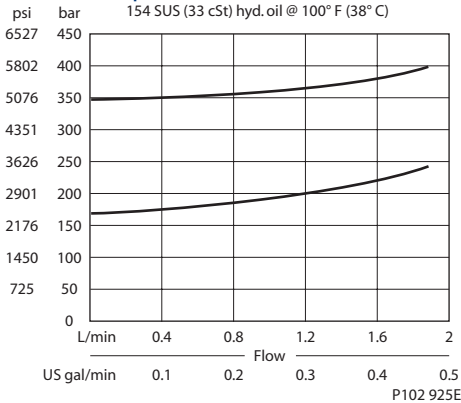
CP208-4

OPERATION

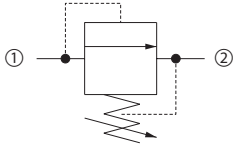
This is a direct-acting poppet type relief valves that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

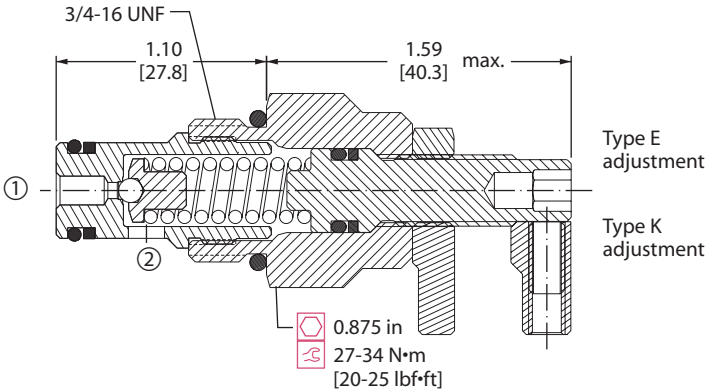
Specifications

| | |
|-----------------------|--|
| Rated pressure | 415 bar [6000 psi] |
| Rated flow | 1.1 l/min [0.3 US gal/min] |
| Leakage | 10 drops/min @ 80% of pressure setting |
| Weight | 0.23 kg [0.50 lb] |
| Cavity | SDC08-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P102 612E

ORDERING INFORMATION

CP208-4-B-4S-E-C-300

| | | |
|--|--|---|
| Seals B = Buna-N V = Viton | Seal kits 120221 120222 | Crack pressure Code x 10 = psi Example: 300 = 3000 psi |
| Housing and ports 0 = 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 | Adjustment ranges C = 69-414 bar [1000-6000] psi Standard 207 [3000] |
| | | Adjustment options E = External K = Knob |

P102 614E

Cartridge Valves Technical Information

Relief Valves

Direct Acting

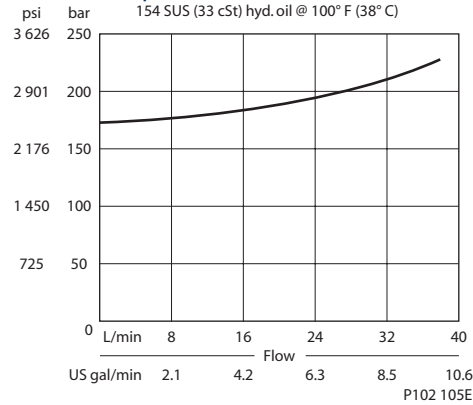
CP208-3

OPERATION

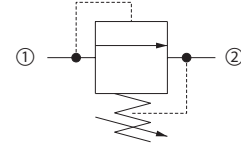
This is a direct-acting poppet type relief valves that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

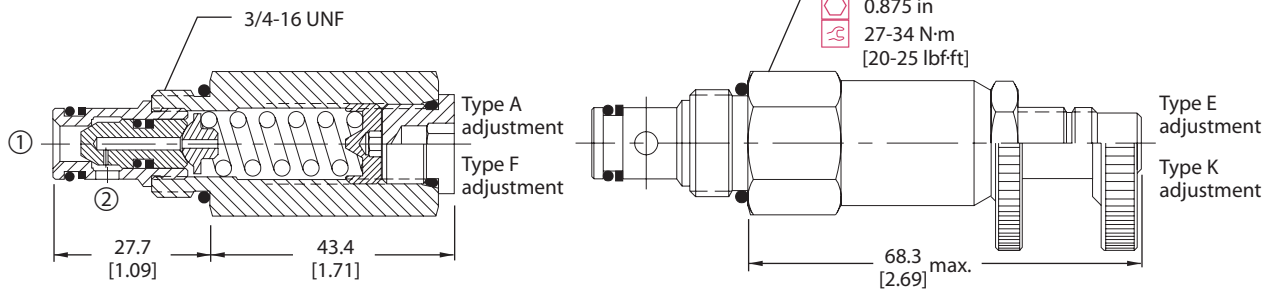
Specifications

| | |
|-----------------------|--|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 30 l/min [8 US gal/min] |
| Leakage | 10 drops/min @ 80% of pressure setting |
| Weight | 0.15 kg [0.32 lb] |
| Cavity | SDC08-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P102 104E

ORDERING INFORMATION

Seals
 B = Buna-N
 V = Viton

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

Adjustment option
 A = Internal
 E = External
 F = Tamper resistant
 K = Knob

Seal Kit
 120221
 120222

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

CP208 - 3 - B - 6S - A - C - 150

Crack pressure
 Code x 10 = psi
 Example: 150 = 1500 psi

| | bar | [psi] |
|-----------------------|--------|------------|
| Pressure range | | |
| A = | 7-69 | [100-1000] |
| Standard | 28 | [400] |
| B = | 14-138 | [200-2000] |
| Standard | 69 | [1000] |
| C = | 35-248 | [500-3600] |
| Standard | 103 | [1500] |

P102 107E

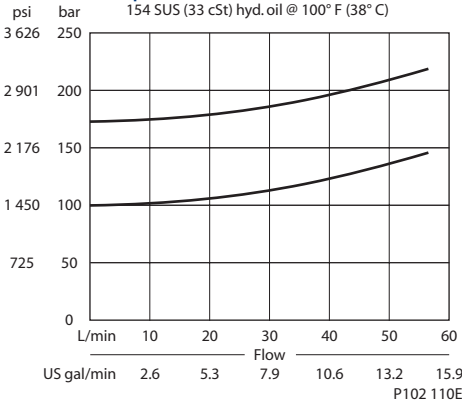
Cartridge Valves Technical Information
Relief Valves
Direct Acting
CP200-3

OPERATION

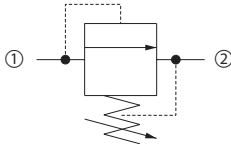
This is a direct-acting poppet type relief valves that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

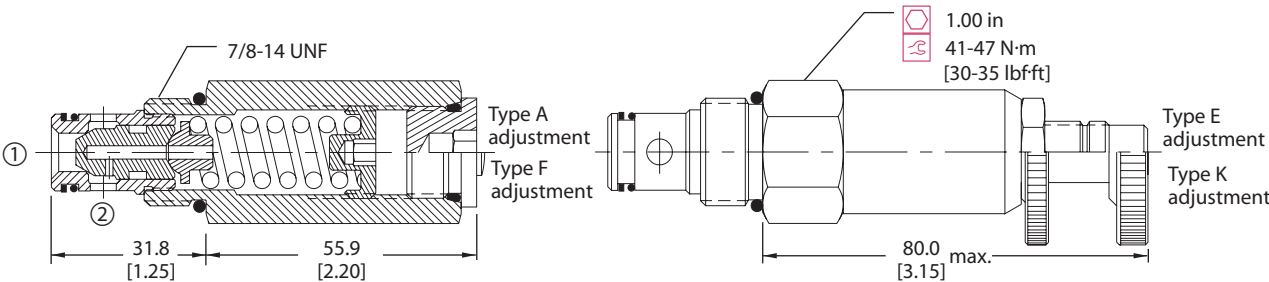
Specifications

| | |
|----------------|--|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 40 l/min [11 US gal/min] |
| Leakage | 10 drops/min @ 80% of pressure setting |
| Weight | 0.21 kg [0.47 lb] |
| Cavity | SDC10-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P102 108E

ORDERING INFORMATION

| | | | |
|--|--|---|---|
| CP200 - 3 - B - 6S - A - C - 150 | | | |
| Seals B = Buna-N V = Viton | Seal kit 120015 120016 | Crack pressure Code x 10 = psi Example: 150 = 1500 psi | |
| Housing and ports 0 = No Housing DG3B = Al, 3/8 BSP DG4B = Al, 1/2 BSP 6S = Al, #6 SAE 8S = Al, #8 SAE Other housings available | Housing P/N No Housing SDC10-2-DG-3B SDC10-2-DG-4B CP10-2-6S CP10-2-8S | Pressure range | |
| Adjustment option A = Internal E = External F = Tamper resistant K = Knob | | A = Standard B = Standard C = Standard | bar [psi] 7-69 [100-1000] 28 [400] 17-172 [250-2500] 69 [1000] 41-248 [600-3600] 103 [1500] |

P102 111E

Cartridge Valves Technical Information

Relief Valves

Direct Acting

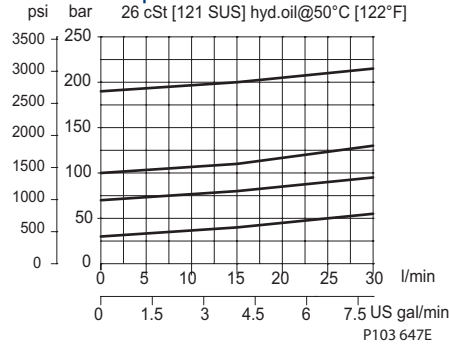
RV08-DR

OPERATION

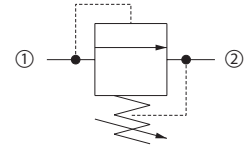
This is a direct-acting, poppet-type relief valve that relieves from 1 to 2. It features a highly damped poppet for smooth and stable response.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

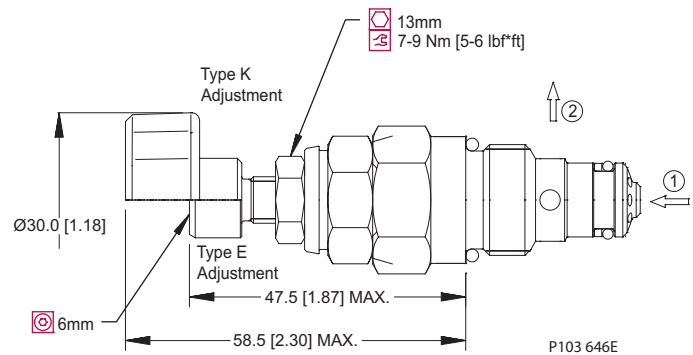
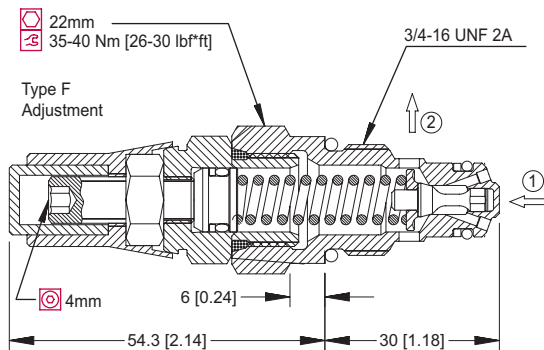
Specifications

| | |
|-----------------------|--|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 30 l/min [8 US gal/min] |
| Leakage | 10 drops/min @ 80% of pressure setting |
| Weight | 0.10 kg [0.22 lb] |
| Cavity | SDC08-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P103 646E

ORDERING INFORMATION

| RV08-DR-1-E-XXX-B-4S | | | |
|-------------------------------|--|--------------------------|--------------------|
| Pressure range | | Housing and ports | Housing P/N |
| 1 = 20-80 Bar [290-1150 psi] | | 00 = No Housing | No Housing |
| 2 = 35-160 Bar [500-2300 psi] | | DG2B = Al, 1/4 BSP | SDC08-2-DG-2B |
| 3 = 60-250 Bar [870-3600 psi] | | DG3B = Al, 3/8 BSP | SDC08-2-DG-3B |
| Adjustment option | | 4S = Al, #4 SAE | CP08-2-4S |
| E = External | | 6S = Al, #6 SAE | CP08-2-6S |
| F = Tamper resistant | | Other housings available | |
| K = Knob | | | |
| Crack pressure | | Seals | Seal Kit |
| Code = Setting in Bar | | B = Buna-N | 354000119 |
| XXX = No specific setting | | V = Viton | 354000219 |

P103 648E

Cartridge Valves Technical Information

Relief Valves

Direct Acting

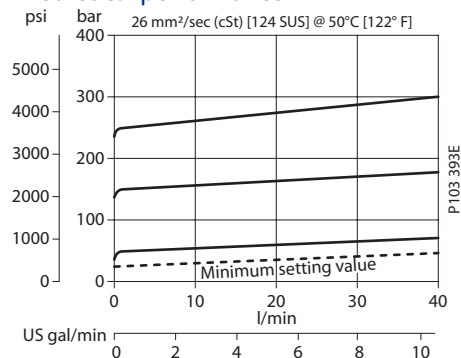
VEN 06

OPERATION

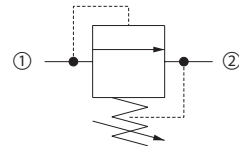
This is a direct-acting, poppet-type relief valve that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

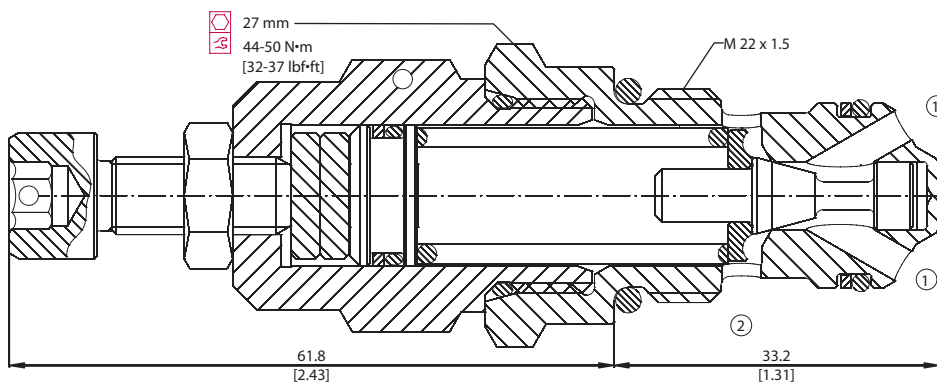
Specifications

| | |
|-----------------------|--------------------------|
| Rated pressure | 315 bar [4500 psi] |
| Rated flow | 40 l/min [11 US gal/min] |
| Weight | 0.20 kg [0.44 lb] |
| Cavity | NCS06/2 |

DIMENSIONS

mm [in]

Cross-sectional view



P103 392

ORDERING INFORMATION

| | | | |
|---|--|--------------------------|--------------------|
| VEN 06 - M - 1 - DG3/8 - V - XXX | | | |
| Type of adjustment | | Seals | Seal kit |
| EN = External screw | | V = Viton seals | 230000380 |
| M = Handwheel | | Omit = Buna-N | 230000060 |
| Setting range | | Housing and ports | Housing P/N |
| 1 = 20 - 80 bar [290 - 1160 psi] | | 0 = No Housing | No Housing |
| 2 = 35 - 160 bar [508 - 2321 psi] | | DG3/8 = AL, 3/8 BSP | NCS06/2-DG-3/8 |
| 3 = 70 - 315 bar [1015 - 4569 psi] | | DG1/2 = AL, 1/2 BSP | NCS06/2-DG-1/2 |
| | | DG6S = AL, #6 SAE | NCS06/2-DG-6S |
| | | DG8S = AL, #8 SAE | NCS06/2-DG-8S |
| | | Other housings available | |

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

P103 394E

Cartridge Valves Technical Information

Relief Valves

Direct Acting

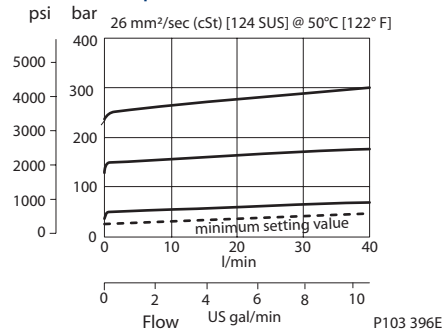
VME 06

OPERATION

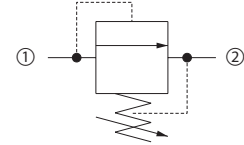
This is a direct-acting, poppet-type relief valve that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

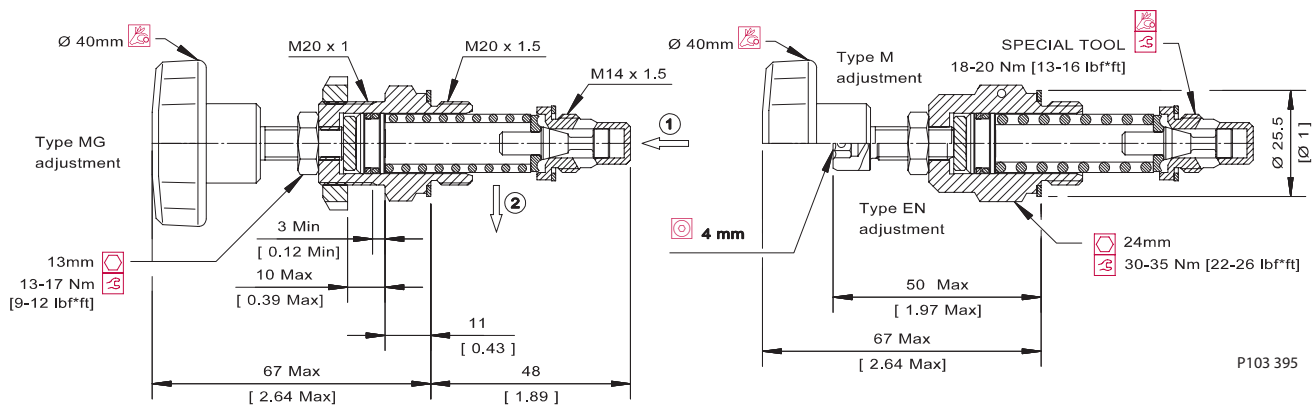
Specifications

| | |
|-----------------------|--------------------------|
| Rated pressure | 315 bar [4500 psi] |
| Rated flow | 40 l/min [11 US gal/min] |
| Weight | 0.13 kg [0.29 lb] |
| Cavity | VME06 |

DIMENSIONS

mm [in]

Cross-sectional view



P103 395

ORDERING INFORMATION

VME 06 - EN - 2 - DG3/8 - V - XXX

Adjustment

EN = External screw
 M = Handwheel
 MG = Handwheel (panel mounted)

Setting range

1 = 25 - 70 bar [363-1015 psi]
 2 = 35 - 170 bar [508-2466 psi]
 3 = 70 - 315 bar [1015-4569 psi]

Housing and ports

00 = No Housing
 DG3/8 = AI, 3/8 BSP
 DG6S = AI, #6 SAE
 Other housings available

Housing P/N

No Housing
 VME06-DG-3/8
 VME06-DG-6S

Seals
 V = Viton seals
 Omit = Buna-N

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

P103 397E

Cartridge Valves Technical Information

Relief Valves

Direct Acting

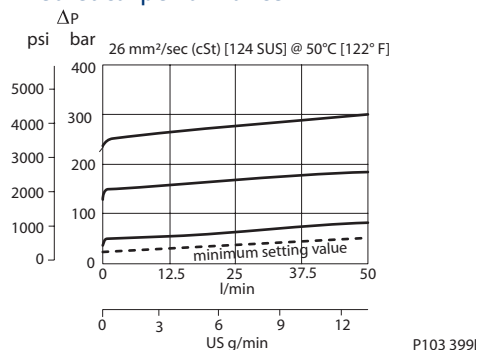
VME 07

OPERATION

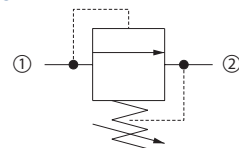
This is a direct-acting, poppet-type relief valve that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



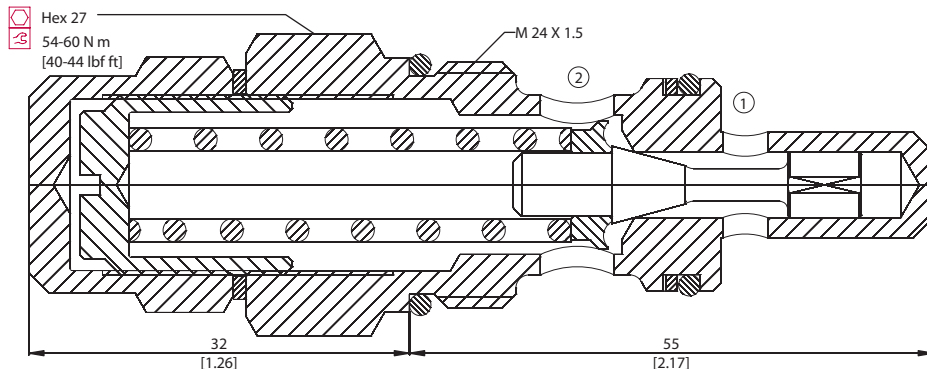
Specifications

| | |
|-----------------------|--------------------------|
| Rated pressure | 315 bar [4500 psi] |
| Rated flow | 50 l/min [13 US gal/min] |
| Weight | 0.20 kg [0.44 lb] |
| Cavity | VME07 |

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

VME 07 - E - 2 - DG1/2 - V - XXX

Adjustment

E = Internal screw
M = Handwheel

Setting range

1 = 25 - 80 bar [363-1160 psi]
2 = 35 - 180 bar [508-2611 psi]
3 = 70 - 315 bar [1015-4569 psi]

Seals

V = Viton
Omit = Buna-N

Seal kit

Consult factory
Consult factory

Housing and ports

00 = No Housing
DG1/2 = Al, 1/2 BSP
DG8S = Al, #8 SAE
Other housings available

Housing P/N

No Housing
VME07-DG-1/2
VME07-DG-8S

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

P103 400E

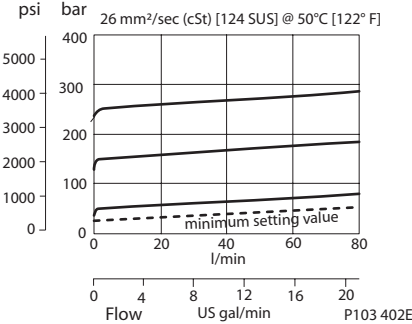
Cartridge Valves Technical Information
Relief Valves
Direct Acting
VME 08

OPERATION

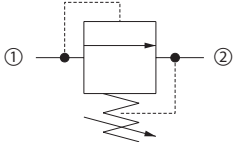
This is a direct-acting, poppet-type relief valve that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

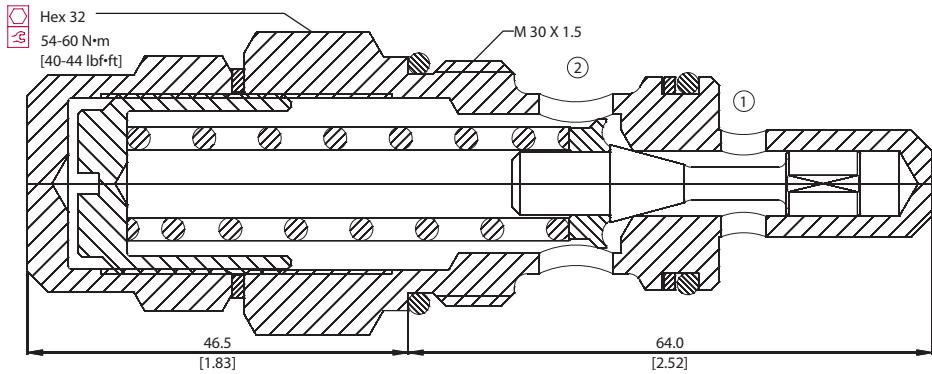
Specifications

| | |
|----------------|--------------------------|
| Rated pressure | 315 bar [4500 psi] |
| Rated flow | 80 l/min [21 US gal/min] |
| Weight | 0.35 kg [0.77 lb] |
| Cavity | VME08 |

DIMENSIONS

mm [in]

Cross-sectional view



P103 401

ORDERING INFORMATION

| | | | |
|---|--|--------------------------|--------------------|
| VME 08 - E - 2 - DG3/4 - V - XXX | | | |
| Adjustment | | Seals | Seal kit |
| E = Internal screw | | V = Viton | Consult factory |
| M = Handwheel | | Omit = Buna-N | Consult factory |
| Setting range | | Housing and ports | Housing P/N |
| 1 = 25 - 80 bar [363-1160 psi] | | 00 = No Housing | No Housing |
| 2 = 35 - 160 bar [508-2321 psi] | | DG3/4 = Al, 3/4 BSP | VME08-DG-3/4 |
| 3 = 70 - 315 bar [1015-4569 psi] | | DG12S = Al, #12 SAE | VME08-DG-12S |
| | | Other housings available | |

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

P103 403E

Cartridge Valves Technical Information

Relief Valves

Differential Area

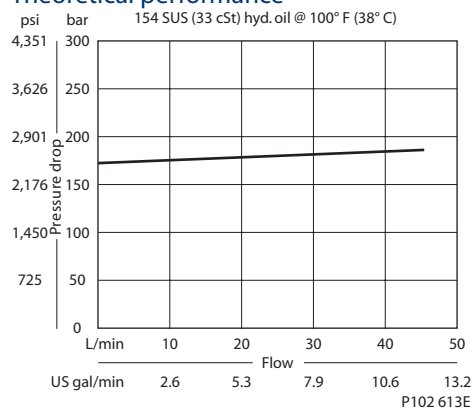
CP200-2

OPERATION

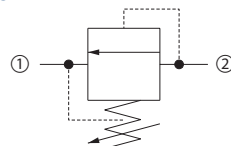
This is a direct acting differential area poppet type relief valve that relieves from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic



P102 627

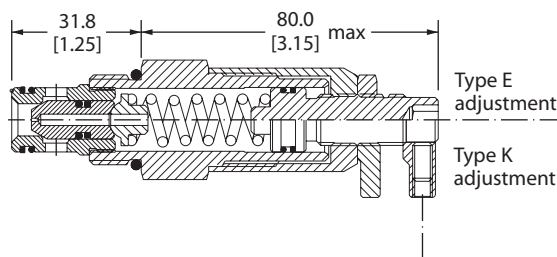
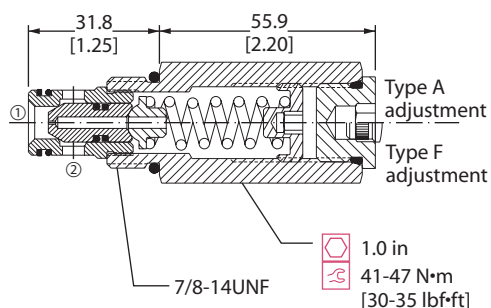
Specifications

| | |
|-----------------------|--------------------------------------|
| Rated pressure | 350 bar [5000 psi] |
| Rated flow | 40 l/min [11 US gal/min] |
| Leakage | 10 drops/min @ 80% of crack pressure |
| Weight | 0.21 kg [0.46 lb] |
| Cavity | SDC10-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P102 589E

ORDERING INFORMATION

| | | | |
|-----------------------------|-----------|---------------------------|--------------------|
| CP200-2-B-6S-E-D-150 | | | |
| Seals | | Crack pressure | |
| B = Buna-N | Seal kits | Code x 10 = psi | |
| V = Viton | 120015 | Example: 150 = 1500 psi | |
| | 120016 | | |
| Housing and ports | | Adjustment ranges | |
| 0 = No Housing | | D = Standard | bar [psi] |
| DG3B = AI, 3/8 BSP | | | 69-345 [1000-5000] |
| DG4B = AI, 1/2 BSP | | | 103 [1500] |
| 6S = AI, #6 SAE | | | |
| 8S = AI, #8 SAE | | | |
| Other housings available | | | |
| Housing P/N | | Adjustment options | |
| No Housing | | A = Internal | |
| SDC10-2-DG-3B | | F = Tamper resistant | |
| SDC10-2-DG-4B | | E = External | |
| CP10-2-6S | | K = Knob | |
| CP10-2-8S | | | |

P102 590E

Cartridge Valves Technical Information

Relief Valves

Differential Area

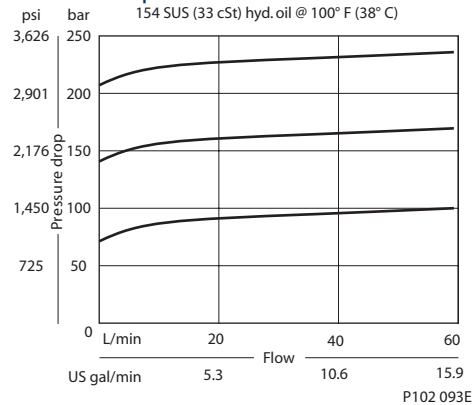
CP208-1

OPERATION

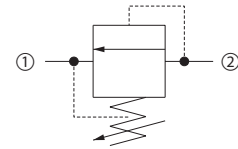
This is a direct acting differential area poppet type relief valve that relieves from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic



P102 627

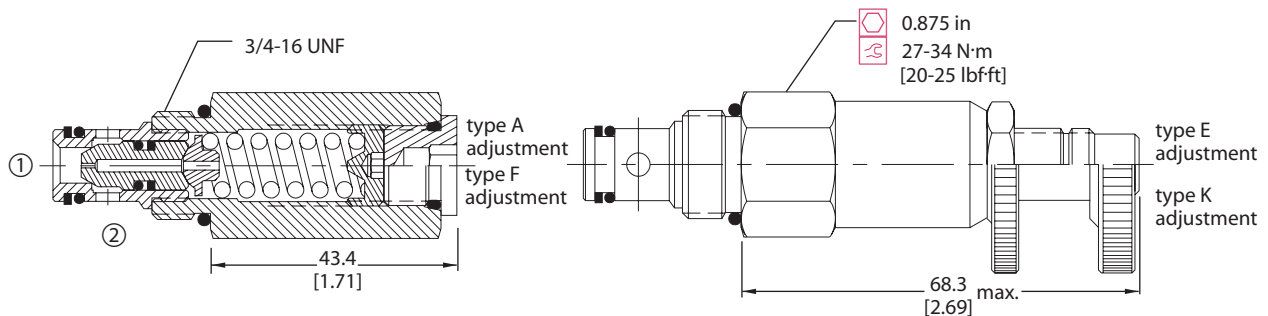
Specifications

| | |
|-----------------------|--|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 40 l/min [11 US gal/min] |
| Leakage | 10 drops/min @ 80% of pressure setting |
| Weight | 0.15 kg [0.32 lb] |
| Cavity | SDC08-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P102 092E

ORDERING INFORMATION

| | | | |
|--|--|---|--|
| CP208 - 1 - B - 6S - A - C - 150 - XXX | | | |
| Seals B = Buna-N V = Viton | Seal Kit 120221 120222 | Crack pressure Code x 10 = psi Example: 150 = 1500 psi | |
| Housing and ports 0 = 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 | Pressure range | |
| Adjustment option A = Internal E = External F = Tamper resistant K = Knob | | A = 7-69 bar [100-1000] Standard 28 [400] B = 14-138 bar [200-2000] Standard 69 [1000] C = 35-248 bar [500-3600] Standard 103 [1500] | |

P102 095E

Cartridge Valves Technical Information

Relief Valves

Differential Area

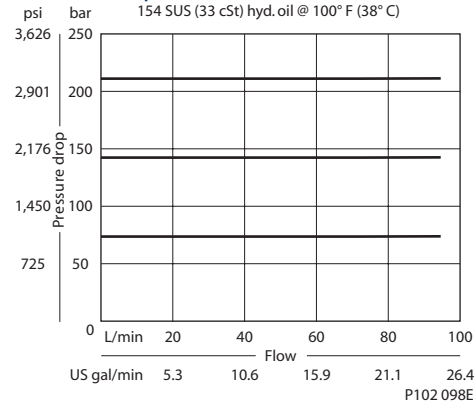
CP200-1

OPERATION

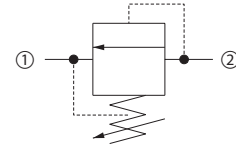
This is a direct acting differential area poppet type relief valve that relieves from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic



P102 627

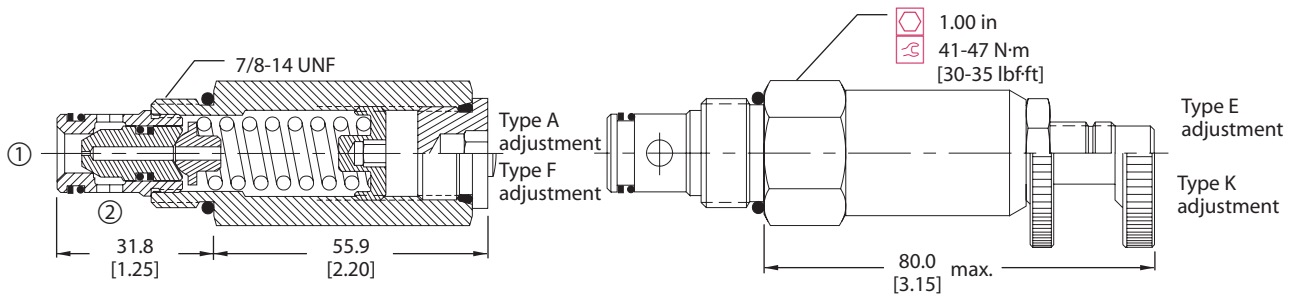
Specifications

| | |
|-----------------------|--|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 75 l/min [20 US gal/min] |
| Leakage | 10 drops/min @ 80% of pressure setting |
| Weight | 0.21 kg [0.46 lb] |
| Cavity | SDC10-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P102 096E

ORDERING INFORMATION

Seals

B = Buna-N
V = Viton

Housing and ports

0 = No Housing
DG3B = Al, 3/8 BSP
DG4B = Al, 1/2 BSP
6S = Al, #6 SAE
8S = Al, #8 SAE
Other housings available

Adjustment option

A = Internal
E = External
F = Tamper resistant
K = Knob

CP200 - 1 - B - 8S - A - C - 150

Seal kit
120015
120016

Housing P/N

No Housing
SDC10-2-DG-3B
SDC10-2-DG-4B
SDC10-2-6S
SDC10-2-8S

Crack pressure

Code x 10 = psi
Example: 150 = 1500 psi

Pressure range

| | bar | [psi] |
|----------|--------|------------|
| A = | 7-55 | [100-800] |
| Standard | 28 | [400] |
| B = | 17-138 | [250-2000] |
| Standard | 69 | [1000] |
| C = | 41-248 | [600-3600] |
| Standard | 103 | [1500] |

P102 099E

Cartridge Valves Technical Information

Relief Valves

Differential Area

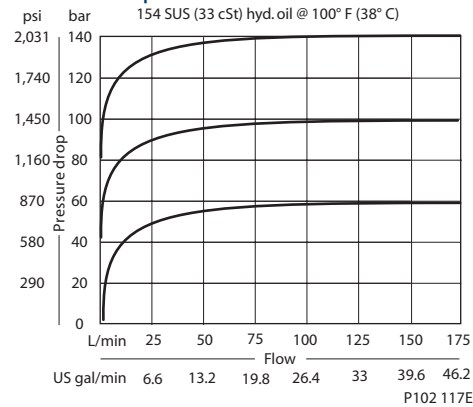
CP201-1

OPERATION

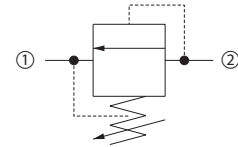
This is a direct acting differential area poppet type relief valve that relieves from 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic



P102 627

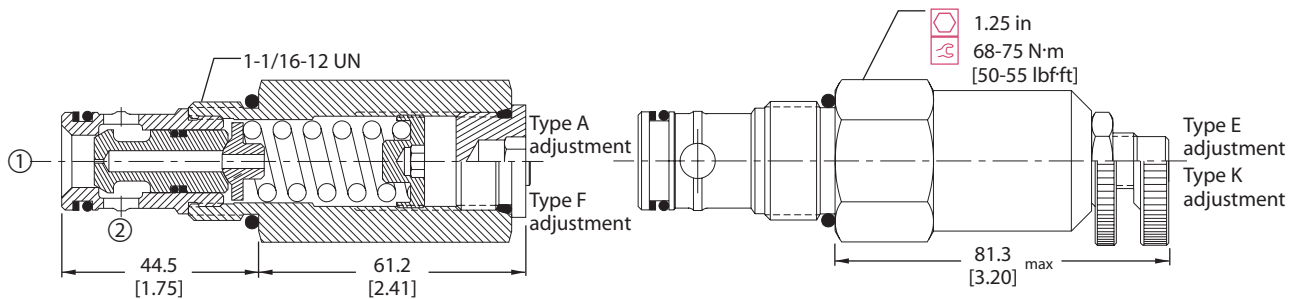
Specifications

| | |
|-----------------------|--|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 150 l/min [40 US gal/min] |
| Leakage | 10 drops/min @ 80% of pressure setting |
| Weight | 0.42 kg [0.92 lb] |
| Cavity | CP12-2 |

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

| | | | |
|--|--|--------------------------|--|
| CP201 - 1 - B - 12S - A - C - 150 | | | |
| Seals | | Seal kit | |
| B = Buna-N | | 120017 | |
| V = Viton | | 120018 | |
| 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 | | | |
| Adjustment option | | Crack pressure | |
| A = Internal | | Code x 10 = psi | |
| E = External | | Example: 150 = 1500 psi | |
| F = Tamper resistant | | | |
| K = Knob | | | |
| | | Pressure range | |
| | | A = bar [psi] | |
| | | Standard 7-69 [100-1000] | |
| | | B = 17-172 [250-2500] | |
| | | Standard 69 [1000] | |
| | | C = 35-248 [500-3600] | |
| | | Standard 103 [1500] | |

P102 103E

Cartridge Valves Technical Information

Relief Valves

Direct Acting

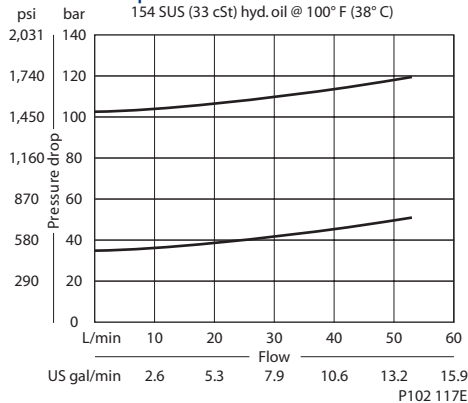
CP210-1

OPERATION

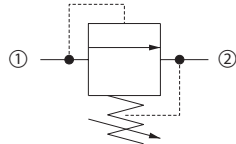
This is a direct acting spool-type relief valve that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

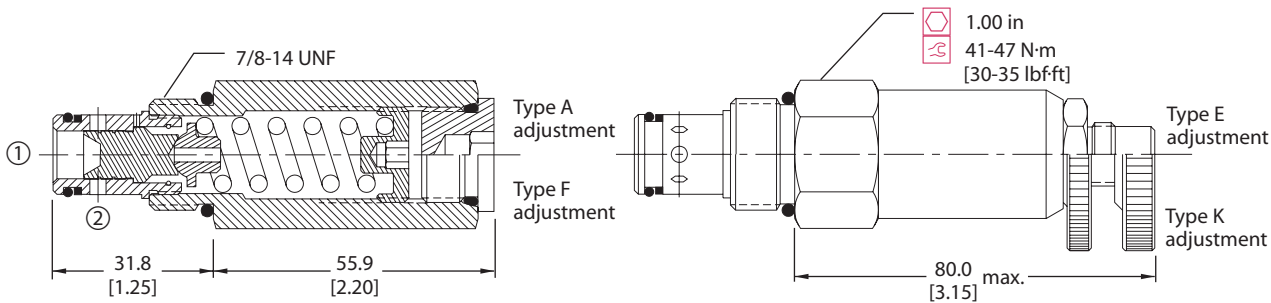
Specifications

| | |
|-----------------------|--|
| Rated pressure | 210 bar [3000 psi] |
| Rated flow | 45 l/min [12 US gal/min] |
| Leakage | 82 cm ³ /min [5 in ³ /min] @ 80% of pressure setting |
| Weight | 0.22 kg [0.48 lb] |
| Cavity | SDC10-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P102 116E

ORDERING INFORMATION

CP210 - 1 - B - 6S - A - C - 075

| | | | | |
|--|-------------------------------------|--|--|-----------------------|
| Seals B = Buna-N V = Viton | Seal kit 120015 120016 | Housing P/N No Housing SDC10-2-DG-3B SDC10-2-DG-4B CP10-2-6S CP10-2-8S | Crack pressure Code x 10 = psi Example: 075 = 750 psi | Pressure range |
| Housing and ports 0 = No Housing DG3B = Al, 3/8 BSP DG4B = Al, 1/2 BSP 6S = Al, #6 SAE 8S = Al, #8 SAE Other housings available | | | | |
| Adjustment option A = Internal E = External F = Tamper resistant K = Knob | | | | |
| | | | | bar [psi] |
| | | | | A = 3.4-28 [50-400] |
| | | | | Standard 17 [250] |
| | | | | B = 5.5-55 [80-800] |
| | | | | Standard 28 [400] |
| | | | | C = 6.9-97 [100-1400] |
| | | | | Standard 52 [750] |
| | | | | D = 34-166 [500-2400] |
| | | | | Standard 103 [1500] |

P102 119E

Cartridge Valves Technical Information

Relief Valves

Direct Acting

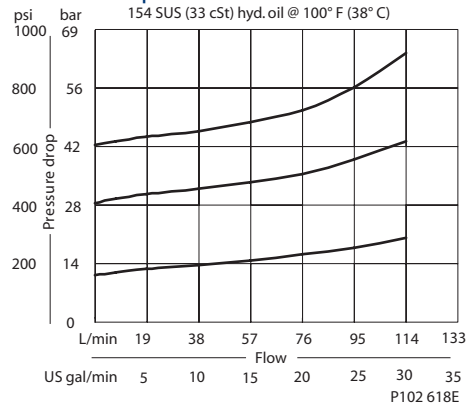
CP211-1

OPERATION

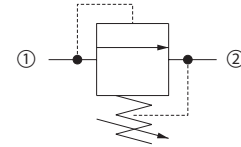
This is a direct acting spool-type relief valve that relieves from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P102 628

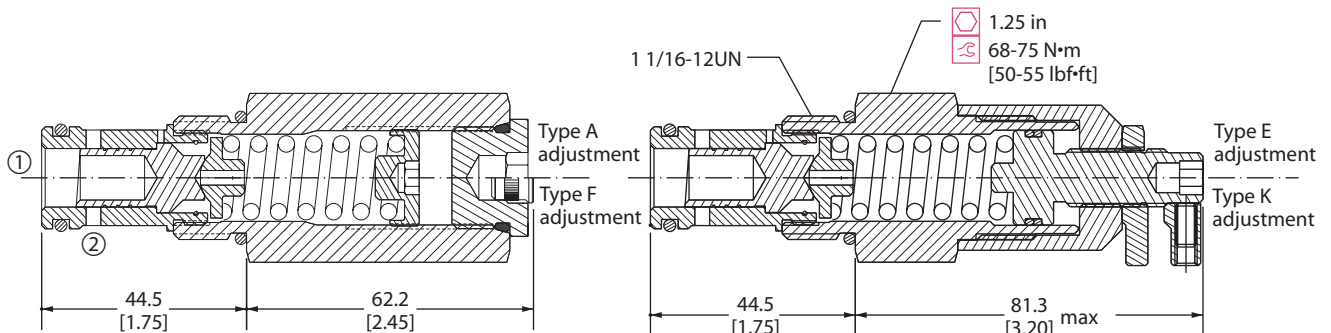
Specifications

| | |
|-----------------------|--|
| Rated pressure | 40 bar [600 psi] |
| Rated flow | 75 l/min [20 US gal/min] |
| Leakage | 82 cm ³ /min [5 in ³ /min] @ 80% of pressure setting |
| Weight | 0.41 kg [0.90 lb] |
| Cavity | CP12-2 |

DIMENSIONS

mm [in]

Cross-sectional view



P102 616E

ORDERING INFORMATION

CP211-1-B-10S-A-C-040

Pressure range

A = 0-10 bar [0-150 psi]
 B = 3.4-34 bar [50-400 psi]
 C = 5.2-41 bar [80-600 psi]

Crack pressure

Code x 10 = psi
 Example: 040 = 400 psi

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
 CP12-2-4B
 CP12-2-6B
 CP12-2-10S
 CP12-2-12S

Adjustment option

A = Internal
 E = External
 F = Tamper resistant
 K = Knob

Seals

B = Buna-N
 V = Viton

Seal kit

120017
 120018

P102 617E

Cartridge Valves Technical Information

Relief Valves

Pilot Operated

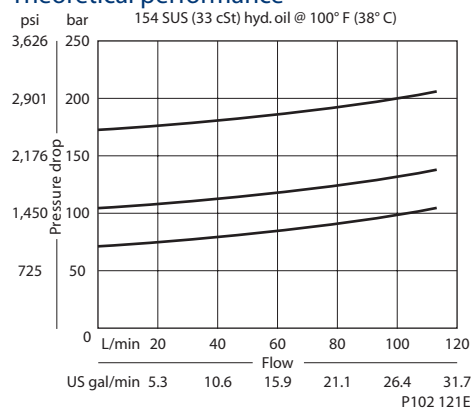
CP210-2

OPERATION

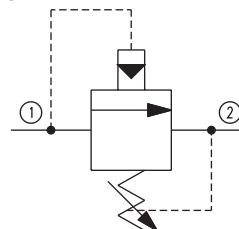
This is a pilot operated spool type relief valve that relieves pressure from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



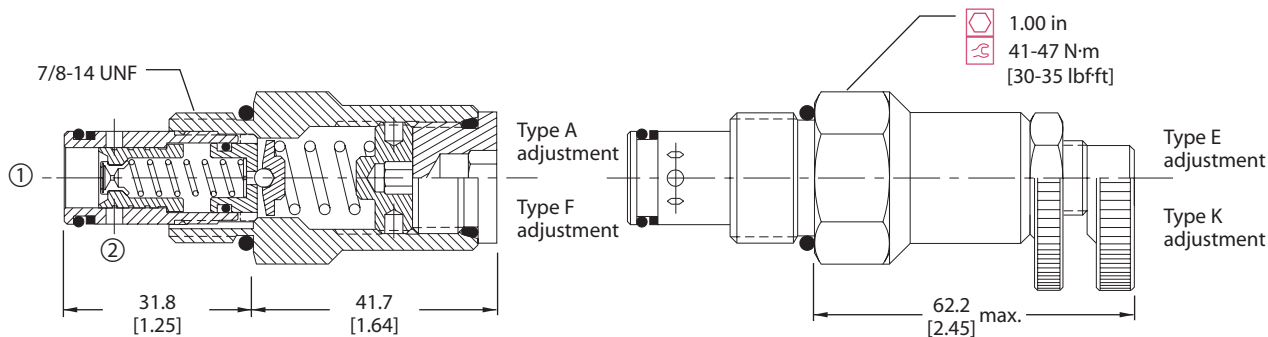
P102 629

Specifications

| | |
|-----------------------|---|
| Rated pressure | 350 bar [5000 psi] |
| Rated flow | 115 l/min [30 US gal/min] |
| Leakage | 82 cm ³ /min [5 in ³ /min] @ 207 bar [3000 psi] |
| Weight | 0.18 kg [0.40 lb] |
| Cavity | SDC10-2 |

DIMENSIONS

Cross-sectional view



P102 120E

ORDERING INFORMATION

| | | | |
|---|--------------------|-------------------------|------------|
| CP210 - 2 - B - 6S - A - C - 150 | | | |
| Seals | Seal kit | Crack pressure | |
| B = Buna-N | 120015 | Code x 10 = psi | |
| V = Viton | 120016 | Example: 150 = 1500 psi | |
| Housing and ports | Housing P/N | Pressure range | |
| 0 = No Housing | No Housing | bar [psi] | |
| DG3B = Al, 3/8 BSP | SDC10-2-DG-3B | A = 14-69 | [200-800] |
| DG4B = Al, 1/2 BSP | SDC10-2-DG-4B | Standard 28 | [400] |
| 6S = Al, #6 SAE | CP10-2-6S | B = 14-103 | [200-1500] |
| 8S = Al, #8 SAE | CP10-2-8S | Standard 69 | [1000] |
| Other housings available | | C = 28-207 | [400-3000] |
| Adjustment option | | Standard 103 | [1500] |
| A = Internal | | D = 28-345 | [400-5000] |
| E = External | | Standard 103 | [1500] |
| F = Tamper resistant | | | |
| K = Knob | | | |

P102 123E

Cartridge Valves Technical Information

Relief Valves

Pilot Operated

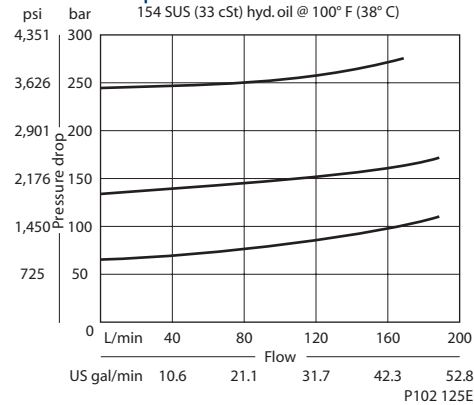
CP211-2

OPERATION

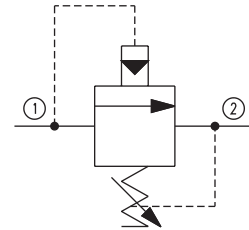
This valve relieves from 1 to 2 and is a pilot operated spool type relief.

SPECIFICATIONS

Theoretical performance



Schematic



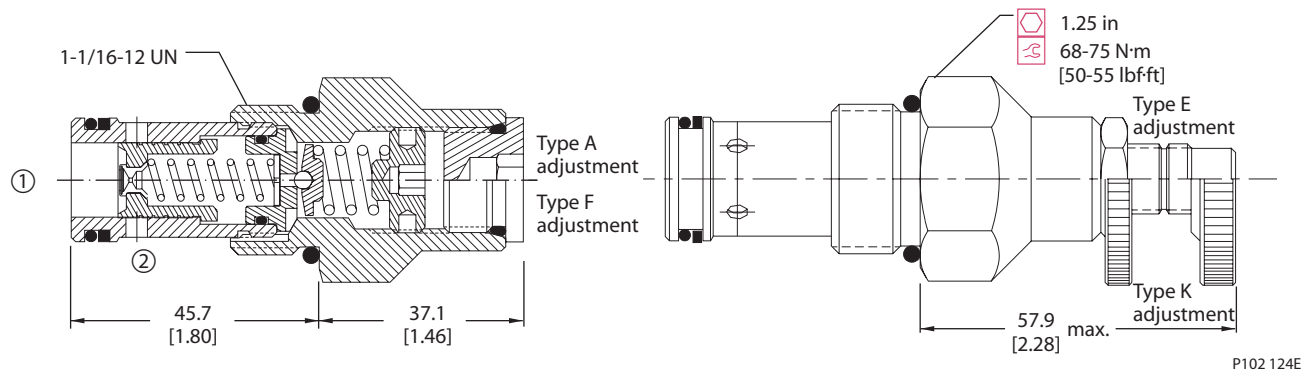
P102 629

Specifications

| | |
|-----------------------|---|
| Rated pressure | 350 bar [5000 psi] |
| Rated flow | 190 l/min [50 US gal/min] |
| Leakage | 82 cm ³ /min [5 in ³ /min] @ 207 bar [3000 psi] |
| Weight | 0.17 kg [0.37 lb] |
| Cavity | CP12-2 |

DIMENSIONS

Cross-sectional view



ORDERING INFORMATION

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

Adjustment option
 A = Internal
 E = External
 F = Tamper resistant
 K = Knob

Seal kit
 120017
 120018

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

CP211 - 2 - B - 12S - A - C - 150

Crack pressure
 Code x 10 = psi
 Example: 150 = 1500 psi

Pressure range

| | bar | [psi] |
|----------|--------|------------|
| A = | 14-69 | [200-800] |
| Standard | 28 | [400] |
| B = | 14-103 | [300-1500] |
| Standard | 69 | [1000] |
| C = | 28-207 | [400-3000] |
| Standard | 103 | [1500] |
| D = | 28-345 | [400-5000] |
| Standard | 103 | [1500] |

P102 127E

Cartridge Valves Technical Information

Relief Valves

Pilot Operated

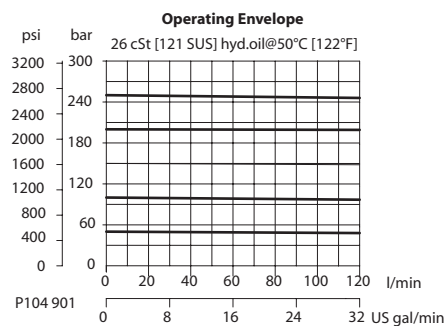
RV10-POP

OPERATION

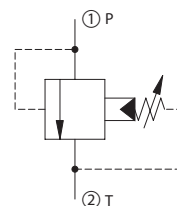
This is a pilot-operated poppet relief valve.

SPECIFICATIONS

Theoretical performance



Schematic



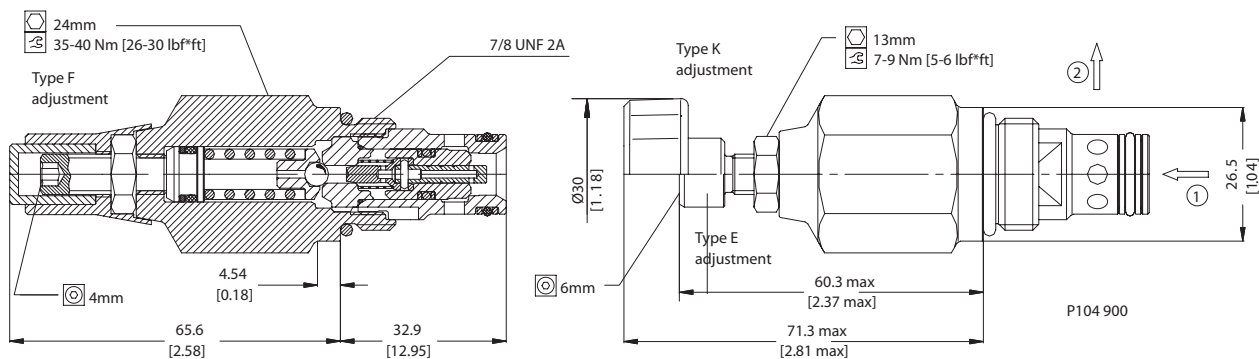
P104 899

Specifications

| | |
|-----------------------|---------------------------------------|
| Rated pressure | 250 bar [3625 psi] |
| Rated flow | 120 l/min [32 US gal/min] |
| Leakage | 6 drops/min @ 80% of pressure setting |
| Weight | 0.22 kg [0.49 lb] |
| Cavity | SDC10-2 |

DIMENSIONS

Cross-sectional view



ORDERING INFORMATION

RV10 - POP - 3 - E - XXX - B - 00

Pressure Range

3 = 25-250 Bar [360-3600 psi]

Adjustment option

E = External adjustment
F = Tamper resistant
K = Knob adjustment

Cracking pressure

Code = Std. setting in bar:
100 = 100 Bar [1500 psi]
XXX = No specific setting

Body and Ports

Omit = Cartridge only
65 = Al, #6 SAE
85 = Al, #8 SAE
DG3B = Al, 3/8 BSP
DG4B = Al, 1/2 BSP
Other housing available

Seals

B = Buna-N seals
V = Viton seals

Seal Kit

354004019
354003419

Body Nomenclature

No Body
CP10-2-65
CP10-2-85
SDC10-2-DG3B
SDC10-2-DG4B

P104 902

Cartridge Valves Technical Information

Relief Valves

Bi-Directional

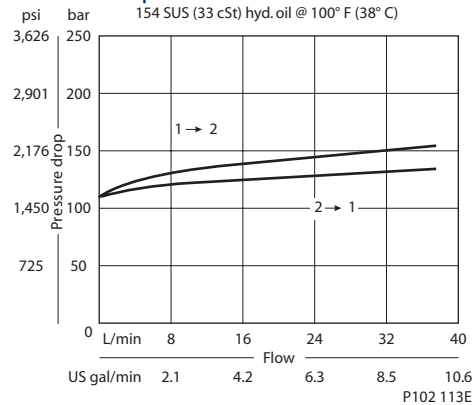
CP200-7

OPERATION

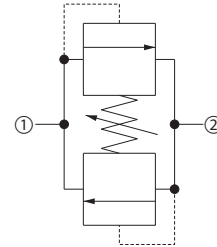
This valve relieves pressure from 1 to 2 and 2 to 1.

SPECIFICATIONS

Theoretical performance



Schematic

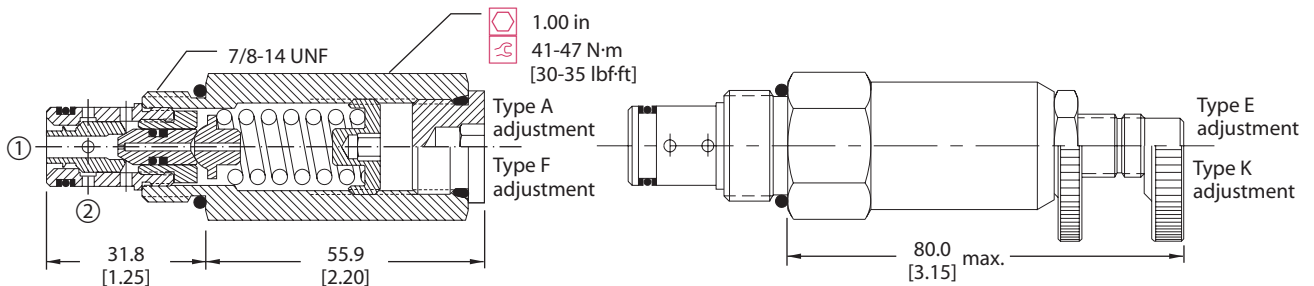


Specifications

| | |
|-----------------------|---|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 40 l/min [11 US gal/min] |
| Leakage | 5 cm ³ /min [0.3 in ³ /min] @ 80% of pressure setting |
| Weight | 0.20 kg [0.43 lb] |
| Cavity | SDC10-2 |

DIMENSIONS

Cross-sectional view



ORDERING INFORMATION

CP200 - 7 - B - 8S - A - C - 150

| | | | | | |
|--------------------------|--|--------------------|--|-------------------------|------------|
| Seals | | Seal kit | | Crack pressure | |
| B = Buna-N | | 120073 | | Code x 10 = psi | |
| V = Viton | | 120074 | | Example: 150 = 1500 psi | |
| Housing and ports | | Housing P/N | | Pressure range | |
| 0 = No Housing | | No Housing | | A = 7-41 | [100-600] |
| DG3B = Al, 3/8 BSP | | SDC10-2-DG-3B | | Standard = 28 | [400] |
| DG4B = Al, 1/2 BSP | | SDC10-2-DG-4B | | B = 17-138 | [250-2000] |
| 6S = Al, #6 SAE | | CP10-2-6S | | Standard = 69 | [1000] |
| 8S = Al, #8 SAE | | CP10-2-8S | | C = 41-248 | [600-3600] |
| Other housings available | | | | Standard = 103 | [1500] |
| Adjustment option | | | | | |
| A = Internal | | | | | |
| E = External | | | | | |
| F = Tamper resistant | | | | | |
| K = Knob | | | | | |

P102 115E

Cartridge Valves Technical Information

Relief Valves

Differential Area

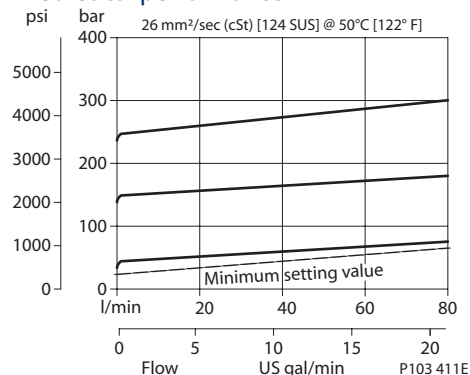
VS06-EN

OPERATION

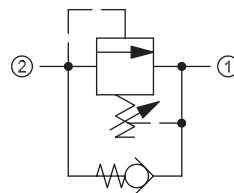
This is a direct-acting, differential area, poppet-type relief valve that relieves from 2 to 1 with an integral free-flow check from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P103 524

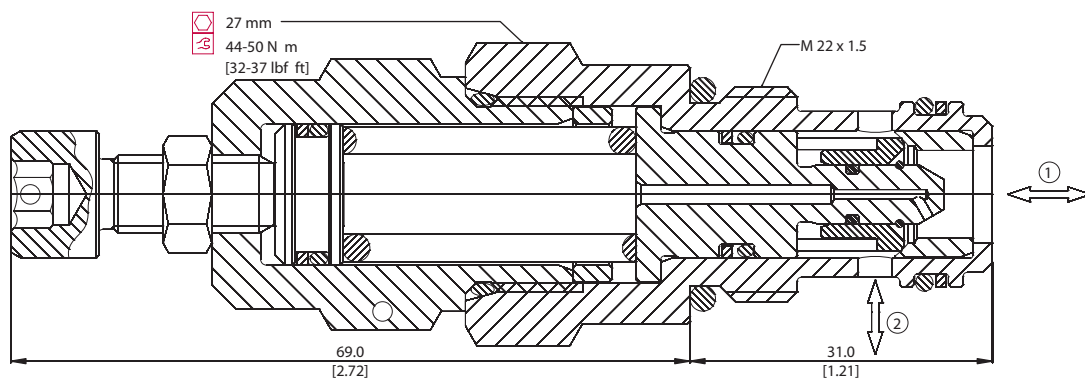
Specifications

| | |
|-----------------------|--------------------------|
| Rated pressure | 350 bar [5000 psi] |
| Rated flow | 80 l/min [21 US gal/min] |
| Weight | 0.22 kg [0.49 lb] |
| Cavity | NCS06/2 |

DIMENSIONS

mm [in]

Cross-sectional view



P103 413

ORDERING INFORMATION

VS06-EN - 1 - 00 - V - XXX

Setting range

- 1 = 20 - 80 bar [363 - 2031 psi]
- 2 = 70 - 210 bar [1015 - 3046 psi]
- 3 = 105 - 350 bar [1523 - 5076 psi]

Seals

- V = Viton
- Omit = Buna-N

Seal Kit

- 230000380
- 230000060

Housing and ports

- 00 = No Housing
- DG3/8 = AL, 3/8 BSP
- DG1/2 = AL, 1/2 BSP
- DG65 = AL, #6 SAE
- DG85 = AL, #8 SAE
- Other housings available

Housing P/N

- No Housing
- NCS06/2-DG-3/8
- NCS06/2-DG-1/2
- NCS06/2-DG-65
- NCS06/2-DG-85

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

P103 414E

Cartridge Valves Technical Information

Relief Valves

Differential Area

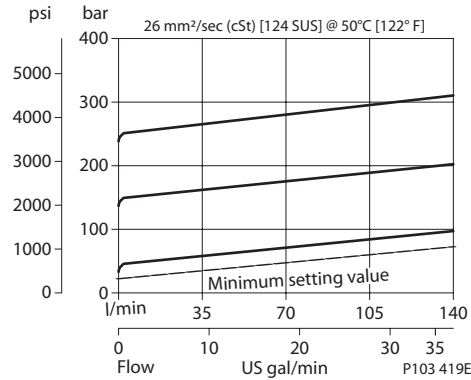
VSB 12-EN

OPERATION

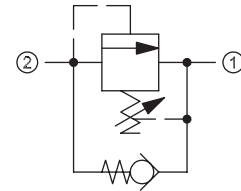
This is a direct-acting, differential area, poppet-type relief valve that relieves from 2 to 1 with an integral free-flow check from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



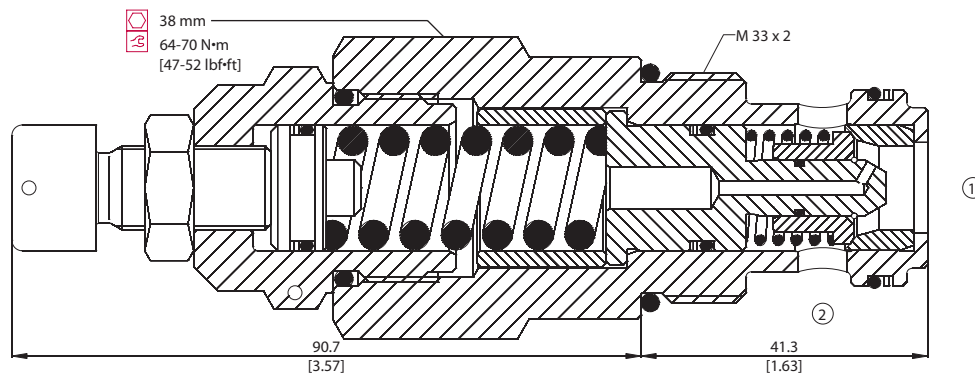
P103 524

Specifications

| | |
|-----------------------|---------------------------|
| Rated pressure | 350 bar [5000 psi] |
| Rated flow | 140 l/min [37 US gal/min] |
| Weight | 0.60 kg [1.32 lb] |
| Cavity | NCS12/2 |

DIMENSIONS

Cross-sectional view



P103 421

ORDERING INFORMATION

VSB 12-EN - 1 - 00 - V - XXX

Setting range

- 1 = 25 - 170 bar [363 - 2466 psi]
- 2 = 70 - 270 bar [1015 - 3916 psi]
- 3 = 105 - 350 bar [1523 - 5076 psi]

Seals

- V = Viton
- Omit = Buna-N

Seal Kit

- 230000470
- 230000120

Housing and ports

- 00 = No Housing
- DG1/2 = AL, 1/2 BSP
- DG3/4 = AL, 3/4 BSP
- DG8S = AL, #8 SAE
- DG12S = AL, #12 SAE
- Other housings available

Housing P/N

- No Housing
- NCS12/2-DG-1/2
- NCS12/2-DG-3/4
- NCS12/2-DG-8S
- NCS12/2-DG-12S

P103 422E

Cartridge Valves Technical Information

Relief Valves

Differential Area

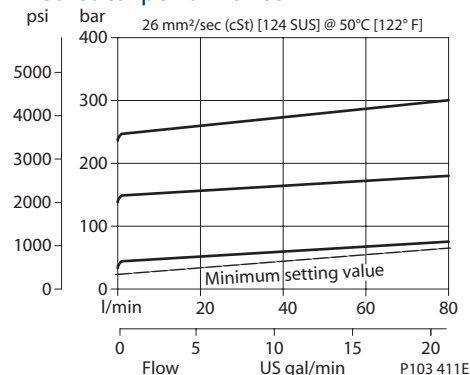
VSB 06-CN

OPERATION

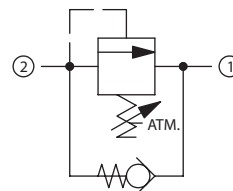
This is a direct-acting, differential area, atmospherically-vented, poppet-type relief valve that relieves from 2 to 1 with an integral free-flow check from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P1

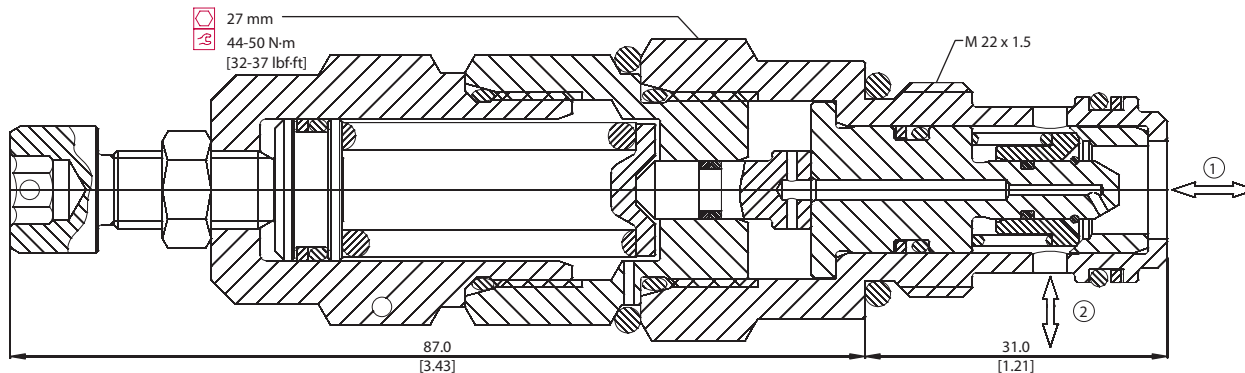
Specifications

| | |
|-----------------------|--------------------------|
| Rated pressure | 350 bar [5000 psi] |
| Rated flow | 80 l/min [21 US gal/min] |
| Weight | 0.29 kg [0.64 lb] |
| Cavity | NCS06/2 |

DIMENSIONS

mm [in]

Cross-sectional view



P103 410

ORDERING INFORMATION

VSB 06-CN - 1 - 00 - V - XXX

Seals
 V = Viton 230000380
 Omit = Buna-N 230000060

Housing and ports
 00 = No Housing
 DG3B = AL, 3/8 BSP
 DG4B = AL, 1/2 BSP
 DG6S = AL, #6 SAE
 DG8S = AL, #8 SAE
 Other housings available

Seal Kit
 230000380
 230000060

Housing P/N
 No Housing
 NCS06/2-DG-3/8
 NCS06/2-DG-1/2
 NCS06/2-DG-6S
 NCS06/2-DG-8S

Setting range

1 = 25 - 140 bar [363 - 2031 psi]
 2 = 70 - 210 bar [1015 - 3046 psi]
 3 = 105 - 350 bar [1523 - 5076 psi]

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

P103 412E

Cartridge Valves Technical Information

Relief Valves

Differential Area

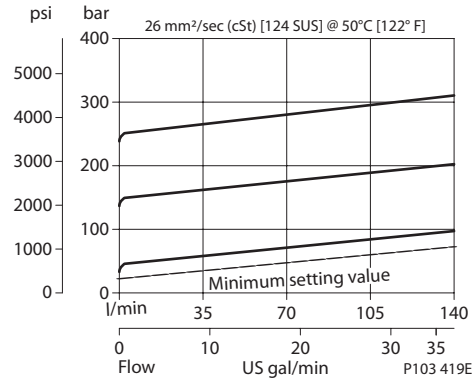
VSB 12-CN

OPERATION

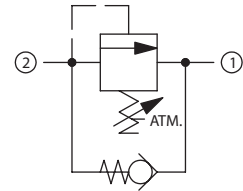
This is a direct-acting, differential area, atmospherically-vented, poppet-type relief valve that relieves from 2 to 1 with an integral free-flow check from 1 to 2.

SPECIFICATIONS

Theoretical performance



Schematic



P1

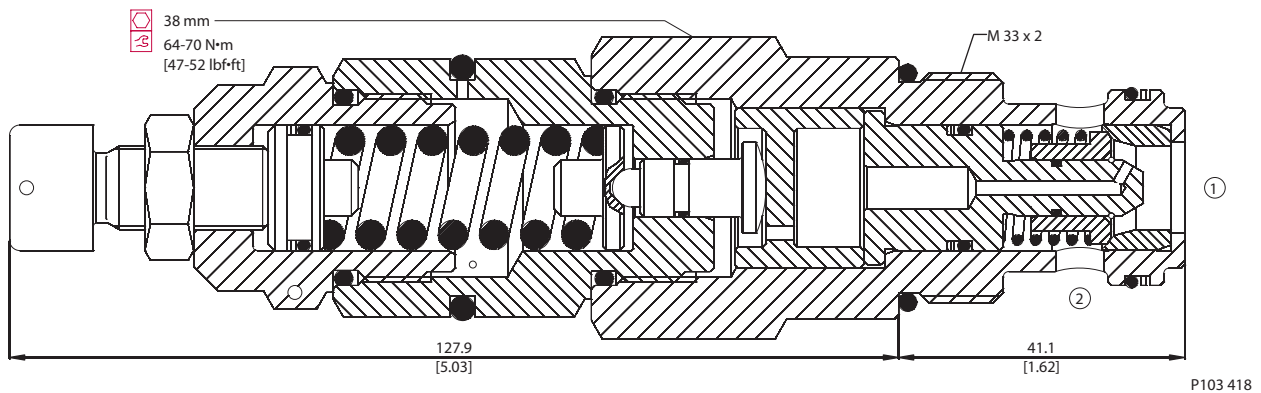
Specifications

| | |
|-----------------------|---------------------------|
| Rated pressure | 350 bar [5000 psi] |
| Rated flow | 140 l/min [37 US gal/min] |
| Weight | 0.75 kg [1.65 lb] |
| Cavity | NCS12/2 |

DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION

VSB 12-CN - 1 - 00 - V - XXX

Setting range

- 1 = 25 - 170 bar [363 - 2466 psi]
- 2 = 70 - 270 bar [1015 - 3916 psi]
- 3 = 105 - 350 bar [1523 - 5076 psi]

Seals

- V = Viton
- Omit = Buna-N

Seal Kit

- 230000470
- 230000120

Housing and ports

- 00 = No Housing
- DG1/2 = AL, 1/2 BSP
- DG3/4 = AL, 3/4 BSP
- DG8S = AL, #8 SAE
- DG12S = AL, #12 SAE
- Other housings available

Housing P/N

- No Housing
- NCS12/2-DG-1/2
- NCS12/2-DG-3/4
- NCS12/2-DG-8S
- NCS12/2-DG-12S

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

P103 420E

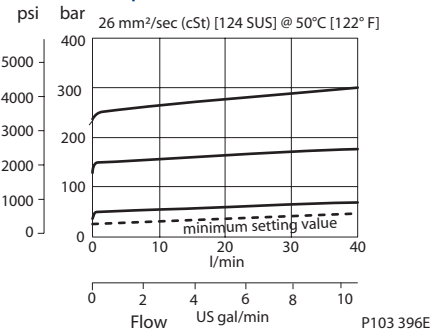
Cartridge Valves Technical Information
Relief Valves
Cross-Over
VA-E 06

OPERATION

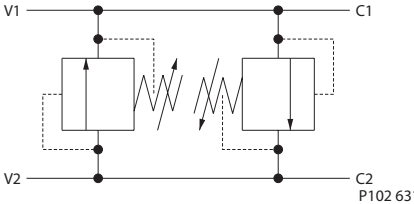
This valve is an inline cross relief. It uses two VME 06 direct-acting relief valves.

SPECIFICATIONS

Theoretical performance



Schematic



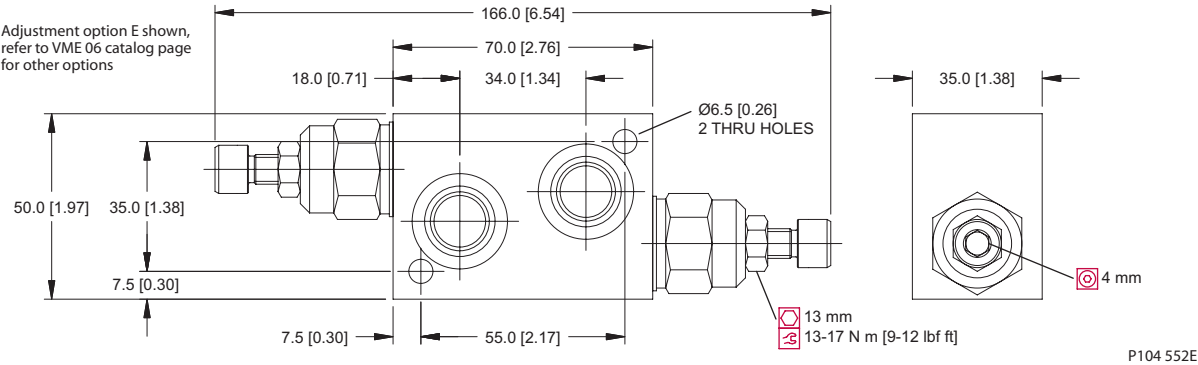
Specifications

| | |
|----------------|--------------------------|
| Rated pressure | 210 bar [3045 psi] |
| Rated flow | 40 l/min [11 US gal/min] |
| Weight | 1.11 kg [2.45 lb] |
| Cavity | none |

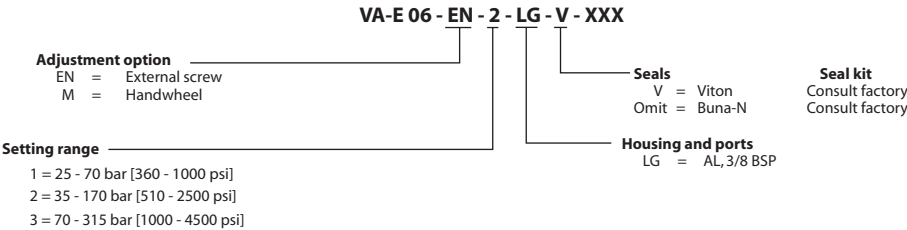
DIMENSIONS

mm [in]

Cross-sectional view



ORDERING INFORMATION



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

P104 553E

Cartridge Valves Technical Information

Relief Valves

Cross-Over

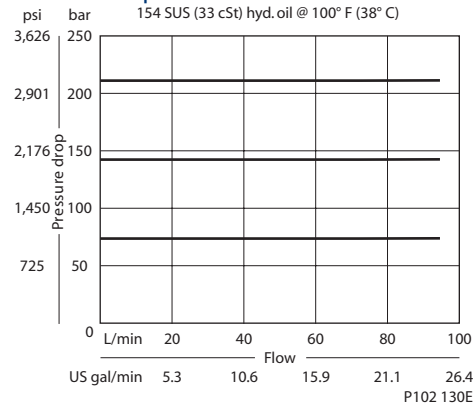
CP220-1

OPERATION

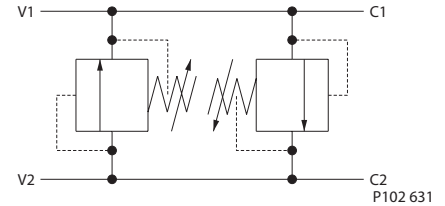
This valve is an inline cross relief. It uses two CP200-1 differential area relief valves.

SPECIFICATIONS

Theoretical performance



Schematic



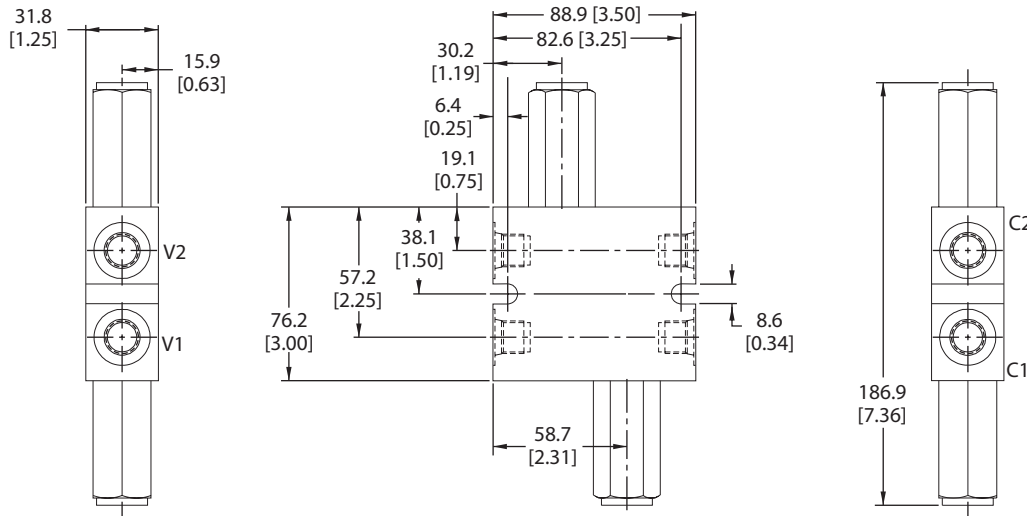
Specifications

| | |
|-----------------------|--------------------------|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 75 l/min [20 US gal/min] |
| Weight | 0.82 kg [1.80 lb] |
| Cavity | none |

DIMENSIONS

mm [in]

Cross-sectional view



P102 129

ORDERING INFORMATION

| | | | |
|---|--|-------------------------------|--|
| CP220 - 1 - 8S - B - 0 - A - C - 150 | | | |
| Housing and ports | | Housing P/N | |
| 3B = Al, 3/8 BSP | | 221743 | |
| 4B = Al, 1/2 BSP | | 221744 | |
| 6S = Al, #6 SAE | | 220216 | |
| 8S = Al, #8 SAE | | 220217 | |
| Other housings available | | | |
| Seals | | Seal kit | |
| B = Buna-N | | 120072 | |
| V = Viton | | 120161 | |
| Adjustment option | | | |
| A = Internal | | | |
| E = External | | | |
| F = Tamper resistant | | | |
| K = Knob | | | |
| | | Crack pressure | |
| | | Code x 10 = psi | |
| | | Example: 150 = 1500 psi | |
| | | Pressure range | |
| | | A = 7-55 bar [100-800] psi | |
| | | Standard 28 [400] | |
| | | B = 17-138 bar [250-2000] psi | |
| | | Standard 69 [1000] | |
| | | C = 41-248 bar [600-3600] psi | |
| | | Standard 103 [1500] | |

P102 131E

Cartridge Valves Technical Information

Relief Valves

Cross-Over

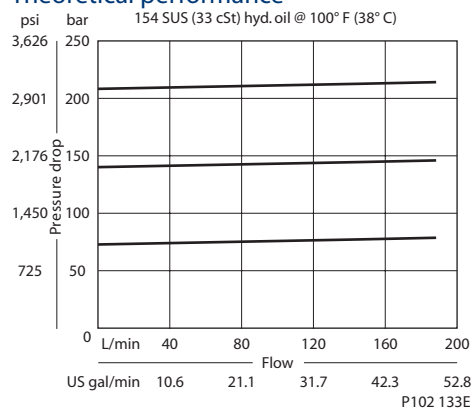
CP221-1

OPERATION

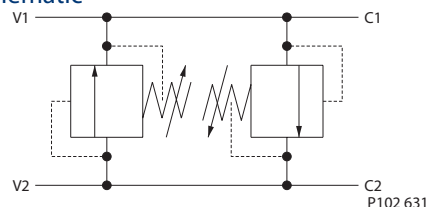
This valve is an inline cross relief. It uses two CP201-1 type differential area relief valves.

SPECIFICATIONS

Theoretical performance



Schematic



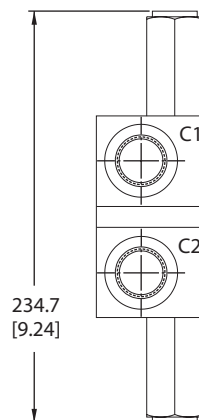
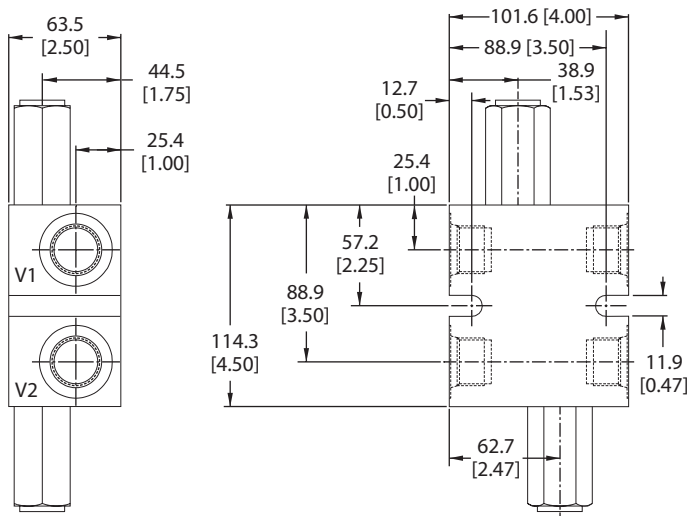
Specifications

| | |
|-----------------------|---------------------------|
| Rated pressure | 250 bar [3600 psi] |
| Rated flow | 190 l/min [50 US gal/min] |
| Weight | 2.25 kg [4.95 lb] |
| Cavity | none |

DIMENSIONS

mm [in]

Cross-sectional view



P102 132

ORDERING INFORMATION

CP221 - 1 - 16S - B - 0 - A - C - 150

Housing and ports

| | |
|-----|---------------|
| 12S | = AL, #12 SAE |
| 16S | = AL, #16 SAE |
| 6B | = AL, 3/4 BSP |
| 8B | = AL, 1 BSP |

Seals

| | |
|---|----------|
| B | = Buna-N |
| V | = Viton |

Adjustment option

| | |
|---|--------------------|
| A | = Internal |
| E | = External |
| F | = Tamper resistant |
| K | = Knob |

Housing P/N

| |
|--------|
| 220223 |
| 220222 |
| 221742 |
| 221690 |

| |
|----------|
| Seal kit |
| 120162 |
| 120163 |

Cracking pressure

Code x 10 = psi
Example: 150 = 1500 psi

Pressure range

| | bar | [psi] |
|----------|--------|------------|
| A = | 7-69 | [100-1000] |
| Standard | 28 | [400] |
| B = | 17-172 | [250-2500] |
| Standard | 69 | [1000] |
| C = | 41-248 | [500-3600] |
| Standard | 103 | [1500] |

P102 134E