

FC

# Flow Control Valves



*Danfoss*

# Flow Control Valves

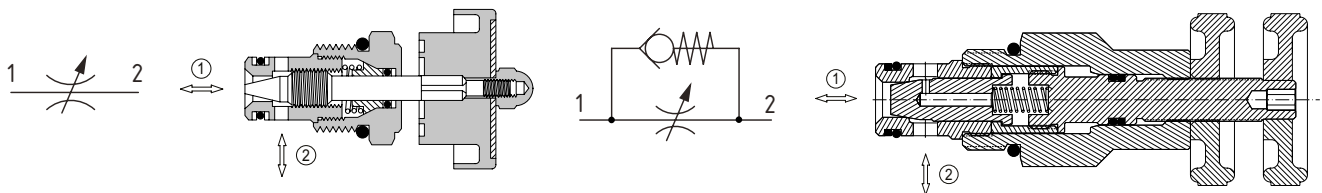
## Application Notes

### Basic Operation: Flow Control Valves

There are two main types of flow control valves: non-compensated and compensated. Non-compensated valves feature an adjustable orifice, where the flow across the valve depends on the pressure differential and the size of the orifice. These valves can also include an integrated reverse flow check valve. Pressure compensated valves include an orifice that works in conjunction with a compensator. These can be two ported (restrictive type) or three ported (priority type), which gives the option of a priority, controlled flow with excess flow available to be used for secondary functions. Spool type flow divider / combiner valves are also available, which feature two spools that are linked mechanically, ensuring equal flow and individual compensation. Velocity fuses are valves that close when a pre-determined pressure drop across an orifice is reached.

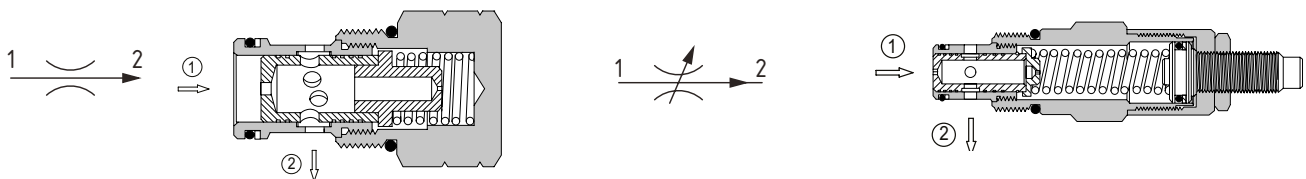
### Needle Valves

Needle valves provide a means to vary a restriction and provide a pressure drop or control a flow from port 1 to 2 or port 2 to 1. The flow is a function of the effective orifice between the two ports. In the case of valves with a reverse flow check, the integral check allows for free flow past the orifice and the restriction is unidirectional. This is ideal when meter out or meter in control is required, such as limiting the speed of an actuator. These valves require the excess flow to pass across a relief valve upstream or a pump compensator to maintain a fixed pressure drop across the valve.



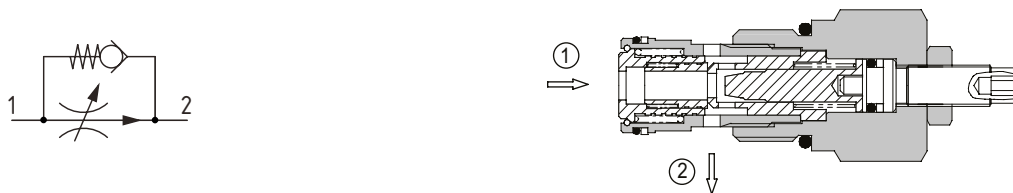
### Pressure Compensated, Restrictive Type Flow Control Valves

Valves of this type allow a flow from port 1 through an orifice in the center of the spool, causing a pressure differential. This differential causes the spool to move back against a spring and restrict flow out of the valve at port 2. If the pressure differential changes, the spool will compensate and further restrict or open the flow out at port 2. In this way, a constant pressure drop is maintained across the orifice and therefore the flow remains constant. Partially adjustable versions of this type of valve change the spring force, allowing for variable flow through the valve. The adjustment is ideal for fine-tuning the flow in an application to improve accuracy, but it does not allow the valve to be closed completely.



### Pressure Compensated, Restrictive Type Flow Control Valves with Reverse Free Flow

These valves are pressure compensated and fully adjustable, which allow the operator to completely close the line between ports 1 and 2. A reverse free flow check is also built into the design from port 2 to 1. The adjustable orifice is independent of the compensating spool, which senses the pressure difference across the orifice and moves to control the outlet flow by restriction the exit holes to port 2.

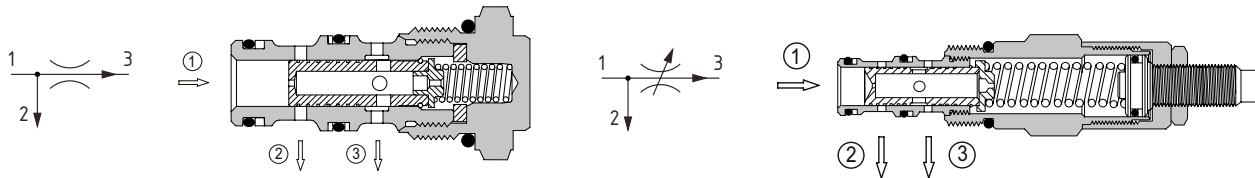


# Flow Control Valves

## Application Notes

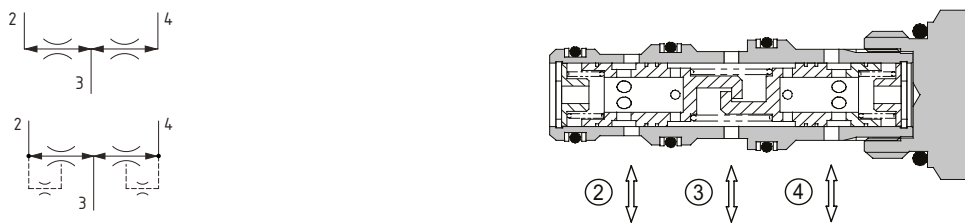
### Pressure Compensated, Priority Type Flow Control Valves

These valves are pressure compensated, three ported, priority type flow regulators. Once the flow setting is reached from port 1 to port 3, excess flow is diverted to port 2 and can be used in a separate part of the circuit. These valves can be used to ensure braking or steering systems have priority flow or to divert a controlled or limited flow to attachment circuits. These valves are available in fixed, partially, or fully adjustable versions.



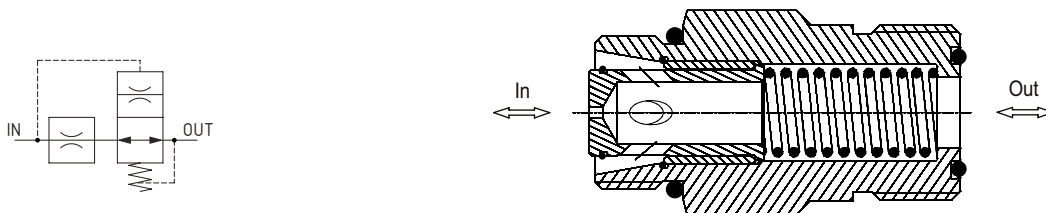
### Flow Dividers / Combiners Pressure Compensated

These valves are pressure compensated spool-type flow divider/combiners. They split an inlet flow into two, maintaining the division independent of changes in pressure. They can also combine two flows accommodating changes in pressure. For transmission applications, a synchronizing version is available that allows a make-up flow through orifices within the valve to allow motors to rotate at different speeds when the vehicle is turning.



### Velocity Fuses

These valves are normally open and designed to close when the flow setting is reached. Depending on the design, the valve will close completely or to a pre-determined low flow. When installed into or next to an actuator, they can protect against catastrophic hose failure. An accelerating load will be slowed if the speed corresponds to a flow greater than the set flow. The valve will only open when the load pressure drops to less than the spring pressure (typically around 5.5 bar [80psi])



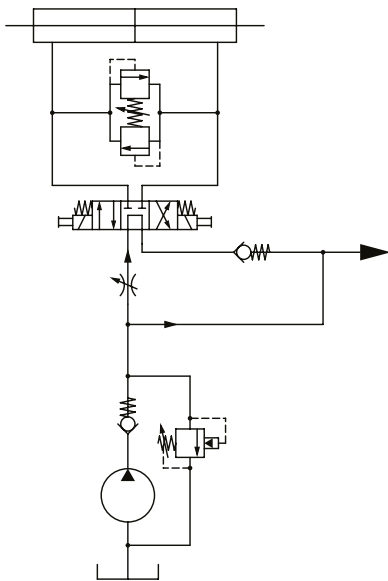
# Flow Control Valves

## Application Notes

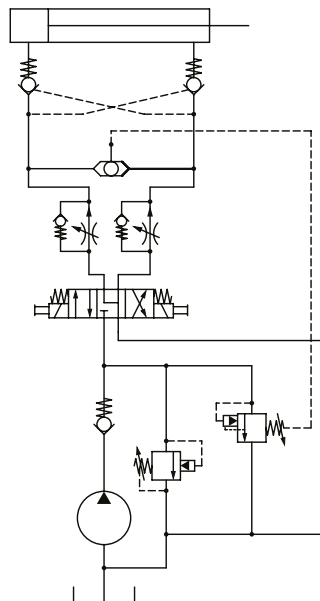
### Application Recommendations

- Using any two ported needle valve or flow control as a meter out device on the rod side of a cylinder may cause intensification to a level equal to the cylinder ratio.
- When using priority type flow controls, blocking the bypass flow port will cause the valve to function as a restrictive type valve.
- Blocking the regulated port on a priority type valve will cause the valve to close all ports.
- On a priority type valve, flow will not be compensated until the setting is reached and oil begins to pass to the bypass flow port.
- Flow dividers will close both outlet ports if one becomes blocked, except for a small make up flow in the opposite port.
- Overflowing flow dividers can cause spool breakages.
- Applying flow dividers below the selected flow setting will reduce the accuracy of the valve. Unless otherwise specified, it is not recommended to use a flow divider below 50% of the inlet flow for the specified flow setting.
- Partially adjustable flow control valves do not completely block the flow. For applications requiring this functionality, fully adjustable versions must be used.

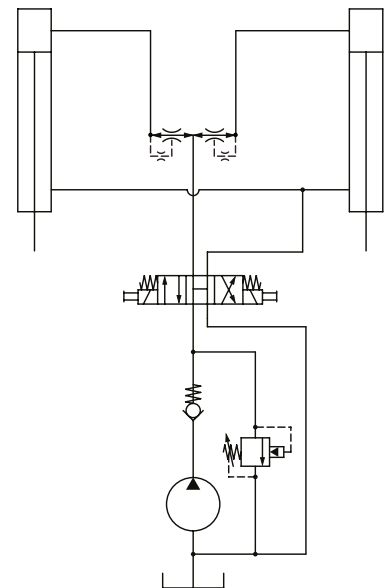
### Typical Applications



▲ Priority flow



▲ Speed control



▲ Synchronization

## Flow Control Valves Quick Reference

Needle Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	NV1-8	SDC08-2	Needle Valve, Fully Adjustable	45 l/min [12 US gpm]	350 bar [5000 psi]	8
	CP618-6	SDC08-2	Needle valve, Fully Adjustable, Fine Metering	11 l/min [3 US gpm]	310 bar [4500 psi]	9
	NV1-10	SDC10-2	Needle valve, Fully Adjustable, Fine Metering	45 l/min [12 US gpm]	250 bar [3600 psi]	10
	FCV7-10-NV	SDC10-2	Needle Valve, Fully Adjustable	45 l/min [12 US gpm]	210 bar [3000 psi]	11
	FCV7-10-NVF	SDC10-2	Needle valve, Fully Adjustable, Fine Metering	38 l/min [10 US gpm]	210 bar [3000 psi]	12
	FCV11-12	C-12-2	Needle Valve, Fully Adjustable	114 l/min [30 US gpm]	350 bar [5000 psi]	13
	FCV6-16	SDC16-2	Needle Valve, Fully Adjustable	208 l/min [55 US gpm]	210 bar [3000 psi]	14
	CP613-1	SDC20-2	Needle Valve, Fully Adjustable	380 l/min [100 US gpm]	210 bar [3000 psi]	15

Needle Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	FCV7-10	SDC10-2	Needle Valve, Fully Adjustable with Reverse Free Flow	45 l/min [12 US gpm]	210 bar [3000 psi]	16
	CP610-7	SDC10-2	Needle Valve, Fully Adjustable, Fine Metering with Reverse Free Flow	55 l/min [14 US gpm]	350 bar [5000 psi]	17

Flow Control Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP308-1	SDC08-2	Flow Control, Fixed, Pressure Compensated, Restrictive Type	15 l/min [4 US gpm]	210 bar [3000 psi]	18
	FR5-8	SDC08-2	Flow Control, Fixed, Pressure Compensated, Restrictive Type	9.5 l/min [2.5 US gpm]	350 bar [5000 psi]	19
	FR5-10	SDC10-2	Flow Control, Fixed, Pressure Compensated, Restrictive Type	23 l/min [6 US gpm]	350 bar [5000 psi]	20
	CP301-1	CP12-2	Flow Control, Fixed, Pressure Compensated, Restrictive Type	57 l/min [15 US gpm]	210 bar [3000 psi]	21
	FR1-16	SDC16-2	Flow Control, Fixed, Pressure Compensated, Restrictive Type	114 l/min [30 US gpm]	210 bar [3000 psi]	22
	FR1-20	SDC20-2	Flow Control, Fixed, Pressure Compensated, Restrictive Type	227 l/min [60 US gpm]	210 bar [3000 psi]	23

Flow Control Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	SC 10	N/A	Flow Control, Insert Type, Fixed, Pressure Compensated, Restrictive Type	16 l/min [4.2 US gpm]	210 bar [3000 psi]	24
	SC 13	N/A	Flow Control, Insert Type, Fixed, Pressure Compensated, Restrictive Type	47 l/min [12.4 US gpm]	210 bar [3000 psi]	25

Flow Control Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	CP300-6	SDC10-3	Flow Control, Fixed, Pressure Compensated, Restrictive Type, Bi-directional	23 l/min [6 US gpm]	210 bar [3000 psi]	26

\*Flow ratings are for reference only. Refer to individual product page for performance information.

## Flow Control Valves Quick Reference

Flow Control Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	<b>CP308-2</b>	<b>SDC08-2</b>	Flow Control, Partially Adjustable, Pressure Compensated, Restrictive Type	15 l/min [4 US gpm]	210 bar [3000 psi]	<b>27</b>
	<b>FR2-10</b>	<b>SDC10-2</b>	Flow Control, Partially Adjustable, Pressure Compensated, Restrictive Type	38 l/min [10 US gpm]	210 bar [3000 psi]	<b>28</b>
	<b>FR2-16</b>	<b>SDC16-2</b>	Flow Control, Partially Adjustable, Pressure Compensated, Restrictive Type	114 l/min [30 US gpm]	210 bar [3000 psi]	<b>29</b>
Flow Control Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	<b>HFCV10-RT</b>	<b>SDC10-2</b>	Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow	11.4 l/min [3 US gpm]	350 bar [5000 psi]	<b>30</b>
	<b>HFCV10-HRT</b>	<b>SDC10-2</b>	Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow	45 l/min [12 US gpm]	350 bar [5000 psi]	<b>31</b>
	<b>2CFRC60</b>	<b>A7447</b>	Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow	60 l/min [16 US gpm]	350 bar [5000 psi]	<b>32</b>
	<b>FAR1-12</b>	<b>C-12-2</b>	Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow	95 l/min [25 US gpm]	350 bar [5000 psi]	<b>33</b>
	<b>FAR1-16</b>	<b>SDC16-2</b>	Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow	114 l/min [30 US gpm]	350 bar [5000 psi]	<b>34</b>
Flow Control Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	<b>CP310-1</b>	<b>SDC10-3</b>	Flow Control, Fixed, Pressure Compensated, Priority Type	23 l/min [6 US gpm]	210 bar [3000 psi]	<b>35</b>
	<b>VRF 06</b>	<b>NCS06/3</b>	Flow Control, Fixed, Pressure Compensated, Priority Type	25 l/min [7 US gpm]	315 bar [4600 psi]	<b>36</b>
	<b>CP311-1</b>	<b>CP12-3</b>	Flow Control, Fixed, Pressure Compensated, Priority Type	45 l/min [12 US gpm]	210 bar [3000 psi]	<b>37</b>
	<b>CP312-1</b>	<b>SDC16-3</b>	Flow Control, Fixed, Pressure Compensated, Priority Type	65 l/min [17 US gpm]	210 bar [3000 psi]	<b>38</b>

\*Flow ratings are for reference only. Refer to individual product page for performance information.

# Flow Control Valves

## Quick Reference

Flow Control Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	<a href="#">2CFP60</a>	<b>CVA27-04</b>	Flow Control, Fully Adjustable, Pressure Compensated, Priority Type	60 l/min [16 US gpm]	350 bar [5000 psi]	<b>39</b>
	<a href="#">PFR2-10</a>	<b>SDC10-3</b>	Flow Control, Partially Adjustable, Pressure Compensated, Priority Type	38 l/min [10 US gpm]	210 bar [3000 psi]	<b>40</b>
	<a href="#">PFR12-10</a>	<b>SDC10-3</b>	Flow Control, Partially Adjustable, Pressure Compensated, Priority Type	38 l/min [10 US gpm]	350 bar [5000 psi]	<b>41</b>
	<a href="#">PFR12-12</a>	<b>C-12-3</b>	Flow Control, Partially Adjustable, Pressure Compensated, Priority Type	76 l/min [20 US gpm]	350 bar [5000 psi]	<b>42</b>
	<a href="#">VRC 06</a>	<b>NCS06/3</b>	Flow Control, Partially Adjustable, Pressure Compensated, Priority Type	30 l/m [8 US gpm]	315 bar [4600 psi]	<b>43</b>
	<a href="#">VRC 12</a>	<b>NCS12/3</b>	Flow Control, Partially Adjustable, Pressure Compensated, Priority Type	73 l/min [19 US gpm]	315 bar [4600 psi]	<b>44</b>
	<a href="#">PFR2-16</a>	<b>SDC16-3</b>	Flow Control, Partially Adjustable, Pressure Compensated, Priority Type	114 l/min [30 US gpm]	210 bar [3000 psi]	<b>45</b>
	<a href="#">PFR12-16</a>	<b>SDC16-3</b>	Flow Control, Partially Adjustable, Pressure Compensated, Priority Type	114 l/min [30 US gpm]	350 bar [5000 psi]	<b>46</b>
Flow Control Valves	Model No.	Cavity	Description	Flow*	Pressure	Page
	<a href="#">HFCV10-PT</a>	<b>SDC10-3</b>	Flow Control, Fully Adjustable, Pressure Compensated, Priority Type with Reverse Free Flow	45 l/min [12 US gpm]	350 bar [5000 psi]	<b>47</b>
Flow Dividers/Combiners	Model No.	Cavity	Description	Flow*	Pressure	Page
	<a href="#">CP340-1/1S</a>	<b>SDC10-4</b>	Flow Divider/Combiner, Fixed Ratio, Flow Synchronizing Option	45 l/min [12 US gpm]	210 bar [3000 psi]	<b>48</b>
	<a href="#">2CFD50/A2X</a>	<b>SDC10-4</b>	Flow Divider/Combiner, Fixed Ratio, Flow Synchronizing Option	40 l/min [11 US gpm]	350 bar [5000 psi]	<b>49</b>
	<a href="#">CP342-1/1S</a>	<b>SDC16-4</b>	Flow Divider/Combiner, Fixed Ratio, Flow Synchronizing Option	150 l/min [40 US gpm]	210 bar [3000 psi]	<b>50</b>
Flow Dividers/Combiners	Model No.	Cavity	Description	Flow*	Pressure	Page
	<a href="#">CP341-1</a>	<b>CP12-4</b>	Flow Divider/Combiner, Fixed Ratio	76 l/min [20 US gpm]	210 bar [3000 psi]	<b>51</b>
	<a href="#">CP342-3</a>	<b>SDC16-4</b>	Flow Divider/Combiner, Fixed Ratio	150 l/min [40 US gpm]	450 bar [6500 psi]	<b>52</b>
	<a href="#">CP343-1</a>	<b>SDC20-4</b>	Flow Divider/Combiner, Fixed Ratio	340 l/min [90 US gpm]	210 bar [3000 psi]	<b>53</b>
Velocity Fuses	Model No.	Cavity	Description	Flow*	Pressure	Page
	<a href="#">VF11-10</a>	<b>SDC10-2</b>	Velocity Fuse	23 l/min [6 US gpm]	350 bar [5000 psi]	<b>54</b>
Velocity Fuses	Model No.	Cavity	Description	Flow*	Pressure	Page
	<a href="#">CP330-3</a>	<b>#10 SAE Port</b>	Velocity Fuse, In-line	110 l/min [29 US gpm]	210 bar [3000 psi]	<b>55</b>

## Flow Control Valves

### NV1-8

Needle Valve, Fully Adjustable

350 bar [5000 psi] • 45 l/min [12 US gpm]

#### DESCRIPTION AND OPERATION

This needle valve is a variable orifice used to create a pressure drop when flow passes from port 1 to 2 or port 2 to 1. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed. The setting can be locked by tightening lock nut or knob on the adjustment screw.

#### SCHEMATIC



#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>350 bar [5000 psi]</b>
<b>Rated flow</b>	<b>45 l/min [12 US gpm]</b>
<b>Leakage</b>	5 drops/min @ 350 bar [5000 psi]
<b>Weight</b>	0.07 kg [0.15 lb]
<b>Cavity</b>	SDC08-2

#### MODEL CODE

**NV1 - 8 - V - S - S - 4T**

##### Seal Option

Code	Seal Kit
Omit - Buna - N	02-165875
V - Viton	02-165877

##### Adjustment Option

S - External  
C - Tamper Resistant  
K - Knob

##### Housing Material

Omit - No housing  
S - Steel  
A - Aluminium

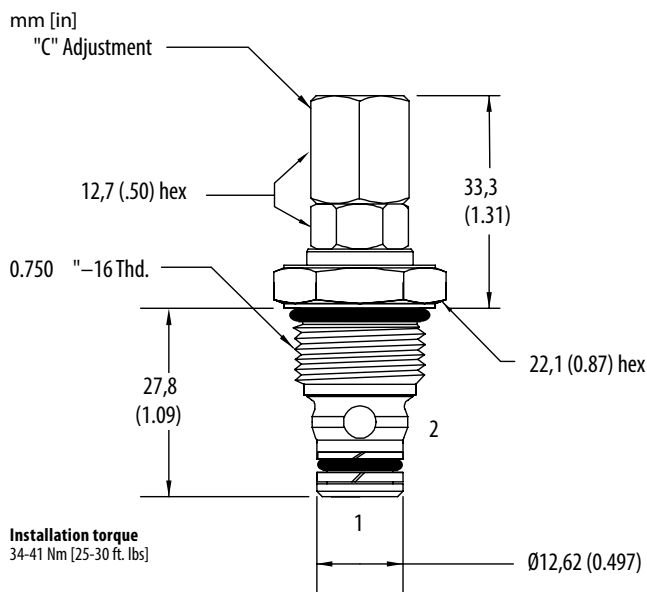
##### Housing

Code	Ports	Aluminium Heavy duty	Steel
0	No housing		
4T	#4 SAE	02-160730	02-160736
6T	#6 SAE	02-160731	02-160737
8T	#8 SAE	02-160732	02-160738
2G	1/4" BSP	02-160727	02-160733
3G	3/8" BSP	02-160728	02-160734

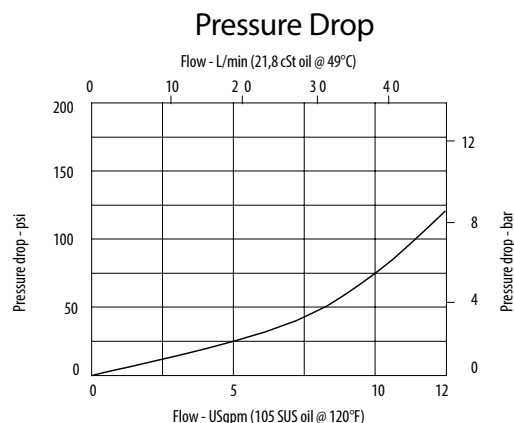
\* Aluminium bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### DIMENSIONS



#### PERFORMANCE CURVES



## Flow Control Valves

### CP618-6

Needle valve, Fully Adjustable, Fine Metering

310 bar [4500 psi] • 11 l/min [3 US gpm]

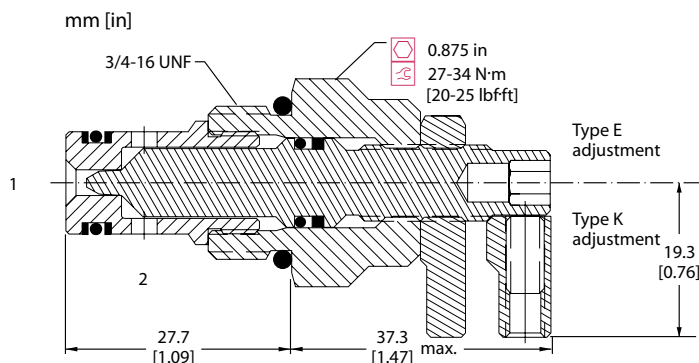
#### DESCRIPTION AND OPERATION

This needle valve with fine metering is a variable orifice used to create a pressure drop when flow passes from port 1 to 2 or port 2 to 1. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed. The setting can be locked by tightening lock nut or knob on the adjustment screw.

#### SCHEMATIC



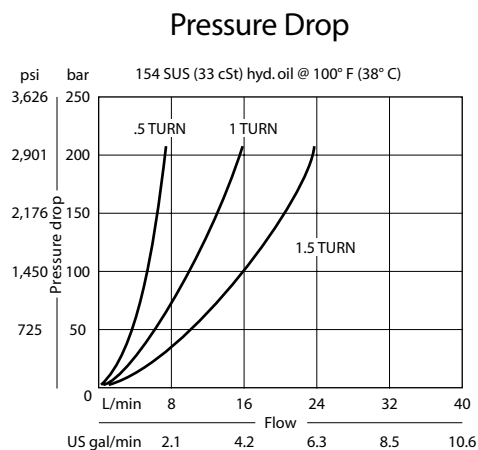
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	310 bar [4500 psi]
Rated flow	11 l/min [3 US gpm]
Leakage	6 drops/min @ Rated pressure
Weight	0.12 kg [0.26 lb]
Cavity	SDC08-2

#### PERFORMANCE CURVES



#### MODEL CODE

CP618 - 6 - B - 6S - K

##### Seal Option

Code	Seal Kit
B	Buna - N 120227
V	Viton 120228

##### Adjustment Option

E - External  
K - Knob

##### Housing

Code	Ports	Housing Model Code
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	CP08-2-4S
6S	AL, #6 SAE	CP08-2-6S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### NV1-10

Needle valve, Fully Adjustable, Fine Metering

210 bar [3000 psi] • 45 l/min [12 US gpm]

#### DESCRIPTION AND OPERATION

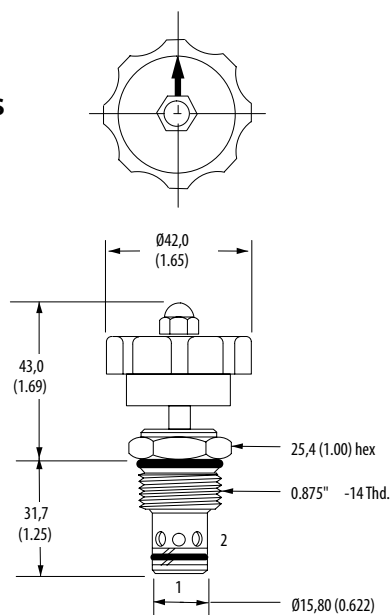
This needle valve with fine metering is a variable orifice used to create a pressure drop when flow passes from port 1 to 2 or port 2 to 1. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

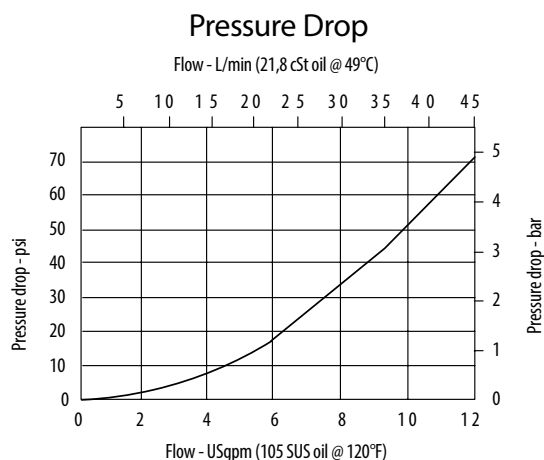


Installation Torque:  
47-54 Nm [35-40 ft. lbs]

#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	45 l/min [12 US gpm]
Leakage	5 drops/min @ 210 bar [3000 psi]
Weight	0.11 kg [0.24 lb]
Cavity	SDC10-2

#### PERFORMANCE CURVES



#### MODEL CODE

NV1 - 10 - V - K - 0

##### Seal Option

Code	Seal Kit
Omit - Buna - N	565806
V - Viton	889627

##### Adjustment Option

K - Knob [black]  
R - Knob [red]

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
3B	3/8" BSP	02-175462	
6T	#6 SAE	566151	
2G	1/4" BSP		876702
3G	3/8" BSP		876703
6H	#6 SAE		876700
8H	#8 SAE		876701

\* Aluminium bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FCV7-10-NV

Needle Valve, Fully Adjustable

210 bar [3000 psi] • 45 l/min [12 US gpm]

#### DESCRIPTION AND OPERATION

This needle valve is a variable orifice used to create a pressure drop when flow passes from port 1 to 2 or port 2 to 1. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed. The setting can be locked by tightening lock nut or knob on the adjustment screw.

#### SCHEMATIC

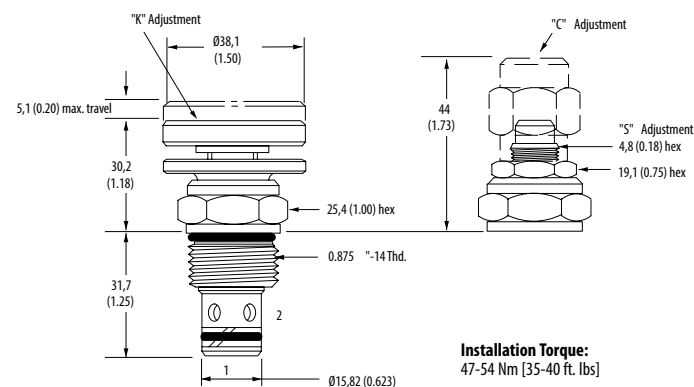


#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	45 l/min [12 US gpm]
Weight	0.11 kg [0.24 lb]
Cavity	SDC10-2

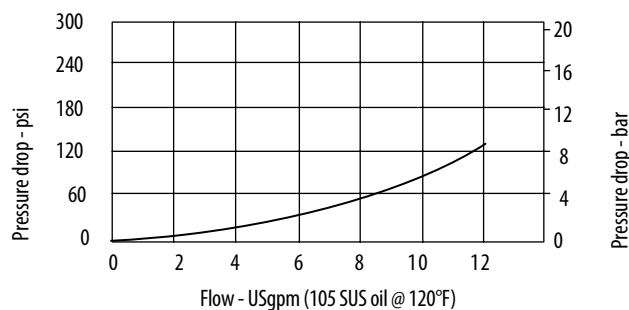
#### DIMENSIONS

mm [in]



#### PERFORMANCE CURVES

##### Pressure Drop



#### MODEL CODE

FCV7 - 10 - V - C - 0 - NV

##### Seal Option

Code	Seal Kit
Omit - Buna - N	565806
V - Viton	889627

##### Adjustment Option

C - Tamper Resistant  
K - Knob  
S - External

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
3B	3/8" BSP	02-175462	-
6T	#6 SAE	566151	-
2G	1/4" BSP	-	876702
3G	3/8" BSP	-	876703
6H	#6 SAE	-	876700
8H	#8 SAE	-	876701

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FCV7-10-NVF

Needle valve, Fully Adjustable, Fine Metering

210 bar [3000 psi] • 38 l/min [10 US gpm]

#### DESCRIPTION AND OPERATION

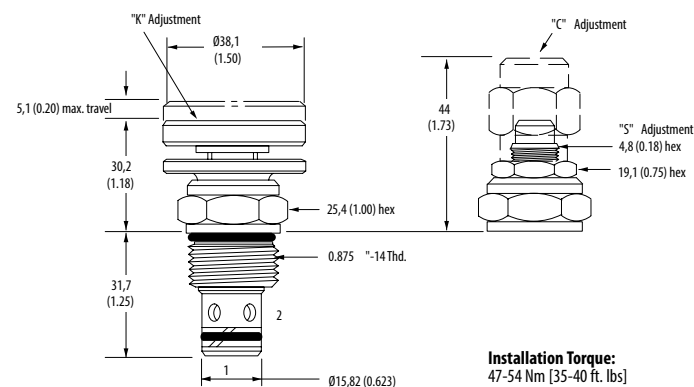
This needle valve with fine metering is a variable orifice used to create a pressure drop when flow passes from port 1 to 2 or port 2 to 1. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed. The setting can be locked by tightening lock nut or knob on the adjustment screw.

#### SCHEMATIC



#### DIMENSIONS

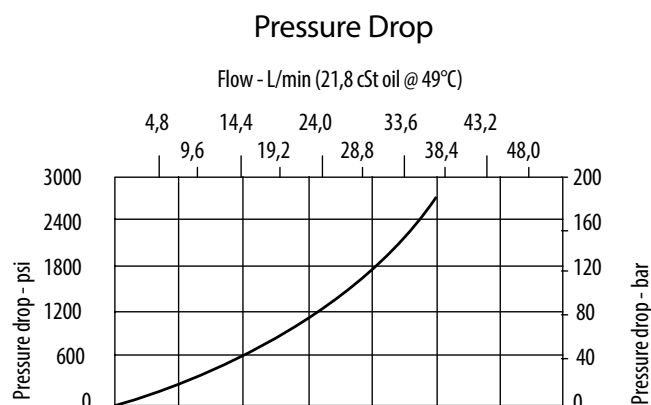
mm [in]



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	38 l/min [10 US gpm]
Weight	0.11 kg [0.24 lb]
Cavity	SDC10-2

#### PERFORMANCE CURVES



#### MODEL CODE

FCV7 - 10 - V - C - 0 - NVF

##### Seal Option

Code	Seal Kit
Omit-Buna - N	565806
V-Viton	889627

##### Adjustment Option

C - Tamper Resistant  
K - Knob  
S - External

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
3B	3/8" BSP	02-175462	-
6T	#6 SAE	566151	-
2G	1/4" BSP	-	876702
3G	3/8" BSP	-	876703
6H	#6 SAE	-	876700
8H	#8 SAE	-	876701

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FCV11-12

Needle Valve, Fully Adjustable

350 bar [5000 psi] • 114 l/min [30 US gpm]

#### DESCRIPTION AND OPERATION

This needle valve is a variable orifice used to create a pressure drop when flow passes from port 1 to 2 or port 2 to 1. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed. The setting can be locked by tightening lock nut or knob on the adjustment screw.

#### SCHEMATIC



#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>350 bar [5000 psi]</b>
<b>Rated flow</b>	<b>114 l/min [30 US gpm]</b>
<b>Leakage</b>	5 drops/min @ 210 bar [3000 psi]
<b>Weight</b>	0.24 kg [0.54 lb]
<b>Cavity</b>	C-12-2/C-12-2U

#### MODEL CODE

**FCV11 - 12 - V - S - A - 10T - U - NV**

##### Seal Option

Code	Seal Kit
Omit - Buna - N	02-165889
V - Viton	02-165888

##### Adjustment Option

S - External  
K - Knob

##### Housing Material

Omit - No housing  
A - Aluminium  
S - Steel

##### Cavity

Omit - Cavity without undercut  
U - Cavity with undercut

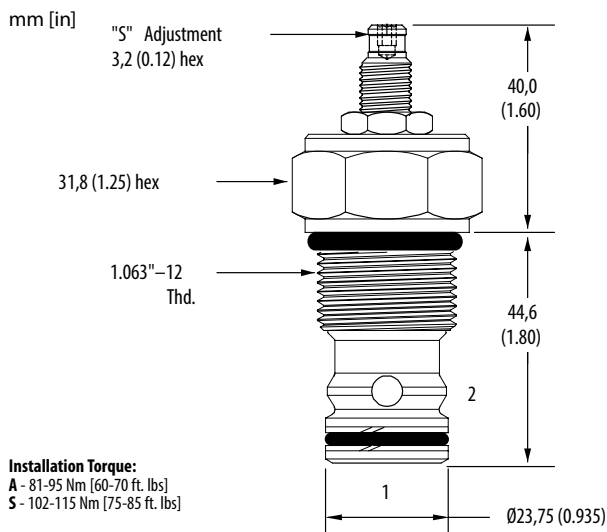
##### Housing

Code	Ports	C-12-2U Aluminium Heavy duty	C-12-2 Aluminium Heavy duty	C-12-2U Steel Heavy duty	C-12-2 Steel Heavy duty
<b>0</b>	No housing				
<b>10T</b>	#10 SAE	02-160641	02-160640	02-169817	02-169744
<b>12T</b>	#12 SAE	02-160645	02-160644	02-169790	02-169782
<b>4G</b>	1/2" BSP	02-161116	02-161118	02-172512	02-172062
<b>6G</b>	3/4" BSP	02-161115	02-161117	02-162922	02-169665

\* Aluminium bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

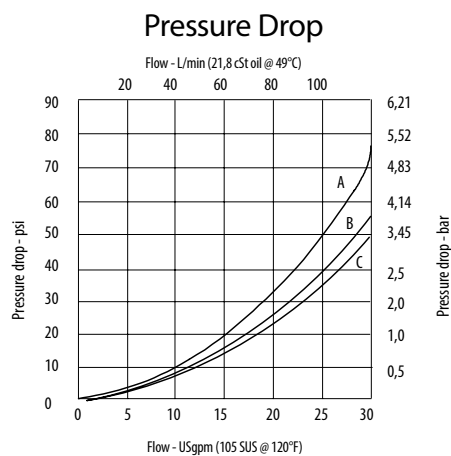
#### DIMENSIONS



##### Installation Torque:

A - 81-95 Nm [60-70 ft. lbs]  
S - 102-115 Nm [75-85 ft. lbs]

#### PERFORMANCE CURVES



**A - Cartridge with C-12-2 valve body, full open**

**B - Cartridge with C-12-2U valve body, full open • C - Cartridge only, full open**

## Flow Control Valves

### FCV6-16

Needle Valve, Fully Adjustable

210 bar [3000 psi] • 208 l/min [55 US gpm]

#### DESCRIPTION AND OPERATION

This needle valve is a variable orifice used to create a pressure drop when flow passes from port 1 to 2 or port 2 to 1. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed. The setting can be locked by tightening lock nut or knob on the adjustment screw.

#### SCHEMATIC



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	208 l/min [55 US gpm]
Leakage	Port 2 to 1: 5 drops/min @ 210 bar [3000 psi]
Weight	0.37 kg [0.81 lb]
Cavity	SDC16-2

#### MODEL CODE

**FCV6 - 16 - V - C - 0 - NV**

##### Seal Option

Code	Seal Kit
Omit-Buna - N	889631
V-Viton	889635

##### Adjustment Option

C - Tamper Resistant
K - Knob
S - External

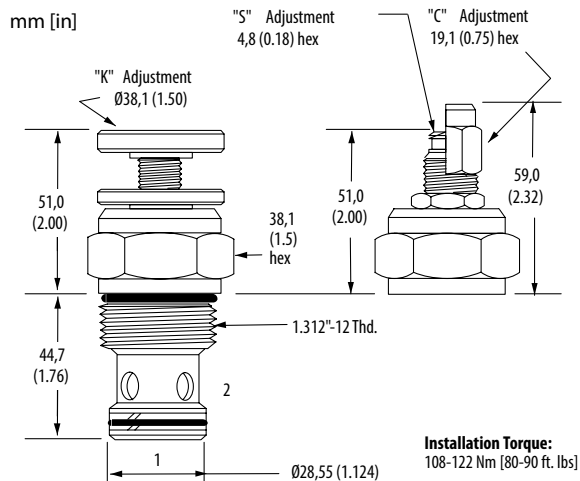
##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
6B	3/4" BSP	02-175463	-
12T	#12 SAE	566149	-
4G	1/2" BSP	-	876716
6G	3/4" BSP	-	876718
10H	#10 SAE	-	876717
12H	#12 SAE	-	566113

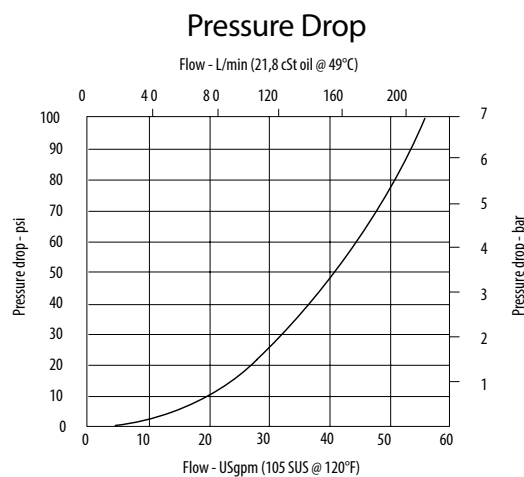
\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### DIMENSIONS



#### PERFORMANCE CURVES



## Flow Control Valves

### CP613-1

Needle Valve, Fully Adjustable

210 bar [3000 psi] • 380 l/min [100 US gpm]

#### DESCRIPTION AND OPERATION

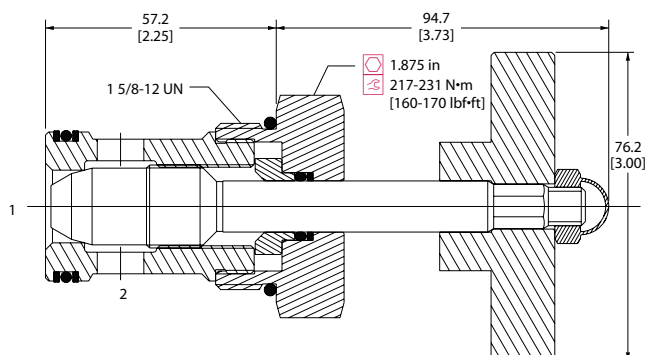
This needle valve is a variable orifice used to create a pressure drop when flow passes from port 1 to 2 or port 2 to 1. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

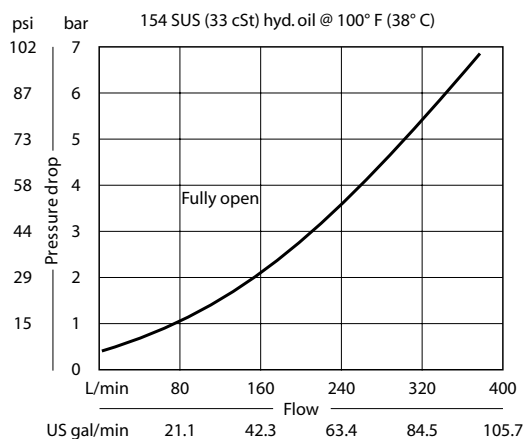


#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	380 l/min [100 US gpm]
Leakage	6 drops/min @ Rated pressure
Weight	0.85 kg [1.87 lb]
Cavity	SDC20-2

#### PERFORMANCE CURVES

##### Pressure Drop



#### MODEL CODE

CP613 - 1 - B - 16S

##### Seal Option

Code	Seal Kit
B-Buna - N	120172
V-Viton	120173

##### Housing

Code	Ports & Material	Housing Model Code
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

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FCV7-10

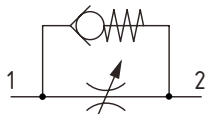
Needle Valve, Fully Adjustable with Reverse Free Flow

210 bar [3000 psi] • 45 l/min [12 US gpm]

#### DESCRIPTION AND OPERATION

This is a needle valve with a reverse free flow check. It is a variable orifice used to create a pressure drop when flow passes from port 2 to 1, while allowing free flow when flow passes from 1 to 2. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed. The setting can be locked by tightening lock nut or knob on the adjustment screw.

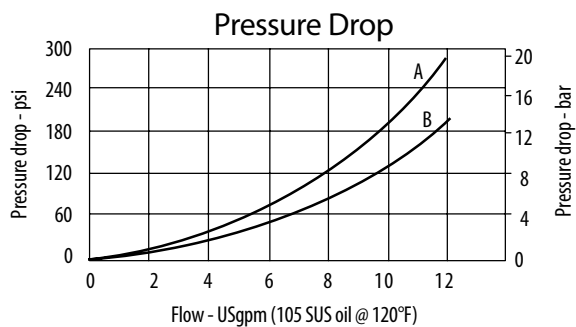
#### SCHEMATIC



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	45 l/min [12 US gpm]
Weight	0.11 kg [0.25 lbs]
Cavity	SDC10-2

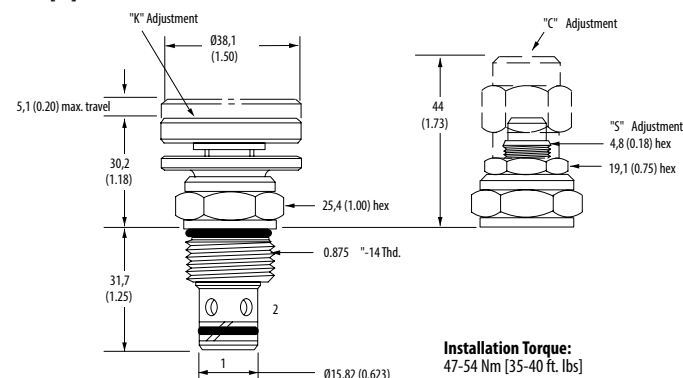
#### PERFORMANCE CURVES



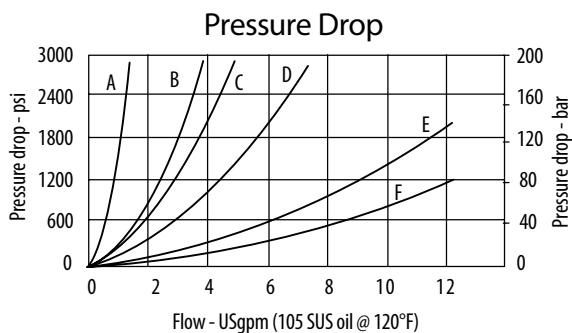
- A ("FF" code) - Port 2 to 1 (open)  
 B ("FF" code) - Port 1 to 2 (open and closed)

#### DIMENSIONS

mm [in]



Installation Torque:  
47-54 Nm [35-40 ft. lbs]



- A ("10" code) - Port 2 to 1 (open) and port 1 to 2 (closed)  
 B ("20" code) - Port 1 to 2 (open) and port 1 to 2 (closed)  
 C ("10" code) - Port 1 to 2 (open)  
 D ("40" code) - Port 2 to 1 (open) and port 1 to 2 (closed)  
 E ("20" code) - Port 1 to 2 (open) • F ("40" code) - Port 1 to 2 (open)

#### MODEL CODE

FCV7 - 10 - V - C - 3B - FF

##### Seal Option

Code	Seal Kit
Omit-Buna - N	565806
V-Viton	889627

##### Adjustment Option

C	Tamper Resistant
K	Knob
S	External

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
3B	3/8" BSP	02-175462	-
6T	#6 SAE	566151	-
2G	1/4" BSP	-	876702
3G	3/8" BSP	-	876703
6H	#6 SAE	-	876700
8H	#8 SAE	-	876701

##### Flow Range

Code	l/min	US gpm
FF	0-45	[0-12]
10	0-6.6	[0-1.75]
20	0-14	[0-3.75]
40	0-27	[0-7.25]

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].  
 \* Additional housings available

## Flow Control Valves

### CP610-7

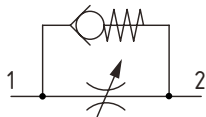
Needle Valve, Fully Adjustable, Fine Metering with Reverse Free Flow

350 bar [5000 psi] • 55 l/min [14 US gpm]

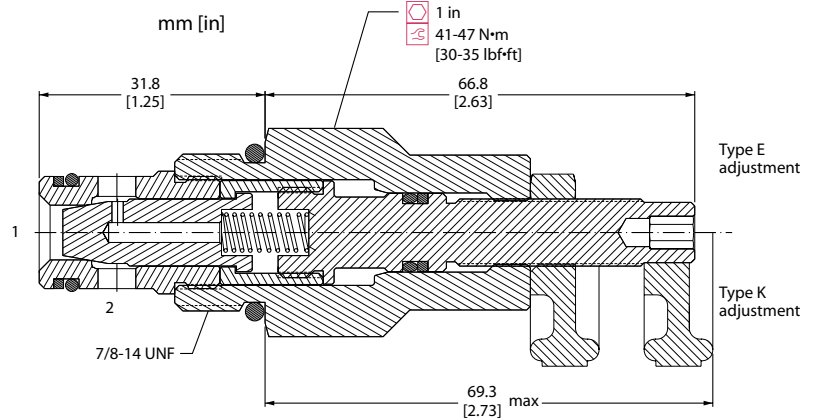
#### DESCRIPTION AND OPERATION

This is a needle valve with a reverse free flow check. It is a variable orifice used to create a pressure drop when flow passes from port 2 to 1, while allowing free flow when flow passes from 1 to 2. Clockwise rotation of the adjustment screw decreases the flow setting until it is completely closed. The setting can be locked by tightening lock nut or knob on the adjustment screw.

#### SCHEMATIC



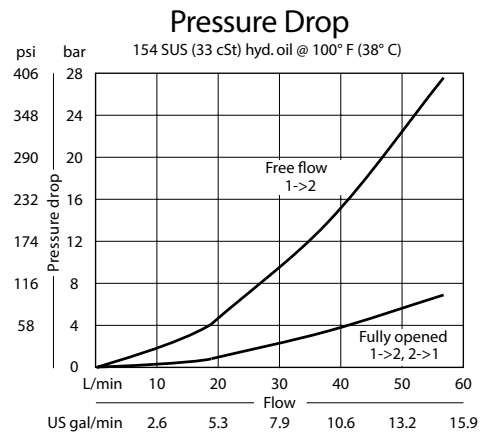
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	350 bar [5000 psi]
Rated flow	55 l/min [14 US gpm]
Weight	0.18 kg [0.40 lb]
Cavity	SDC10-2

#### PERFORMANCE CURVES



#### MODEL CODE

CP610 - 7 - B - 8S - K

##### Seal Option

Code	Seal Kit
B-Buna - N	120015
V-Viton	120016

##### Adjustment Option

E - External  
K - Knob

##### Housing

Code	Ports&Material	Housing Model Code
0	No Housing	No Housing
DG3B	AL, 3/8 BSP	SDC10-2-DG-3B
DG4B	AL, 1/2 BSP	SDC10-2-DG-4B
65	AL, #6 SAE	CP10-2-65
8S	AL, #8 SAE	CP10-2-8S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### CP308-1

Flow Control, Fixed, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 15 l/min [4 US gpm]

#### DESCRIPTION AND OPERATION

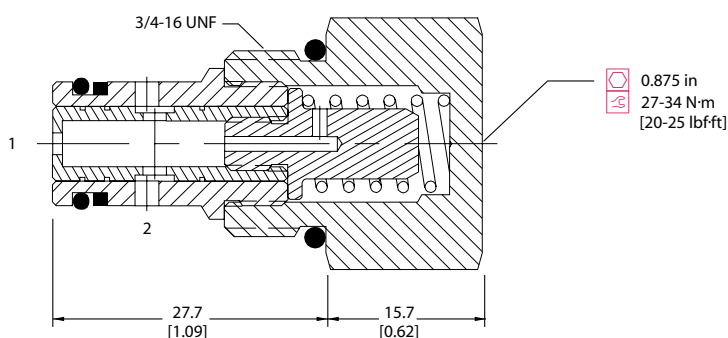
This is a fixed, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

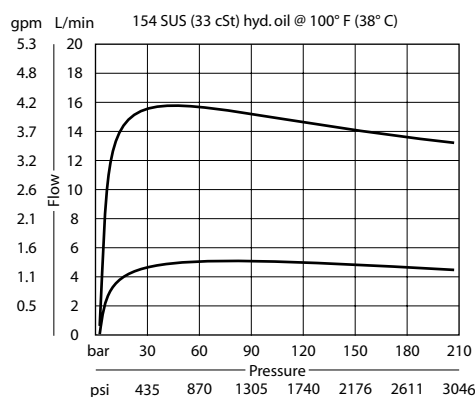


#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>210 bar [3000 psi]</b>
<b>Rated flow</b>	<b>15 l/min [4 US gpm]</b>
<b>Flow Range</b>	0.4-15.0 l/min [0.1-4.0 US gpm]
	0.4-1.88 l/min [0.1-0.49 US gpm] ± 20%
<b>Flow Accuracy</b>	1.89-5.67 l/min [0.5-1.49 US gpm] ± 15%
	5.68-15.1 l/min [1.5-4.0 US gpm] ± 10%
<b>Weight</b>	0.08 kg [0.17 lb]
<b>Cavity</b>	SDC08-2

#### PERFORMANCE CURVES

##### Flow Compensation



#### MODEL CODE

**CP308 - 1 - B - 6S - 1.0**

##### Seal Option

Code	Seal Kit
B-Buna - N	120221
V-Viton	120022

##### Flow Setting

**Code** - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
1.0	4.0	1.0

##### Housing

Code	Ports & Material	Housing Model Code
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	CP08-2-4S
6S	AL, #6 SAE	CP08-2-6S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FR5-8

Flow Control, Fixed, Pressure Compensated, Restrictive Type

350 bar [5000 psi] • 9.5 l/min [2.5 US gpm]

#### DESCRIPTION AND OPERATION

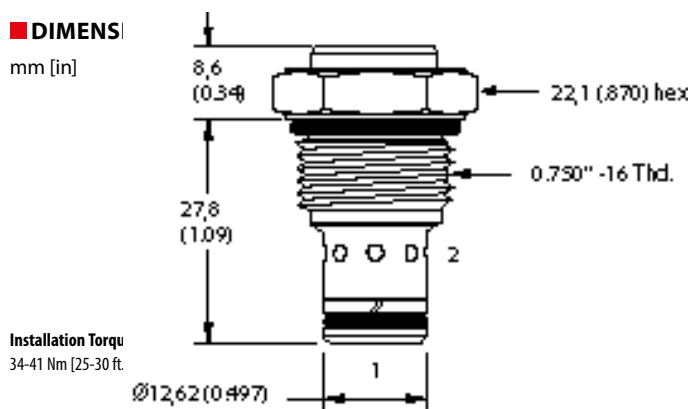
This is a fixed, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

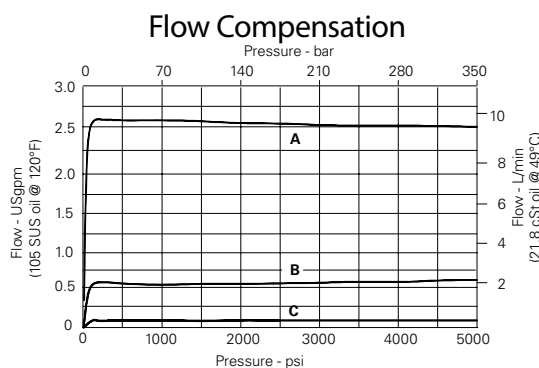


Installation Torque  
34-41 Nm [25-30 ft

#### PERFORMANCE DATA

Rated pressure	350 bar [5000 psi]
Rated flow	9.5 l/min [2.5 US gpm]
Flow Range	0.4-9.5 l/min [0.1-2.5 US gpm]
Flow Accuracy	0.4-1.9 l/min [0.1-0.49 US gpm] ±20% @ 210 bar [3000 psi]
	0.4-1.9 l/min [0.1-0.49 US gpm] ±40% @ 350bar [3000 psi]
	1.9-5.7 l/min [0.5-1.49 US gpm] ±15% @ 350 bar [5000 psi]
	5.7-9.5 l/min [1.5-2.5 US gpm] ±10% @ 350 bar [5000 psi]
Weight	0.05 kg [0.12 lbs]
Cavity	SDC08-2

#### PERFORMANCE CURVES



A - 9,5 L/min (2.5 USgpm) • B - 1,9 L/min (0.5 USgpm)  
C - 0,4 l/min (0.1 USgpm)

#### MODEL CODE

FR5 - 8 - V - F - A - 4T - 1.0

##### Seal Option

Code	Seal Kit
Omit-Buna - N	02-165875
V-Viton	02-165877

##### Adjustment Option

F - Fixed

##### Housing Material

Omit - No housing  
A - Aluminium  
S - Steel

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
1.0	4.0	1.0

##### Housing

Code	Ports	Aluminium Heavy duty	Steel Heavy duty
0	No housing		
4T	#4 SAE	02-160730	02-160736
6T	#6 SAE	02-160731	02-160737
8T	#8 SAE	02-160732	02-160738
2G	1/4" BSP	02-160727	02-160733
3G	3/8" BSP	02-160728	02-160734

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FR5-10

Flow Control, Fixed, Pressure Compensated, Restrictive Type

350 bar [5000 psi] • 23 l/min [6 US gpm]

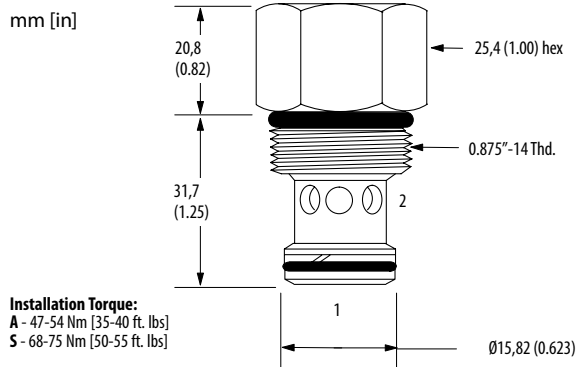
#### DESCRIPTION AND OPERATION

This is a fixed, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC



#### DIMENSIONS

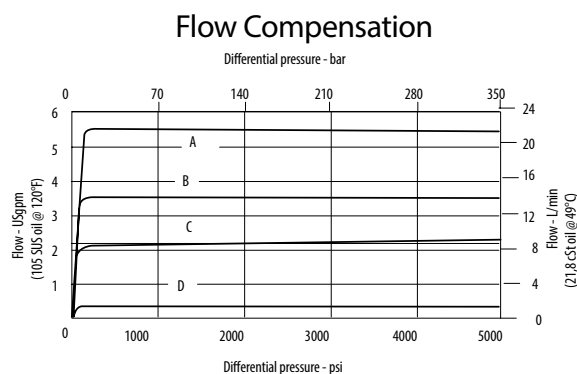


**Installation Torque:**  
 A - 47-54 Nm [35-40 ft. lbs]  
 S - 68-75 Nm [50-55 ft. lbs]

#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>350 bar [5000 psi]</b>
<b>Rated flow</b>	<b>23 l/min [6 US gpm]</b>
<b>Flow Range</b>	0.4-23 l/min [0.1-6 US gpm]
<b>Flow Accuracy</b>	0.4-1.9 l/min [0.1-0.49 US gpm] ±20% @ 210 bar [3000 psi]
	0.4-1.9 l/min [0.1-0.49 US gpm] ±40% @ 350 bar [5000 psi]
	1.9-5.7 l/min [0.5-1.49 US gpm] ±15% @ 350 bar [5000 psi]
	5.7-22.7 l/min [1.5-6 US gpm] ±10% @ 350 bar [5000 psi]
<b>Weight</b>	0.12 kg [0.26 lb]
<b>Cavity</b>	SDC10-2

#### PERFORMANCE CURVES



**A - 21 l/min (5.5 US gpm) • B - 13.3 l/min (3.5 US gpm)**  
**C - 7.8 l/min (2.0 US gpm) • D - 0.95 l/min (0.25 US gpm)**

#### MODEL CODE

**FR 5 - 10 - V - F - A - 3B - 1.0**

##### Seal Option

Code	Seal Kit
Omit-Buna - N	565803
V-Viton	566086

##### Adjustment Option

F - Fixed

##### Housing Material

Omit - No housing  
 A - Aluminium  
 S - Steel

##### Flow Setting

Code - Flow in US gpm  
 Specify in 0.1 gpm increments within flow range  
 Example

Code	l/min	[US gpm]
1.0	4.0	1.0

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty	Steel Heavy duty
0	No housing			
3B	3/8" BSP	02-175462		
2G	1/4" BSP		876702	02-175102
3G	3/8" BSP		876703	02-175103
6H	#6 SAE		876700	
8H	#8 SAE		876701	
6T	#6 SAE	566151		02-175100
8T	#8 SAE			02-175101

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### CP301-1

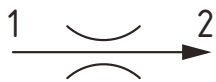
Flow Control, Fixed, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 57 l/min [15 US gpm]

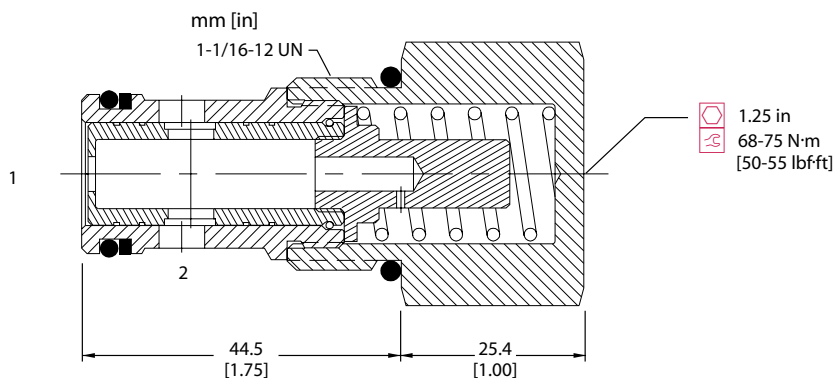
#### DESCRIPTION AND OPERATION

This is a fixed, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC



#### DIMENSIONS

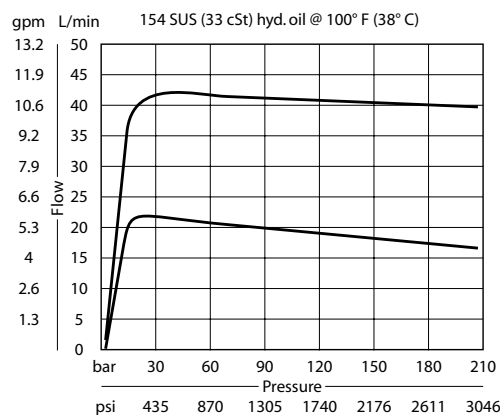


#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	57 l/min [15 US gpm]
Flow range	1.9-56.8 l/min [0.5-15 US gpm]
Flow Accuracy	1.9-7.5 l/min [0.5-1.99 US gpm] ± 20% 7.6-56.8 l/min [2-15 US gpm] ± 15%
Weight	0.24 kg [0.52 lb]
Cavity	CP12-2

#### PERFORMANCE CURVES

##### Flow Compensation



#### MODEL CODE

CP301 - 1 - B - 12S - 10.0

##### Seal Option

Code	Seal Kit
B-Buna - N	120017
V-Viton	120018

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
10.0	38.0	10.0

##### Housing

Code	Ports & Material	Housing Model Code
0	No Housing	No Housing
4B	AL, 1/2 BSP	CP-12-2-4B
6B	AL, 3/4 BSP	CP-12-2-6B
10S	AL, #10 SAE	CP-12-2-10S
12S	AL, #12 SAE	CP-12-2-12S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FR1-16

Flow Control, Fixed, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 114 l/min [30 US gpm]

#### DESCRIPTION AND OPERATION

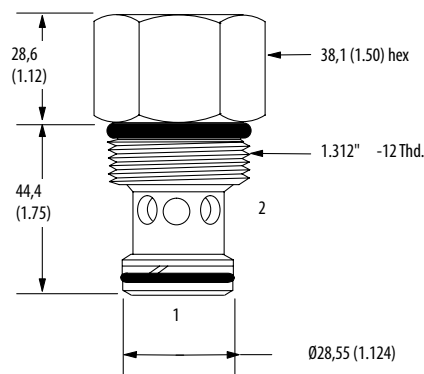
This is a fixed, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

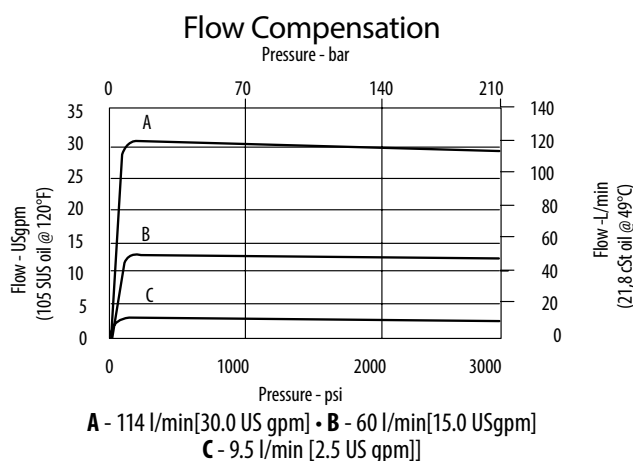


Installation Torque:  
108-122 Nm [80-90 ft. lbs]

#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	114 l/min [30 US gpm]
Flow range	1.9-114 l/min [0.5-30 US gpm]
Flow accuracy	1.9-10.9 l/min [0.5-2.9 US gpm] ±15% 11.4-114 l/min [3-30 US gpm] ±10%
Weight	0.33 kg [0.72 lb]
Cavity	SDC16-2

#### PERFORMANCE CURVES



#### MODEL CODE

FR 1 - 16 - V - F - 0 - 15.0

##### Seal Option

Code	Seal Kit
Omit-Buna - N	565810
V-Viton	880609

##### Adjustment Option

F - Fixed

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
15.0	57.0	15.0

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
6B	3/4" BSP	02-175463	-
12T	#12 SAE	566149	-
4G	1/2" BSP	-	876716
6G	3/4" BSP	-	876718
10H	#10 SAE	-	876717
12H	#12 SAE	-	566113

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FR1-20

Flow Control, Fixed, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 227 l/min [60 US gpm]

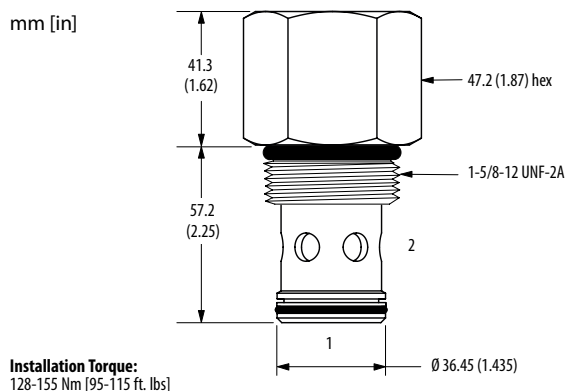
#### DESCRIPTION AND OPERATION

This is a fixed, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC



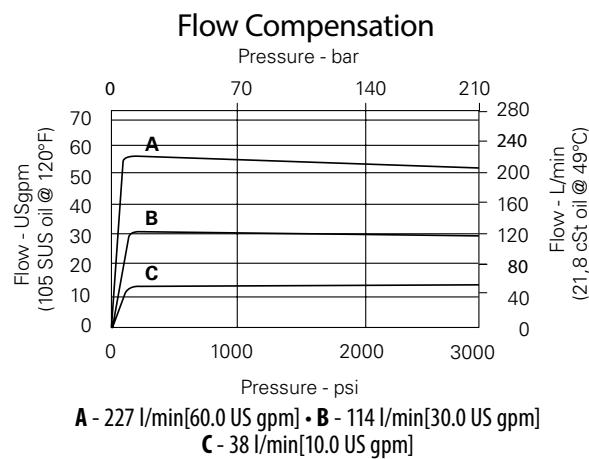
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	227 l/min [60 US gpm]
Flow range	3.8-227 l/min [1.0-60 US gpm]
Flow accuracy	3.8-18.5 l/min [1-4.9 US gpm] ±15% 19-227 l/min [5-60 US gpm] ±10%
Weight	0.82 kg [1.8 lb]
Cavity	SDC20-2

#### PERFORMANCE CURVES



#### MODEL CODE

FR 1 - 20 - V - F - 0 - 10.0

##### Seal Option

Code	Seal Kit
Omit-Buna - N	889615
V-Viton	889619

##### Adjustment Option

F - Fixed

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
10.0	38.0	10.0

##### Housing

Code	Ports	Housing Model Code	
		Aluminum standard duty	Aluminum heavy duty
0	No Housing		
8B	1" BSP	02-175464	-
16T	#16 SAE	566409	-
6G	3/4" BSP	-	876732
8G	1" BSP	-	876734
12H	#12 SAE	-	876733
16H	#16 SAE	-	876735

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### SC 10

Flow Control, Insert Type, Fixed, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 16 l/min [4.2 US gpm]

#### DESCRIPTION AND OPERATION

This is an insert type, fixed, restrictive type, pressure compensated flow control valve, where the flow from port A will remain constant regardless of the pressure difference across the valve. Flow enters at port B and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC

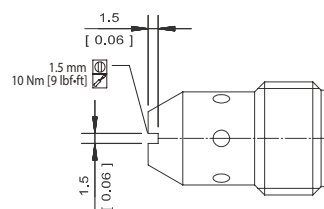
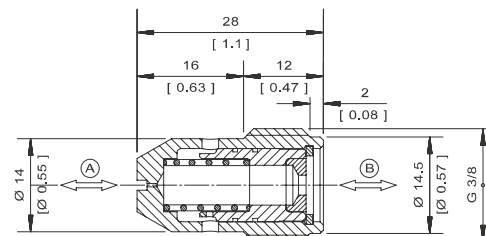


#### PERFORMANCE DATA

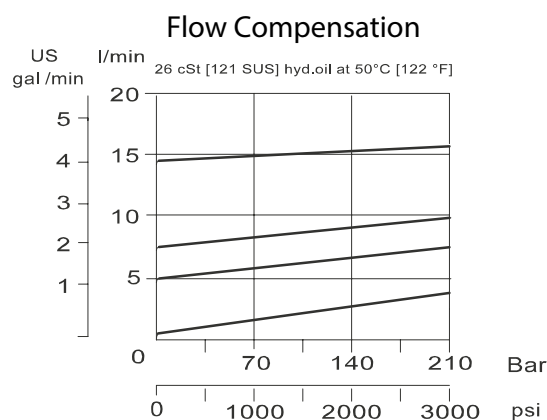
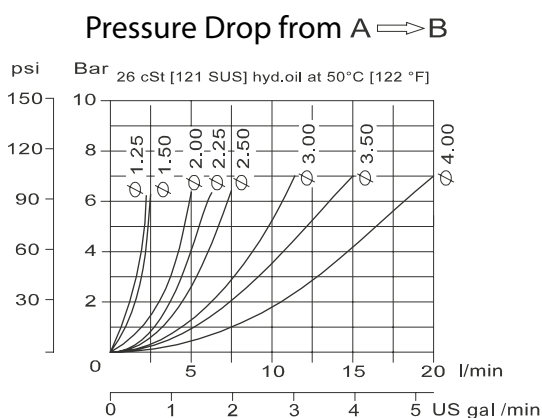
Rated pressure	210 bar [3000 psi]
Rated flow	16 l/min [4.2 US gpm]
Flow range	2.0-16.0 l/min [0.53-4.2 US gpm]
Weight	0.023 kg [0.05 lb]
Cavity	1/2" BSP (Consult factory)

#### DIMENSIONS

mm [in]



#### PERFORMANCE CURVES



#### MODEL CODE

SC10 - 1.25 - G - 00

##### Orifice Size

Code - Orifice Size in mm

Code	Flow at 100 bar [1450 psi]	
	l/min	US gpm
1.25	2.0	[0.53]
1.50	3.0	[0.79]
2.00	4.0	[1.06]
2.25	5.0	[1.32]
2.50	6.0	[1.59]
3.00	9.0	[2.38]
3.50	11.0	[2.91]
4.00	16.0	[4.23]

##### Housing

Code Ports

00	No housing
L	3/8 BSP

## Flow Control Valves

### SC 13

Flow Control, Insert Type, Fixed, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 47 l/min [12.4 US gpm]

#### DESCRIPTION AND OPERATION

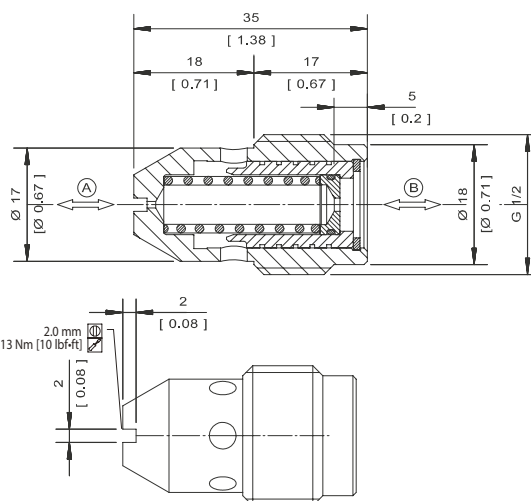
This is an insert type, fixed, restrictive type, pressure compensated flow control valve, where the flow from port A will remain constant regardless of the pressure difference across the valve. Flow enters at port B and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC



#### DIMENSIONS

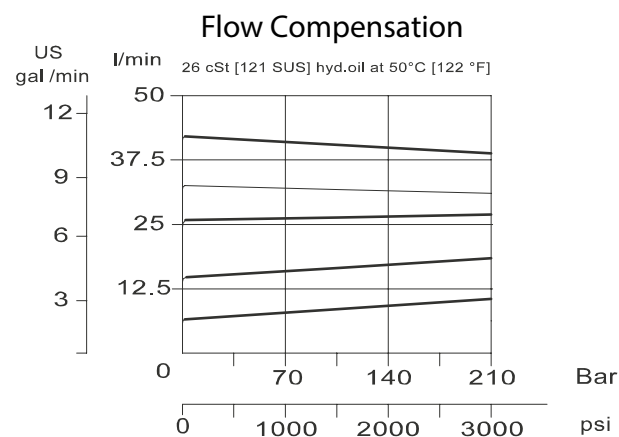
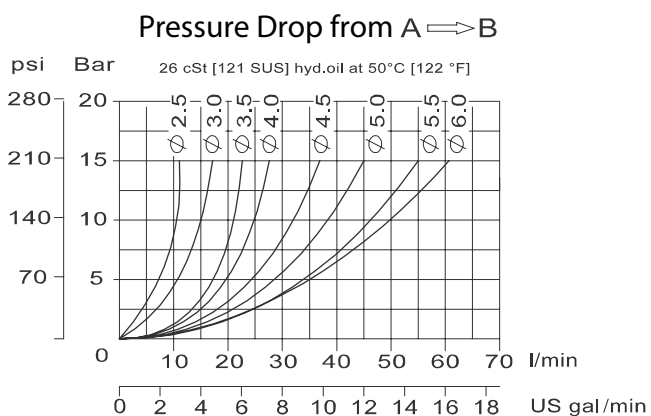
mm [in]



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	47 l/min [12.4 US gpm]
Flow range	9-47 l/min [2.38-12.4 US gpm]
Weight	0.045 kg [0.01 lb]
Cavity	3/8" BSP (Consult factory)

#### PERFORMANCE CURVES



#### MODEL CODE

**SC13 - 4.50 - G - 00**

##### Orifice Size

Code - Orifice Size in mm

Flow at 100 bar [1450 psi]

Code	l/min	[US gpm]
2.50	9	[2.38]
3.00	12	[3.17]
3.50	17	[4.49]
4.00	21	[5.55]
4.50	27	[7.13]
5.00	32	[8.45]
5.50	40	[10.57]
6.00	47	[12.42]

##### Housing

Code	Ports
00	No housing
L	1/2 BSP

## Flow Control Valves

### CP300-6

Flow Control, Fixed, Pressure Compensated, Restrictive Type, Bi-directional

210 bar [3000 psi] • 23 l/min [6 US gpm]

#### DESCRIPTION AND OPERATION

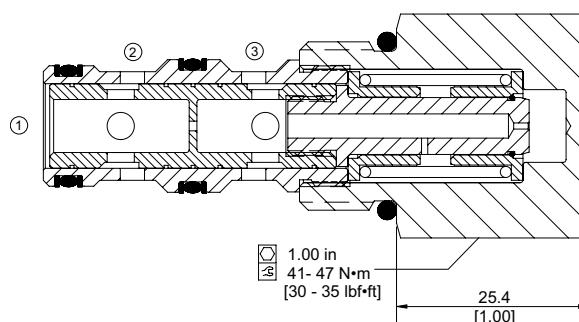
This is a fixed, restrictive type, bi-directional pressure compensated flow control valve, where the outlet flow will remain constant regardless of the direction of flow. Flow enters at port 2 or port 3 and passes across a fixed orifice in the spool creating a pressure drop. This causes the spool to move back against a spring, which then restricts the outlet flow at port 3 or port 2 respectively. Port 1 must be blocked for proper operation.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

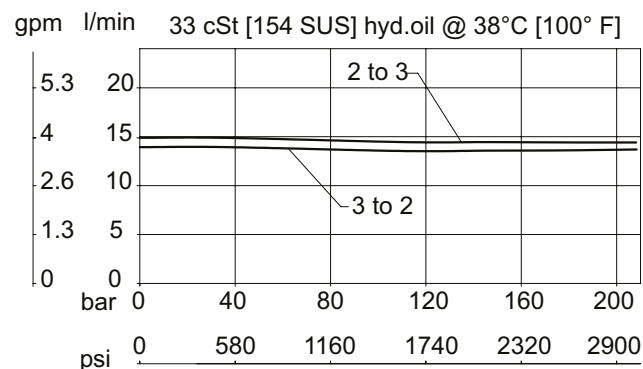


#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>210 bar [3000 psi]</b>
<b>Rated flow</b>	<b>23 l/min [6 US gpm]</b>
<b>Flow range</b>	0.4-23 l/min [0.1-6 US gpm]
<b>Flow accuracy</b>	0.4-1.88 l/min [0.1-0.49 US gpm] ± 20% 1.89-23 l/min [0.49-6.0 US gpm] ± 15%
<b>Weight</b>	0.13 kg [0.29 lb]
<b>Cavity</b>	SDC10-3

#### PERFORMANCE CURVES

##### Flow Compensation



#### MODEL CODE

**CP300 - 6 - B - 8S - 2.5**

##### Seal Option

Code	Seal Kit
<b>B</b> -Buna-N	120009
<b>V</b> -Viton	120010

##### Housing

Code	Ports&Material	Housing Model Code
<b>0</b>	No Housing	No Housing
<b>SE3B</b>	AL, 3/8 BSP	SDC10-3-SE-3B
<b>SE4B</b>	AL, 1/2 BSP	SDC10-3-SE-4B
<b>6S</b>	AL, #6 SAE	CP10-3-6S
<b>8S</b>	AL, #8 SAE	CP10-3-8S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

##### Flow Setting

**Code** - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
<b>2.5</b>	9.5	[2.5]

## Flow Control Valves

### CP308-2

Flow Control, Partially Adjustable, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 15 l/min [4 US gpm]

#### DESCRIPTION AND OPERATION

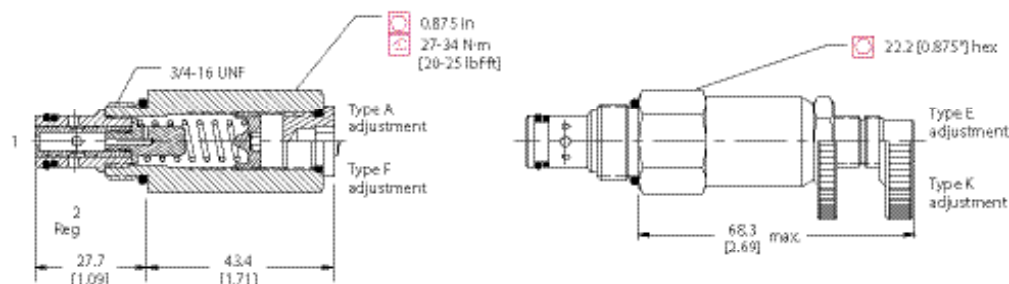
This is a partially adjustable, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

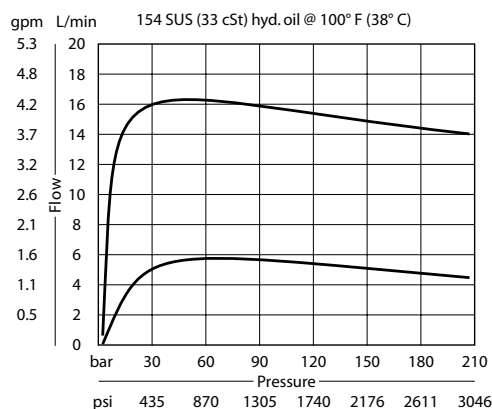


#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>210 bar [3000 psi]</b>
<b>Rated flow</b>	<b>15 l/min [4 US gpm]</b>
<b>Flow range</b>	0.4-15.1 l/min [0.1-4 US gpm]
	0.4-1.88 l/min [0.1-0.49 US gpm] ± 20%
<b>Flow accuracy</b>	1.89-5.67 l/min [0.5-1.49 US gpm] ± 15%
	5.68-15 l/min [1.5-4 US gpm] ± 10%
<b>Flow Adjustment Range</b>	± 25% of nominal setting
<b>Weight</b>	0.15 kg [0.32 lb]
<b>Cavity</b>	SDC08-2

#### PERFORMANCE CURVES

##### Flow Compensation



#### MODEL CODE

**CP308 - 2 - B - 6S - A - 4.0**

##### Seal Option

Code	Seal Kit
<b>B</b> -Buna - N	120221
<b>V</b> -Viton	120222

##### Housing

Code	Ports&Material	Housing Model Code
<b>0</b>	No Housing	No Housing
<b>DG2B</b>	AL, 1/4 BSP	SDC08-2-DG-2B
<b>DG3B</b>	AL, 3/8 BSP	SDC08-2-DG-3B
<b>4S</b>	AL, #4 SAE	CP08-2-4S
<b>6S</b>	AL, #6 SAE	CP08-2-6S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

##### Flow Setting

**Code** - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
<b>4.0</b>	15.1	[4.0]

##### Adjustment Option

**A** - Internal  
**E** - External  
**F** - Tamper resistant  
**K** - Knob

## Flow Control Valves

### FR2-10

Flow Control, Partially Adjustable, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 38 l/min [10 US gpm]

#### DESCRIPTION AND OPERATION

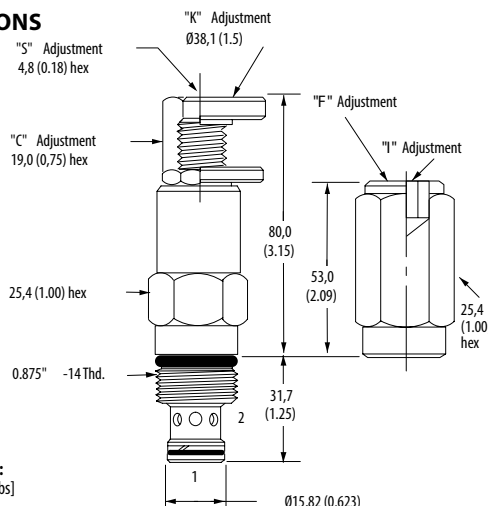
This is a partially adjustable, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

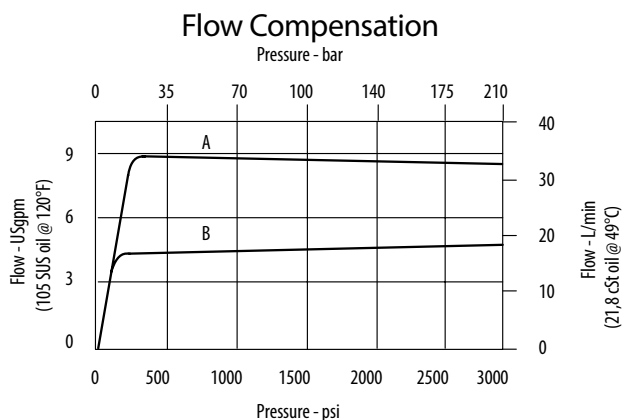


Installation Torque:  
47-54 Nm [35-40 ft. lbs]

#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	38 l/min [10 US gpm]
Flow range	0.4-38 l/min [0.1-10 US gpm]
Flow accuracy	0.4-1.9 l/min [0.1-0.49 US gpm] ±20% 1.9-7.5 l/min [0.5-1.99 US gpm] ±15% 7.6-37.8 l/min [2.0-10 US gpm] ±10%
Weight	0.22 kg [0.48 lb]
Cavity	SDC10-2

#### PERFORMANCE CURVES



A - 38.0 l/min [10.0 US gpm] • B - 19.0 l/min [5.0 US gpm]

#### MODEL CODE

FR 2 - 10 - V - C - 0 - 5.0

##### Seal Option

Code	Seal Kit
Omit-Buna - N	565803
V-Viton	566086

##### Adjustment Option

C - Tamper Resistant
F - Fixed
I - Internal
K - Knob
S - External

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
5.0	18.9	5.0

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
3B	3/8" BSP	02-175462	-
6T	#6 SAE	566151	-
2G	1/4" BSP	-	876702
3G	3/8" BSP	-	876703
6H	#6 SAE	-	876700
8H	#8 SAE	-	876701

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### FR2-16

Flow Control, Partially Adjustable, Pressure Compensated, Restrictive Type

210 bar [3000 psi] • 114 l/min [30 US gpm]

#### DESCRIPTION AND OPERATION

This is a partially adjustable, restrictive type, pressure compensated flow control valve, where the flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	114 l/min [30 US gpm]
Flow range	1.9–114 l/min [0.5–30 US gpm]
Flow accuracy	1.9–10.9 l/min [0.5–2.9 US gpm] ±15% 11.4–114 l/min [3–30 US gpm] ±10%
Weight	0.71 kg [1.57 lb]
Cavity	SDC16-2

#### MODEL CODE

FR 2 - 16 - V - C - 0 - 10.0

##### Seal Option

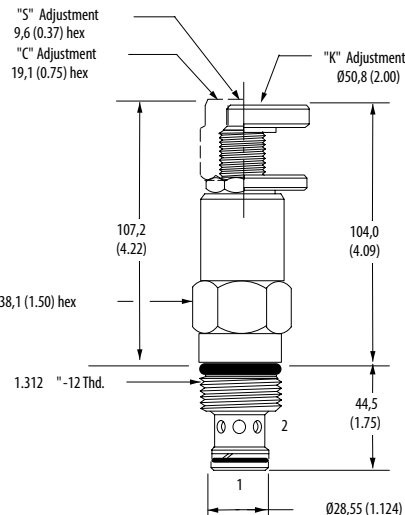
Code	Seal Kit
Omit	Buna - N 565810
V	Viton 889609

##### Adjustment Option

C - Tamper Resistant  
K - Knob  
S - External

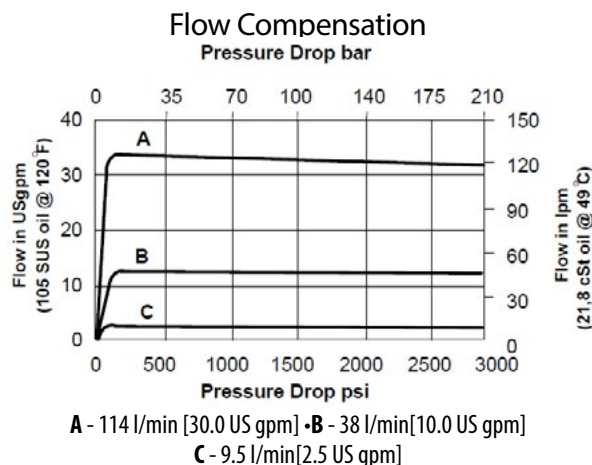
#### DIMENSIONS

mm [in]



Installation torque  
108–122 Nm [80–90 ft lbs]

#### PERFORMANCE CURVES



##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
6B	3/4" BSP	02-175463	-
12T	#12 SAE	566149	-
4G	1/2" BSP	-	876716
6G	3/4" BSP	-	876718
10H	#10 SAE	-	876717
12H	#12 SAE	-	876713

\* Aluminium bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### HFCV10-RT

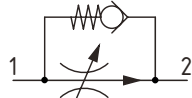
Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow

350 bar [5000 psi] • 11.4 l/min [3 US gpm]

#### DESCRIPTION AND OPERATION

This is a fully adjustable, restrictive type, pressure compensated flow control valve from port 1 to 2 with a reverse free flow check from port 2 to 1. The flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across an adjustable orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Flow from port 2 to 1 passes freely across an integral check valve.

#### SCHEMATIC



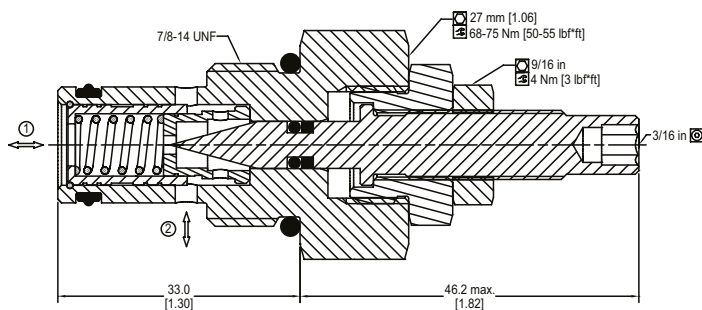
#### PERFORMANCE DATA

Rated pressure*	350 bar [5000 psi]
Rated flow	11.4 l/min [3 US gpm]
Flow range	0.4-11.4 l/min [0.1-3.0 US gpm]
Flow accuracy	+/- 12%
Leakage	40 ml/min@ rated pressure
Weight	0.17 kg [0.37 lb]
Cavity	SDC10-2

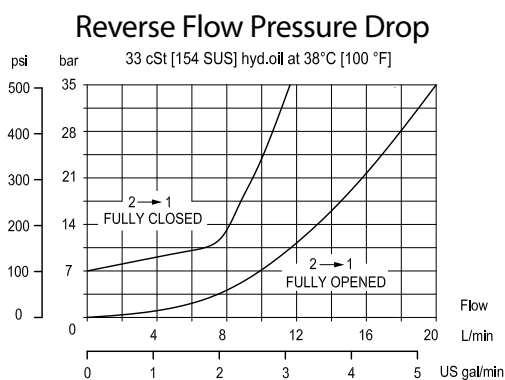
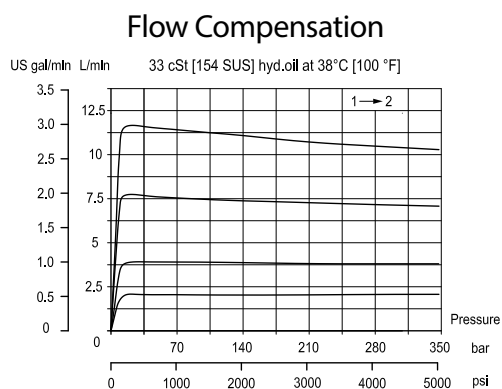
\* Rated Pressure based on NFPA fatigue test standards (at 1 Million Cycles).

#### DIMENSIONS

mm [in]



#### PERFORMANCE CURVES



#### MODEL CODE

**HFCV10 - RT - P - E - 4.0 - 00**

##### Seal Option

Code	Seal Kit
P-Polyurethane Single Seal	11132135
V-Viton	354000819

##### Adjustment Option

Code	Kit Number
E-External	
K-Knob	11353452

##### Flow Setting

Code - Flow in l/min  
Specify in 1.0 lpm increments within flow range  
Example

Code	l/min	[US gpm]
4.0	4.0	1.0

##### Housing

Code	Ports & Material	Housing Model Code
00	No housing	No Body
DG3B	3/8 BSP, AL	SDC10-2-DG3B
DG4B	1/2 BSP, AL	SDC10-2-DG4B
S4B	1/2 BSP, DUCTILE	CP10-2-S4B
6S	#6 SAE, AL	CP10-2-6S
8S	#8 SAE, AL	CP10-2-8S
S8S	#8 SAE, DUCTILE	CP10-2-S8S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### HFCV10-HRT

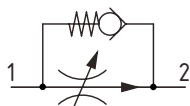
Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow

350 bar [5000 psi] • 45 l/min [12 US gpm]

#### DESCRIPTION AND OPERATION

This is a fully adjustable, restrictive type, pressure compensated flow control valve from port 1 to 2 with a reverse free flow check from port 2 to 1. The flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across an adjustable orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Flow from port 2 to 1 passes freely across an integral check valve.

#### SCHEMATIC

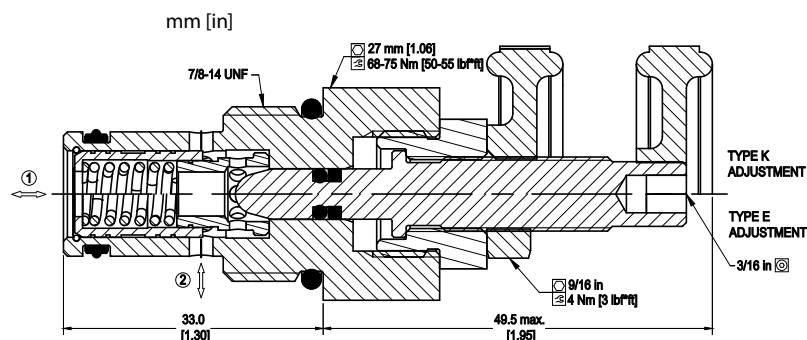


#### PERFORMANCE DATA

Rated pressure*	350 bar [5000 psi]
Rated flow	45 l/min [12 US gpm]
Flow range	4.0-45 l/min [1.0-12.0 US gpm]
Flow accuracy	+/- 12%
Leakage	40 ml/min@ rated pressure
Weight	0.17 kg [0.37 lb]
Cavity	SDC10-2

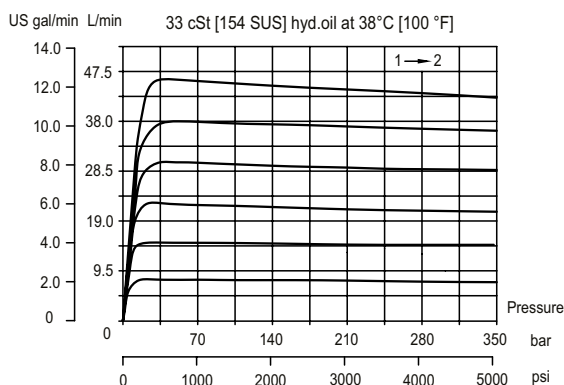
\* Rated Pressure based on NFPA fatigue test standards (at 1 Million Cycles).

#### DIMENSIONS

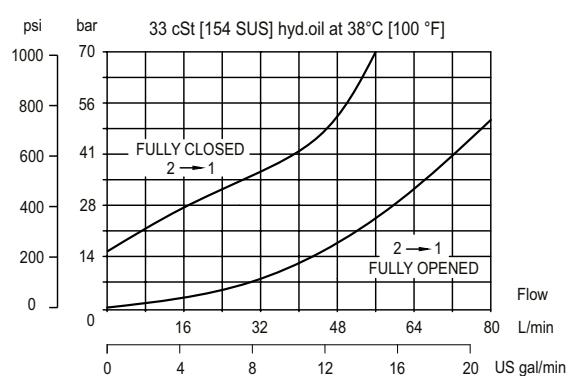


#### PERFORMANCE CURVES

##### Flow Compensation



##### Reverse Flow Pressure Drop



#### MODEL CODE

**HFCV10 - HRT - P - E - 8.0 - 00**

##### Seal Option

Code	Seal Kit
P-Polyurethane Single Seal	11132135
V-Viton	354000819

##### Flow Setting

Code - Flow in l/min  
Specify in 1.0 lpm increments within flow range  
Example

Code	l/min	[US gpm]
8.0	8.0	2.1

##### Adjustment Option

Code	Kit Number
E-External	
K-Knob	11353452

##### Housing

Code	Ports & Material	Housing Model Code
00	No housing	No Body
DG3B	3/8 BSP, AL	SDC10-2-DG3B
DG4B	1/2 BSP, AL	SDC10-2-DG4B
S4B	1/2 BSP, DUCTILE	CP10-2-S4B
6S	#6 SAE, AL	CP10-2-6S
8S	#8 SAE, AL	CP10-2-8S
S8S	#8 SAE, DUCTILE	CP10-2-S8S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available



## Flow Control Valves

### FAR1-12

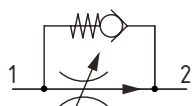
Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow

350 bar [5000 psi] • 95 l/min [25 US gpm]

#### DESCRIPTION AND OPERATION

This is a fully adjustable, restrictive type, pressure compensated flow control valve from port 1 to 2 with a reverse free flow check from port 2 to 1. The flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across an adjustable orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Flow from port 2 to 1 passes freely across an integral check valve.

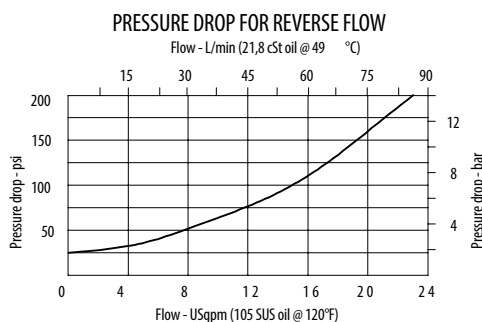
#### SCHEMATIC



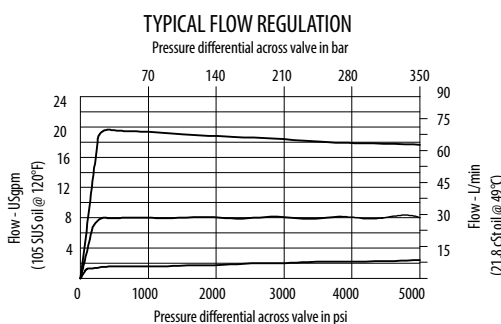
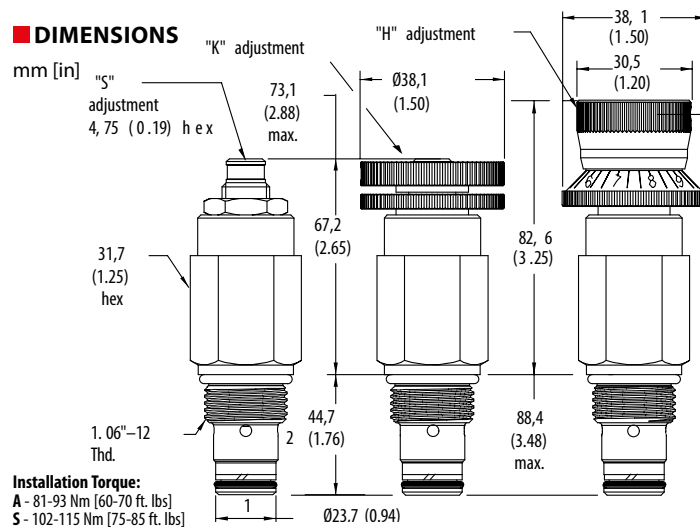
#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>350 bar [5000 psi]</b>
<b>Rated flow</b>	<b>95 l/min [25 US gpm]</b>
<b>Flow range</b>	1.5-94.6 l/min [0.4-25 US gpm] up to 210 bar [3000 psi] 1.5-87.1 l/min [0.4-23 US gpm] up to 350 bar [5000 psi]
<b>Flow accuracy</b>	1.5-3.8 l/min [1.4-1.0 US gpm] ±20% @5000 psi 3.8-56.8 l/min [1-15 US gpm] ±10% @5000 psi
<b>Reverse check crack pressure</b>	1.7 bar [25 psi]
<b>Weight</b>	0.43 kg [0.95 lb]
<b>Cavity</b>	C-12-2/C-12-2U

#### PERFORMANCE CURVES



#### DIMENSIONS



#### MODEL CODE

**FAR1 - 12 - V - H - A - 10T - U - 10.0**

##### Seal Option

Code	Seal Kit
Omit	Buna - N 02-181304
V	Viton 02-181305

##### Adjustment Option

H - Calibrated Knob  
K - Knob  
S - External

##### Housing Material

Omit - No housing  
A - Aluminium  
S - Steel

##### Housing

Code	Ports	C-12-2U Aluminium Standard duty	C-12-2 Aluminium Heavy duty	C-12-2U Steel Heavy duty	C-12-2 Steel Heavy duty
0	No housing				
10T	#10 SAE	02-160641	02-160640	02-169817	02-169744
12T	#12 SAE	02-160645	02-160644	02-169790	02-169782
4G	1/2" BSP	02-161116	02-161118	02-172512	02-172062
6G	3/4" BSP	02-161115	02-161117	02-162922	02-169665

\* Aluminium bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

##### Flow Setting

Code - Flow in US gpm  
Omit - Set at 10 US gpm  
Specify in 0.5 gpm increments within flow range  
Example

Code	l/min	[US gpm]
10	38.0	10.0

##### Cavity

Omit - Cavity without undercut  
U - Cavity with undercut

## Flow Control Valves

### FAR1-16

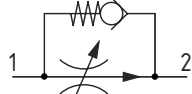
Flow Control, Fully Adjustable, Pressure Compensated, Restrictive Type with Reverse Free Flow

350 bar [5000 psi] • 114 l/min [30 US gpm]

#### DESCRIPTION AND OPERATION

This is a fully adjustable, restrictive type, pressure compensated flow control valve from port 1 to 2 with a reverse free flow check from port 2 to 1. The flow from port 2 will remain constant regardless of the pressure difference across the valve. Flow enters at port 1 and passes across an adjustable orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Flow from port 2 to 1 passes freely across an integral check valve.

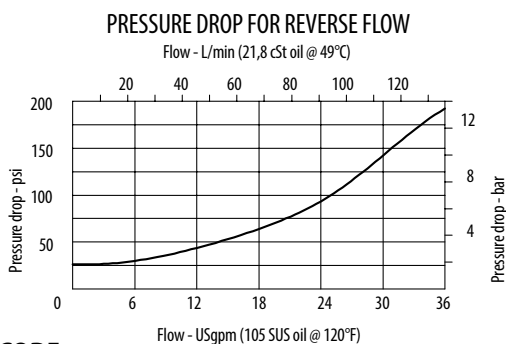
#### SCHEMATIC



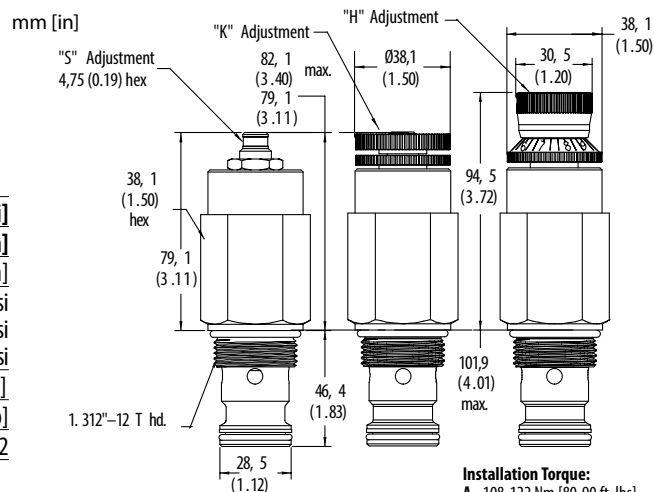
#### PERFORMANCE DATA

Rated pressure	350 bar [5000 psi]
Rated flow	114 l/min [30 US gpm]
Flow range	3.8-114 l/min [1.0-30 US gpm]
Flow accuracy	3.8-15.1 l/min [1.0-4.0 US gpm] ±30% @5000 psi 5.1-30.3 l/min [above 4.0-8.0 US gpm] ±20% @5000 psi 30.3-113.6 l/min [above 8.0-30 US gpm] ±10% @5000 psi
Reverse Check Crack Pressure	1.7 bar [25 psi]
Weight	0.67 kg [1.48 lb]
Cavity	SDC16-2

#### PERFORMANCE CURVES

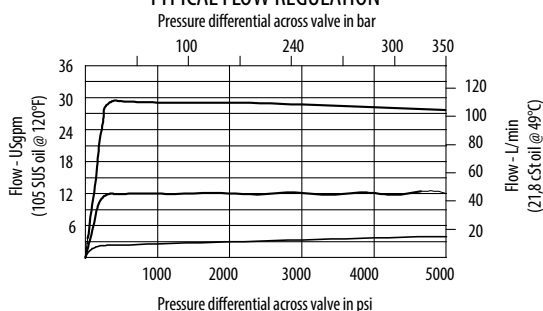


#### DIMENSIONS



**Installation Torque:**  
A - 108-122 Nm [80-90 ft. lbs]  
S - 136-149 Nm [100-110 ft. lbs]

#### TYPICAL FLOW REGULATION



#### MODEL CODE

**FAR1 - 16 - V - H - A - 4G - 10.0**

##### Seal Option

Code	Seal Kit
Omit-Buna - N	565810
V-Viton	889609

##### Adjustment Option

H - Calibrated Knob  
K - Knob  
S - External

##### Housing Material

Omit - No housing  
A - Aluminium  
S - Steel

##### Flow Setting

Code - Flow in US gpm  
Omit - Set at 10 US gpm  
Specify in 0.5 gpm increments within flow range  
Example

Code	l/min	[US gpm]
10.0	38.0	10.0

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty	Steel Heavy duty
0	No housing			
4G	1/2" BSP	-	876716	02-175106
6B	3/4" BSP	02-175463	-	-
6G	3/4" BSP	-	876718	02-175107
10T	#10 SAE	-	-	-
10H	#10 SAE	-	876717	02-175104
12T	#12 SAE	566149	-	-
12H	#12 SAE	-	566113	02-175105

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### CP310-1

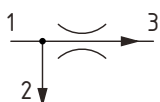
Flow Control, Fixed, Pressure Compensated, Priority Type

210 bar [3000 psi] • 23 l/min [6 US gpm]

#### DESCRIPTION AND OPERATION

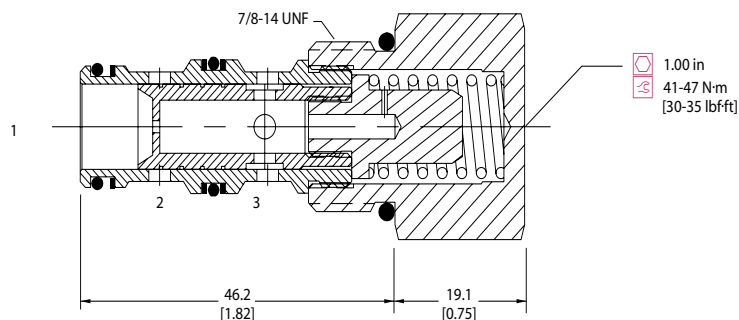
This is a fixed, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

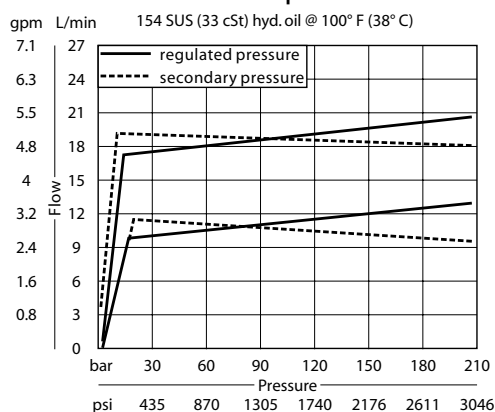


#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>210 bar [3000 psi]</b>
<b>Rated flow</b>	<b>23 l/min [6 US gpm]</b>
<b>Max inlet flow</b>	38 l/min [10 US gpm]
<b>Flow range</b>	0.4 - 23 l/min [0.1 - 6 US gpm]
<b>Flow accuracy</b>	0.4-1.88 l/min [0.1-0.49 US gpm] ± 20%
	1.89-5.67 l/min [0.5-1.49 US gpm] ± 15%
	5.68-22.7 l/min [1.5-6 US gpm] ± 10%
<b>Weight</b>	0.13 kg [0.29 lb]
<b>Cavity</b>	SDC10-3

#### PERFORMANCE CURVES

##### Flow Compensation



#### MODEL CODE

**CP310 - 1 - B - 8S - 6.0**

##### Seal Option

Code	Seal Kit
<b>B</b> -Buna-N	120240
<b>V</b> -Viton	11043064

##### Housing

Code	Ports&Material	Housing Model Code
<b>0</b>	No Housing	No Housing
<b>SE3B</b>	AL, 3/8 BSP	SDC10-3-SE3B
<b>SE4B</b>	AL, 1/2 BSP	SDC10-3-SE4B
<b>6S</b>	AL, #6 SAE	CP10-3-6S
<b>8S</b>	AL, #8 SAE	CP10-3-8S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

##### Flow Setting

**Code** - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
<b>0.1</b>	0.4	0.1
<b>6.0</b>	23	6.0

## Flow Control Valves

### VRF 06

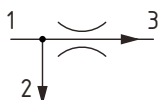
Flow Control, Fixed, Pressure Compensated, Priority Type

315 bar [4600 psi] • 25 l/min [7 US gpm]

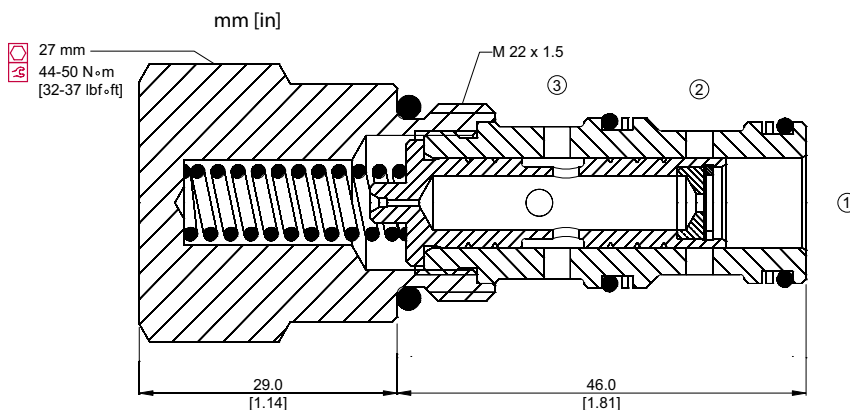
#### DESCRIPTION AND OPERATION

This is a fixed, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



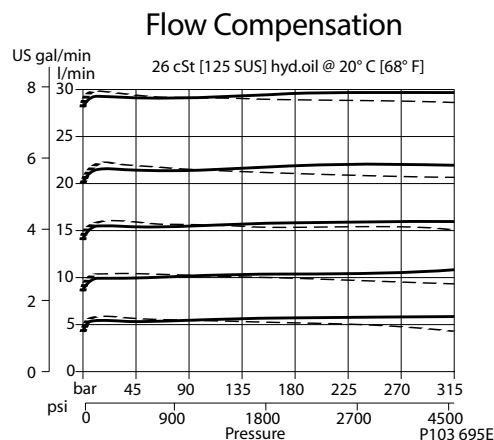
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	315 bar [4600 psi]
Rated flow	25 l/min [7 US gpm]
Max inlet flow	50 l/min [13 US gpm]
Flow range	1.5-25 l/min [0.4-7 US gpm]
Flow accuracy	+/- 10%
Weight	0.19 kg [0.42 lb]
Cavity	NCS06/3

#### PERFORMANCE CURVES



#### MODEL CODE

VRF 06 - 1.50 - SE3/8 - V

##### Orifice Size

Code - Orifice Size in mm

Code	Flow Setting	
	l/min	[US gpm]
0.75	1.5	[0.4]
1.00	2.0	[0.53]
1.25	3.5	[0.92]
1.50	4.5	[1.19]
1.75	6	[1.58]
2.00	9.0	[1.38]
2.25	10	[2.64]
2.50	12	[3.30]
2.75	15	[3.96]
3.00	18	[4.75]
3.25	21.5	[5.68]
3.50	25	[6.73]

##### Seal Option

Code	Seal Kit
V-Viton	230000110
Omit-Buna-N	230000070

##### Housing

Code	Ports & Material	Housing Model Code
00	No Housing	No Housing
SE3/8	AL, 3/8 BSP	NCS06/3-SE-3/8
SE1/2	AL, 1/2 BSP	NCS06/3-SE-1/2
SE65	AL, #6 SAE	NCS06/3-SE-65
SE85	AL, #8 SAE	NCS06/3-SE-85

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### CP311-1

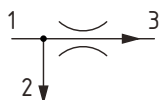
Flow Control, Fixed, Pressure Compensated, Priority Type

210 bar [3000 psi] • 45 l/min [12 US gpm]

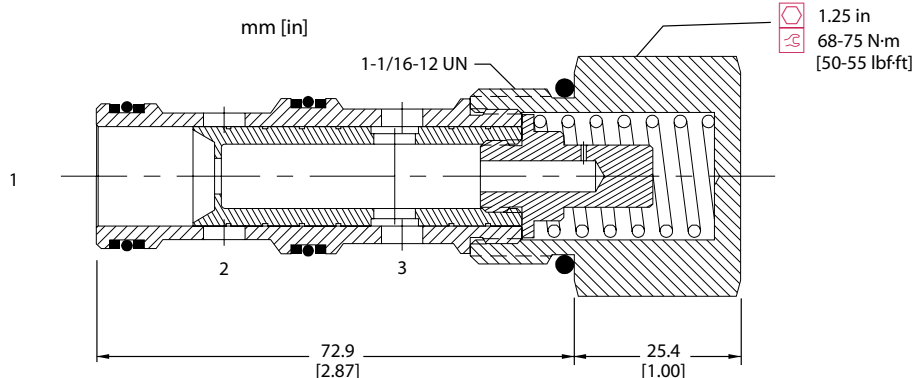
#### DESCRIPTION AND OPERATION

This is a fixed, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### DIMENSIONS

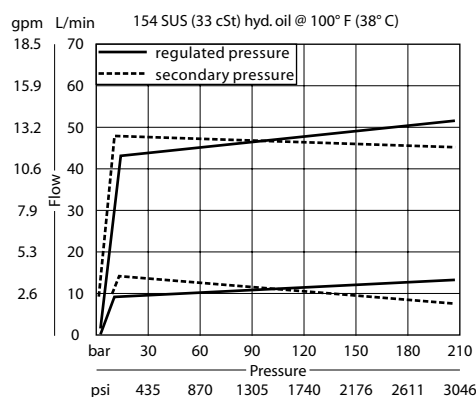


#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	45 l/min [12 US gpm]
Max inlet flow	95 l/min [25 US gpm]
Flow range	1.9-45.4 l/min [0.5-12 US gpm]
Flow accuracy	1.9-7.5 l/min [0.5-1.99 US gpm] ± 15% 7.6-45.4 l/min [2-12 US gpm] ± 10%
Weight	0.28 kg [0.61 lb]
Cavity	CP12-3

#### PERFORMANCE CURVES

##### Flow Compensation



#### MODEL CODE

**CP311 - 1 - B - 12S - 12.0**

##### Seal Option

Code	Seal Kit
B-Buna-N	120053
V-Viton	120052

##### Housing

Code	Ports&Material	Housing Model Code
0	No Housing	No Housing
4B	AL, 1/2 BSP	CP12-3-4B
6B	AL, 3/4 BSP	CP12-3-6B
10S	AL, #10 SAE	CP12-3-10S
12S	AL, #12 SAE	CP12-3-12S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range

Example

Code	l/min	[US gpm]
12.0	45.0	12.0

## Flow Control Valves

### CP312-1

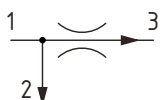
Flow Control, Fixed, Pressure Compensated, Priority Type

210 bar [3000 psi] • 65 l/min [17 US gpm]

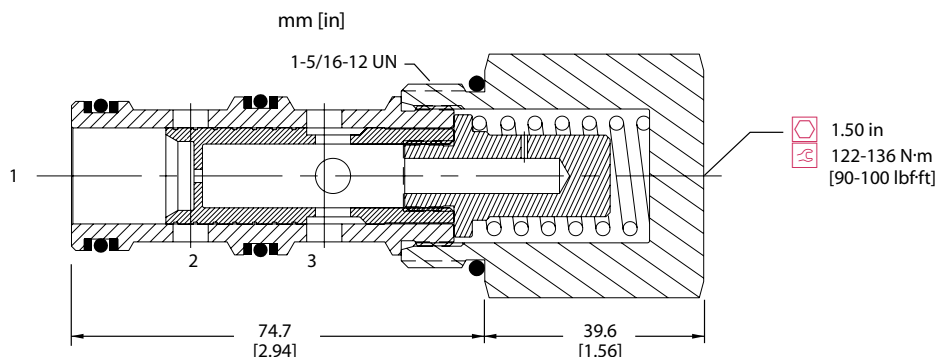
#### DESCRIPTION AND OPERATION

This is a fixed, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### DIMENSIONS

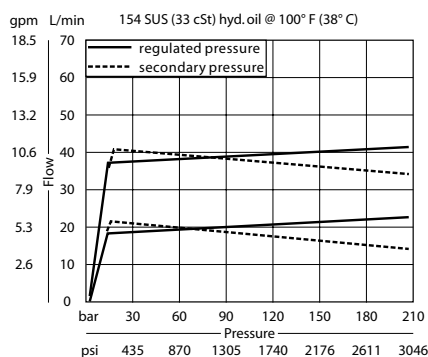


#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	65 l/min [17 US gpm]
Max inlet flow	130 l/min [34 US gpm]
Flow range	1.9-64.3 l/min [0.5-17 US gpm]
Flow accuracy	1.9-7.5 l/min [0.5-2 US gpm] ± 15% 7.6-64.3 l/min [2-17 US gpm] ± 10%
Weight	0.53 kg [1.17 lb]
Cavity	SDC16-3

#### PERFORMANCE CURVES

##### Flow Compensation



#### MODEL CODE

### CP312 - 1 - B - 16S - 10.0

#### Seal Option

Code	Seal Kit
B-Buna-N	120202
V-Viton	120203

#### Housing

Code	Ports&Material	Housing Model Code
0	No housing	No Housing
HE6B	3/4 BSP, AL	SDC16-3-HE-6B
HE8B	1 BSP, AL	SDC16-3-HE-8B
12S	#12 SAE, AL	CP16-3-12S
16S	#16 SAE, AL	CP16-3-16S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
10.0	40	10.0

## Flow Control Valves

### 2CFP60

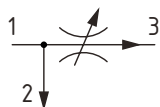
Flow Control, Partially Adjustable, Pressure Compensated, Priority Type

350 bar [5000 psi] • 60 l/min [16 US gpm]

#### DESCRIPTION AND OPERATION

This is a fully adjustable, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across an adjustable orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>350 bar [5000 psi]</b>
<b>Rated flow</b>	<b>60 l/min [16 US gpm]</b>
<b>Flow range</b>	4-60 l/min [1-16 US gpm]
<b>Weight</b>	0.38 kg [0.84 lb]
<b>Cavity</b>	CVA27-04

#### MODEL CODE

**2CFP65 - P - 4W - 4 - S - 377 - 30**

##### Basic Code

2CFP60 - No Housing  
2CFP65 - Cartridge and housing

##### Adjustment Option

P - External  
R - Knob

##### Housing

Code	Ports	Aluminium	Steel
Omit	No Housing		
4W	1/2" BSP	B12631	B13664
8T	1/2" BSP	B10820	B11566

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].  
\* Additional housings available

##### Flow Range

Code	l/min	US gpm
4	4-40	[1.0-10.5]
Standard Setting	30	[7.9]
6	6-60	[1.6-15.9]
Standard Setting	40	[10.5]

##### Flow Setting

Code - Flow in l/min  
Specify in 1.0 lpm increments within flow range  
Example

Code	l/min	[US gpm]
30	30	7.9

##### Housing Material

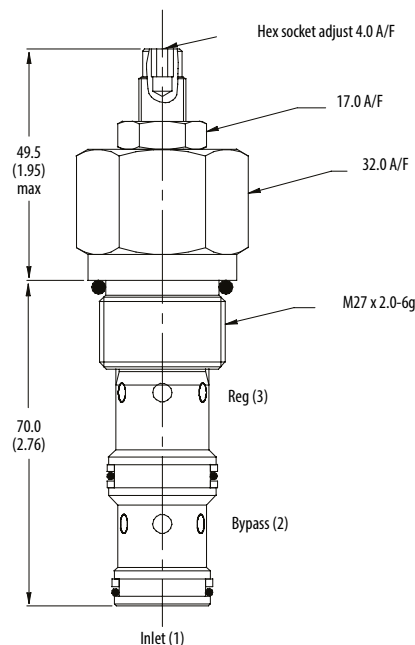
Omit - Aluminum/No housing  
377 - Steel

##### Seal Option

Code	Seal kit
S - Buna-N	SK579
SV - Viton	SK579V

#### DIMENSIONS

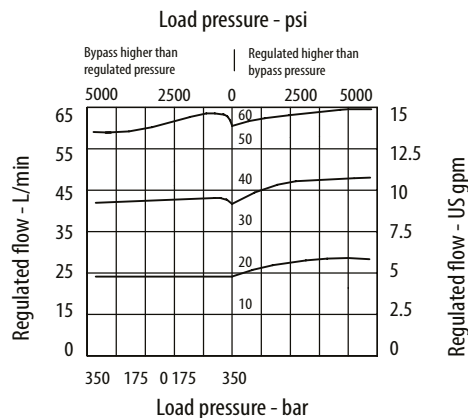
mm [in]



**Installation torque**  
75 Nm [55 ft. lbs]

#### PERFORMANCE CURVES

##### Flow Compensation



## Flow Control Valves

### PFR2-10

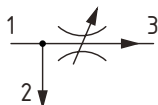
Flow Control, Partially Adjustable, Pressure Compensated, Priority Type

210 bar [3000 psi] • 38 l/min [10 US gpm]

#### DESCRIPTION AND OPERATION

This is a partially adjustable, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>210 bar [3000 psi]</b>
<b>Rated flow</b>	<b>38 l/min [10 US gpm]</b>
<b>Max inlet flow</b>	<b>60 l/min [15 US gpm]</b>
<b>Flow range</b>	0.4–37.8 l/min
	0.4–1.9 l/min [0.1–0.49 US gpm] ±20%
<b>Flow accuracy</b>	1.9–7.5 l/min [0.5–1.99 US gpm] ±15%
	7.6–37.8 l/min [2.0–10.0 US gpm] ±10%
<b>Weight</b>	0.25 kg [0.54 lb]
<b>Cavity</b>	SDC10-3

#### MODEL CODE

**PFR2 - 10 - V - C - 0 - 1.0**

##### Seal Option

Code	Seal Kit
<b>Omit</b> -Buna - N	565804
<b>V</b> -Viton	889599

##### Adjustment Option

**C** - Tamper Resistant  
**K** - Knob  
**S** - External

##### Flow Setting

**Code** - Flow in US gpm  
 Specify in 0.1 gpm increments within flow range  
 Example

Code	l/min	[US gpm]
<b>1.0</b>	4.0	1.0

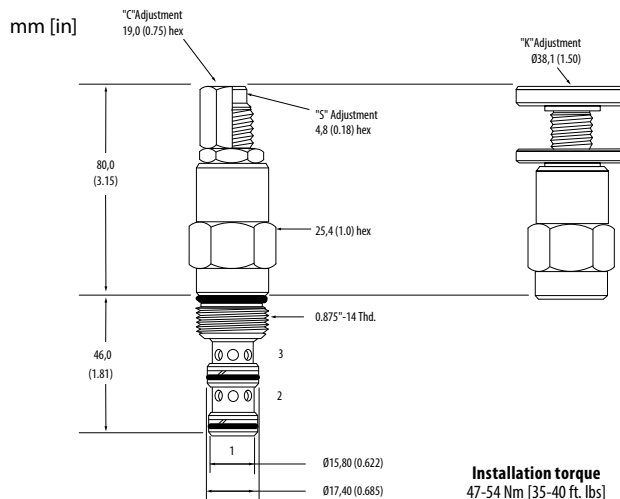
##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
<b>0</b>	No housing	-	-
<b>3B</b>	3/8" BSP	02-173358	-
<b>6T</b>	#6 SAE	566162	-
<b>2G</b>	1/4" BSP	-	876705
<b>3G</b>	3/8" BSP	-	876714
<b>6H</b>	#6 SAE	-	876704
<b>8H</b>	#8 SAE	-	876711

\* Aluminium bodies are to be used for pressures less than 210 bar [3000 psi].

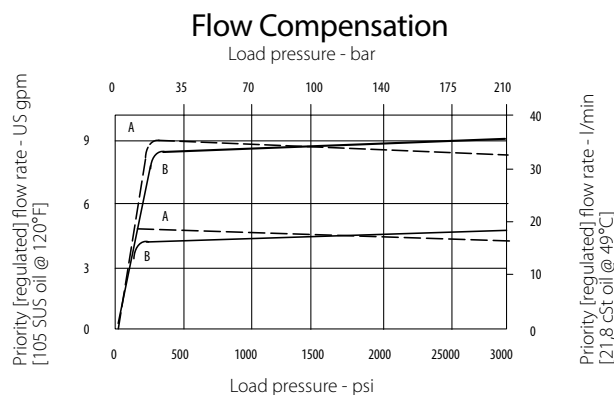
\* Additional housings available

#### DIMENSIONS



**Installation torque**  
 47-54 Nm [35-40 ft. lbs]

#### PERFORMANCE CURVES



**A** - Port 3, priority (regulated) outlet pressurized  
**B** - Port 2, bypass outlet pressurized

## Flow Control Valves

### PFR12-10

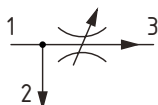
Flow Control, Partially Adjustable, Pressure Compensated, Priority Type

350 bar [5000 psi] • 38 l/min [10 US gpm]

#### DESCRIPTION AND OPERATION

This is a partially adjustable, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### PERFORMANCE DATA

Rated pressure	350 bar [5000 psi]
Rated flow	38 l/min [10 US gpm]
Max inlet flow	64 l/min [17 US gpm]
Flow range	0.4-37.8 l/min [0.1-10 US gpm]
Flow accuracy	0.4-1.9 l/min [0.1-0.49 US gpm] ±20%
	1.9-7.5 l/min [0.5-1.99 US gpm] ±15%
	7.6-37.8 l/min [2.0-10.0 US gpm] ±10%
Weight	0.25 kg [0.54 lb]
Cavity	SDC10-3

#### MODEL CODE

PFR12 - 10 - V - C - A - 2G - 1.0

##### Seal Option

Code	Seal Kit
Omit-Buna - N	565804
V-Viton	889599

##### Adjustment Option

C - Tamper Resistant  
K - Knob  
S - External

##### Housing Material

Omit - No housing  
A - Aluminum  
S - Steel

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
1.0	4.0	1.0

##### Housing

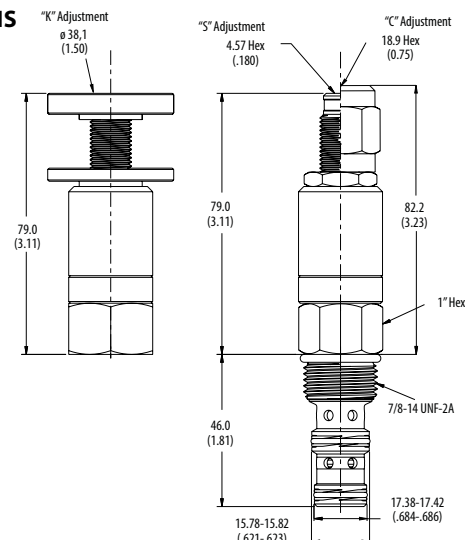
Code	Ports	Aluminium Heavy duty	Steel
0	No housing		
2G	1/4" BSP	876705	
3G	3/8" BSP	876714	
6H	#6 SAE	876704	
8H	#8 SAE	876711	
2G	1/4" BSP		02-175127
3G	3/8" BSP		02-175128
6T	#6 SAE		02-175124
8T	#8 SAE		02-175125

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### DIMENSIONS

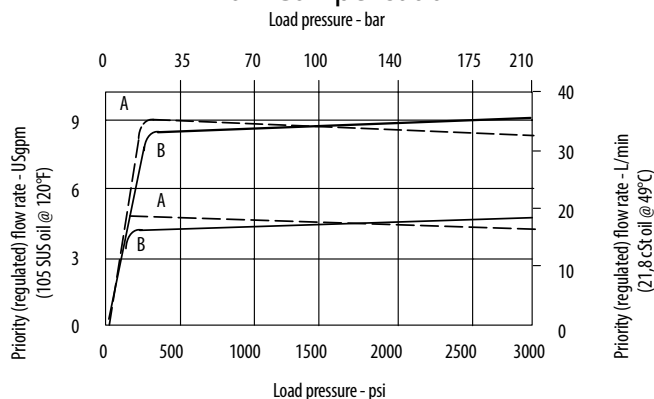
mm [in]



Installation torque  
47-54 Nm [35-40 ft. lbs]

#### PERFORMANCE CURVES

##### Flow Compensation



A - Port 3, priority (regulated outlet) pressurized.  
B - Port 2, (bypass outlet) pressurized.

## Flow Control Valves

### PFR12-12

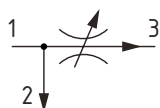
Flow Control, Partially Adjustable, Pressure Compensated, Priority Type

350 bar [5000 psi] • 76 l/min [20 US gpm]

#### DESCRIPTION AND OPERATION

This is a partially adjustable, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>350 bar [5000 psi]</b>
<b>Rated flow</b>	<b>76 l/min [20 US gpm]</b>
<b>Max inlet flow</b>	114 l/min [30 US gpm]
<b>Flow range</b>	1.9-76 l/min [0.5-20 US gpm]
<b>Flow accuracy</b>	± 15%
<b>Weight</b>	0.32 kg [0.70 lb]
<b>Cavity</b>	C-12-3

#### MODEL CODE

**PFR12 - 12 - V - C - A - 4G - 1.0**

##### Seal Option

Code	Seal Kit
Omit - Buna - N	9900171
V - Viton	9900172

##### Adjustment Option

C - Tamper Resistant
K - Knob
S - External

##### Housing Material

Omit - No housing
A - Aluminum
S - Steel

##### Flow Setting

**Code** - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
1.0	4.0	1.0

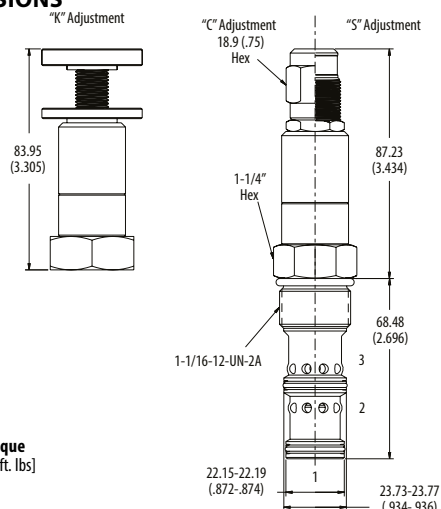
##### Housing

Code	Ports	Aluminium Heavy duty	Steel
0	No housing		
4G	1/2" BSP	02-161817	
6G	3/4" BSP	02-161816	
10H	#10 SAE	02-160642	
12H	#12 SAE	02-160646	
4G	1/2" BSP		02-169815
6G	3/4" BSP		02-169814
10T	#10 SAE		02-161070
12T	#12 SAE		02-169816

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].  
\* Additional housings available

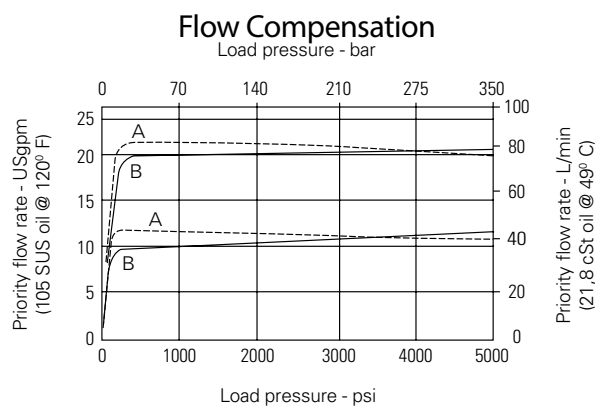
#### DIMENSIONS

mm [in]



**Installation torque**  
47-54 Nm [35-40 ft. lbs]

#### PERFORMANCE CURVES



**A** - Port 3, priority (regulated outlet) pressurized  
**B** - Port 2, (bypass outlet) pressurized.

## Flow Control Valves

### VRC 06

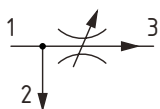
Flow Control, Partially Adjustable, Pressure Compensated, Priority Type

315 bar [4600 psi] • 30 l/min [8 US gpm]

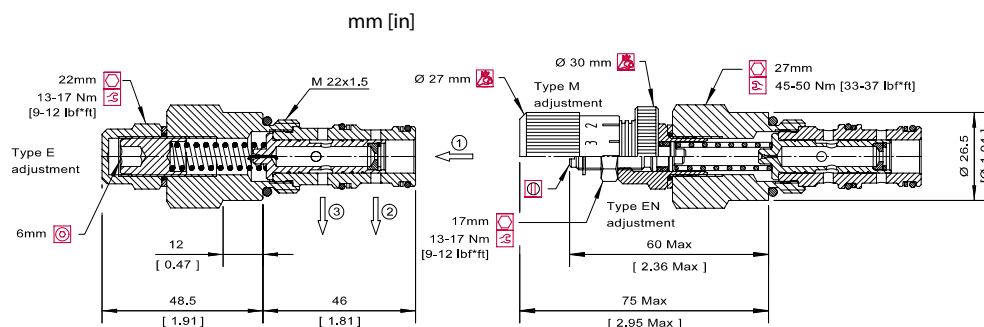
#### DESCRIPTION AND OPERATION

This is a partially adjustable, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



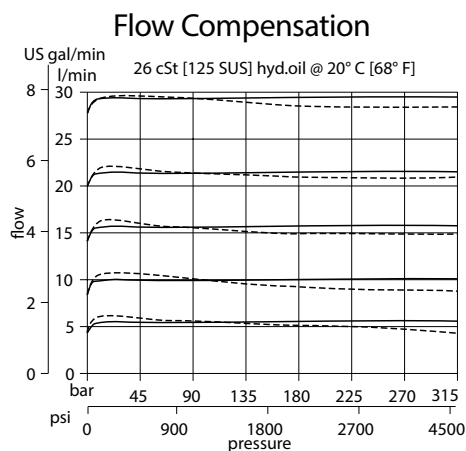
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	315 bar [4600 psi]
Rated flow	30 l/min [8 US gpm]
Max inlet flow	50 l/min [13 US gpm]
Flow range	1-30 l/min [0.4-8 US gpm]
Weight	0.21 kg [0.46 lb]
Cavity	NCS06/3

#### PERFORMANCE CURVES



#### MODEL CODE

VRC 06 - EN - 2.0 - SE3/8 - V - 4.0

##### Adjustment Option

E - Internal  
EN - External  
M - Calibrated Knob

##### Orifice Size

Code - Orifice size in mm

Code	Flow Range	
	l/min	[US gpm]
1.25	1-4	[0.3-1.1]
2.0	3-10	[0.8-2.5]
3.0	6-20	[1.6-5.3]
3.5	10-30	[2.6-7.9]

##### Flow Setting

Code - Flow in l/min  
Specify in 1.0 lpm increments within flow range  
Example

Code	l/min	[US gpm]
4.0	4.0	[1.0]

##### Seal Option

Code	Seal Kit
V-Viton	230000110
Omit-Buna-N	230000070

##### Housing

Code	Ports&Material	Housing Model Code
0	No Housing	No Housing
SE3/8	AL, 3/8 BSP	NCS06/3-SE-3/8
SE1/2	AL, 1/2 BSP	NCS06/3-SE-1/2
SE6S	AL, #6 SAE	NCS06/3-SE-6S
SE8S	AL, #8 SAE	NCS06/3-SE-8S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### VRC 12

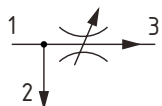
Flow Control, Partially Adjustable, Pressure Compensated, Priority Type

315 bar [4600 psi] • 73 l/min [19 US gpm]

#### DESCRIPTION AND OPERATION

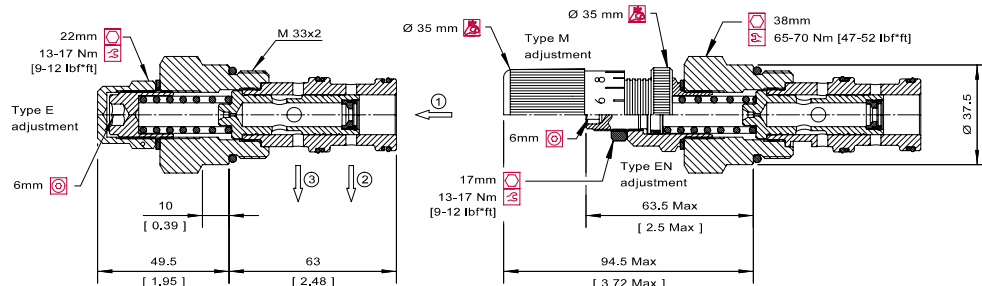
This is a partially adjustable, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### DIMENSIONS

mm [in]

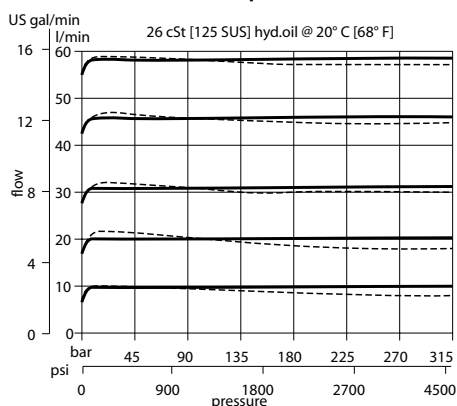


#### PERFORMANCE DATA

Rated pressure	315 bar [4600 psi]
Rated flow	73 l/min [19 US gpm]
Max inlet flow	100 l/min [26 US gpm]
Flow range	2.5-73 l/min [0.7-19 US gpm]
Weight	0.50 kg [1.10 lb]
Cavity	NCS12/3

#### PERFORMANCE CURVES

##### Flow Compensation



#### MODEL CODE

### VRC 12 - EN - 1.5 - SE1/2 - V - 4.0

#### Adjustment Option

E - Internal  
EN - External  
M - Calibrated Knob

#### Orifice Size

Code - Orifice Size in mm

#### Flow Range

Code	l/min	[US gpm]
1.50	2.5-6.5	[0.7-1.7]
2.50	6-16	[1.6-4.2]
3.50	9-32	[2.4-8.4]
4.00	16-40	[4.2-10.6]
5.00	25-60	[6.6-15.8]
5.75	30-73	[7.9-19.3]

#### Housing

Code	Ports&Material	Housing Model Code
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

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### Flow Setting

Code - Flow in l/min  
Specify in 1.0 lpm increments within flow range  
Example

Code	l/min	[US gpm]
4.0	4.0	1.0

#### Seal Option

Code	Seal Kit
V-Viton	230000360
Omit-Buna-N	230000130

## Flow Control Valves

### PFR2-16

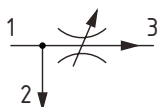
Flow Control, Partially Adjustable, Pressure Compensated, Priority Type

210 bar [3000 psi] • 114 l/min [30 US gpm]

#### DESCRIPTION AND OPERATION

This is a partially adjustable, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	114 l/min [30 US gpm]
Max inlet flow	151 l/min [40 US gpm]
Flow range	1.9-114 l/min [0.5-30 US gpm]
Flow accuracy	1.9-10.9 l/min [0.5-2.9 US gpm] ±15% 11.4-114 l/min [3-30 US gpm] ±10%
Weight	0.43 kg [0.95 lb]
Cavity	SDC16-3

#### MODEL CODE

**PFR2 - 16 - V - C - 0 - 30.0**

##### Seal Option

Code	Seal Kit
Omit - Buna - N	565811
V - Viton	889610

##### Adjustment Option

C - Tamper Resistant  
K - Knob  
S - External

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
30.0	114.0	30.0

##### Housing

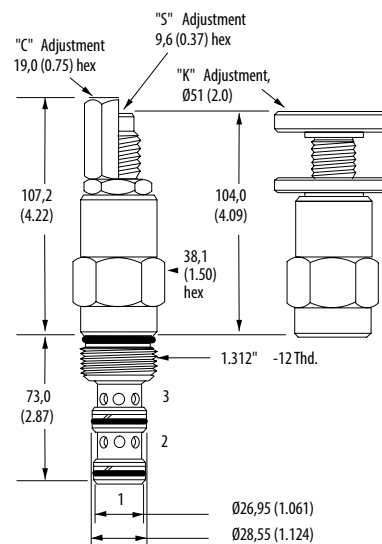
Code	Ports	Aluminium Standard duty	Aluminium Heavy duty
0	No housing		
12T	#12 SAE	566152	
6B	3/4" BSP	02-175465	
10H	#10 SAE		876721
12H	#12 SAE		876723
4G	1/2" BSP		876720
6G	3/4" BSP		876722

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### DIMENSIONS

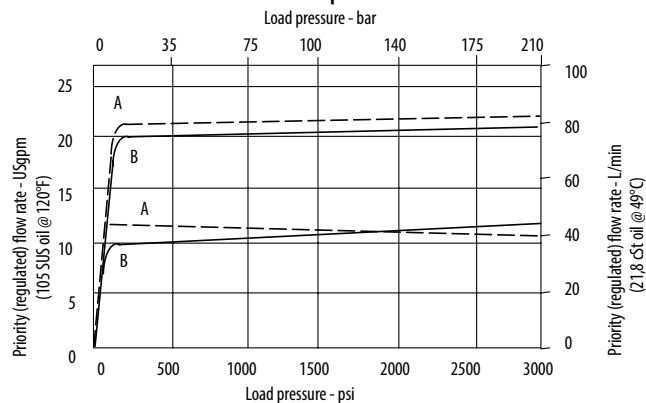
mm [in]



Installation torque  
108-122 Nm [80-90 ft. lbs]

#### PERFORMANCE CURVES

##### Flow Compensation



A - Port 3, priority (regulated) outlet pressurized  
B - Port 2, bypass outlet pressurized

## Flow Control Valves

### PFR12-16

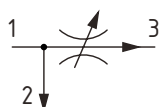
Flow Control, Partially Adjustable, Pressure Compensated, Priority Type

350 bar [5000 psi] • 114 l/min [30 US gpm]

#### DESCRIPTION AND OPERATION

This is a partially adjustable, priority type, pressure compensated flow control valve, where the flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across a fixed orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow. Port 1 then opens to port 2 to allow excess flow to pass. The Flow Setting will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC



#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>350 bar [5000 psi]</b>
<b>Rated flow</b>	<b>114 l/min [30 US gpm]</b>
<b>Max inlet flow</b>	151 l/min [40 US gpm]
<b>Flow range</b>	1.9-114 l/min [0.5-30 US gpm]
<b>Flow accuracy</b>	1.9-10.9 l/min [0.5-2.9 US gpm] ±15% 11.4-114 l/min [3-30 US gpm] ±10%
<b>Weight</b>	0.43 kg [0.95 lb]
<b>Cavity</b>	SDC16-3

#### MODEL CODE

**PFR12 - 16 - V - C - A - 10H - 30.0**

##### Seal Option

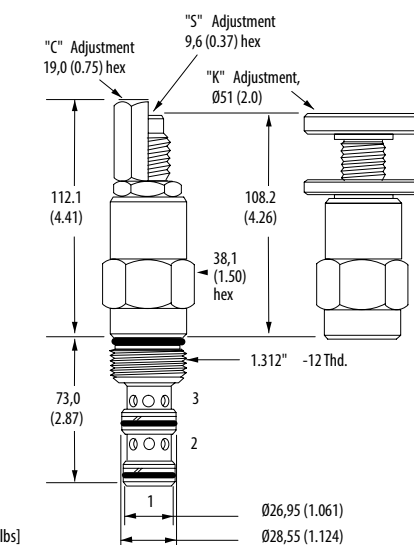
Code	Seal Kit
Omit-Buna - N	889632
V-Viton	889636

##### Adjustment Option

C - Tamper Resistant  
K - Knob  
S - External

##### Housing Material

Omit - No housing  
A - Aluminum  
S - Steel



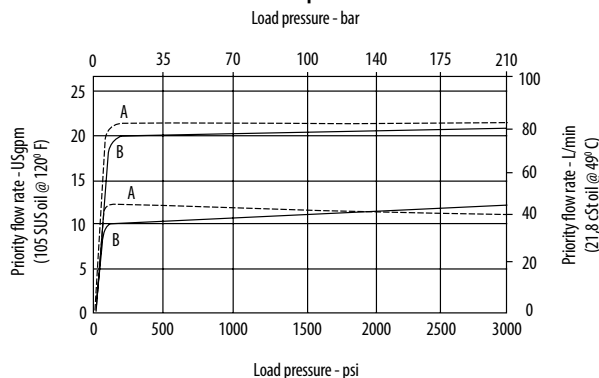
#### DIMENSIONS

mm [in]

**Installation torque**  
A - 108-122 Nm [80-90 ft. lbs]  
S - 136-149,6 Nm [100-110 ft. lbs]

#### PERFORMANCE CURVES

##### Flow Compensation



A - Port 3, priority (regulated outlet) pressurized. • B - Port 2, (bypass outlet) pressurized.

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
30.0	114.0	30.0

##### Housing

Code	Ports	Aluminium Heavy duty	Steel
0	No housing		
10H	#10 SAE	876721	
12H	#12 SAE	876723	
4G	1/2" BSP	876720	
6G	3/4" BSP	876722	
4G	1/2" BSP		02-175131
6G	3/4" BSP		02-175132
10T	#10 SAE		02-175129
12T	#12 SAE		02-175130

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].  
\* Additional housings available

## Flow Control Valves

### HFCV10-PT

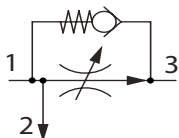
Flow Control, Fully Adjustable, Pressure Compensated, Priority Type with Reverse Free Flow

350 bar [5000 psi] • 45 l/min [12 US gpm]

#### DESCRIPTION AND OPERATION

This is a fully adjustable, priority type, pressure compensated flow control valve, with reverse flow capability from port 3 to 1. The flow from port 3 will remain constant regardless of the pressure difference across the valve, while excess flow passes from port 1 to 2. Flow enters at port 1 and passes across an adjustable orifice in the spool, which creates a pressure drop. This causes the spool to move back against the spring, which then restricts the outlet flow at port 3. Port 1 then opens to port 2 to allow excess flow to pass. The regulated flow will always take priority and remains constant if the working pressure is higher in either port 2 or port 3.

#### SCHEMATIC

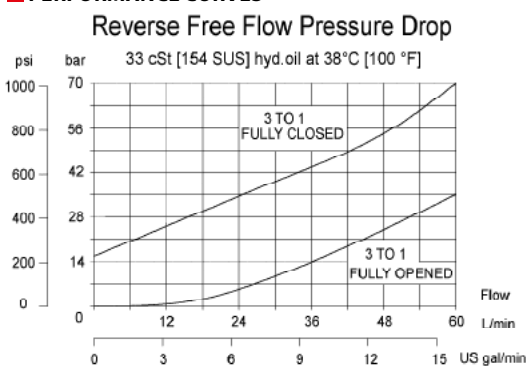


#### PERFORMANCE DATA

Rated pressure	350 bar [5000 psi]
Rated flow	45 l/min [12 US gpm]
Max inlet flow	76 l/min [20 US gpm]
Flow range	4-45 l/min [1-12 US gpm]
Flow accuracy	±12%
Weight	0.16 kg [0.35 lb]
Cavity	SDC10-3

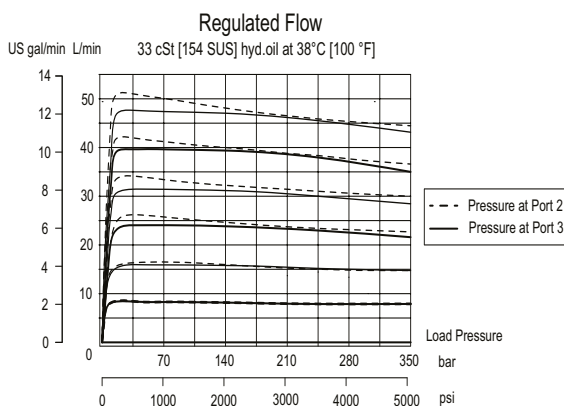
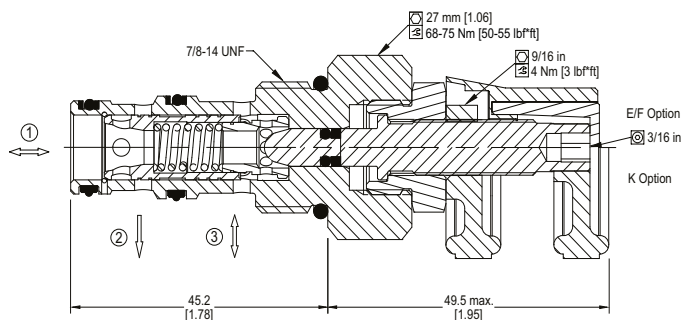
\* Inlet flow must be at least 50% above flow setting

#### PERFORMANCE CURVES



#### DIMENSIONS

mm [in]



#### MODEL CODE

### HFCV10-PT - P - E - 4.0 - 00

#### Seal Option

Code	Seal Kit
P-Polyurethane	11357050
V-Viton	11357051

#### Adjustment Option

Code	Kit Number
E - External	
K - Knob	11353452
F - Tamperproof	

#### Flow Setting

Code - Flow in l/min  
Specify in 1 l/min increments within flow range  
Example

Code	l/min	[US gpm]
4.0	4.0	1.0

#### Housing

Code	Ports & Material	Housing Model Code
00	Cartridge Only	No Housing
SE3B	3/8 BSP, AL	SDC10-3-SE3B
SE4B	1/2 BSP, AL	SDC10-3-SE4B
S3B	3/8 BSP, Steel	CP10-3-S3B
S4B	1/2 BSP, Steel	CP10-3-S4B
6S	#6 SAE, AL	CP10-3-6S
8S	#8 SAE, AL	CP10-3-8S
S6S	#6 SAE, Steel	CP10-3-S6S
S8S	#8 SAE, Steel	CP10-3-S8S

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### CP340-1 /1S

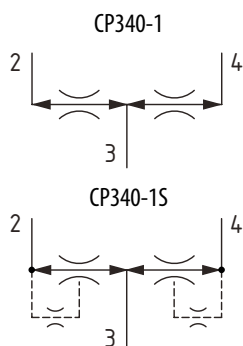
Flow Divider/Combiner, Fixed Ratio, Flow Synchronizing Option

210 bar [3000 psi] • 45 l/min [12 US gpm]

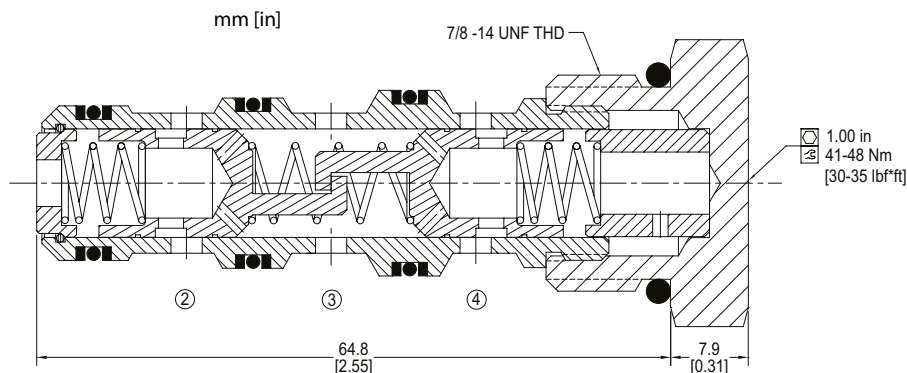
#### DESCRIPTION AND OPERATION

This is a fixed ratio flow divider/combiner valve. In dividing mode, flow enters port 3 and passes across two fixed orifices in linked spools. If the pressure drop through one orifice is higher than the other, then the spools will move together to restrict the flow in the lower pressure outlet port. This maintains equal pressure drops across the spools, thus maintaining the flow division in the outlet ports. In combining mode, flow will enter ports 2 and 4 pass through the orifices, which causes the spools to move to restrict the higher-pressure inlet and maintain equal pressure drops and equal flow into the valve. The CP340-1S provides synchronizing flow to the opposite port in the event that one port is completely blocked.

#### SCHEMATIC



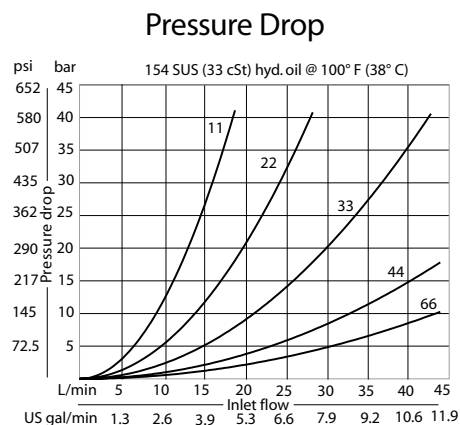
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	45 l/min [12 US gpm]
Weight	0.11 kg [0.24 lb]
Cavity	SDC10-4

#### PERFORMANCE CURVES



#### MODEL CODE

CP340 - 1 - B - 6S - 44

##### Flow Synchronization Option

1 - Without synchronization  
1S - With synchronization

##### Seal Option

Code	Seal Kit
B-Buna-N	120023
V-Viton	120024

##### Housing

Code	Ports&Material	Housing Model Code
0	No housing	No Housing
3B	3/8 BSP, AL	CP10-4-2B-X1
4B	1/2 BSP, AL	CP10-4-3B-X1
6S	#6 SAE, AL	CP10-4-6S-X1
8S	#8 SAE, AL	CP10-4-8S-X1

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

##### Flow Setting

Code	Port 2: Port 4	Total Flow
11	1:1	7.6 l/min [2 US gpm]
22	1:1	15 l/min [4 US gpm]
33	1:1	23 l/min [6 US gpm]
36	1:2	34 l/min [9 US gpm]
44	1:1	30 l/min [8 US gpm]
46	2:3	38 l/min [10 US gpm]
63	2:1	34 l/min [9 US gpm]
64	3:2	38 l/min [10 US gpm]
66	1:1	45 l/min [12 US gpm]

## Flow Control Valves

### 2CFD50 / A2X

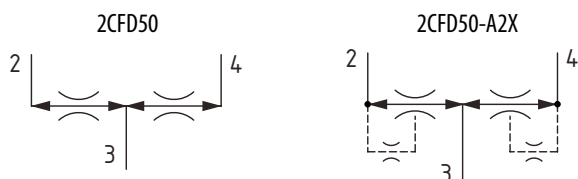
Flow Divider/Combiner, Fixed Ratio, Flow Synchronizing Option

350 bar [5000 psi] • 40 l/min [11 US gpm]

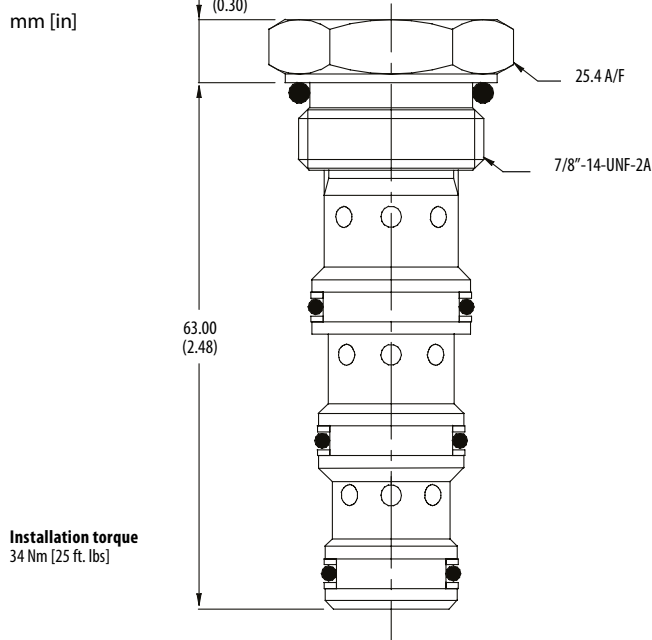
#### DESCRIPTION AND OPERATION

This is a fixed ratio flow divider/combiner valve. In dividing mode, flow enters port 3 and passes across two fixed orifices in linked spools. If the pressure drop through one orifice is higher than the other, then the spools will move together to restrict the flow in the lower pressure outlet port. This maintains equal pressure drops across the spools, thus maintaining the flow division in the outlet ports. In combining mode, flow will enter ports 2 and 4 pass through the orifices, which causes the spools to move to restrict the higher-pressure inlet and maintain equal pressure drops and equal flow into the valve. The A2X version has extra orifice in the sleeve to allow make up flow when needed in transmission circuits.

#### SCHEMATIC



#### DIMENSIONS

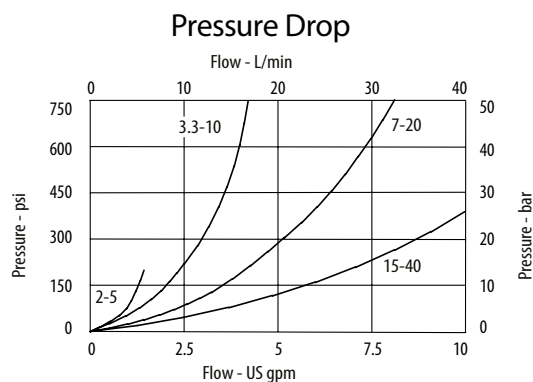


Installation torque  
34 Nm [25 ft. lbs]

#### PERFORMANCE DATA

Rated pressure	350 bar [5000 psi]
Rated flow	40 l/min [11 US gpm]
Weight	0.11 kg [0.24 lb]
Cavity	SDC10-4

#### PERFORMANCE CURVES



#### MODEL CODE

### 2CFD50 - 4W - 40 - S - 377 - A2X

#### Basic Code

2CFD50 - No housing  
2CFD55 - Cartridge and housing

#### Housing

Code	Ports	Aluminium	Steel
Omit	No Housing		
3W	3/8" BSP inlet and outlet	B19187	
4W	1/2" BSP inlet and outlet	B20816	
8T-6T	1/2" SAE inlet and 3/8" SAE outlet	B19185	B21935

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### Flow Synchronization Option

Omit - Without synchronization  
A2X - With synchronization

#### Housing Material

Omit - Aluminum/No housing  
377 - Steel

#### Seal Option

Code	Seal Kit
S	Buna-N SK1065
SV	Viton SK1065V

#### Inlet Flow Range

Code	Inlet Flow	
	l/min	[US gpm]
5	2-5	0.5-1.3
10	3.3 - 10	0.9-2.6
20	7-20	1.8-5.3
40	15-40	4.0-10.5

Flow ratio is 1:1. Additional flow ratios available.

## Flow Control Valves

### CP342-1 /1S

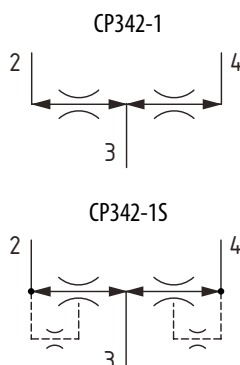
Flow Divider/Combiner, Fixed Ratio, Flow Synchronizing Option

210 bar [3000 psi] • 150 l/min [40 US gpm]

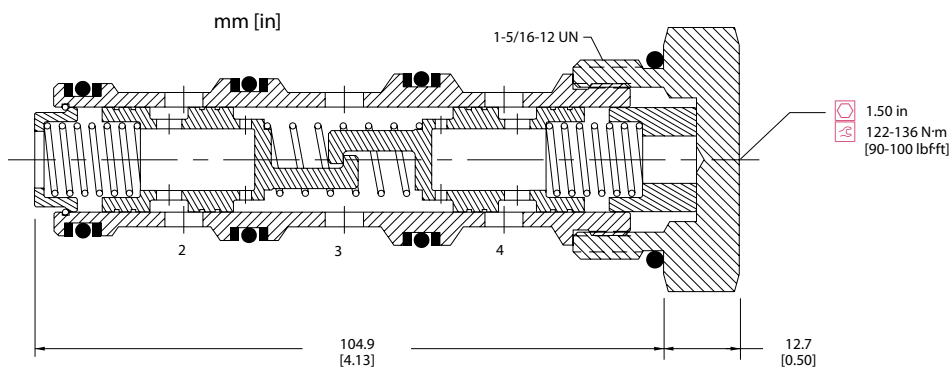
#### DESCRIPTION AND OPERATION

This is a fixed ratio flow divider/combiner valve. In dividing mode, flow enters port 3 and passes across two fixed orifices in linked spools. If the pressure drop through one orifice is higher than the other, then the spools will move together to restrict the flow in the lower pressure outlet port. This maintains equal pressure drops across the spools, thus maintaining the flow division in the outlet ports. In combining mode, flow will enter ports 2 and 4 pass through the orifices, which causes the spools to move to restrict the higher-pressure inlet and maintain equal pressure drops and equal flow into the valve. The CP342-1S provides synchronizing flow to the opposite port in the event that one port is completely blocked.

#### SCHEMATIC



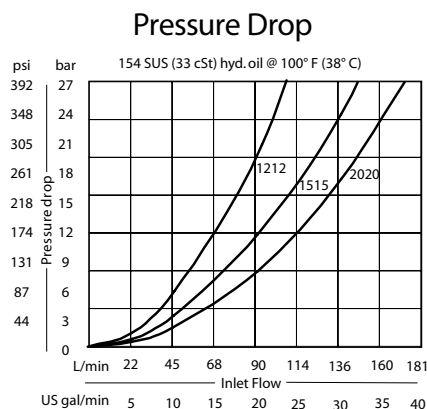
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	150 l/min [40 US gpm]
Weight	0.37 kg [0.81 lb]
Cavity	SDC16-4

#### PERFORMANCE CURVES



#### MODEL CODE

### CP342 - 1 - B - 16S - 1515

#### Flow Synchronization Option

1 - Without synchronization  
1S - With synchronization

#### Seal Option

Code	Seal Kit
B-Buna-N	120025
V-Viton	120026

#### Housing

Code	Ports & Material	Housing Model Code
0	No Housing	No Housing
6B	AL, 3/4 BSP	CP16-4-6B-X1
8B	AL, 1 BSP	CP16-4-8B-X1
12S	AL, #12 SAE	CP16-4-12S-X1
16S	AL, #16 SAE	CP16-4-16S-X1

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### Flow Setting

Code	Port 2: Port 4	Total Inlet Flow
1020	1:2	114 l/min [30 US gpm]
1212	1:1	91 l/min [24 US gpm]
1215	4:5	102 l/min [27 US gpm]
1220	3:5	121 l/min [32 US gpm]
1512	5:4	102 l/min [27 US gpm]
1515	1:1	114 l/min [30 US gpm]
1520	3:4	132 l/min [35 US gpm]
2012	5:3	121 l/min [32 US gpm]
2015	4:3	132 l/min [35 US gpm]
2020	1:1	151 l/min [40 US gpm]

## Flow Control Valves

### CP341-1

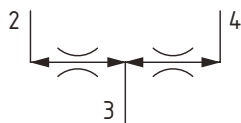
Flow Divider/Combiner, Fixed Ratio

210 bar [3000 psi] • 76 l/min [20 US gpm]

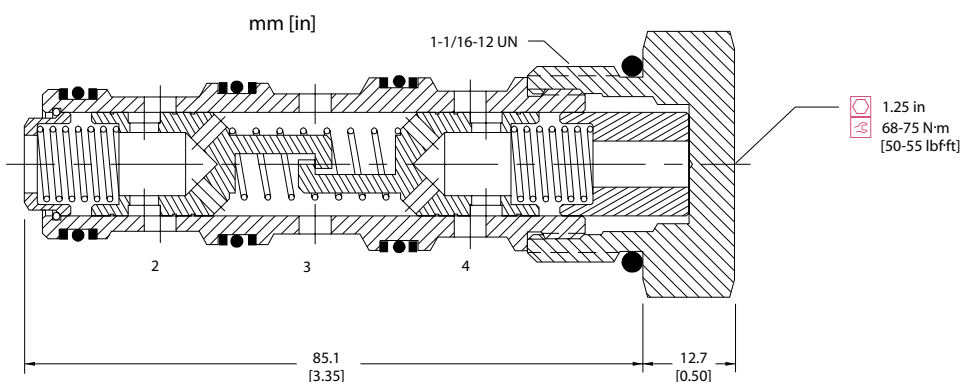
#### DESCRIPTION AND OPERATION

This is a fixed ratio flow divider/combiner valve. In dividing mode, flow enters port 3 and passes across two fixed orifices in linked spools. If the pressure drop through one orifice is higher than the other, then the spools will move together to restrict the flow in the lower pressure outlet port. This maintains equal pressure drops across the spools, thus maintaining the flow division in the outlet ports. In combining mode, flow will enter ports 2 and 4 pass through the orifices, which causes the spools to move to restrict the higher-pressure inlet and maintain equal pressure drops and equal flow into the valve.

#### SCHEMATIC



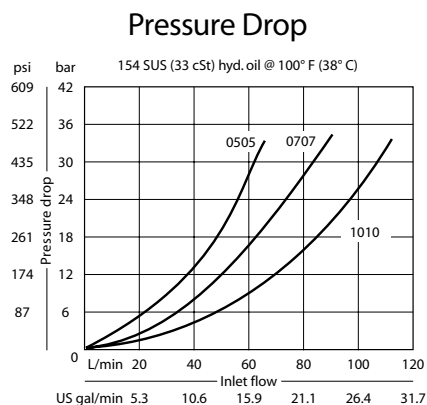
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	76 l/min [20 US gpm]
Weight	0.23 kg [0.50 lb]
Cavity	CP12-4

#### PERFORMANCE CURVES



#### MODEL CODE

### CP341 - 1 - B - 10S - 0707

#### Seal Option

Code	Seal Kit
B-Buna-N	120262
V-Viton	120263

#### Housing

Code	Ports&Material	Housing Model Code
0	No Housing	No Housing
4B	AL, 1/2 BSP	CP12-4-4B-X1
6B	AL, 3/4 BSP	CP12-4-6B-X1
10S	AL, #10 SAE	CP12-4-10S-X1
12S	AL, #12 SAE	CP12-4-12S-X1

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### Flow Setting

Flow Ratio		
Code	Port 2: Port 4	Total Inlet Flow
0505	1:1	38 l/min [10 US gpm]
0507	5:7	45 l/min [12 US gpm]
0510	1:2	57 l/min [15 US gpm]
0707	1:1	53 l/min [14 US gpm]
0710	7:10	64 l/min [17 US gpm]
1010	1:1	76 l/min [20 US gpm]

## Flow Control Valves

### CP342-3

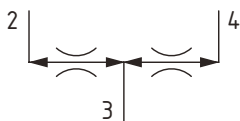
Flow Divider/Combiner, Fixed Ratio

450 bar [6500 psi] • 150 l/min [40 US gpm]

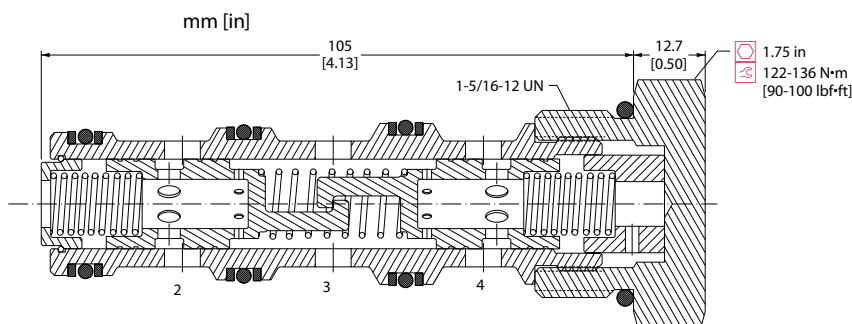
#### DESCRIPTION AND OPERATION

This is a fixed ratio flow divider/combiner valve. In dividing mode, flow enters port 3 and passes across two fixed orifices in linked spools. If the pressure drop through one orifice is higher than the other, then the spools will move together to restrict the flow in the lower pressure outlet port. This maintains equal pressure drops across the spools, thus maintaining the flow division in the outlet ports. In combining mode, flow will enter ports 2 and 4 pass through the orifices, which causes the spools to move to restrict the higher-pressure inlet and maintain equal pressure drops and equal flow into the valve.

#### SCHEMATIC



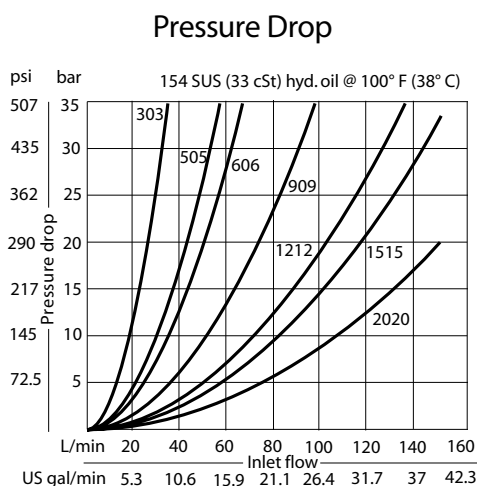
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	450 bar [6500 psi]
Rated flow	150 l/min [40 US gpm]
Weight	0.37 kg [0.81 lb]
Cavity	SDC16-4

#### PERFORMANCE CURVES



#### MODEL CODE

CP342 - 3 - U - S16S - 0505

##### Seal Option

Code	Seal Kit
U-Urethane	120677

##### Housing

Code	Ports&Material	Housing Model Code
0	No Housing	No Housing
S6B	Steel, 3/4 BSP	CP16-4-S6B-X1
S8B	Steel, 1 BSP	CP16-4-S8B-X1
S12S	Steel, #12 SAE	CP16-4-S12S-X1
S16S	Steel, #16 SAE	CP16-4-S16S-X1

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

##### Flow Setting

Code	Port 2: Port 4	Total Inlet Flow
0303	1:1	23 l/min [6 US gpm]
0505	1:1	38 l/min [10 US gpm]
0606	1:1	45 l/min [12 US gpm]
0909	1:1	68 l/min [18 US gpm]
1212	1:1	91 l/min [24 US gpm]
1515	1:1	114 l/min [30 US gpm]
2020	1:1	151 l/min [40 US gpm]
1220	3:5	121 l/min [32 US gpm]
1215	4:5	102 l/min [27 US gpm]
1520	3:4	132 l/min [35 US gpm]
2012	5:3	121 l/min [32 US gpm]
1512	5:4	102 l/min [27 US gpm]
2015	4:3	132 l/min [35 US gpm]
1020	1:2	114 l/min [30 US gpm]

## Flow Control Valves

### CP343-1

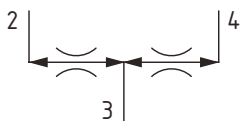
Flow Divider/Combiner, Fixed Ratio

210 bar [3000 psi] • 340 l/min [90 US gpm]

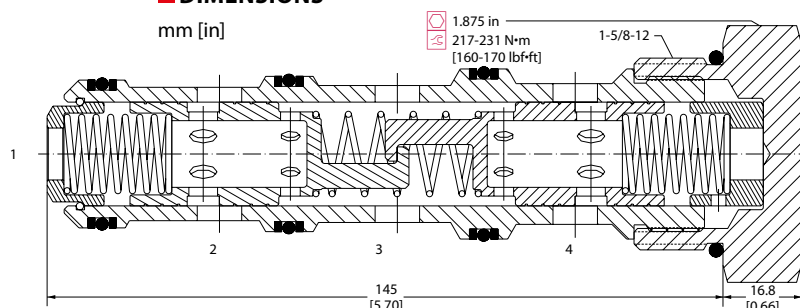
#### DESCRIPTION AND OPERATION

This is a fixed ratio flow divider/combiner valve. In dividing mode, flow enters port 3 and passes across two fixed orifices in linked spools. If the pressure drop through one orifice is higher than the other, then the spools will move together to restrict the flow in the lower pressure outlet port. This maintains equal pressure drops across the spools, thus maintaining the flow division in the outlet ports. In combining mode, flow will enter ports 2 and 4 pass through the orifices, which causes the spools to move to restrict the higher-pressure inlet and maintain equal pressure drops and equal flow into the valve.

#### SCHEMATIC



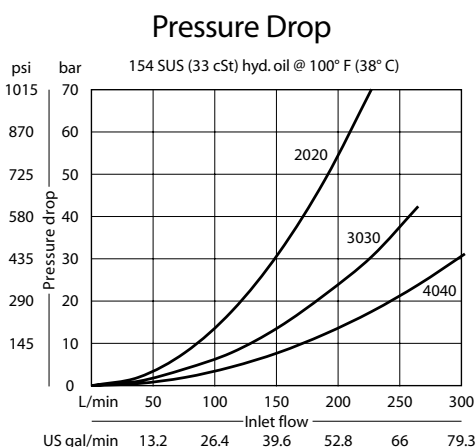
#### DIMENSIONS



#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	340 l/min [90 US gpm]
Weight	1.13 kg [2.50 lb]
Cavity	SDC20-4

#### PERFORMANCE CURVES



#### MODEL CODE

### CP343 - 1 - B - 16S - 4545

#### Seal Option

Code	Seal Kit
B-Buna-N	120181
V-Viton	120182

#### Housing

Code	Ports&Material	Housing Model Code
0	No Housing	No Housing
8B	AL, 1 BSP	SDC20-4-8B-X1
10B	AL, 1-1/4 BSP	SDC20-4-10B-X1
16S	AL, #16 SAE	SDC20-4-16S-X1
20S	AL, #20 SAE	SDC20-4-20S-X1

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

#### Flow Setting

Flow Ratio		
Code	Port 2: Port 4	Total Flow
2020	1:1	151 l/min [40 US gpm]
2525	1:1	189 l/min [50 US gpm]
3030	1:1	227 l/min [60 US gpm]
3535	1:1	265 l/min [70 US gpm]
4020	2:1	227 l/min [60 US gpm]
4040	1:1	303 l/min [80 US gpm]
4530	3:2	284 l/min [75 US gpm]
4545	1:1	341 l/min [90 US gpm]

## Flow Control Valves

### VF11-10

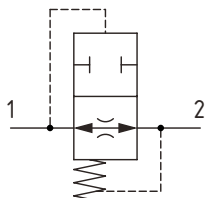
Velocity Fuse

350 bar [5000 psi] • 23 l/min [6 US gpm]

#### DESCRIPTION AND OPERATION

This is a velocity fuse, which closes when the set flow is exceeded. These valves are often used to prevent a load falling in the event of a total hose failure. The valve is normally open from port 1 to port 2. The valve closes when the pre-set flow is exceeded, and it will remain closed until the pressure at port 1 is reduced to less than 80 psi.

#### SCHEMATIC

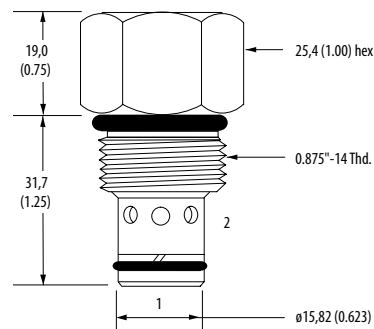


#### PERFORMANCE DATA

<b>Rated pressure</b>	<b>350 bar [5000 psi]</b>
<b>Rated flow</b>	<b>23 l/min [6 US gpm]</b>
<b>Flow range</b>	1.9–22.7 l/min [0.5–6.0 USgpm]
<b>Weight</b>	0.11 kg [0.25 lb]
<b>Cavity</b>	SDC10-2

#### DIMENSIONS

mm [in]

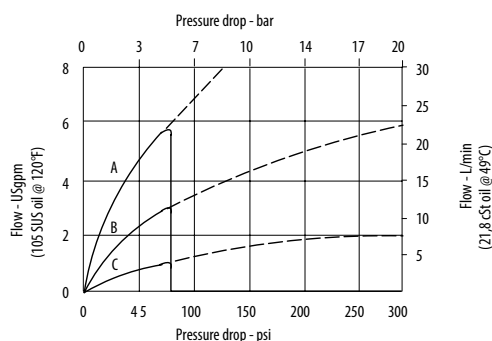


#### Installation torque

A - 47-54 Nm [35-40 ft. lbs]  
S - 68-75 Nm [50-55 ft. lbs]

#### PERFORMANCE CURVES

##### Pressure Drop



**A** - 22.8 l/min (6 US gpm)  
maximum flow setting  
— Port 1 to 2,  
fusing direction  
--- Port 2 to 1, reverse  
flow down to 0

**B** - 14.44 l/min (3 US gpm)  
maximum flow setting  
— Port 1 to 2,  
fusing direction  
--- Port 2 to 1, reverse  
flow down to 0

**C** - 3.8 l/min (1 US gpm)  
maximum flow setting  
— Port 1 to 2,  
fusing direction  
--- Port 2 to 1, reverse  
flow down to 0

#### MODEL CODE

**VF11 - 10 - N - F - A - 3B - 6.0**

##### Seal Option

Code	Seal Kit
Omit - Buna-N	656803
V-Viton	566086

##### Adjustment Option

F - Fixed

##### Housing Material

Omit - No housing  
A - Aluminium  
S - Steel

##### Flow Setting

Code - Flow in US gpm  
Specify in 0.1 gpm increments within flow range  
Example

Code	l/min	[US gpm]
6.0	23.0	6.0

##### Housing

Code	Ports	Aluminium Standard duty	Aluminium Heavy duty	Steel
0	No housing			
3B	3/8" BSP	02-175462	-	-
6T	#6 SAE	566151	-	-
2G	1/4" BSP	-	876702	-
3G	3/8" BSP	-	876703	-
6H	#6 SAE	-	876700	-
8H	#8 SAE	-	876701	-
6T	#6 SAE	-	-	02-175100
8T	#8 SAE	-	-	02-175101
2G	1/4" BSP	-	-	02-175102
3G	3/8" BSP	-	-	02-175103

\* Aluminum bodies are to be used for pressures less than 210 bar [3000 psi].

\* Additional housings available

## Flow Control Valves

### CP330-3

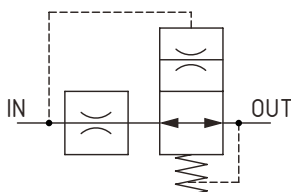
Velocity Fuse, In-line

210 bar [3000 psi] • 110 l/min [29 US gpm]

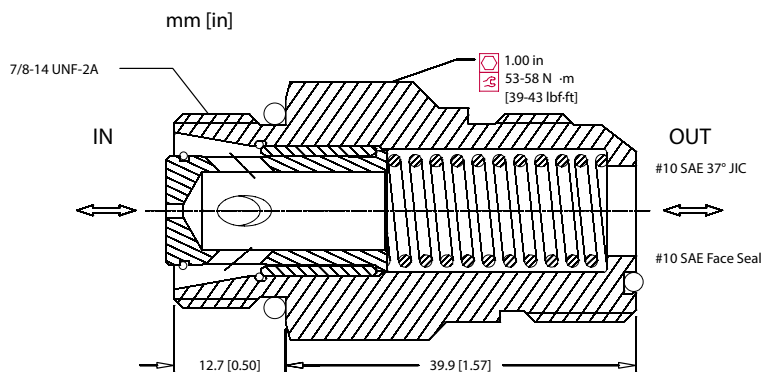
#### DESCRIPTION AND OPERATION

This is an in-line velocity fuse, which closes when the set flow is exceeded. These valves are often used to prevent a load falling in the event of a total hose failure. The valve closes when the pre-set flow is exceeded and then provides non-compensated, restrictive flow. It provides reverse free flow when operated in the opposite direction.

#### SCHEMATIC



#### DIMENSIONS

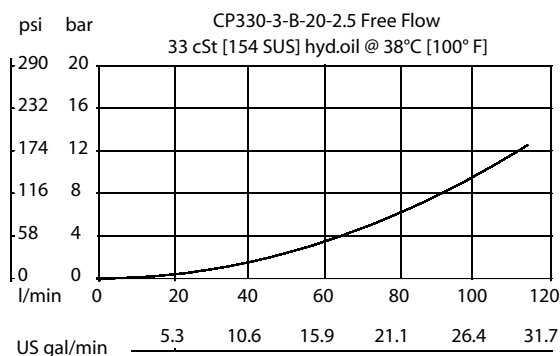


#### PERFORMANCE DATA

Rated pressure	210 bar [3000 psi]
Rated flow	110 l/min [29 US gpm]
Weight	0.12 kg [0.26 lb]
Cavity	#10 SAE Port

#### PERFORMANCE CURVES

##### Pressure Drop



#### MODEL CODE

**CP330 - 3 - B - FS10 - 17 - 2.5**

##### Seal Option

Code

B-Buna-N

V-Viton

##### Fitting Type

Omit- # 10 SAE 37° JIC

FS10- #10 SAE face seal

##### Bypass Flow @ 48 bar [700 psi]

Code l/min [US gpm]

2.5 9.5 2.5

##### Flow Setting

Code l/min [US gpm]

17 64.4 17

20 75.7 20

23 87.1 23

26 98.4 26

29 109.8 29

*Danfoss*