# Flange Mounted Pressure Controls

**Relief, Unloading & Check Valves -
06, 08, 10 & 12 Size**

# Flange Mounted Valves

Continued on next page

| Model/Size: Relief Valves | Function | Max. Pressure | Max. Flow | Pressure Drop Vented ΔP to T at Max. Flow | Page |
|---|---|---|---|---|---|
| CPF1S-06<br>SAE 3/4” | Relief, single pressure | 275 bar (4000 psi) | 100 l/min (26 USgpm) | – | 6<br>11 |
| CPF1S-08<br>SAE 1” | | | 300 l/min (80 USgpm) | | 12 |
| CPF1S-10<br>SAE 1 1/4” | | | 600 l/min (160 USgpm) | | 13 |
| CPF1S-12<br>SAE 1 1/2” | | | | | 14 |
| CPF1V-12<br>(code 62)<br>SAE 1 1/2” | | 350 bar (5000 psi) | | | |
| CPF2S-06<br>SAE 3/4” | Relief, single pressure with vent | 275 bar (4000 psi) | 100 l/min (26 USgpm) | 3,5 bar (51 psi) @ 100 l/min (26,4 USgpm) | 15<br>20 |
| CPF2S-08<br>SAE 1” | | | 300 l/min (80 USgpm) | 4 bar (58 psi) @ 300 l/min (80 USgpm) | 21 |
| CPF2S-10<br>SAE 1 1/4” | | | 600 l/min (160 USgpm) | Internal Drain 7 bar (102 psi) @ 600 l/min (160 USgpm)<br>External Drain 4,9 bar (71 psi) @ 600 l/min (160 USgpm) | 22 |
| CPF2S-12<br>SAE 1 1/2” | | | | Internal Drain 7,5 bar (109 psi) @ 600 l/min (160 USgpm)<br>External Drain 2,5 bar (36 psi) @ 600 l/min (160 USgpm) | 23 |
| CPF2V-12<br>(code 62)<br>SAE 1 1/2” | | 350 bar (5000 psi) | | | |
| CPF3S-06<br>SAE 3/4” | Bi-pressure relief with max. press. override | 275 bar (4000 psi) | 100 l/min (26 USgpm) | 3,5 bar (51 psi) @ 100 l/min (26,4 USgpm) | 24<br>29 |
| CPF3S-08<br>SAE 1” | | | 300 l/min (80 USgpm) | 4 bar (58 psi) @ 300 l/min (80 USgpm) | 30 |
| CPF3S-10<br>SAE 1 1/4” | | | 600 l/min (160 USgpm) | Internal Drain 7 bar (102 psi) @ 600 l/min (160 USgpm)<br>External Drain 4,9 bar (71 psi) @ 600 l/min (160 USgpm) | 31 |
| CPF3S-12<br>SAE 1 1/2” | | | | Internal Drain 7,5 bar (109 psi) @ 600 l/min (160 USgpm)<br>External Drain 2,5 bar (36 psi) @ 600 l/min (160 USgpm) | 32 |
| CPF3V-12<br>(code 62)<br>SAE 1 1/2” | | 350 bar (5000 psi) | | | |
| CPF4S-06<br>SAE 3/4” | Tri-pressure relief with max. press. override | 275 bar (4000 psi) | 100 l/min (26 USgpm) | 3,5 bar (51 psi) @ 100 l/min (26,4 USgpm) | 29 |
| CPF4S-08<br>SAE 1” | | | 300 l/min (80 USgpm) | 4 bar (58 psi) @ 300 l/min (80 USgpm) | 30 |
| CPF4S-10<br>SAE 1 1/4” | | | 600 l/min (160 USgpm) | Internal Drain 7 bar (102 psi) @ 600 l/min (160 USgpm)<br>External Drain 4,9 bar (71 psi) @ 600 l/min (160 USgpm) | 31 |
| CPF4S-12<br>SAE 1 1/2” | | | | Internal Drain 7,5 bar (109 psi) @ 600 l/min (160 USgpm)<br>External Drain 2,5 bar (36 psi) @ 600 l/min (160 USgpm) | 32 |
| CPF4V-12<br>(code 62)<br>SAE 1 1/2” | | 350 bar (5000 psi) | | | |

Continued on next page

| Model/Size: Unloading Valves | Function | Max. Pressure | Max. Flow | ΔP P to T in Unloaded Position | | Page |
|---|---|---|---|---|---|---|
| UPF1S-06<br>SAE 3/4" | Unloading without check | 275 bar (4000 psi) | 100 l/min (26 USgpm) | Internal Drain<br>3,5 bar (51 psi)<br>@ 100 l/min<br>(26,4 USgpm) | External Drain<br>2,5 bar (36 psi)<br>@ 100 l/min<br>(26,4 USgpm) | 33<br>38 |
| UPF1S-C*-06<br>SAE 3/4" | Unloading with check | | | | | 39 |
| UPF1S-08<br>SAE 1" | Unloading without check | | 300 l/min (80 USgpm) | 3,5 bar (51 psi)<br>@ 100 l/min<br>(26,4 USgpm) | | 40 |
| UPF1S-C*-08<br>SAE 1" | Unloading with check | | | | | 41 |
| UPF1S-10<br>SAE 1 1/4" | Unloading without check | | 600 l/min (160 USgpm) | Internal Drain<br>7,5 bar (109 psi)<br>@ 600 l/min<br>(160 USgpm) | External Drain<br>4,9 bar (71 psi)<br>@ 600 l/min<br>(160 USgpm) | 42 |
| UPF1S-C*-10<br>SAE 1 1/4" | Unloading with check | | | | | 43 |
| UPF1S-12<br>SAE 1 1/2" | Unloading without check | | | Internal Drain<br>7,5 bar (109 psi)<br>@ 600 l/min<br>(160 USgpm) | External Drain<br>3 bar (44 psi)<br>@ 600 l/min<br>(160 USgpm) | 44 |
| UPF1V-12<br>(code 62)<br>SAE 1 1/2" | Unloading without check | 350 bar (5000 psi) | | | | |
| UPF1S-C*-12<br>SAE 1 1/2" | Unloading with check | 275 bar (4000 psi) | | | | 45 |
| UPF2S-06<br>SAE 3/4" | Unloading with vent without check | | 100 l/min (26 USgpm) | Internal Drain<br>3,5 bar (51 psi)<br>@ 100 l/min<br>(26,4 USgpm) | External Drain<br>2,5 bar (36 psi)<br>@ 100 l/min<br>(26,4 USgpm) | 46<br>51 |
| UPF2S-C*-06<br>SAE 3/4" | Unloading with vent and check | | | | | 52 |
| UPF2S-08<br>SAE 1" | Unloading with vent without check | | 300 l/min (80 USgpm) | 3,5 bar (51 psi)<br>@ 100 l/min<br>(26,4 USgpm) | | 53 |
| UPF2S-C*-08<br>SAE 1" | Unloading with vent and check | | | | | 54 |
| UPF2S-10<br>SAE 1 1/4" | Unloading with vent without check | 275 bar (4000 psi) | 600 l/min (160 USgpm) | Internal Drain<br>7,5 bar (109 psi)<br>@ 600 l/min<br>(160 USgpm) | External Drain<br>4,9 bar (71 psi)<br>@ 600 l/min<br>(160 USgpm) | 55 |
| UPF2S-C*-10<br>SAE 1 1/4" | Unloading with vent and check | | | | | 56 |
| UPF2S-12<br>SAE 1 1/2" | Unloading with vent without check | | | Internal Drain<br>7,5 bar (109 psi)<br>@ 600 l/min<br>(160 USgpm) | External Drain<br>3 bar (44 psi)<br>@ 600 l/min<br>(160 USgpm) | 57 |
| UPF2V-12<br>(code 62)<br>SAE 1 1/2" | Unloading with vent without check | 350 bar (5000 psi) | | | | |
| UPF2S-C*-12<br>SAE 1 1/2" | Unloading with vent and check | 275 bar (4000 psi) | | | | 58 |

| Model/Size: Check Valve | Function | Max. Pressure | Max. Flow | Pressure Drop | Page |
|---|---|---|---|---|---|
| DCPFS-08<br>SAE 1” | Right Angle Check valve | 275 bar<br>(4000 psi) | 114 l/min<br>(30 USgpm) | 13 bar (187 psi) @114 l/min<br>(30 USgpm) - 3,4 bar (50 psi)<br>cracking press.<br>9,4 bar (137 psi) @114 l/min<br>(30 USgpm) - 0,3 bar (5 psi)<br>cracking press. | 59<br>62 |
| DCPFS-10<br>SAE 1 $^1/_4$” | | | 227 l/min<br>(60 USgpm) | 4,1 bar (60 psi) @227 l/min<br>(60 USgpm) - 0,3 (5 psi) cracking<br>press. | 62 |
| DCPFS-12<br>SAE 1 $^1/_2$” | | | 378 l/min<br>(100 USgpm) | 8,6 bar (125 psi) @378 l/min<br>(100 USgpm) - 0,3 (5 psi) cracking<br>press. | 62 |
| DICPFS-06<br>SAE .75” | In-line Check valve | 350 bar<br>(5000 psi) | 120 l/min<br>(32 USgpm) | 1,4 bar (20 psi) @120 l/min<br>(32 USgpm) - 0,3 bar (5 psi)<br>cracking press.<br>2,4 bar (35 psi) @120 l/min<br>(32 USgpm) - 1,7 bar (25 psi)<br>cracking press. | 60<br>62 |
| DICPFS-08<br>SAE 1” | | | 300 l/min<br>(80 USgpm) | 3,4 bar (49 psi) @300 l/min<br>(80 USgpm) - 0,3 bar (5 psi)<br>cracking press.<br>3,4 bar (49 psi) @300 l/min<br>(80 USgpm) - 1,7 bar (25 psi)<br>cracking press. | 62 |
| DICPFS-10<br>SAE 1 $^1/_4$” | | 280 bar<br>(4000 psi) | 600 l/min<br>(160 USgpm) | 8,3 bar (120 psi) @600 l/min<br>(160 USgpm) - 0,3 bar (5 psi)<br>cracking press.<br>8,3 bar (120 psi) @600 l/min<br>(160 USgpm) - 1,7 bar (25 psi)<br>cracking press. | 62 |
| DICPFS-12<br>SAE 1 $^1/_2$” | | 207 bar<br>(3000 psi) | 750 l/min<br>(200 USgpm) | 4,1 bar (60 psi) @750 l/min<br>(200 USgpm) - 0,3 (5 psi)<br>cracking press.<br>5,9 bar (85 psi) @750 l/min<br>(200 USgpm) - 1,7 bar (25 psi)<br>cracking press. | 62 |

# Introduction

### Flange Mounted Valve Benefits

- Direct mounting to pump flange reduces potential leak points for superior leak resistance.
- Reduced installed costs and space requirements.
- Excellent repeatability and stable performance from cartridge design main stage parts.
- High response due to small trapped volume.
- Easier installation and servicing of components.
- Pilot design minimizes response time and cracking flow which allows for high pressure stability thus increasing system productivity.
- Fast opening and closing action and stable performance from cartridge design.
- Minimum unloaded pressure drop due to short piping runs.
- Viton seals provide multi-fluid capability without the need to change seals.

#### Sizes

06 – $^{3}/_{4}$" flange
08 – 1" flange
10 – 1 $^{1}/_{4}$" flange
12 – 1 $^{1}/_{2}$" flange

## General Description

### Relief Valves

Vickers space saving CPF relief valves improve machine reliability and uptime by limiting the pressure in a hydraulic circuit to the desired maximum, thereby protecting the hydraulic pump and system from pressure peaks. The CPF relief valves are designed to mount on a wide range of SAE pump outlet port flanges to eliminate intervalve piping and fittings.

Direct pump flange mounting of the valves reduces installation costs and provides a highly leak–resistant, compact pump control package.

CPF relief valves are of two–stage design with a fast–acting poppet type main stage for simple, long-lasting and effective operation. The pilot stage features a sensitive adjustment mechanism which allows setting of the pressure in fine increments over a wide range – up to the maximum rating of the valve.

The pressure setting adjustment choices available for the CPF relief valves are the standard screw-type adjuster with locknut, an optional knurled hand knob with set screw lock or a micrometer knob with or without keylock. External remote control/vent connections are available on all models. Additional optional features include various pressure setting ranges and many solenoid valve options on valves so equipped.

These CPF relief valves have excellent dynamic and steady state operating characteristics including stability, fast response and low pressure override. The many available control options make it possible to choose the optimum valve model for industrial and mobile applications. Additionally, CPF valves use many of the same parts of other Vickers products to insure proven durability. For over 70 years, the Vickers name has been synonymous with long, trouble–free service.

### Unloading Valves

Unloading valves are used in accumulator charging circuits where a pressure regulator is required to automatically unload the pump. This is done by diverting the pump delivery to the reservoir at low pressure when the desired accumulator pressure is reached. Also, the UPF unloading valve can be used to unload the low pressure side of a double pump.

The UPF unloading valves are designed to mount directly on SAE pump outlet port flanges to eliminate intervalve piping and fittings. Direct pump flange mounting of the valves reduces installation costs and provides a highly leak resistant, compact pump control package.

UPF unloading valves are of two-stage design with a fast acting poppet type main stage for simple, long-lasting, and effective operation. The pilot stage features a sensitive adjustment mechanism which allows setting of the pressure in fine increments over a wide range – up to the maximum rating of the valve.

The pressure setting adjustment choices available for the UPF unloading valves are the standard screw-type adjuster with locknut or optional adjusters with or without keylock. Gage connections for pump and system pressures are available on all models. Additional optional features include various pressure setting ranges and many solenoid valve options on valves so equipped.

Unloading valves may be ordered with or without the integral check valve.

### Check Valves

DCPF/DICPF flange mounted right angle and in-line check valves are ruggedly designed for superior shock resistance, reliability and long life.

The check valves may be mounted directly on an SAE pump outlet port flange or may be stacked with a CPF relief valve to provide a pump unloading function. The DCPF/DICPF check valves are not intended for use as an unloading check.

The right angle and in-line check valves are offered in sizes matching the CPF relief valves.

# CPF1*-06/08/10/12-**-20

**Relief Valve Without Venting**

## Flange Sizes

- 06 - $^{3}/_{4}$ inch flange
- 08 - 1 inch flange
- 10 - $1^{1}/_{4}$ inch flange
- 12 - $1^{1}/_{2}$ inch flange

### Benefits

- Direct mounting to pump flange reduces potential leak points for superior leak resistance.
- Reduced installed costs and space requirements.
- Excellent repeatability and stable performance from cartridge design mainstage parts.
- Easier installation and servicing of components (stackable design).
- Pilot design minimizes response time and cracking flow which allows for high pressure stability thus increasing system productivity.

| Ratings | CPF1S–06 | CPF1S–08 | CPF1S–10 | CPF1S–12 |
|---|---|---|---|---|
| Maximum flow | 100 l/min (26 USgpm) | 300 l/min (80 USgpm) | 600 l/min (160 USgpm) | 600 l/min (160 USgpm) |
| Maximum pressure: | | | | |
| P port | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi)* |
| T port | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) |

* The CPF1V-12 (code 62 flange) has a P port max. pressure rating of 350 bar (5000 psi).

### Hydraulic Response

**06 Size:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 3450 bar (50000 psi) /second. Maximum overshoot < 8%.

**08 Size:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 2900 bar (42000 psi) /second. Maximum overshoot < 10%.

**10/12 Sizes:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 2600 bar (37500 psi) /second. Maximum overshoot < 10%.

### General Description

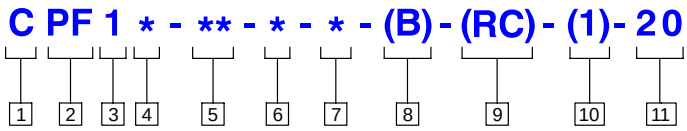
This Vickers CPF1S relief valve features flange mounting for increased design flexibility and reduced external piping. The valve is designed for direct mounting on the SAE flange outlet port of a pump. Fewer leak points and SAE flange connections lead to installations with superior leak resistance.

Pressure relief valves are used to limit or control pressure by directing system flow to the reservoir when system pressure reaches the setting of the valve. System overload is thereby prevented and peak pressures which could damage the pump and actuating components are eliminated.

The CPF1S valve has excellent dynamic and steady state operating characteristics including stability, fast response and low pressure override. CPF relief valves are of two–stage design with a fast–acting poppet type main stage for simple, long–lasting and effective operation. The many available control options make it possible to choose the optimum valve model for each application.

# CPF1* Model Series

## Model Code




### 1 Valve Function

C - Relief

### 2 Mounting Type

PF - Pump flange mounting

### 3 Unit Type

1 - Single pressure without vent

### 4 Flange Type

S - SAE J518 4-bolt flange standard series code 61 (available in all sizes)
V - SAE J518 4-bolt high pressure series code 62 (size 12 only)

### 5 Valve Size

06 - $^{3}/_{4}$ inch
08 - 1 inch
10 - 1 $^{1}/_{4}$ inch
12 - 1 $^{1}/_{2}$ inch

### 6 Pressure Range

A - 10 - 50 bar (145 - 725 psi)
B - 10 - 100 bar (145 - 1450 psi)
F - 10 - 207 bar (145 - 3000 psi)
G - 10 - 275 bar (145 - 4000 psi)
350 bar (5000 psi) - (CPF*V-12 models only)

### 7 Control Type

W - Screw adjust with locknut
H - Handknob adjust without keylock
K - Micrometer adjust with keylock

### 8 Thread Type (remote control/vent connection)

Blank - SAE-6 O-ring boss port (.5625-18 UNF-2B thd.)
B - BSP-G $^{1}/_{4}$ ($^{1}/_{4}$" BSPF)

### 9 Remote Control

Blank - No remote control
RC - Remote Control

### 10 Pilot Drain

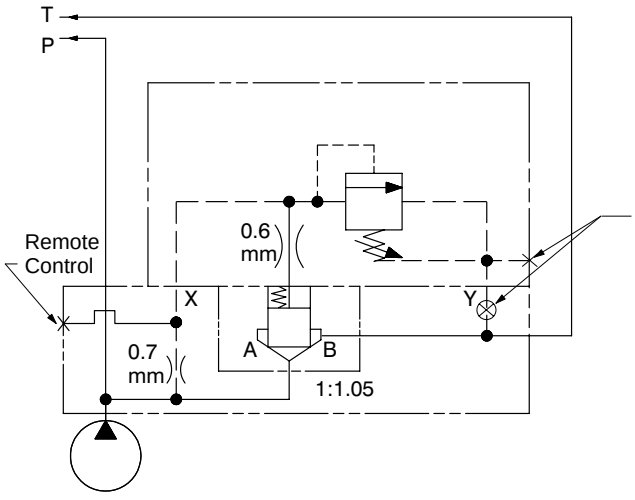
Blank - Internal drain
1 - External drain

### 11 Design Number, 20 Series

Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusive.

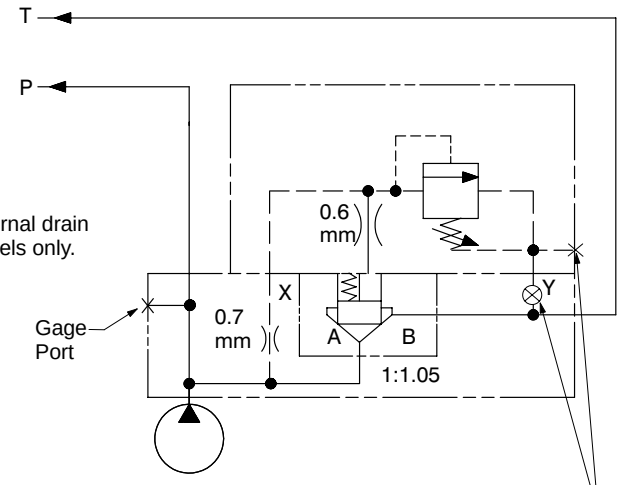
# Circuit Schematics

**CPF1S-06/08-*-20 with remote control**




–06 size 100 l/min (26 USgpm) max. flow
–08 size 300 l/min (80 USgpm) max. flow

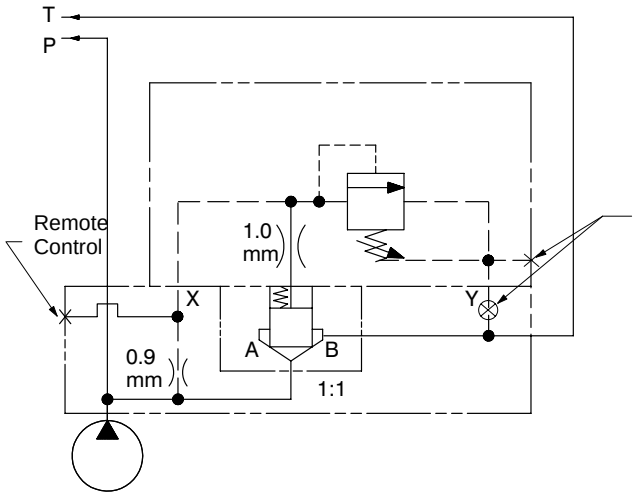
**CPF1S-06/08-P-*-20 without remote control**




–06 size 100 l/min (26 USgpm) max. flow
–08 size 300 l/min (80 USgpm) max. flow

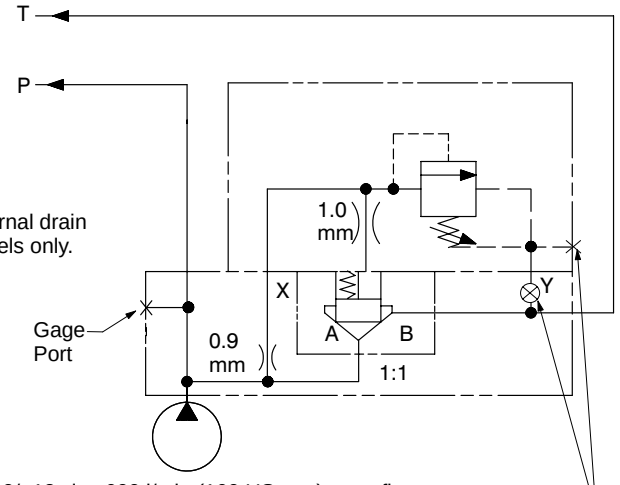
External drain
models only.

**CPF1S-10/12-*-20 with remote control**




–10/–12 size 600 l/min (160 USgpm) max. flow

**CPF1S-10/12-P-*-20 without remote control**

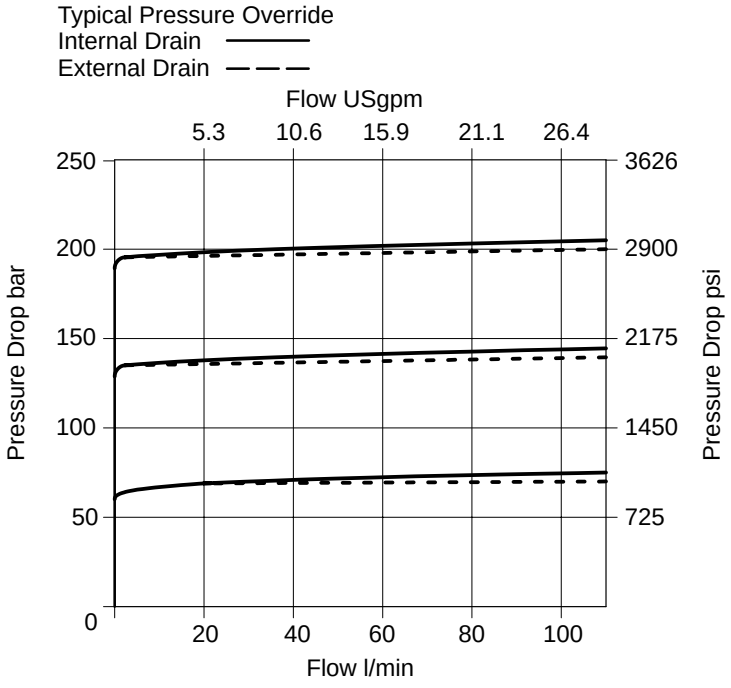



–10/–12 size 600 l/min (160 USgpm) max. flow

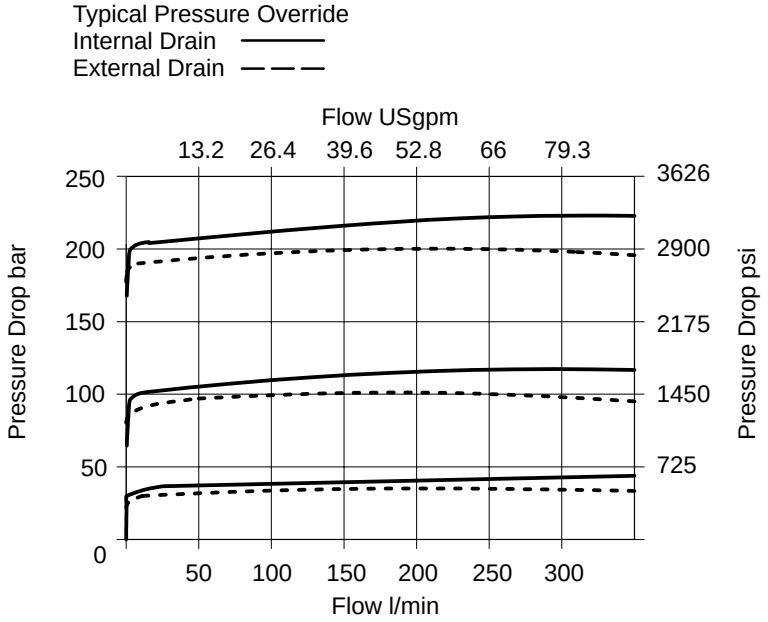
External drain
models only.

# Pressure Curves

**CPF1S-06**

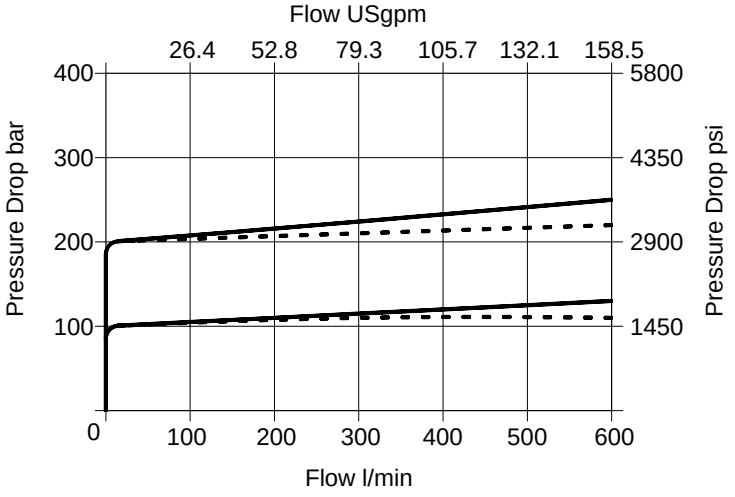



**CPF1S-08**



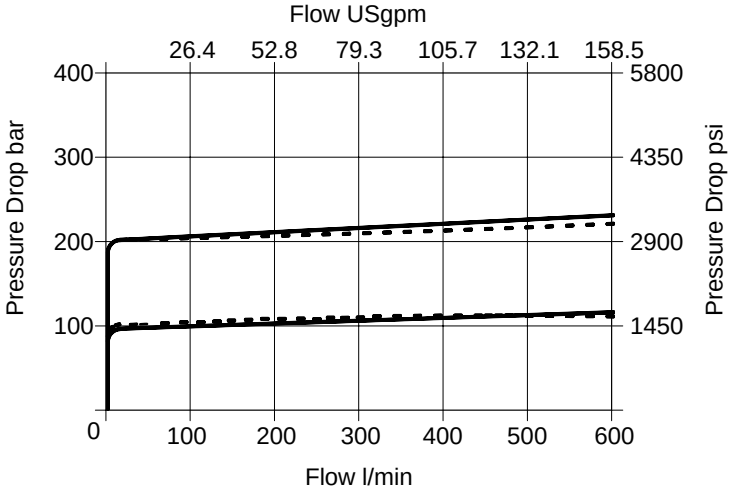
**CPF1S-10**

Typical Pressure Override
Internal Drain ——
External Drain - - - - -




**CPF1S-12**
**CPF1V-12**

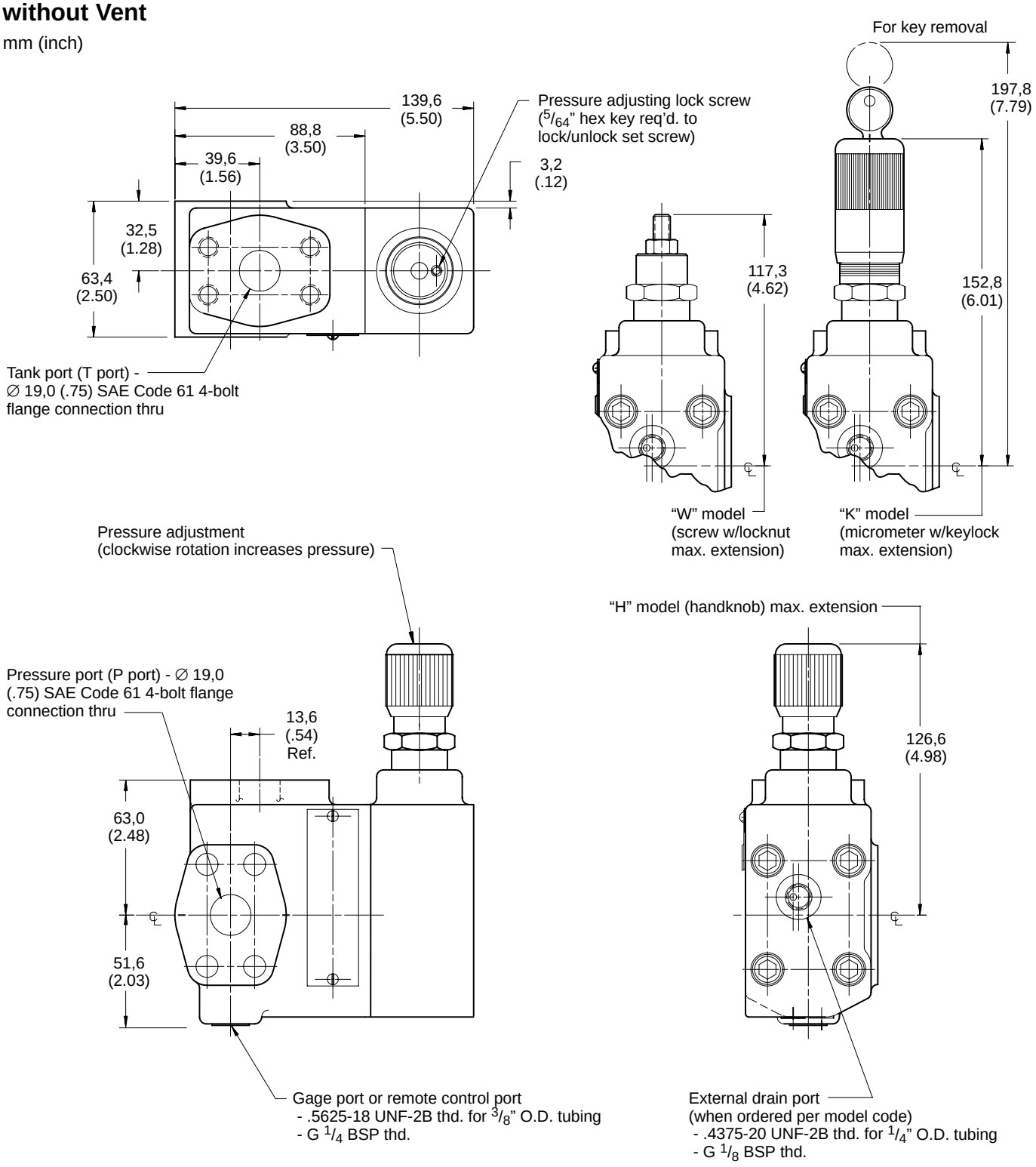
Typical Pressure Override
Internal Drain ——
External Drain - - - - -



# Installation Dimensions

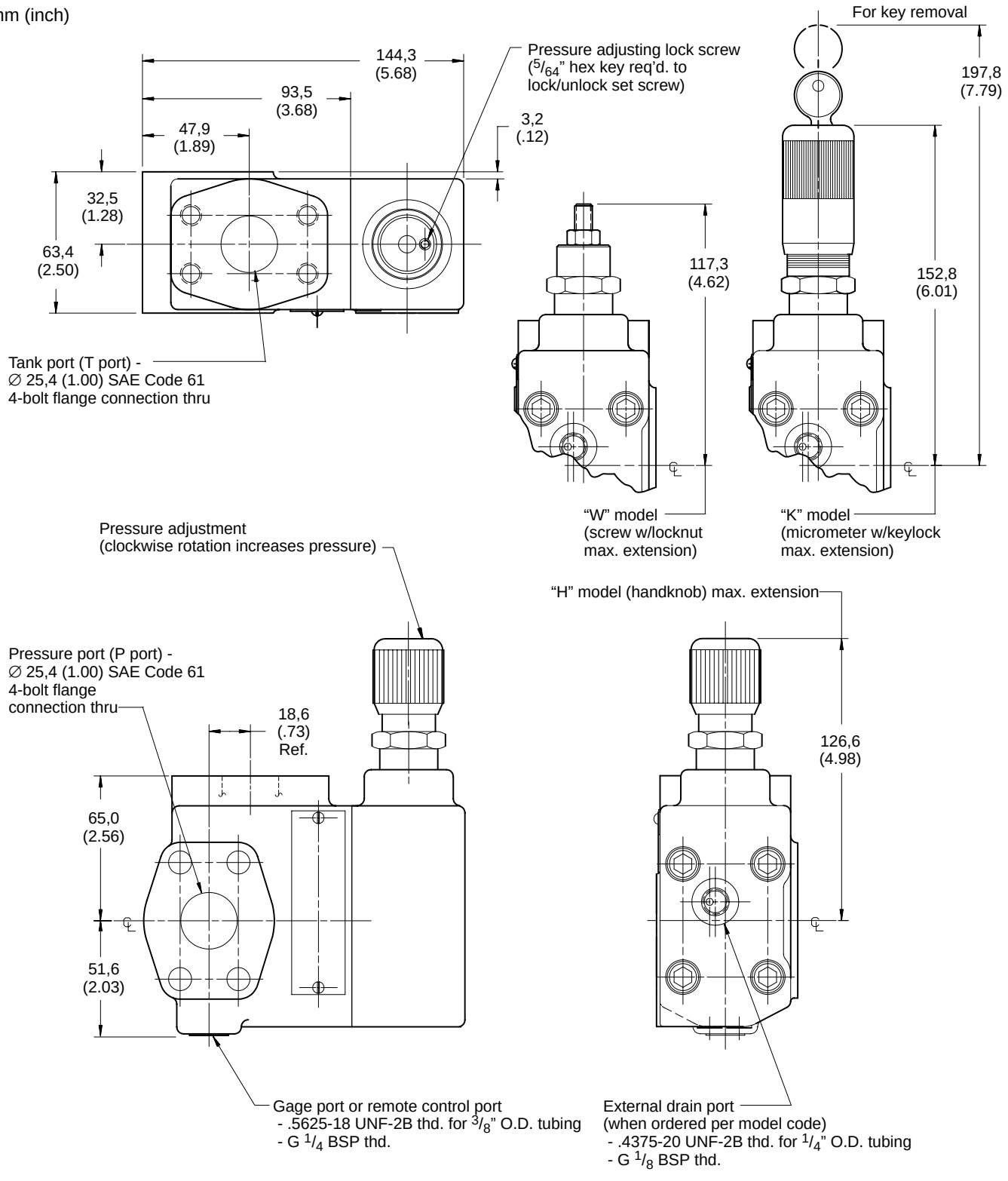
## CPF1S-06 $^{3}/_{4}$" Flange - Single Pressure Relief Valve without Vent

mm (inch)



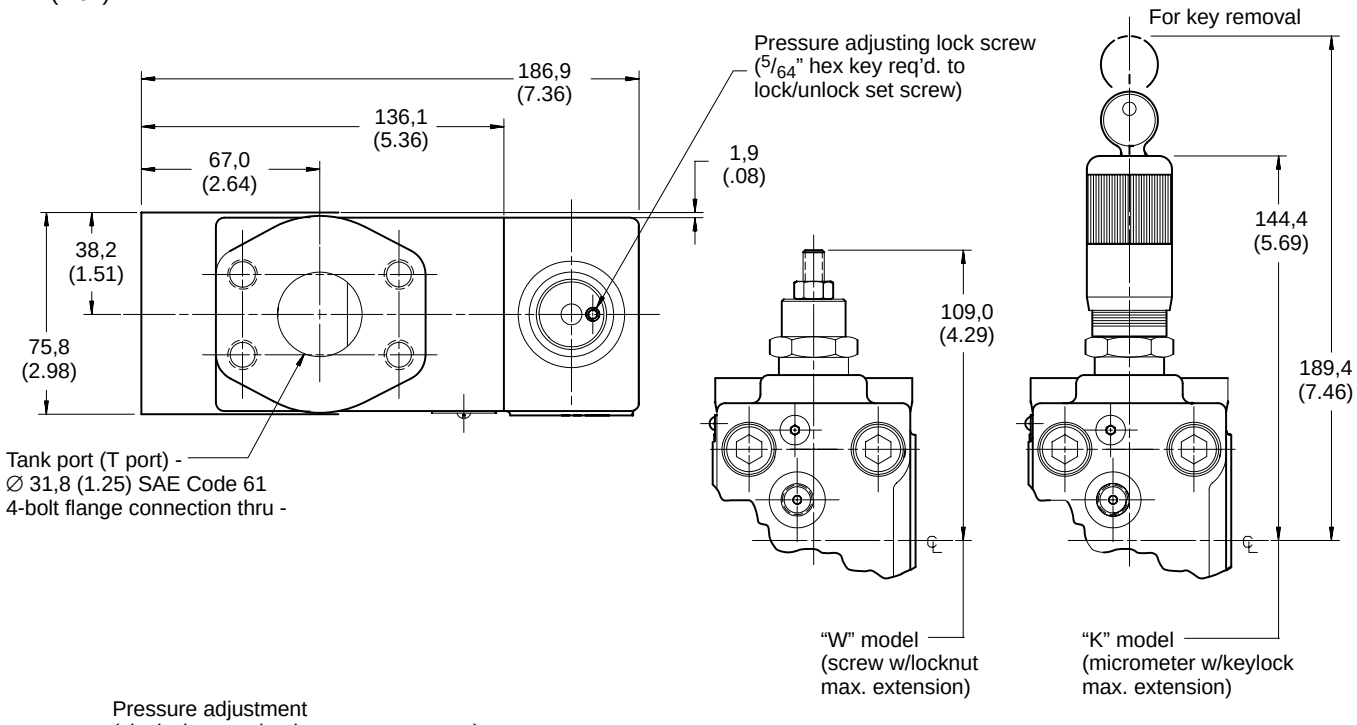
## CPF1S-08 1” Flange - Single Pressure Relief Valve without Vent

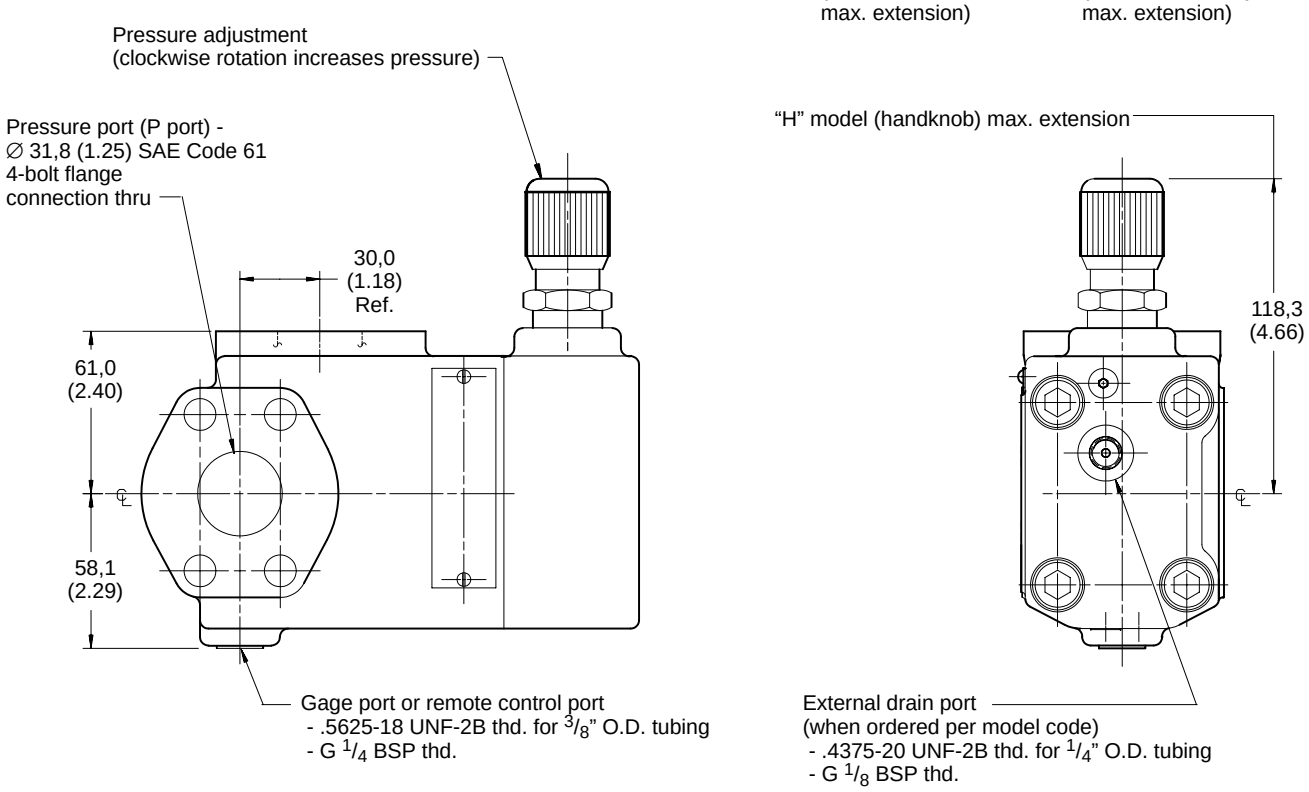
mm (inch)



## CPF1S-10 $1^1/_4$" Flange - Single Pressure Relief Valve Without Vent

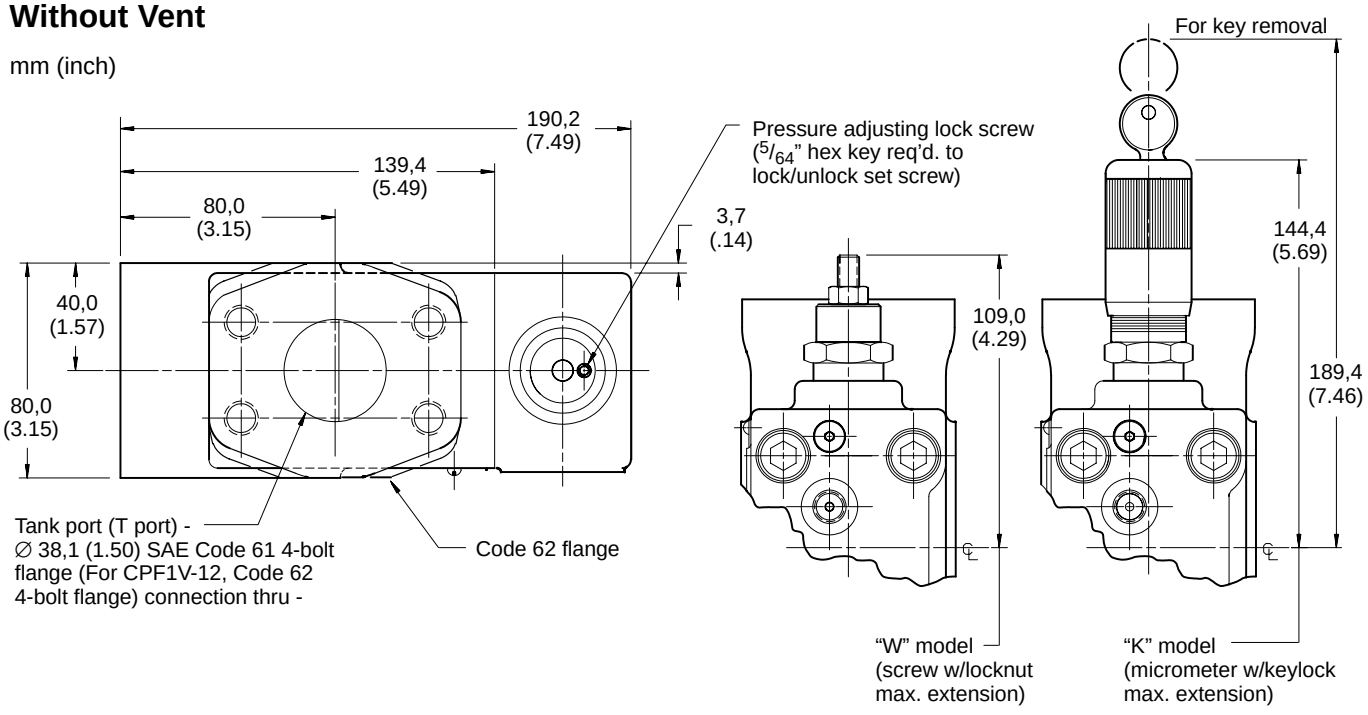
mm (inch)

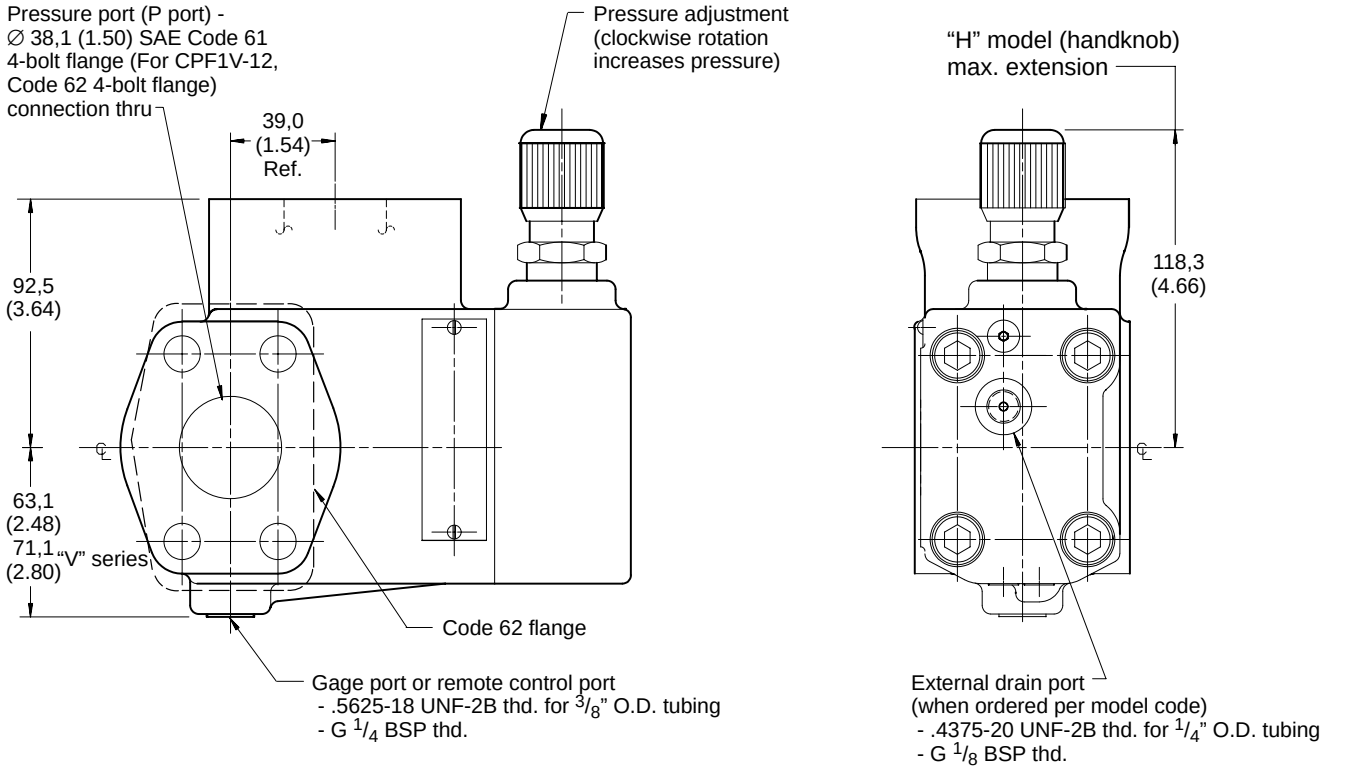


## CPF1S-12 – Code 61
## CPF1V-12 – Code 62
## $1^1/_2$" Flange -
## Single Pressure Relief Valve
## Without Vent

mm (inch)



# CPF2*-06/08/10/12-**-20

**Relief Valve with Venting**

## Flange Sizes

- 06 - $^{3}/_{4}$ inch flange
- 08 - 1 inch flange
- 10 - $1^{1}/_{4}$ inch flange
- 12 - $1^{1}/_{2}$ inch flange

### Benefits

- Excellent repeatability and stable performance from cartridge design mainstage parts.
- Reduced installed costs and space requirements.
- Easier installation and servicing of components.
- Pilot design minimizes response time and cracking flow which allows for high pressure stability thus increasing system productivity.
- Direct mounting to pump flange reduces potential leak points for superior leak resistance.

| Ratings | CPF2S–06 | CPF2S–08 | CPF2S–10 | CPF2S–12 |
|---|---|---|---|---|
| Maximum flow | 100 l/min (26 USgpm) | 300 l/min (80 USgpm) | 600 l/min (160 USgpm) | 600 l/min (160 USgpm) |
| Maximum pressure: | | | | |
| P port | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi)* |
| T port | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) |

* The CPF2V-12 (code 62 flange) has a max. P port pressure rating of 350 bar (5000 psi).

### Pilot Valve Max. T Port Pressure Rating

100 bar (1450 psi) for DG4V-3S valve
210 bar (3045 psi) for DG4V-3 valve AC
210 bar (3045 psi) for DG4V-3 valve DC

### Electrical Response

Electrical response is defined as the time from initiation of power to the solenoid, to the initiation of pressure rise, with 1,5 liters (.4 USgpm) of oil under compression:

**06 size –**
@100 l/min (26 USgpm) = DC - 200 ms
AC - 160 ms
**08 size –**
@300 l/min (80 USgpm) = DC - 210 ms
AC - 175 ms
**10/12 size -**
@300 l/min (80 USgpm) = DC - 180 ms
AC - 160 ms

### Hydraulic Response

**06 Size:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 3450 bar (50000 psi) /second. Maximum overshoot < 8%.

**08 Size:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 2900 bar (42000 psi) /second. Maximum overshoot < 10%.

**10/12 Sizes:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 2600 bar (37500 psi) /second. Maximum overshoot < 10%.

### General Description

This Vickers CPF2S relief valve features flange mounting for increased design flexibility and reduced external piping. The valve is designed for direct mounting on the SAE flange outlet port of a pump. Fewer leak points and SAE flange connections lead to installations with superior leak resistance.

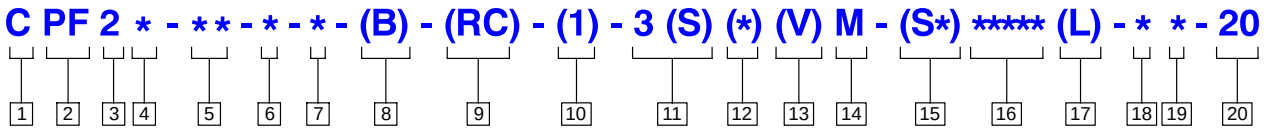
Pressure relief valves are used to limit or control pressure by directing system flow to the reservoir when system pressure reaches the setting of the valve. System overload is thereby prevented and peak pressures which could damage the pump and actuating components are eliminated.

The CPF2S relief valves also provide a means of limiting system pressure to the relatively low vented pressure by directing pilot flow to tank by de-energizing the solenoid operated DG4V–3 valve.

The CPF2S valve has excellent dynamic and steady state operating characteristics including stability, fast response and low pressure override. CPF relief valves are of two–stage design with a fast–acting poppet type main stage for simple, long–lasting and effective operation. The many available control options make it possible to choose the optimum valve model for each application.

# CPF2* Model Series

## Model Code




**1 Valve Function**

C - Relief

**2 Mounting Type**

PF - Pump flange mounting

**3 Unit Type**

2 - Single pressure with vent

**4 Flange Type**

S - SAE J518 4-bolt flange standard series code 61 (available in all sizes)
V - SAE J518 4-bolt high pressure series code 62 (size 12 only)

**5 Valve Size**

06 - $^{3}/_{4}$ inch
08 - 1 inch
10 - 1 $^{1}/_{4}$ inch
12 - 1 $^{1}/_{2}$ inch

**6 Pressure Range**

A - 10 - 50 bar (145 - 725 psi)
B - 10 - 100 bar (145 - 1450 psi)
F - 10 - 207 bar (145 - 3000 psi)
G - 10 - 275 bar (145 - 4000 psi) - 350 bar (5000 psi) - (CPF2V-12 models only)

**7 Control Type**

W - Screw adjust with locknut
H - Handknob adjust without key
K - Micrometer adjust with keylock

**8 Thread Type (remote control/Vent connection)**

Blank - SAE-6 O-ring boss port (.5625-18 UNF-2B thd.)
B - BSP-G $^{1}/_{4}$ ($^{1}/_{4}$" BSPF)

**9 Remote Control**

Blank - No remote control
RC - Remote control

**10 Pilot Drain**

Blank - Internal drain
1 - External drain

**11 Vent Valve**

3S - Standard performance
3 - High performance
Uses OBL type spool/spring. Other features are optional. Refer to Vickers literature # GB-C-2015B Solenoid Operated Directional Control Valves catalog.

**12 Manual Override Options**

**13 Solenoid Energization Identification**

**14 Electrical Options Flag**

**15 Spool Position Monitoring Switch**

**16 Solenoid Type/Electrical Connections**

**17 Indicator Lights**

**18 Coil Identification**

**19 Tank Rating Pressure**

2 - 10 bar (145 psi) for spool position indicator models.
5 - 100 bar (1450 psi) for standard performance models, DG4V-3S, with AC or DC solenoids.
6 - 207 bar (3000 psi) for high performance models, DG4V-3, with AC solenoids.
7 - 207 bar (3000 psi) for high performance models, DG4V-3 with DC solenoids.

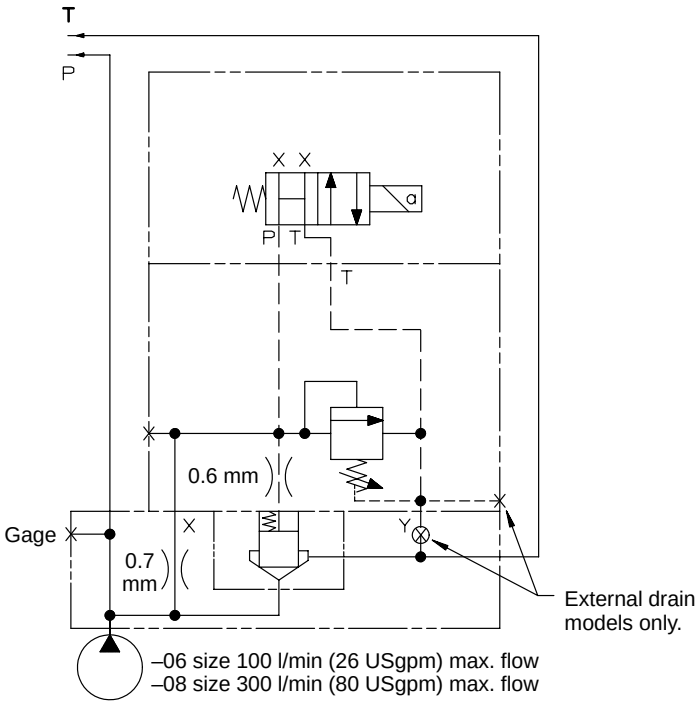
**20 Design Number, 20 series**

Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusive.

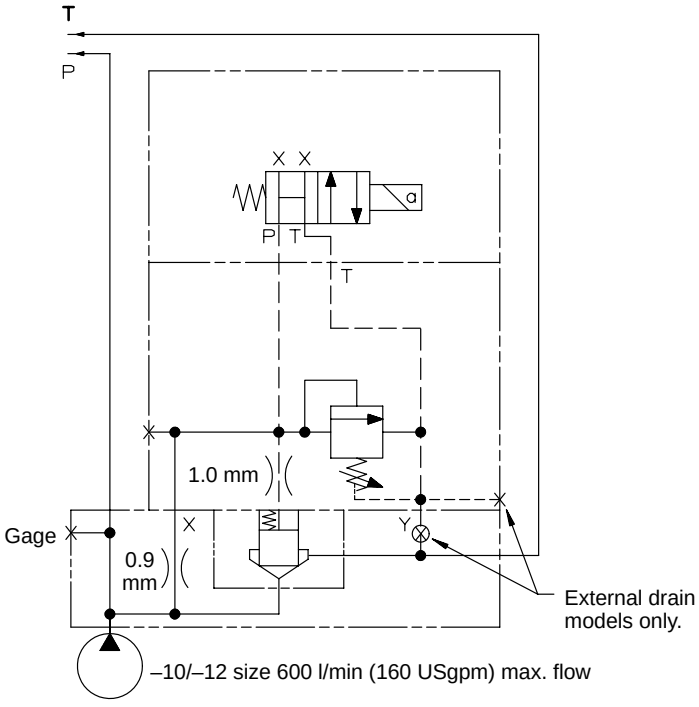
EN417 – Normally closed, energize to vent relief

# Circuit Schematics

**CPF2S-06/08-*-20**

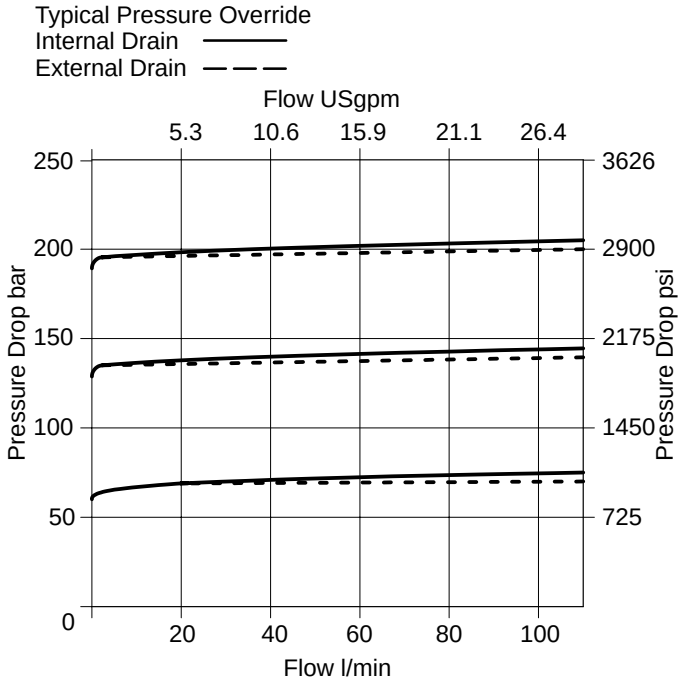


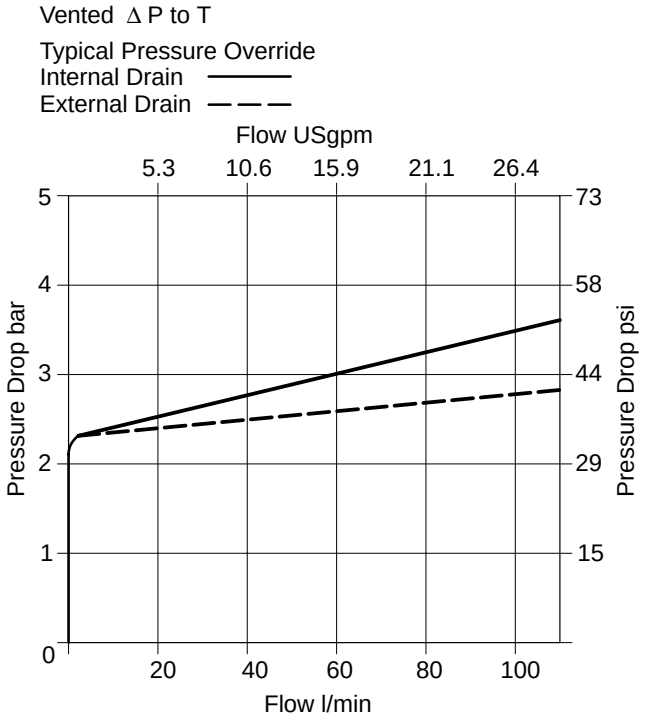

**CPF2S-10/12-*-20**
**CPF2V-12-*-20**



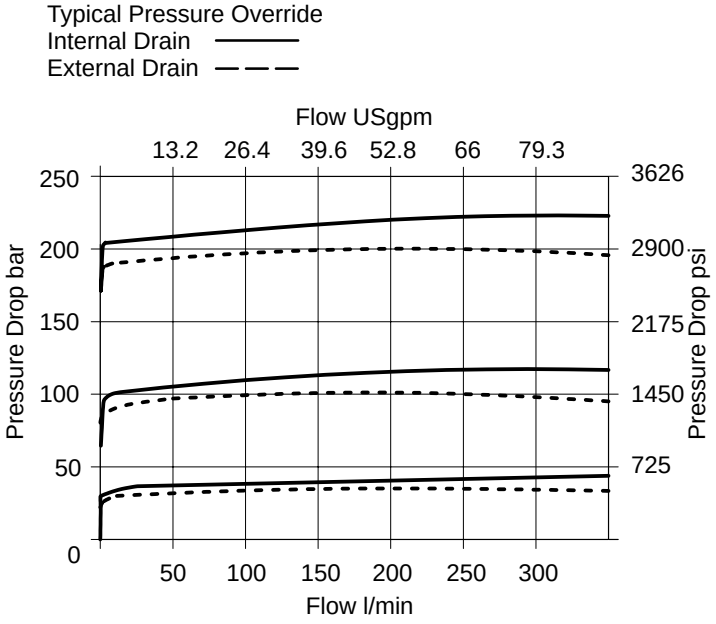
# Pressure Curves

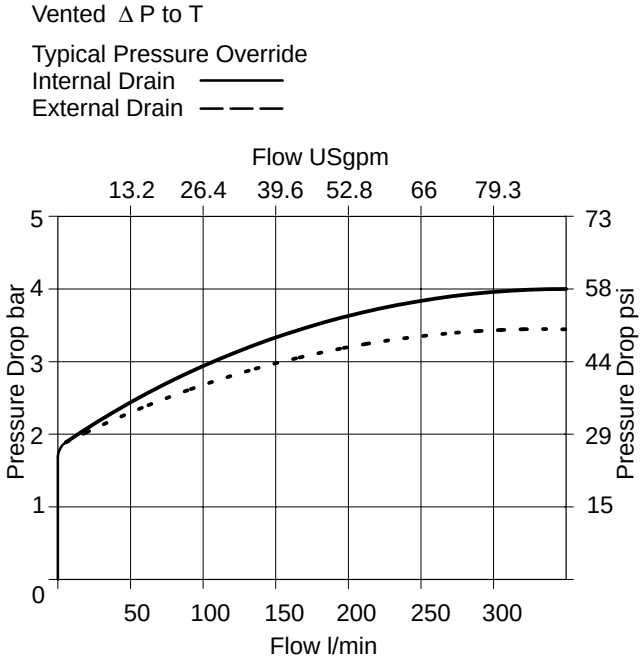
## CPF2S-06



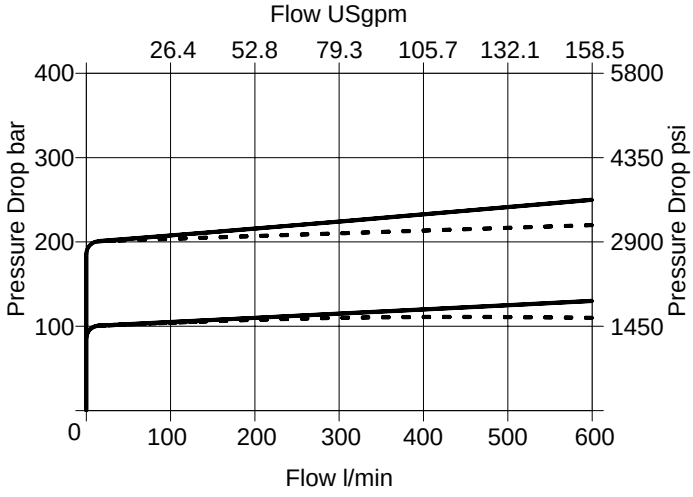

## CPF2S-08



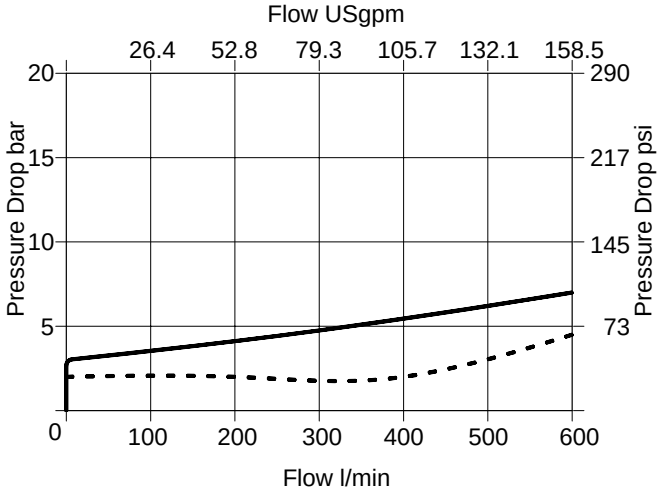



## CPF2S-10

Typical Pressure Override
Internal Drain ———
External Drain - - - - -

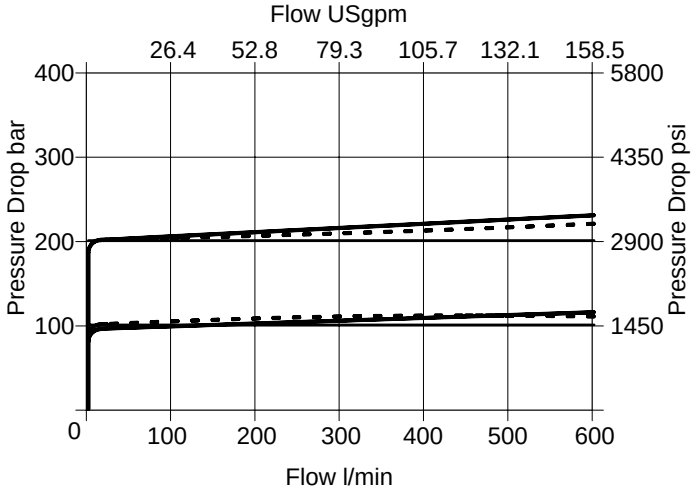



Vented ∆ P to T
Internal Drain ———
External Drain - - - - -

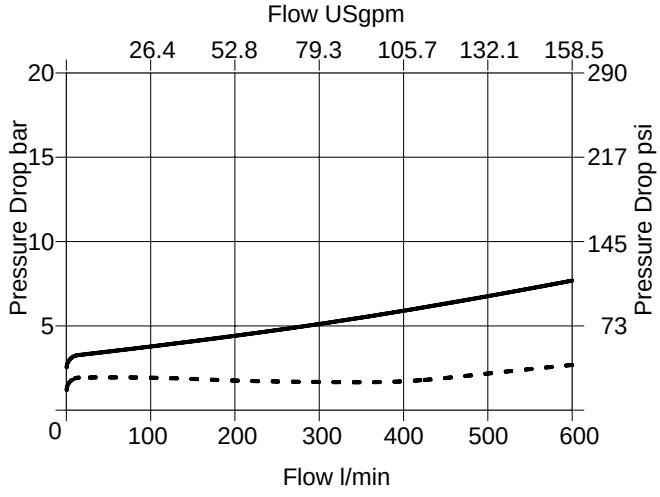



## CPF2S-12
## CPF2V-12

Typical Pressure Override
Internal Drain ———
External Drain - - - - -



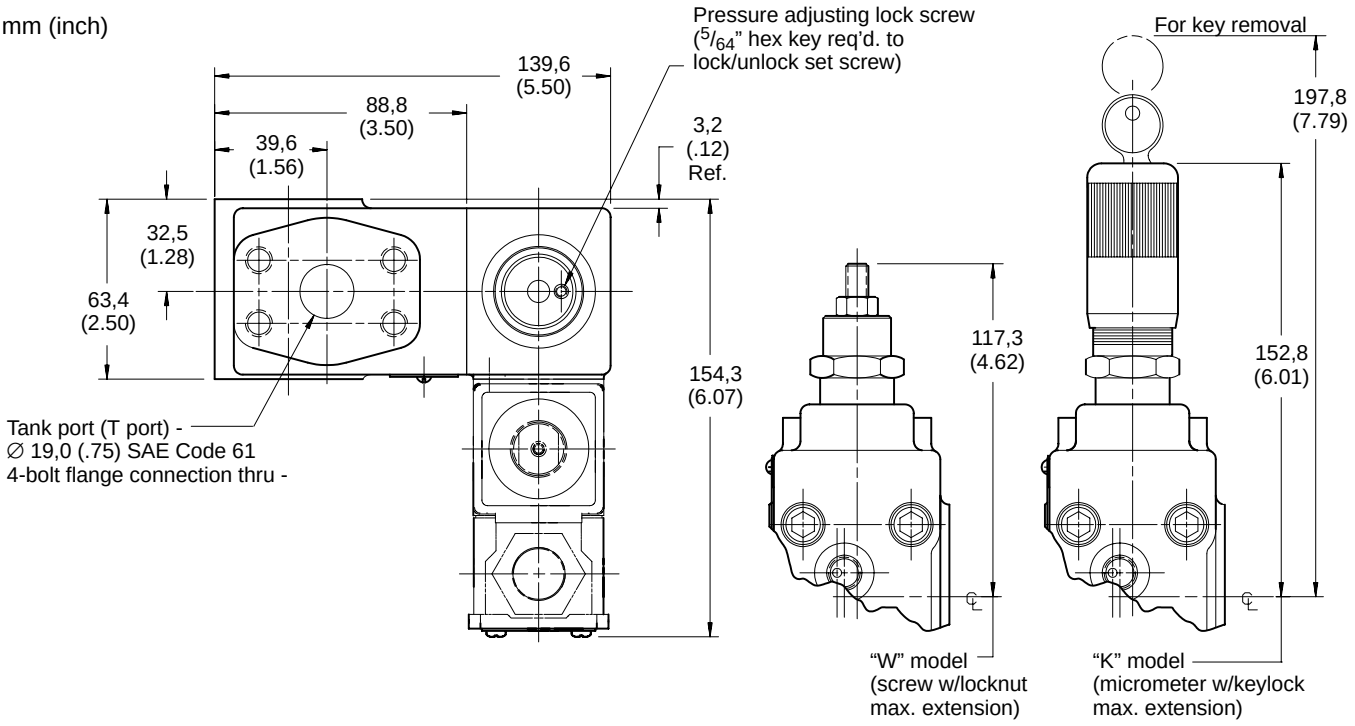

Vented ∆ P to T
Internal Drain ———
External Drain - - - - -

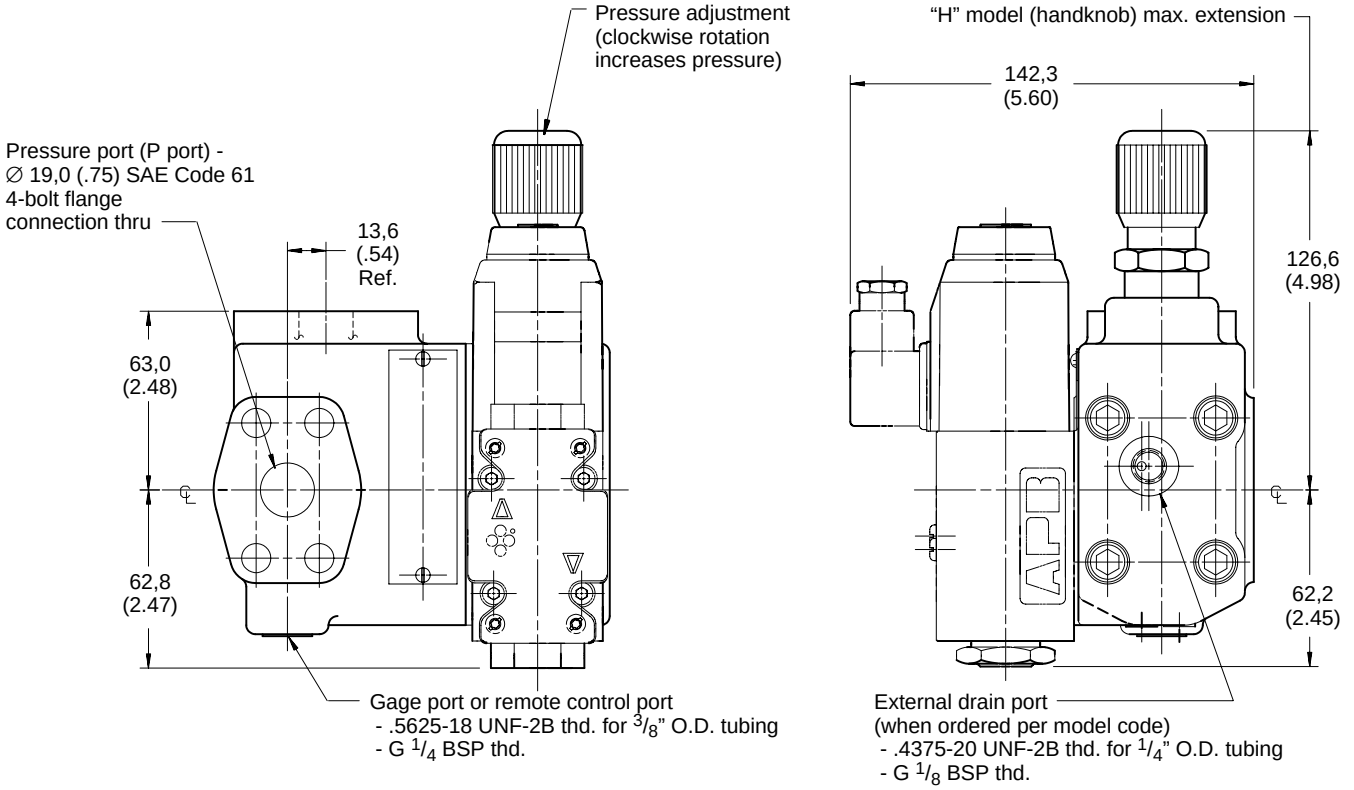


# Installation Dimensions

## CPF2S-06 $^{3}/_{4}$" Flange - Single Pressure Relief Valve With Vent

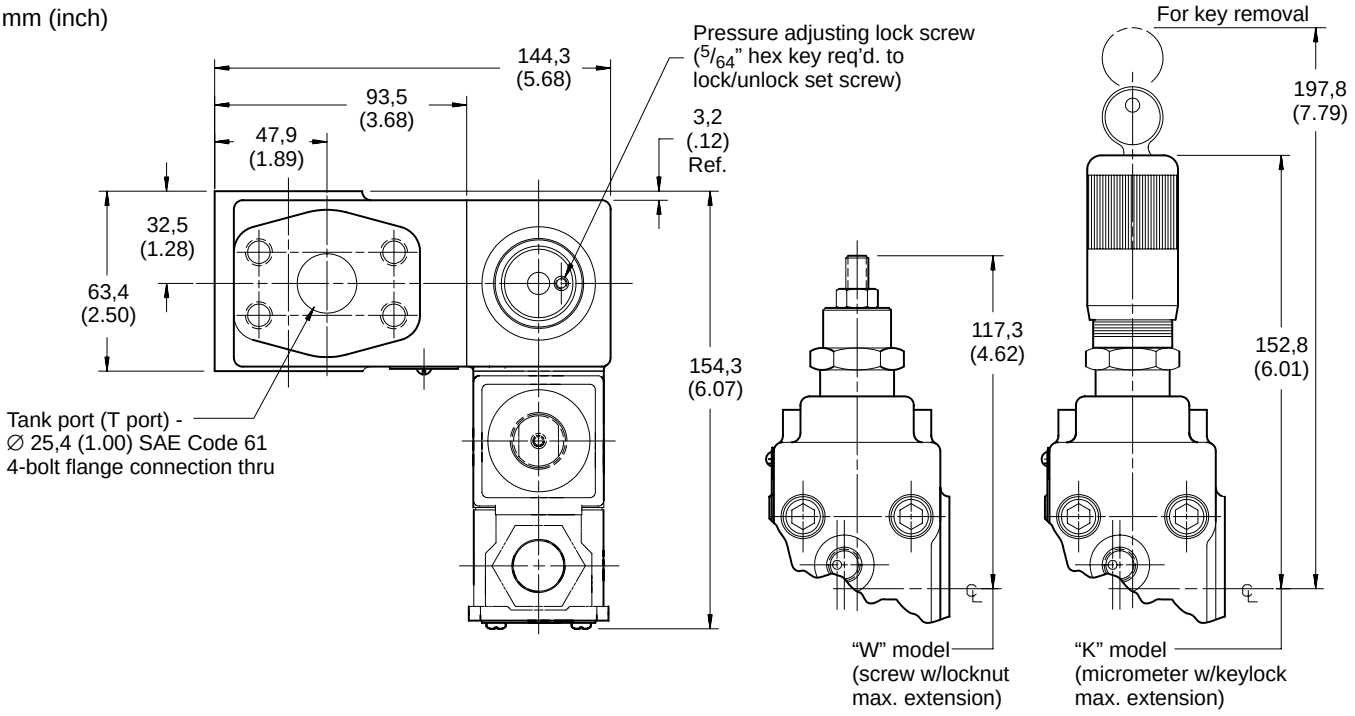
mm (inch)

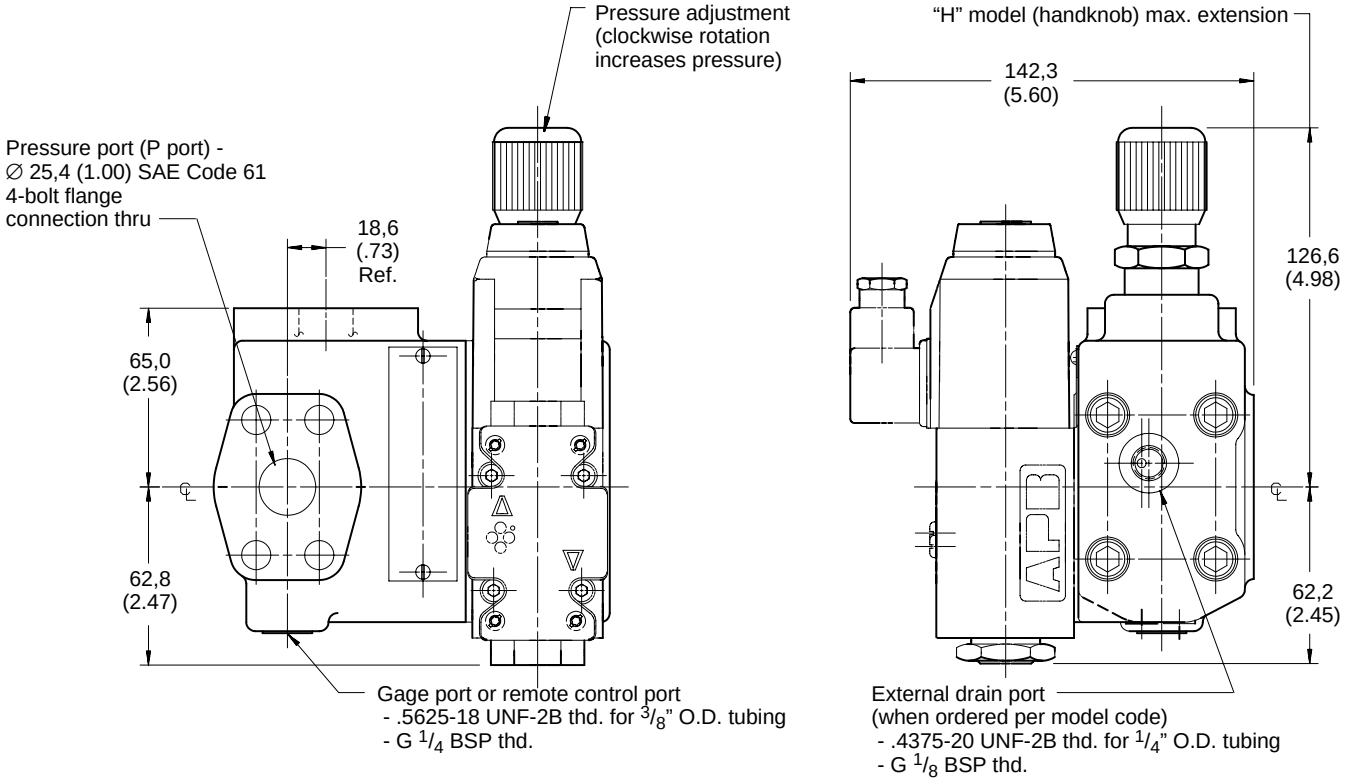


## CPF2S-08 1” Flange - Single Pressure Relief Valve With Vent

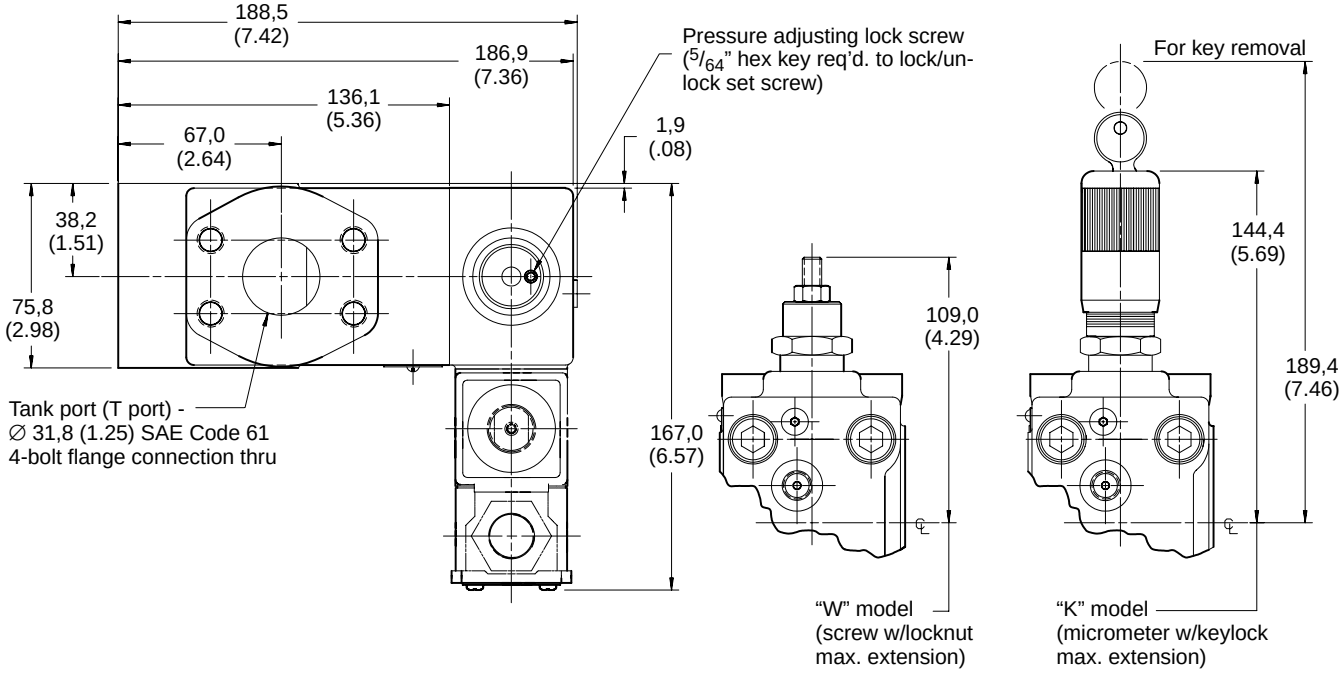
mm (inch)

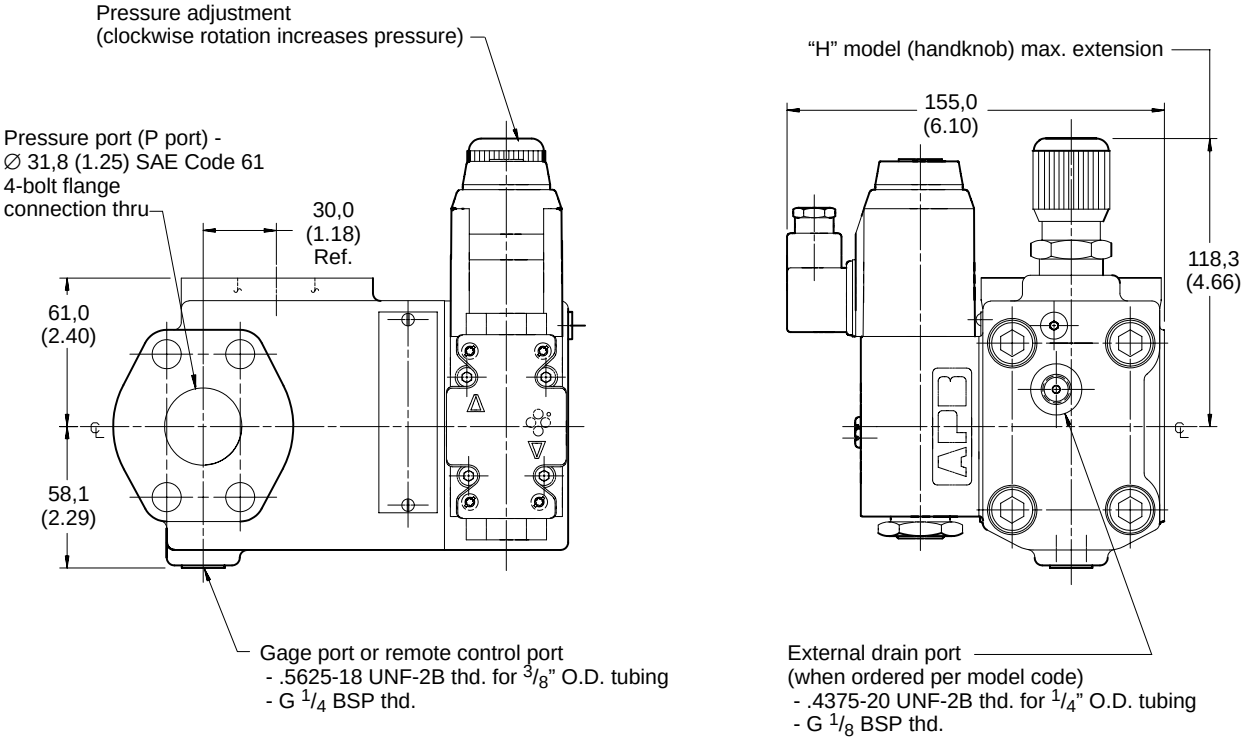


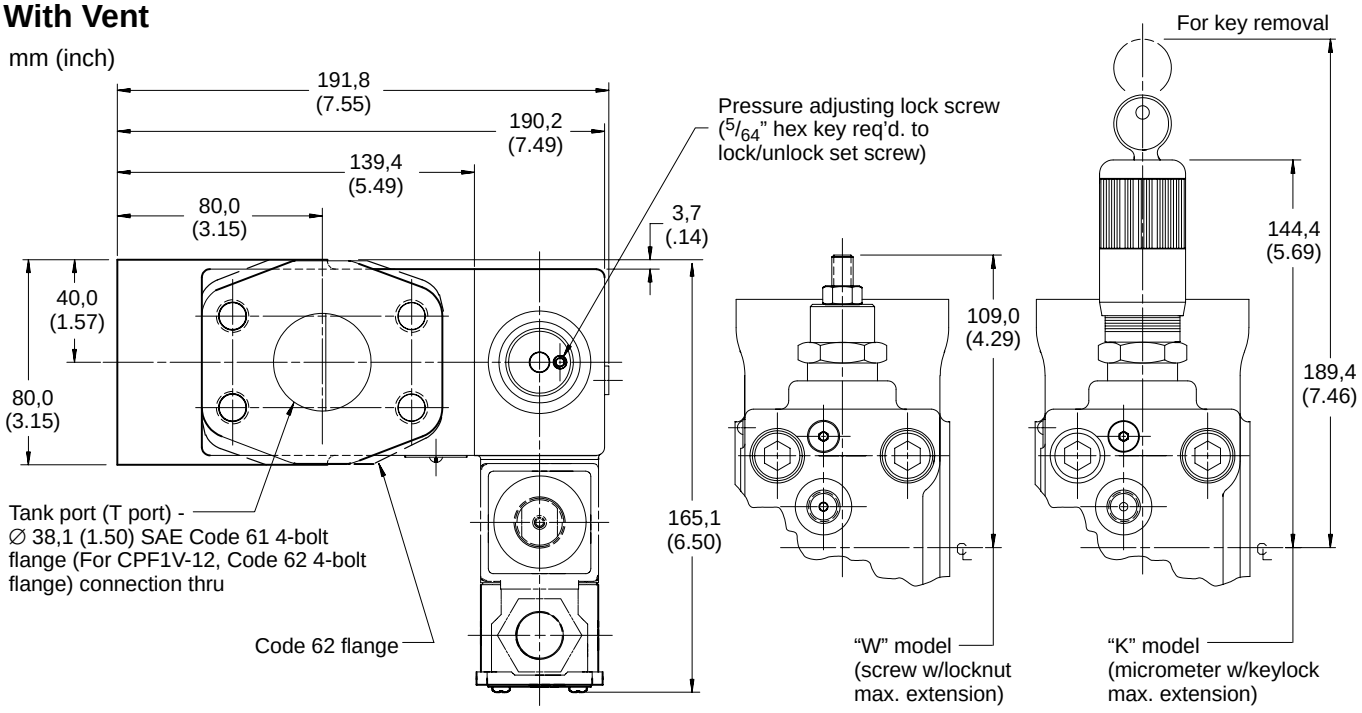
## CPF2S-10 $1^{1}/_{4}$" Flange - Single Pressure Relief Valve With Vent

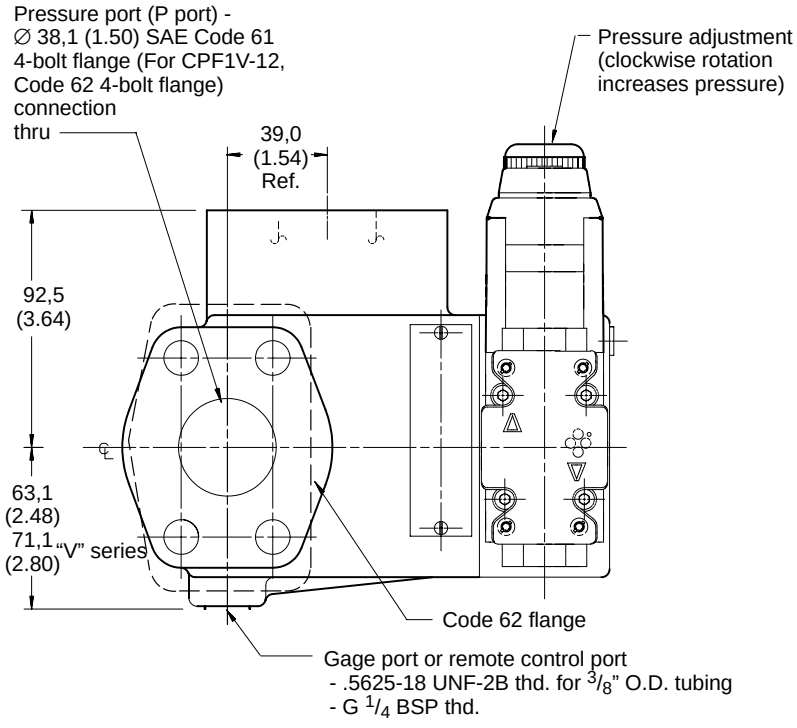
mm (inch)

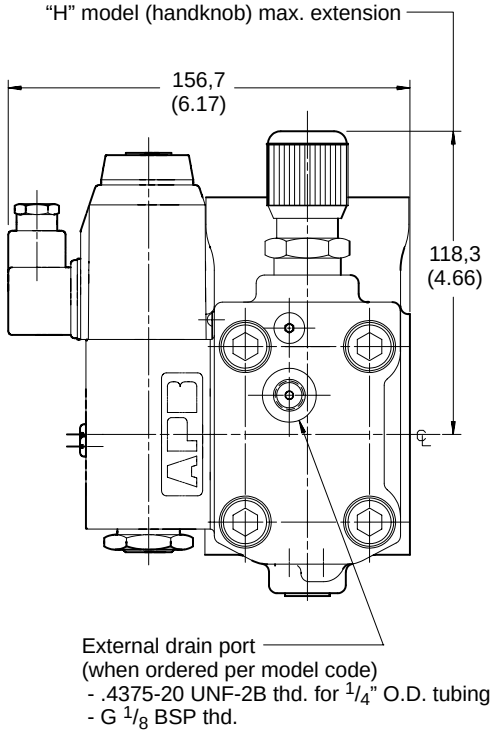


## CPF2S-12 – Code 61
## CPF2V-12 – Code 62
## $1^1/_2$" Flange -
## Single Pressure Relief Valve
## With Vent



# CPF3/4*-06/08/10/12-**-20

**Bi-Pressure & Tri-Pressure Relief Valves With Venting**

## Flange Sizes

- 06 - $^{3}/_{4}$ inch flange
- 08 - 1 inch flange
- 10 - $1^{1}/_{4}$ inch flange
- 12 - $1^{1}/_{2}$ inch flange

### Benefits

- Excellent repeatability and stable performance from cartridge design mainstage parts.
- Reduced installed costs and space requirements.
- Easier installation and servicing of components.
- Pilot design minimizes response time and cracking flow which allows for high pressure stability thus increasing system productivity.
- Direct mounting to pump flange reduces potential leak points for superior leak resistance.

| Ratings | CPF3/4S–06 | CPF3/4S–08 | CPF3/4S–10 | CPF3/4S–12 |
|---|---|---|---|---|
| Maximum flow | 100 l/min (26 USgpm) | 300 l/min (80 USgpm) | 600 l/min (160 USgpm) | 600 l/min (160 USgpm) |
| Maximum pressure: | | | | |
| P port | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi)* |
| T port | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) |

* The CPF2V-12 (code 62 flange) has a max. P port pressure rating of 350 bar (5000 psi).

### Pilot Valve Max. T Port Pressure Rating

100 bar (1450 psi) for DG4V-3S valve
210 bar (3045 psi) for DG4V-3 valve AC
210 bar (3045 psi) for DG4V-3 valve DC

### Electrical Response

Electrical response is defined as the time from initiation of power to the solenoid, to the initiation of pressure rise, with 1,5 liters (.4 USgpm) of oil under compression:

**06 size –**
@100 l/min (26 USgpm) = DC - 200 ms
AC - 160 ms
**08 size –**
@300 l/min (80 USgpm) = DC - 210 ms
AC - 175 ms
**10/12 size -**
@300 l/min (80 USgpm) = DC - 180 ms
AC - 160 ms

### Hydraulic Response

**06 Size:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 3450 bar (50000 psi) /second. Maximum overshoot < 8%.

**08 Size:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 2900 bar (42000 psi) /second. Maximum overshoot < 10%.

**10/12 Sizes:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 2600 bar (37500 psi) /second. Maximum overshoot < 10%.

### General Description

This Vickers CPF3/4S relief valve features flange mounting for increased design flexibility and reduced external piping. The valve is designed for direct mounting on the SAE flange outlet port of a pump. Fewer leak points and SAE flange connections lead to installations with superior leak resistance.

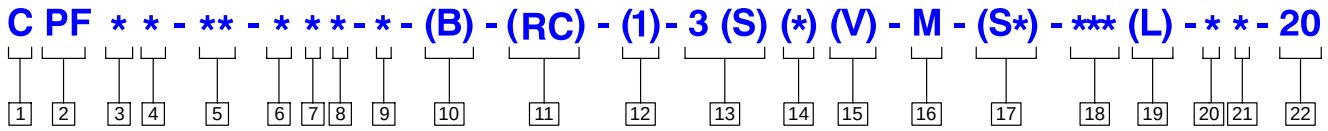
Pressure relief valves are used to limit or control pressure by directing system flow to the reservoir when system pressure reaches the setting of the valve. System overload is thereby prevented and peak pressures which could damage the pump and actuating components are eliminated.

This valve features an integrally mounted 3-position solenoid vent valve which requires no additional piping. Energizing the “a” or “b” solenoid selects pressure setting (2) or (1) respectively. With neither solenoid energized the relief valve is vented to limit system pressure to the maximum vent pressure. The CPF4S tri-pressure relief valve is a pressure control unit which can be used to electrically select any one of three preset pressures, or two pressures and vent with the CPF3S.

The CPF3/4S valve has excellent dynamic and steady state operating characteristics including stability, fast response and low pressure override. CPF relief valves are of two-stage design with a fast–acting poppet type main stage for simple, long-lasting and effective operation. The many available control options make it possible to choose the optimum valve model for each application.

# CPF3/4* Model Series

## Model Code




### 1 Valve Function

C - Relief

### 2 Mounting Type

PF - Pump flange mounting

### 3 Unit Type

3 - Bi-pressure with max. pressure override
4 - Tri-pressure

### 4 Flange Type

S - SAE J518 4-bolt flange standard series code 61 (available all sizes)
V - SAE J518 4-bolt high pressure series code 62 (size 12 only)

### 5 Valve Size

06 - $^{3}/_{4}$ inch
08 - 1 inch
10 - 1 $^{1}/_{4}$ inch
12 - 1 $^{1}/_{2}$ inch

### 6 Head 1 Pressure Range

A - 10 - 50 bar (145 - 725 psi)
B - 10 - 100 bar (145 - 1450 psi)
F - 10 - 207 bar (145 - 3000 psi)
G - 10 - 275 bar (145 - 4000 psi)
350 bar (5000 psi) - (CPF*V-12 models only)

### 7 Head 2 Pressure Range

A - 10 - 50 bar (145 - 725 psi)
B - 10 - 100 bar (145 - 1450 psi)
F - 10 - 207 bar (145 - 3000 psi)
G - 10 - 275 bar (145 - 4000 psi)
350 bar (5000 psi) - (CPF*V-12 models only)

### 8 Head 3 Pressure Range

A - 10 - 50 bar (145 - 725 psi)
B - 10 - 100 bar (145 - 1450 psi)
F - 10 - 207 bar (145 - 3000 psi)
G - 10 - 275 bar (145 - 4000 psi)
350 bar (5000 psi) - (CPF*V-12 models only)

Note: Head 3 is the maximum pressure override adjustment. The pressure range selection should be at least 17 bar (250 psi) higher than those for Heads 1 and 2.

### 9 Control Type

W - Screw adjust with locknut
H - Handknob adjust without key
K - Micrometer adjust with keylock

### 10 Thread Type

Remote Control/Vent Connection
Blank - SAE-6 O-ring boss port (.5625-18 UNF-2B thd.)
B - BSP-G $^{1}/_{4}$ ($^{1}/_{4}$" BSPF)

### 11 Remote Control

Blank - No remote control
RC - Remote Control

### 12 Pilot Drain

Blank - Internal drain
1 - External drain

### 13 Vent Valve

3S - Standard performance
3 - High performance
Uses 0C type spool/spring for CPF3 and 2C type spool/spring for CPF4; other features are optional. Refer to Vickers literature # GB-C-2015B Solenoid Operated Directional Control Valves catalog.

### 14 Manual Override Options

### 15 Solenoid Energization Identification

### 16 Electrical Options Flag

### 17 Spool Position Monitoring Switch

### 18 Solenoid Type/Electrical Connections

### 19 Indicator Lights

### 20 Coil Voltage Identification

### 21 Tank Rating Pressure

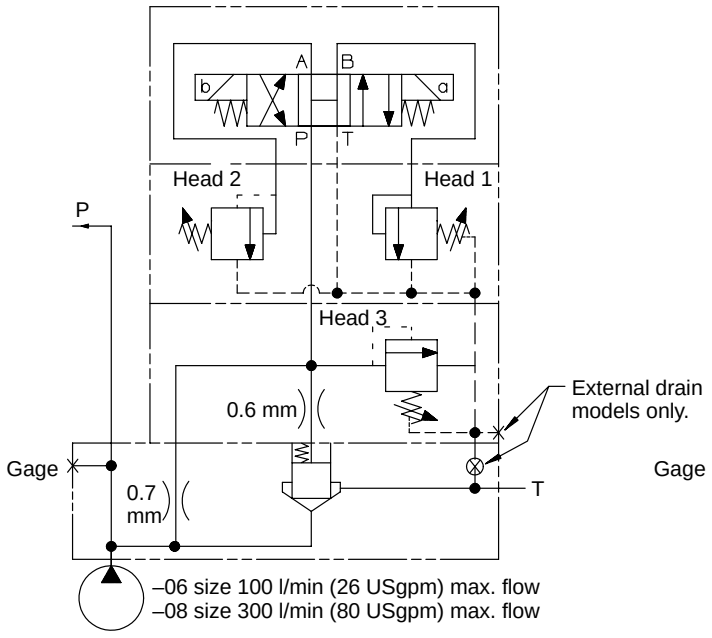
2 - 10 bar (145 psi) for spool position indicator models.
5 - 100 bar (1450 psi) for standard performance models, DG4V-3S, with AC or DC solenoids.
6 - 207 bar (3000 psi) for high performance models, DG4V-3, with AC solenoids.
7 - 207 bar (3000 psi) for high performance models, DG4V-3 with DC solenoids.

### 22 Design Number, 20 Series

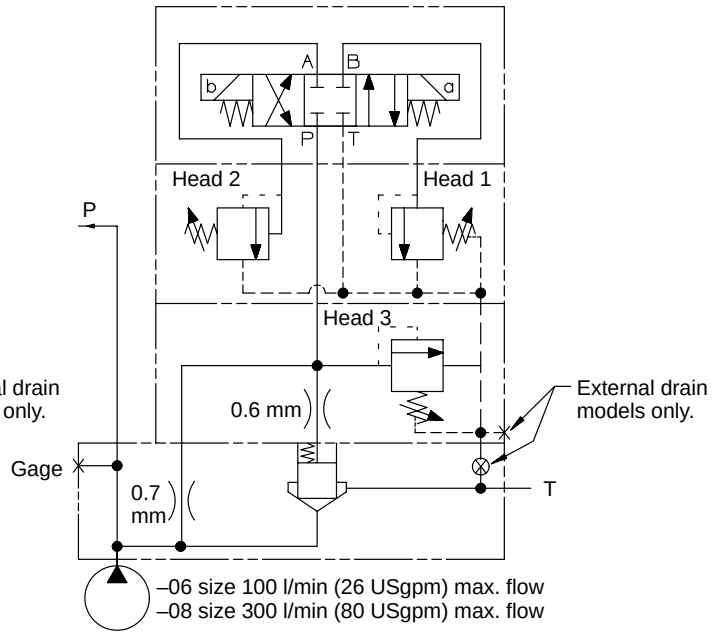
Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusive.

# Circuit Schematics

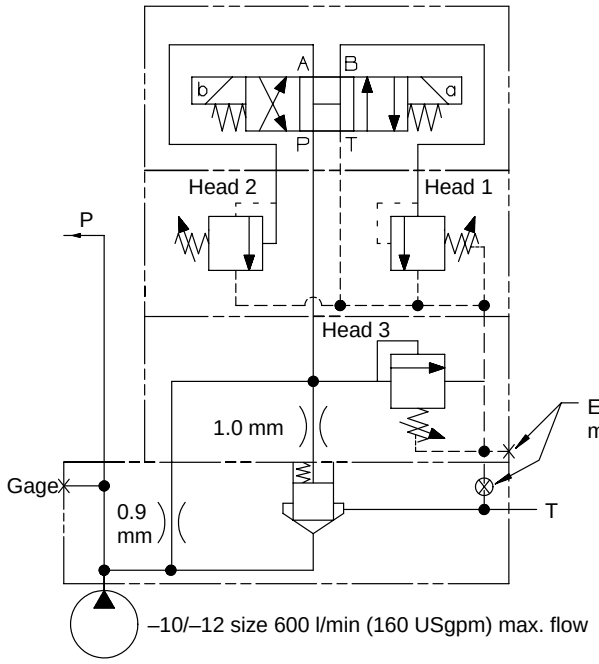
**CPF3S-06/08-*-20**



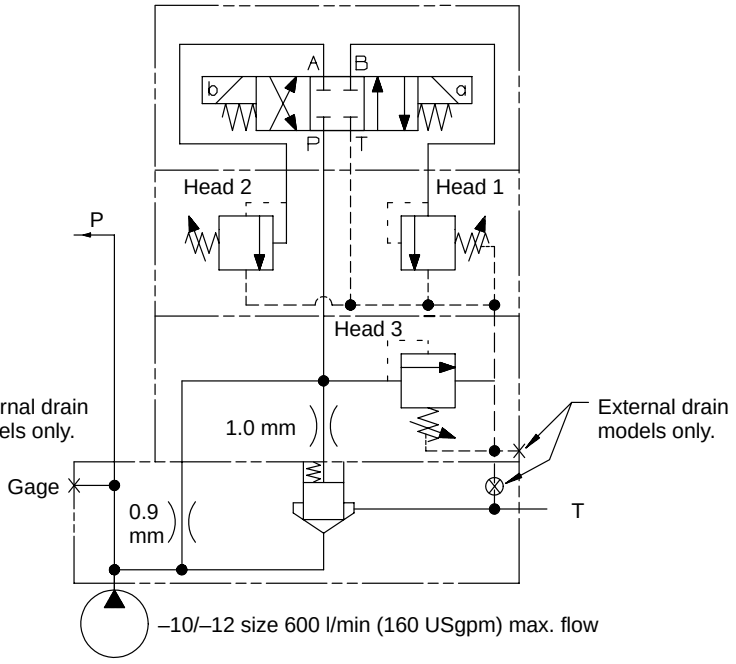

**CPF4S-06/08-*-20**




**CPF3S-10/12-*-20**
**CPF3V-12-*-20**

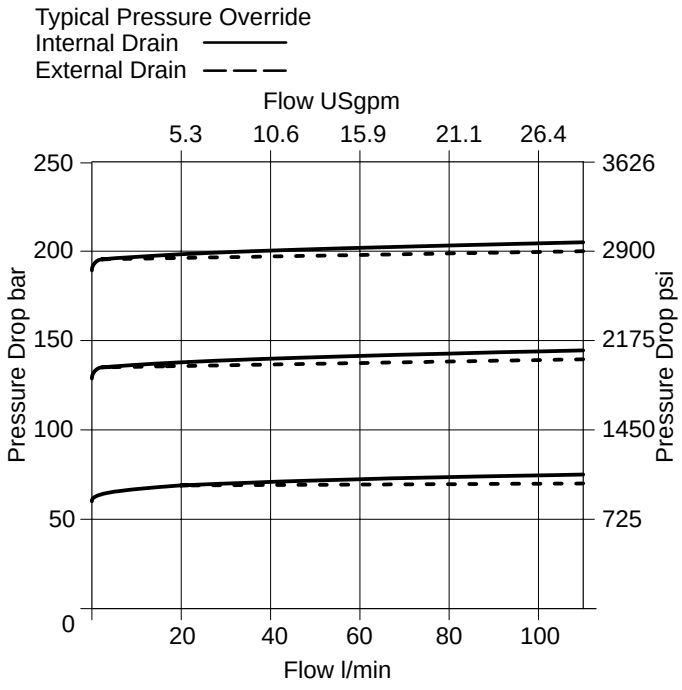


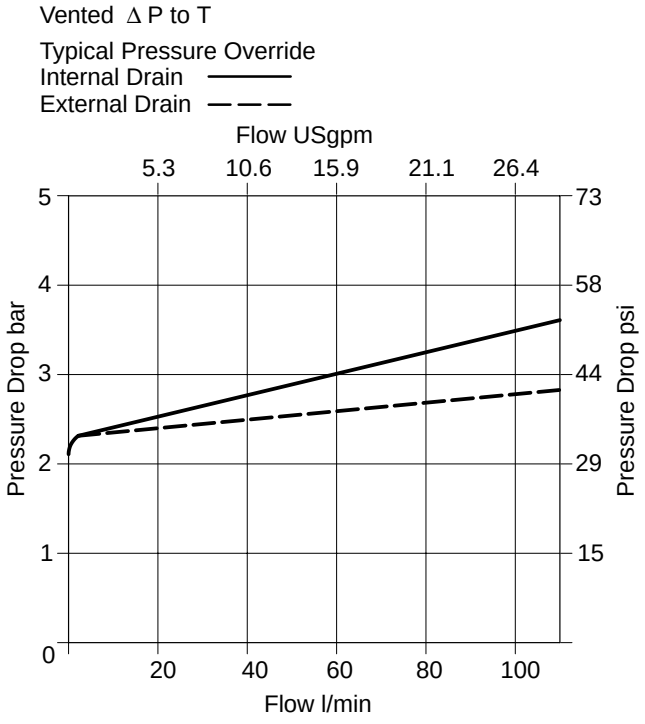

**CPF4S-10/12-*-20**
**CPF4V-12-*-20**



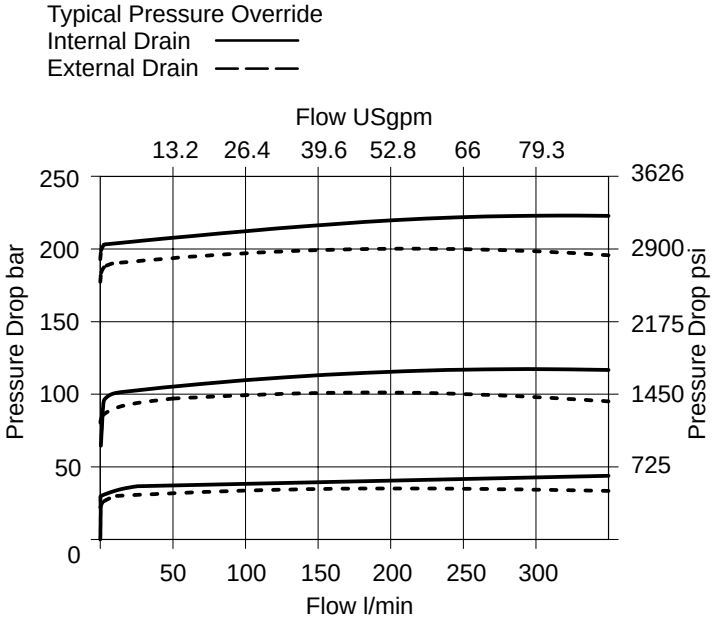
# Pressure Curves

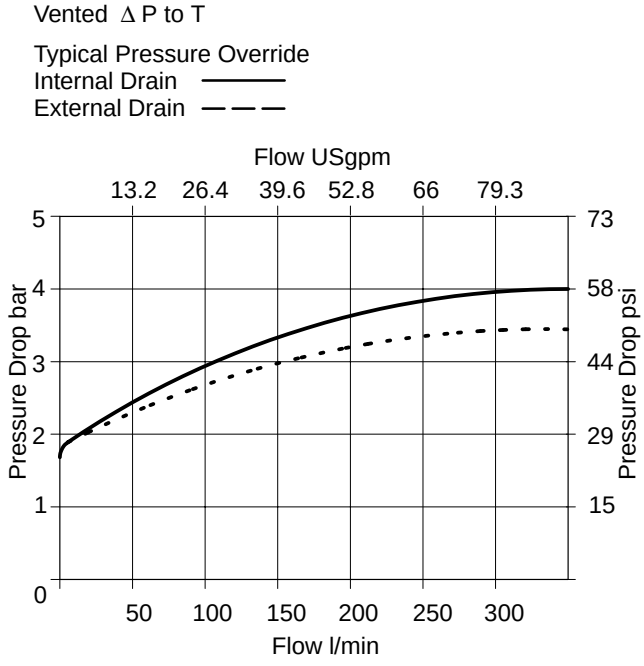
## CPF3/4S-06



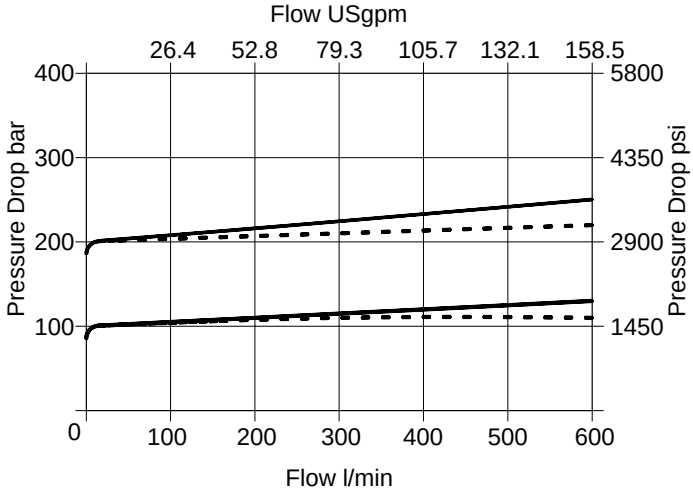

## CPF3/4S-08



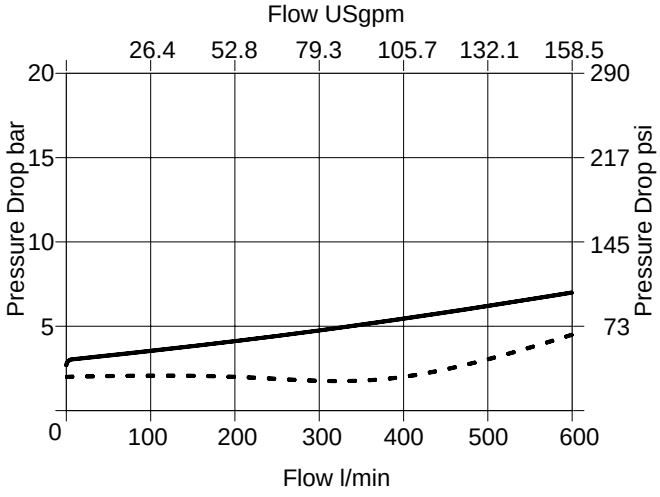



**CPF3/4S-10**

Typical Pressure Override
Internal Drain ———
External Drain - - - - -

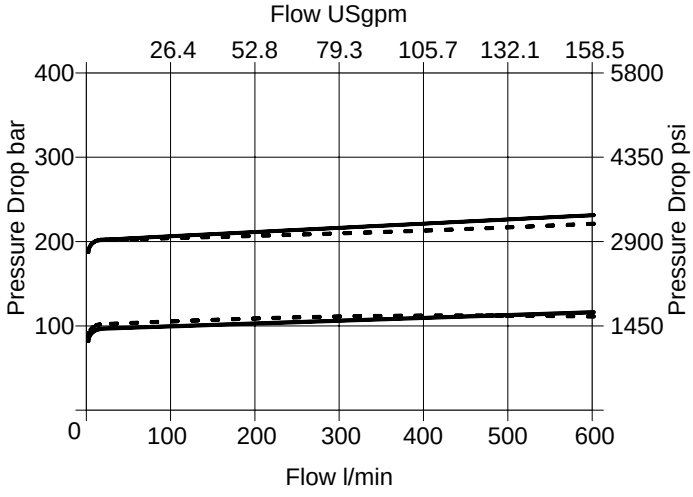



Vented ∆ P to T
Internal Drain ———
External Drain - - - - -

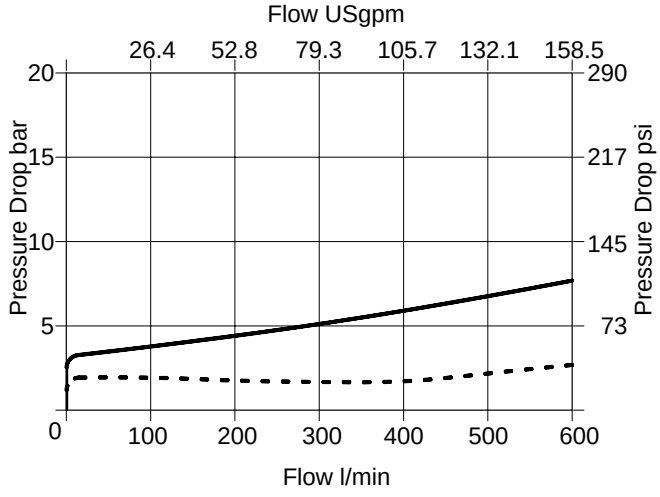



**CPF3/4S-12**
**CPF3/4V-12**

Typical Pressure Override
Internal Drain ———
External Drain - - - - -

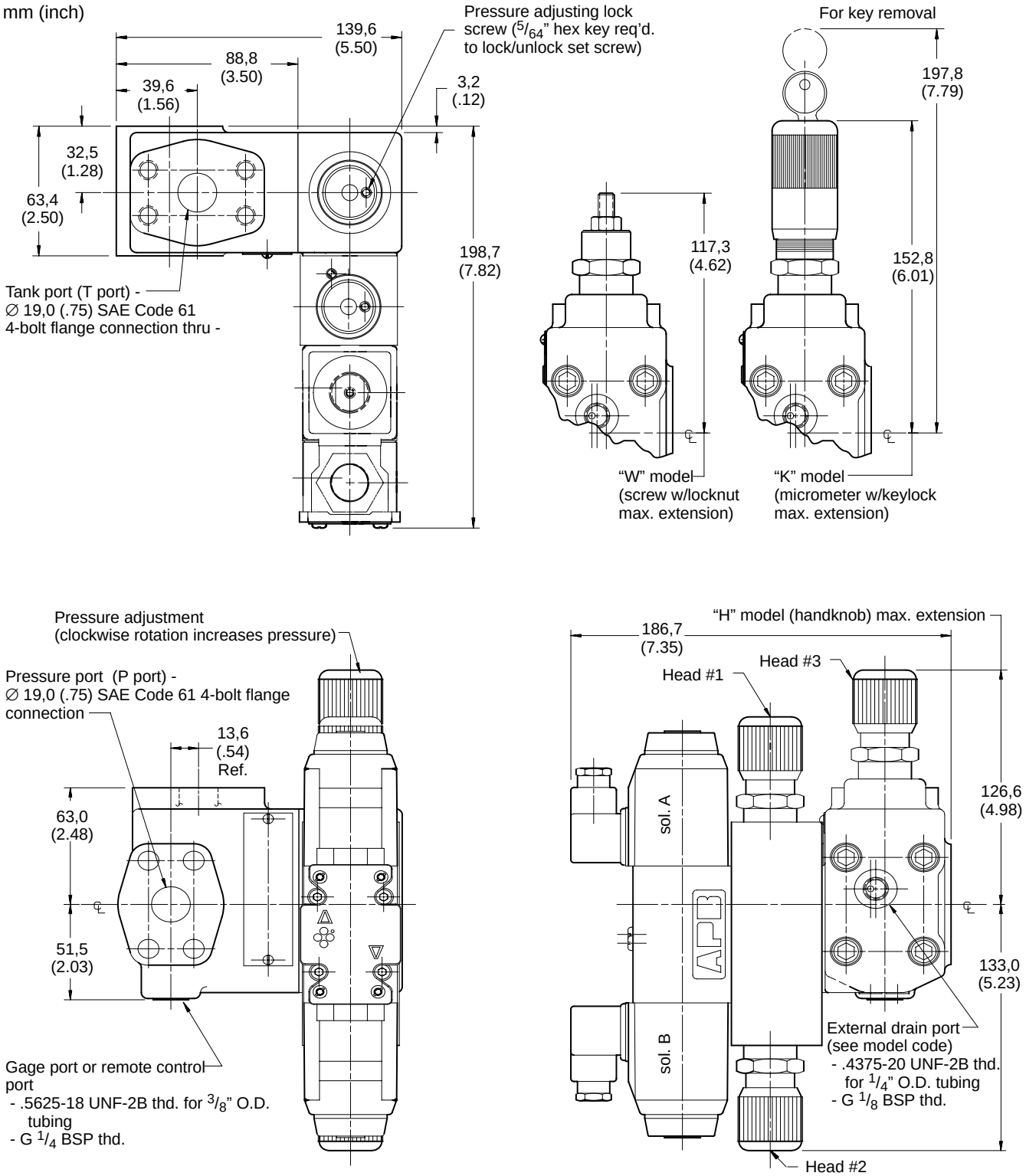



Vented ∆ P to T
Internal Drain ———
External Drain - - - - -



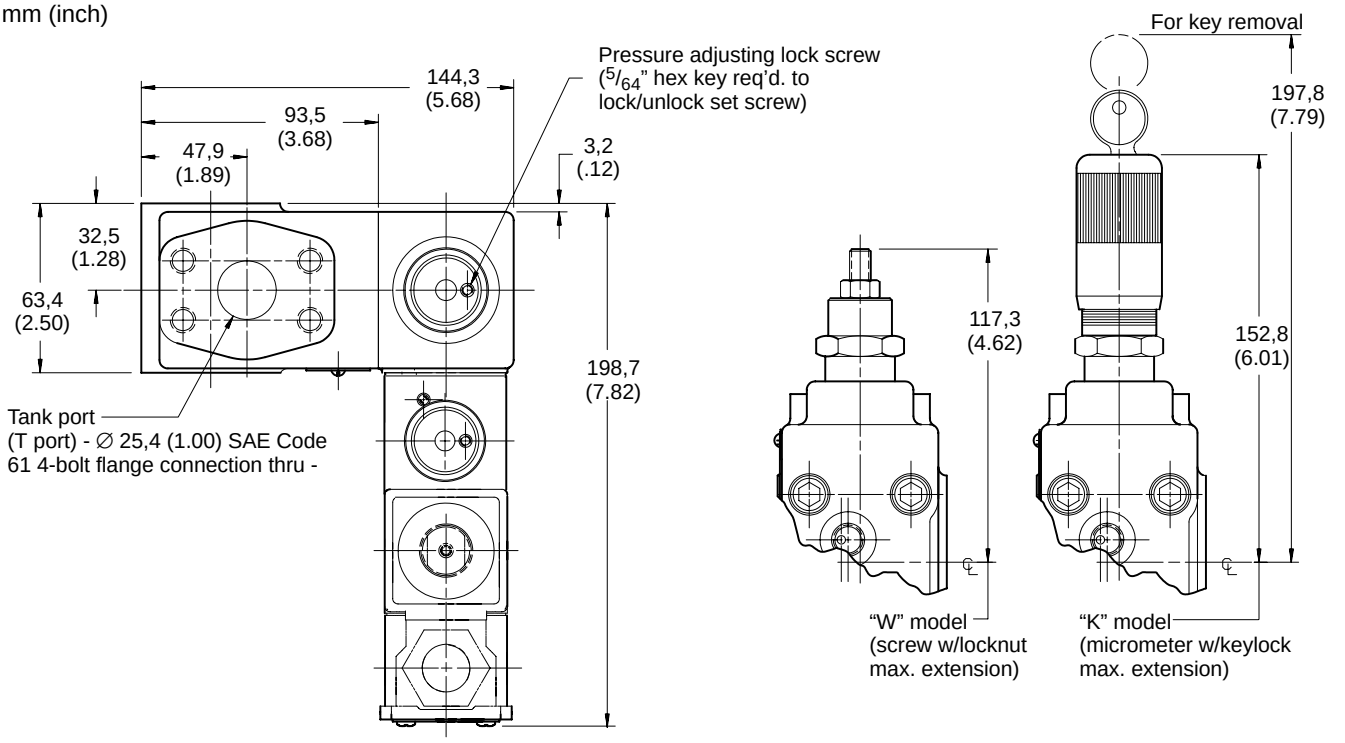
# Installation Dimensions

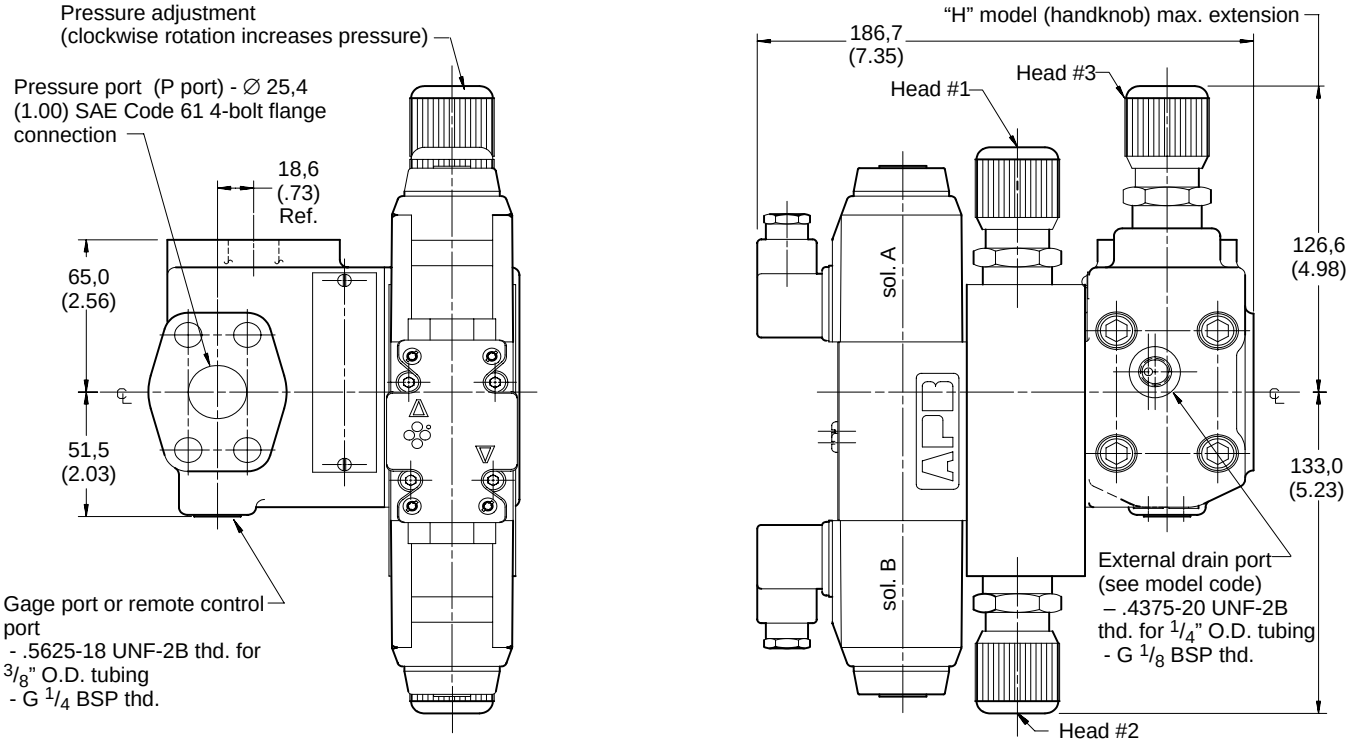
## CPF3/4S-06 $^{3}/_{4}$" Flange - Bi-Pressure With Safety & Tri-Pressure Relief Valve



## CPF3/4S-08 1” Flange - Bi-Pressure With Safety & Tri-Pressure Relief Valve

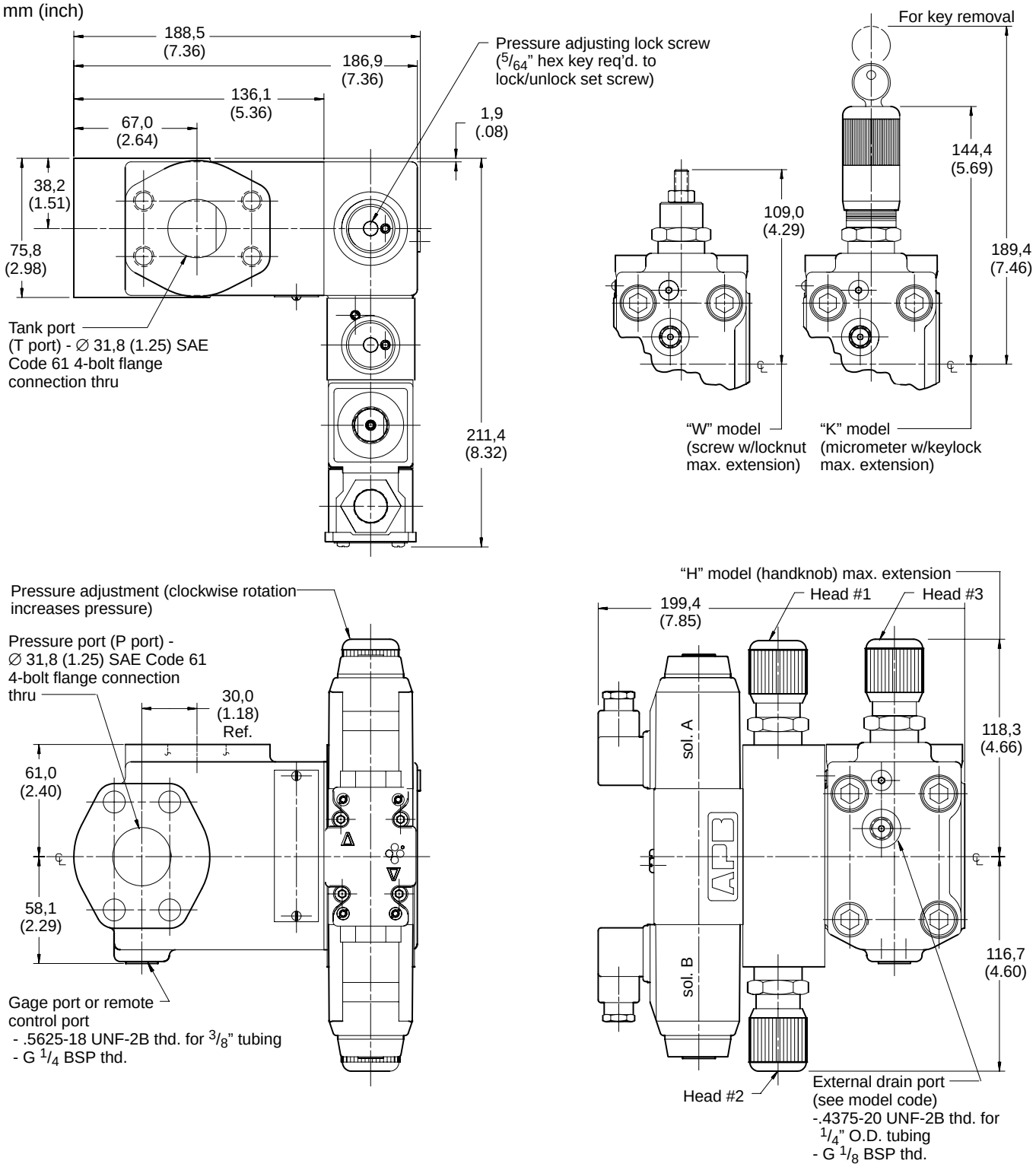
mm (inch)



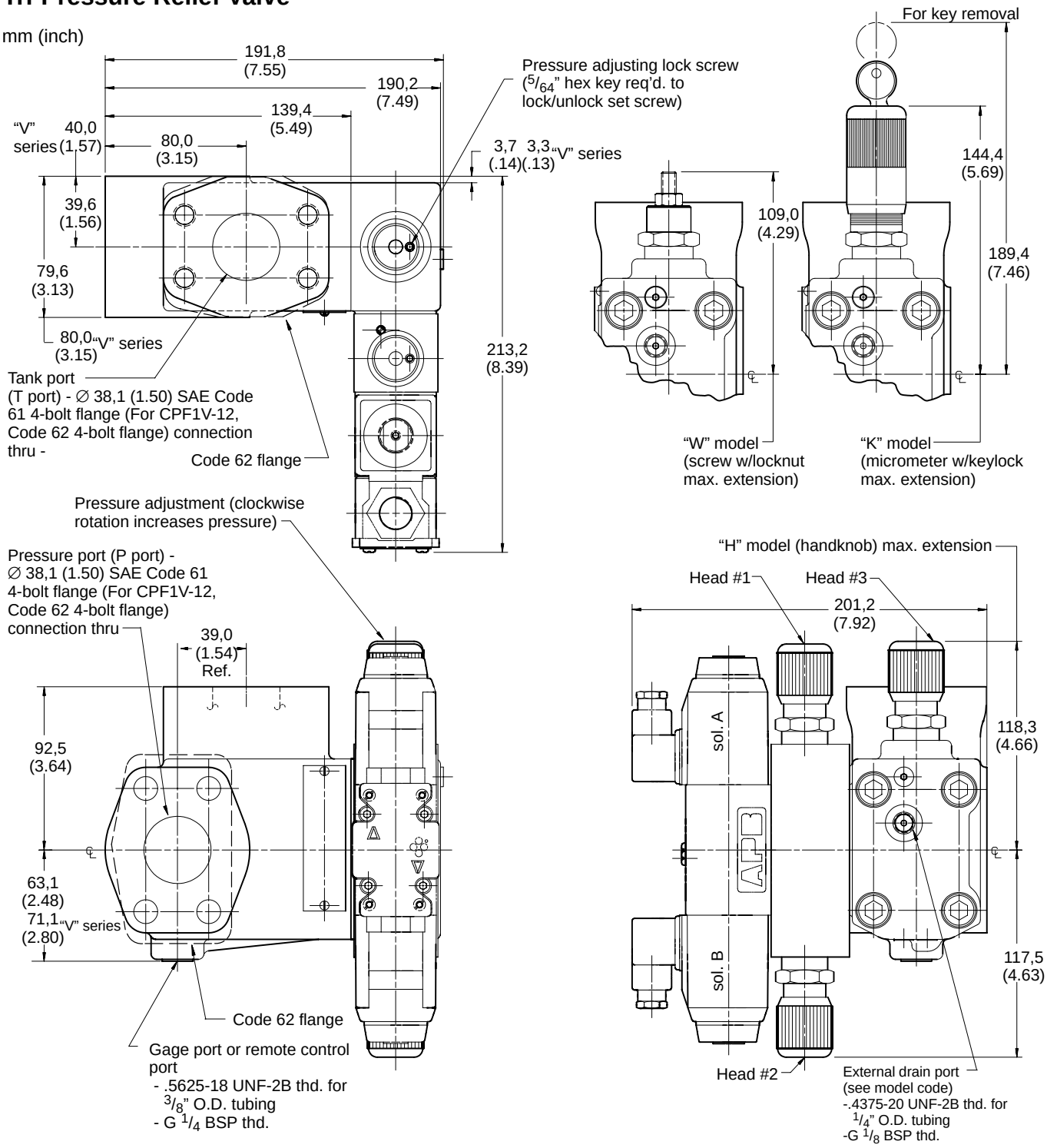
## CPF3/4S-10 $1^1/_4$" Flange - Bi-Pressure With Safety & Tri-Pressure Relief Valve

mm (inch)



## CPF3/4S-12 – Code 61
## CPF3/4V-12 – Code 62
## $1^1/_2$" Flange -
## Bi-Pressure With Safety &
## Tri-Pressure Relief Valve

mm (inch)



# UPF1*-(**)-06/08/10/12-**-20

**Unloading Valves - Without Vent**

## Flange Sizes

- 06 - $^{3}/_{4}$ inch flange
- 08 - 1 inch flange
- 10 - $1^{1}/_{4}$ inch flange
- 12 - $1^{1}/_{2}$ inch flange

### Benefits

- Excellent repeatability and stable performance from cartridge design mainstage parts.
- Reduced installed costs and space requirements.
- Easier installation and servicing of components.
- Pilot design minimizes response time and cracking flow which allows for high pressure stability thus increasing system productivity.
- Direct mounting to pump flange reduces potential leak points for superior leak resistance.
- Multi-fluid capability without the need to change seals.

| Ratings | UPF1S—06 | UPF1S—08 | UPF1S—10 | UPF1S—12* |
|---|---|---|---|---|
| Maximum flow: | 100 l/min (26 USgpm) | 300 l/min (80 USgpm) | 600 l/min (160 USgpm) | 600 l/min (160 USgpm) |
| External drain | 300 l/min (80 USgpm) | 300 l/min (80 USgpm) | | |
| Internal drain | 151 l/min (40 USgpm) | 151 l/min (40 USgpm) | | |
| Maximum pressure: | | | | |
| P port | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi)* |
| T port | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) |

* The UPF1V-12 (code 62 flange) has a max. P port pressure rating of 350 bar (5000 psi).

### General Description

This Vickers UPF1S unloading valve features flange mounting for increased design flexibility and reduced external piping. The valve is designed for direct mounting on the SAE flange outlet port of a pump. Fewer leak points and SAE flange connections lead to installations with superior leak resistance.

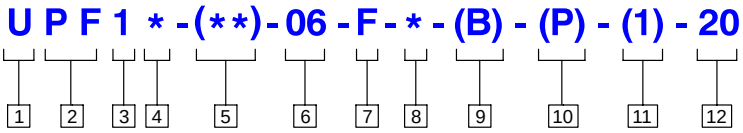
Unloading valves are used in accumulator charging circuits where a pressure regulator is required to automatically unload the pump by diverting the pump delivery to the reservoir, at low pressure, when the desired accumulator pressure is reached. These valves may also be used to unload the low pressure side of double pumps. The unloading valves also function as pressure relief valves when the remote pressure is lower than the plunger pressure setting.

In construction, an unloading valve contains a compound relief valve with a poppet-type main stage, an integral (when ordered per model code) check valve to prevent reverse flow from the accumulator, and a pressure operated plunger which vents the relief valve at the selected pressure.

The UPF1S valve has excellent dynamic and steady state operating characteristics including stability, fast response and low pressure override. UPF valves are of two–stage design with a fast–acting poppet type main stage for simple, long–lasting and effective operation. The many available control options make it possible to choose the optimum valve model for each application.

# UPF1* Model Series

## Model Code




**1 Valve Function**

U - Unloading valve

**2 Mounting Type**

PF - Pump flange mounting

**3 Unit type**

1 - Single pressure without vent

**4 Flange Type**

S - SAE J518 4-bolt flange standard series code 61 (available in all sizes)
V - SAE J518 4-bolt high pressure series code 62 (size 12 only)

**5 Integral Check Valve* (0,3 bar (5 psi) cracking pressure only)**

Blank - Without check valve
C - With right angle check - Not available with UPF1V-12
CL - With In-line check

* The integral check valve is not the same as the DCPFS right angle check valve.

**6 Valve Size**

06 - $^{3}/_{4}$ inch
08 - 1 inch
10 - 1 $^{1}/_{4}$ inch
12 - 1 $^{1}/_{2}$ inch

**7 Pressure Adjustment Range**

A - 9 - 70 bar (130 - 1000 psi)
B - 9 - 125 bar (130 - 1800 psi)
F - 9 - 245 bar (130 - 3600 psi)
G - 9 - 275 bar (130 - 4000 psi)
350 bar (5000 psi) - (UPF1V-12 models only)

**8 Control Type**

W - Screw adjust with locknut
K - Micrometer adjust with keylock
M - Micrometer adjust w/o keylock

**9 Thread Type (remote control/vent connection)**

Blank - SAE-6 O-ring boss port (.5625-18 UNF-2B thd.)
B - BSP-G $^{1}/_{4}$ ($^{1}/_{4}$" BSPF)

**10 Accumulator Sense Port**

Blank - Internal sense port
P - External sense port (not available on models w/integral check)

**11 Pilot Drain**

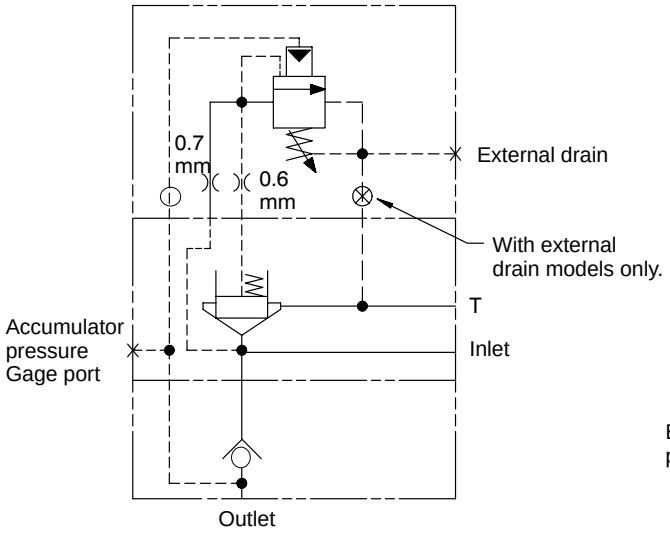
Blank - Internal drain
1 - External drain

**12 Design Number, 20 series**

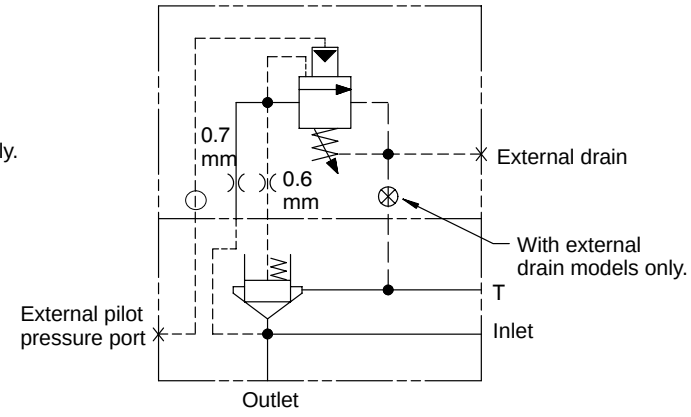
Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusive.

# Circuit Schematics

**UPF1S-C*-06/08-*-20 with check valve**

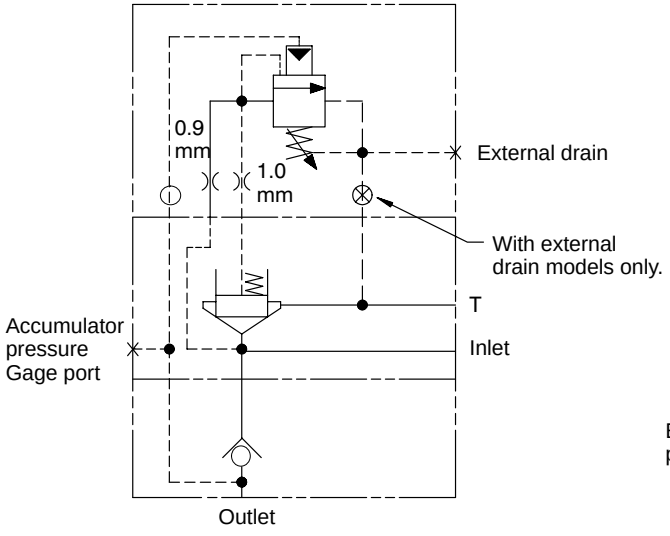



**UPF1S-06/08-(P)-*-20 without check valve**

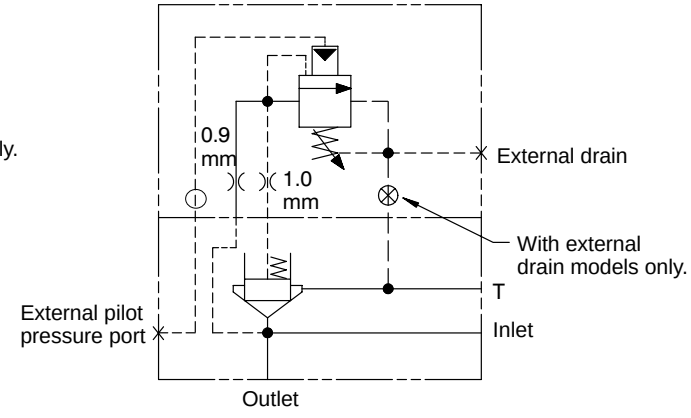



–06 size 100 l/min (26 USgpm) max. flow
–08 size 300 l/min (80 USgpm) external drain
150 l/min (40 USgpm) internal drain max. flow

**UPF1S-C*-10/12-*-20 with check valve**




**UPF1S-10/12-(P)-*-20 without check valve**

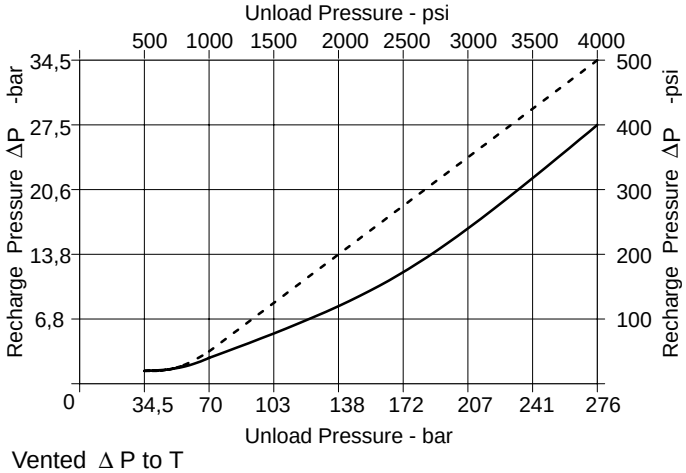



–10/-12 sizes 600 l/min (160 USgpm) max. flow

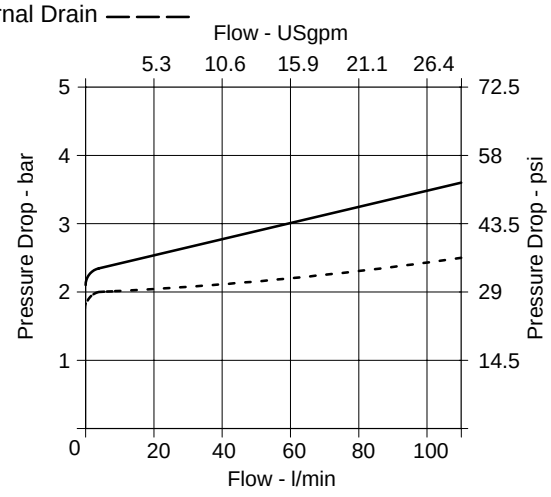
# Pressure Curves

## UPF1S-06

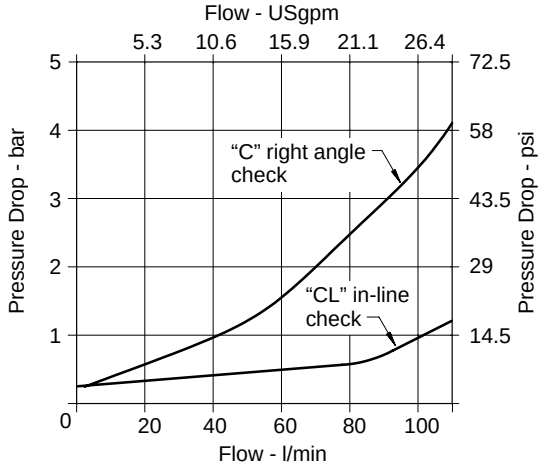
Unload vs Recharge Δ P Pressure @100 l/min (26 USgpm) with integral check valve as supplied.
Internal Drain ———
External Drain — — —




Vented Δ P to T
Internal Drain ———
External Drain — — —

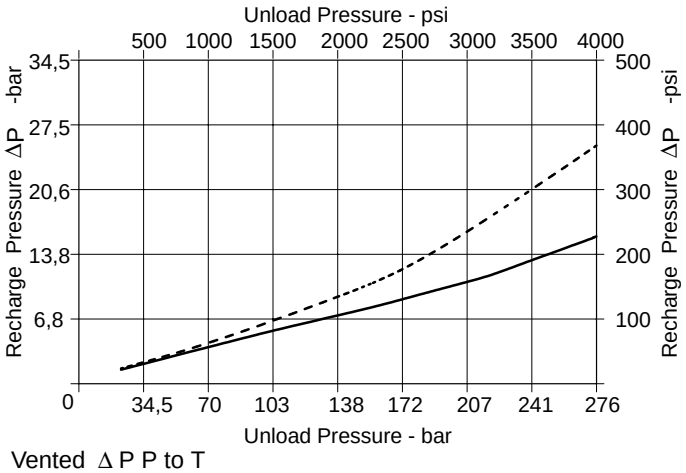



Δ P P to P
With 0,34 bar (5 psi) Check Valve

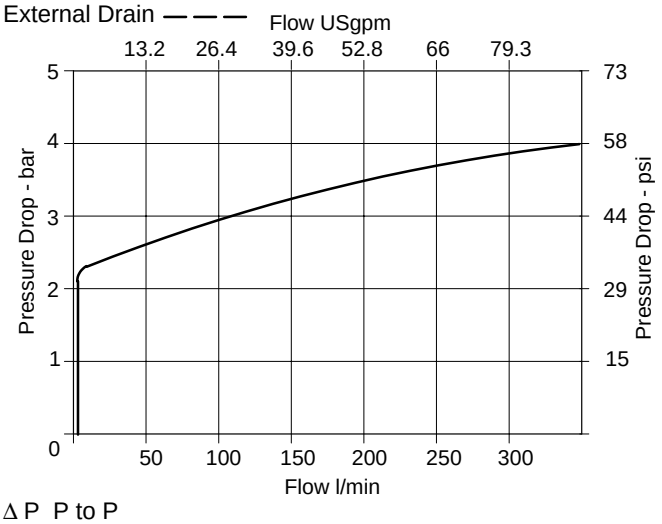



## UPF1S-08

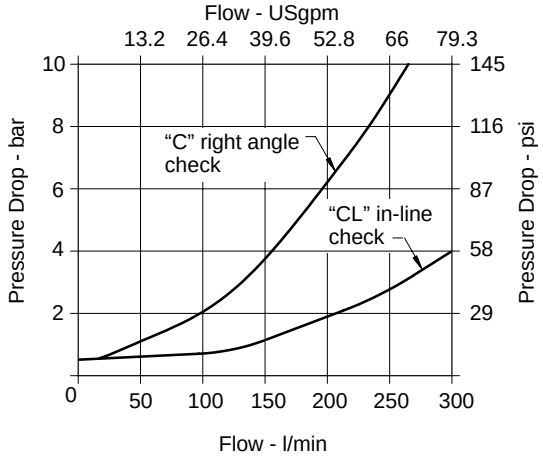
Unload vs Recharge Δ P Pressure with integral check valve as supplied.
Internal Drain ——— @150 l/min (40 USgpm)
External Drain — — — — @300 l/min (80 USgpm)




Vented Δ P P to T
Internal Drain ———
External Drain — — —



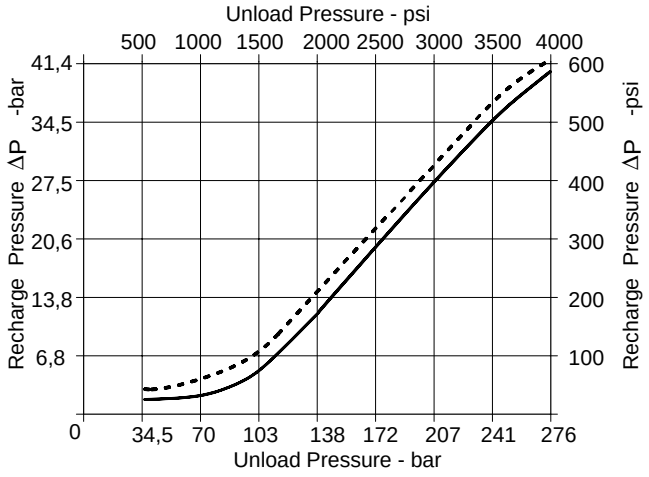

Δ P P to P
With 0,34 bar (5 psi) Check Valve



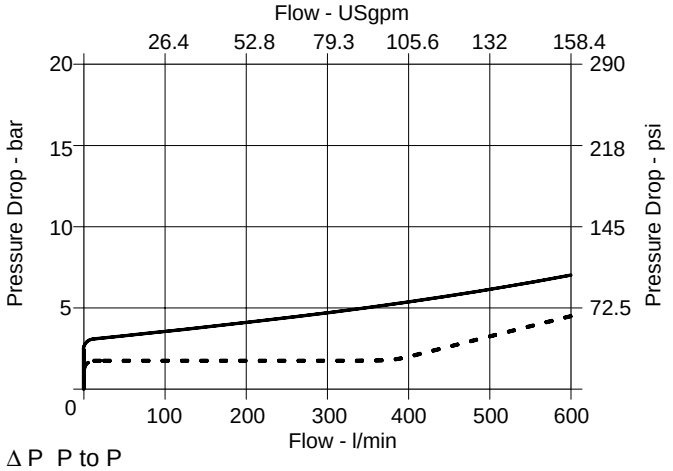
# Pressure Curves

## UPF1S-10

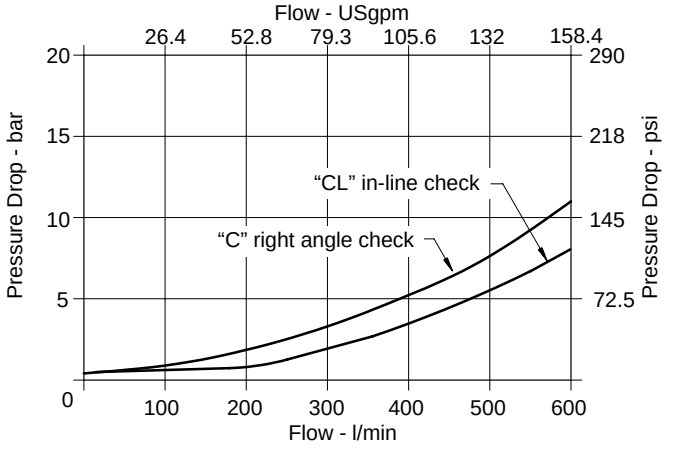
Unload vs Recharge Δ P Pressure with integral check valve as supplied.
Internal Drain ——— @600 l/min (160 USgpm)
External Drain — — — — @600 l/min (160 USgpm)




Vented Δ P P to T
Internal Drain ——— @600 l/min (160 USgpm)
External Drain — — — — @600 l/min (160 USgpm)

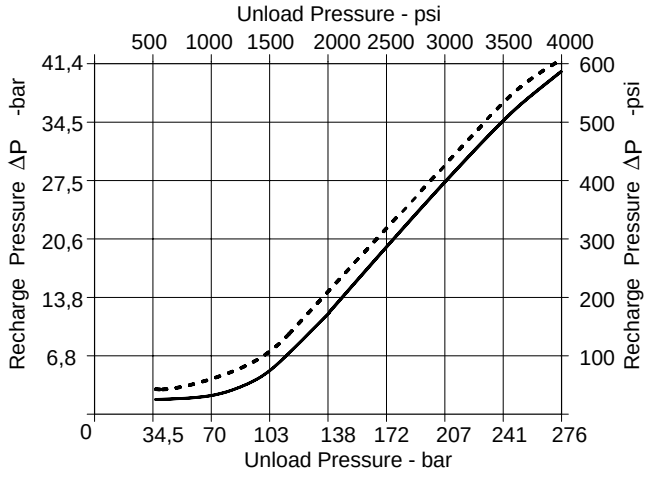



Δ P P to P
With 0,34 bar (5 psi) Check Valve

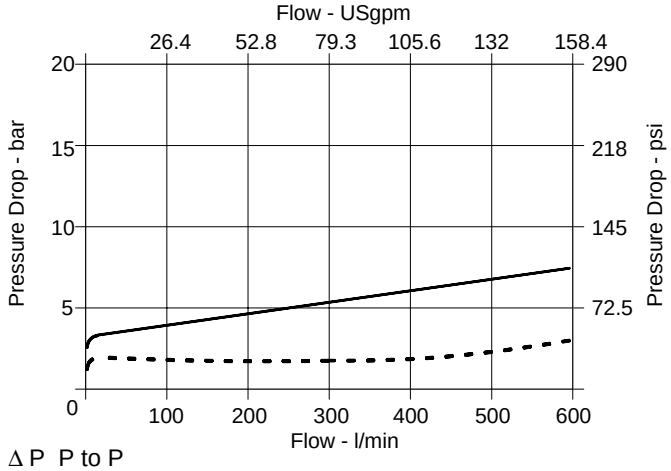



## UPF1S(V)-12

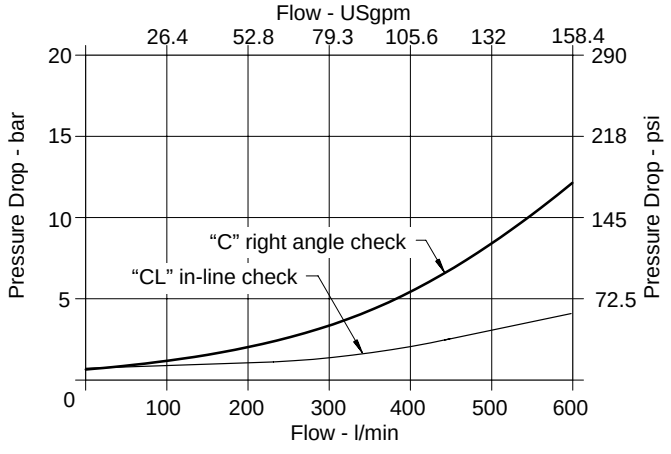
Unload vs Recharge Δ P Pressure with integral check valve as supplied.
Internal Drain ——— @600 l/min (160 USgpm)
External Drain — — — — @600 l/min (160 USgpm)




Vented Δ P P to T
Internal Drain ——— @600 l/min (160 USgpm)
External Drain — — — — @600 l/min (160 USgpm)



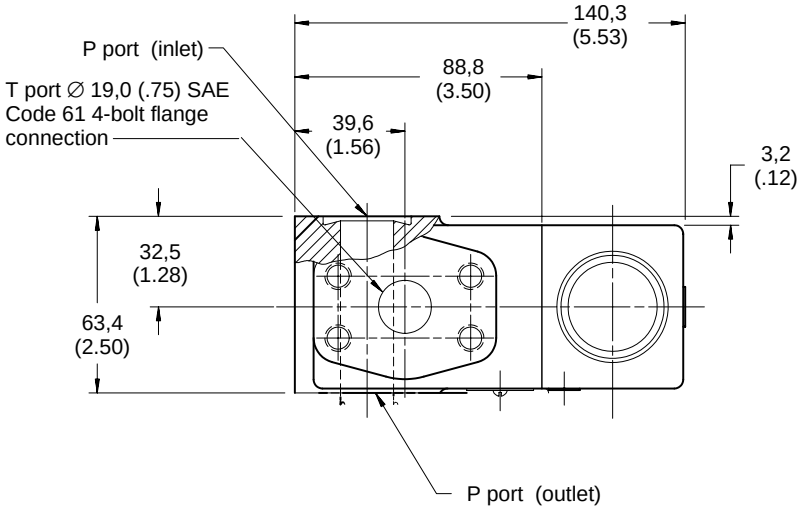

Δ P P to P
With 0,34 bar (5 psi) Check Valve

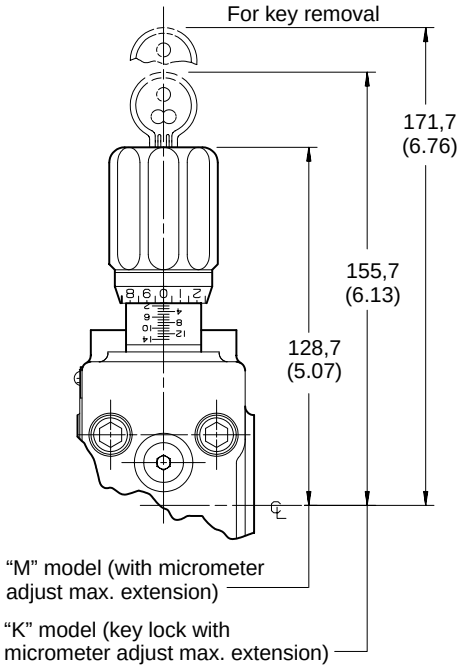


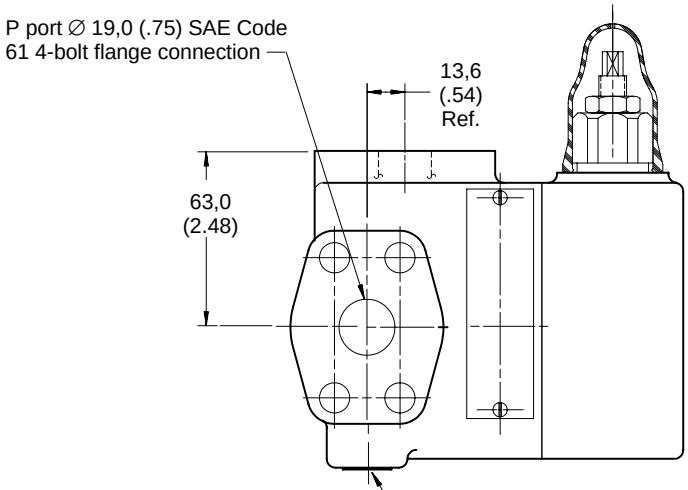
# Installation Dimensions

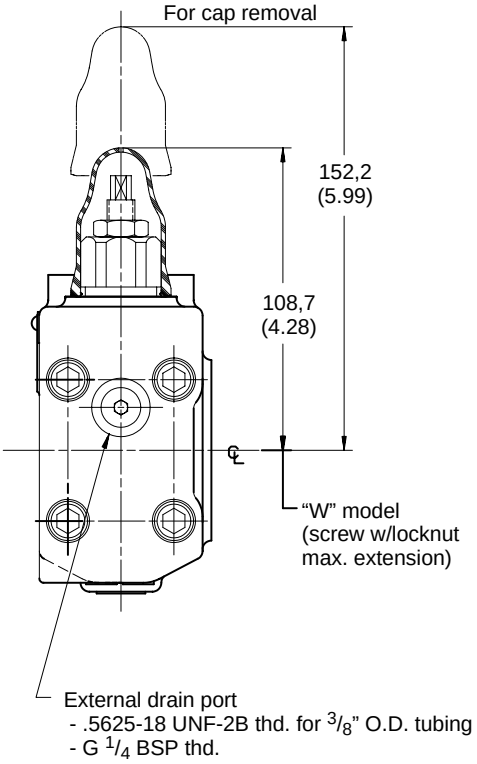
## UPF1S-06 $^{3}/_{4}$" Flange - Unloading Valve without Vent or Check

mm (inch)



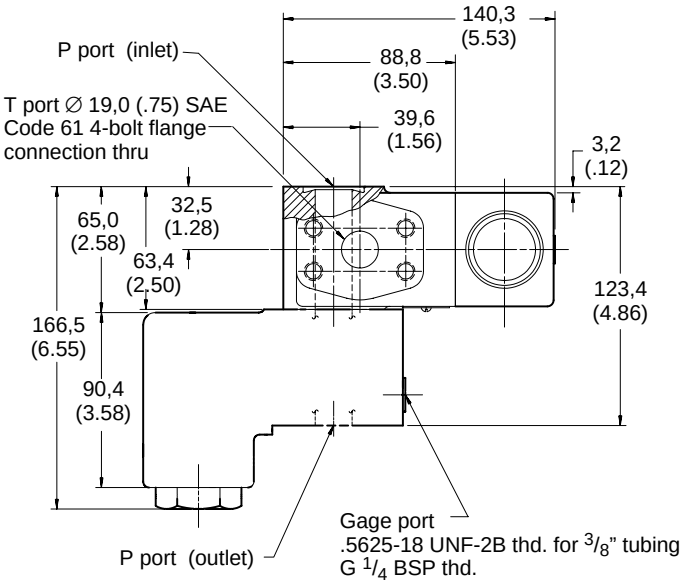



# Installation Dimensions

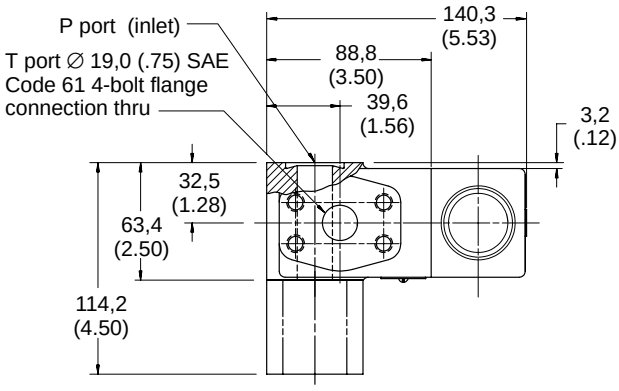
## UPF1S-C*-06 $^{3}/_{4}$" Flange - Unloading Valve with Check without Vent

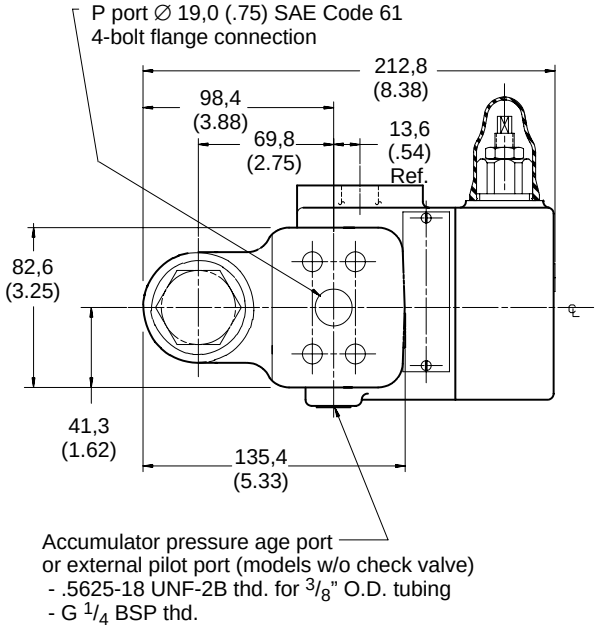
mm (inch)

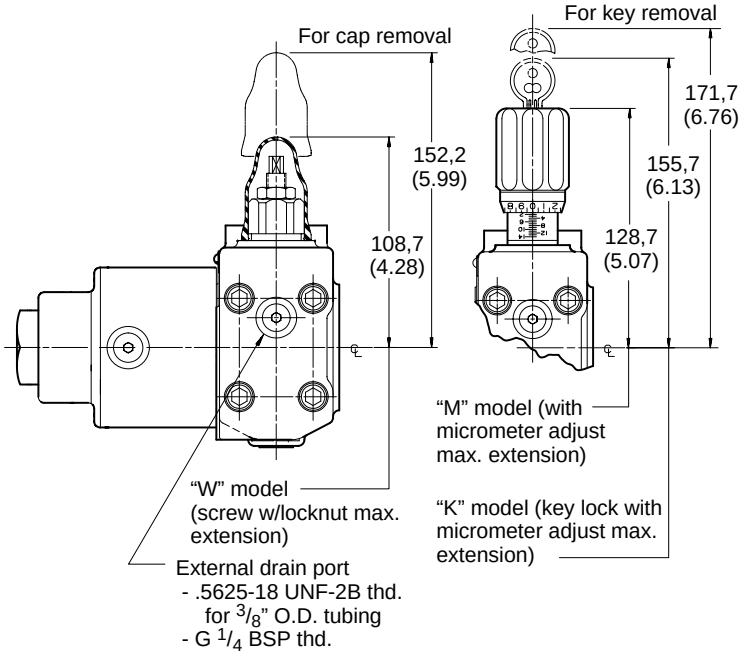
### "C" Models
Right Angle Check




### "CL" Models
In-line Check

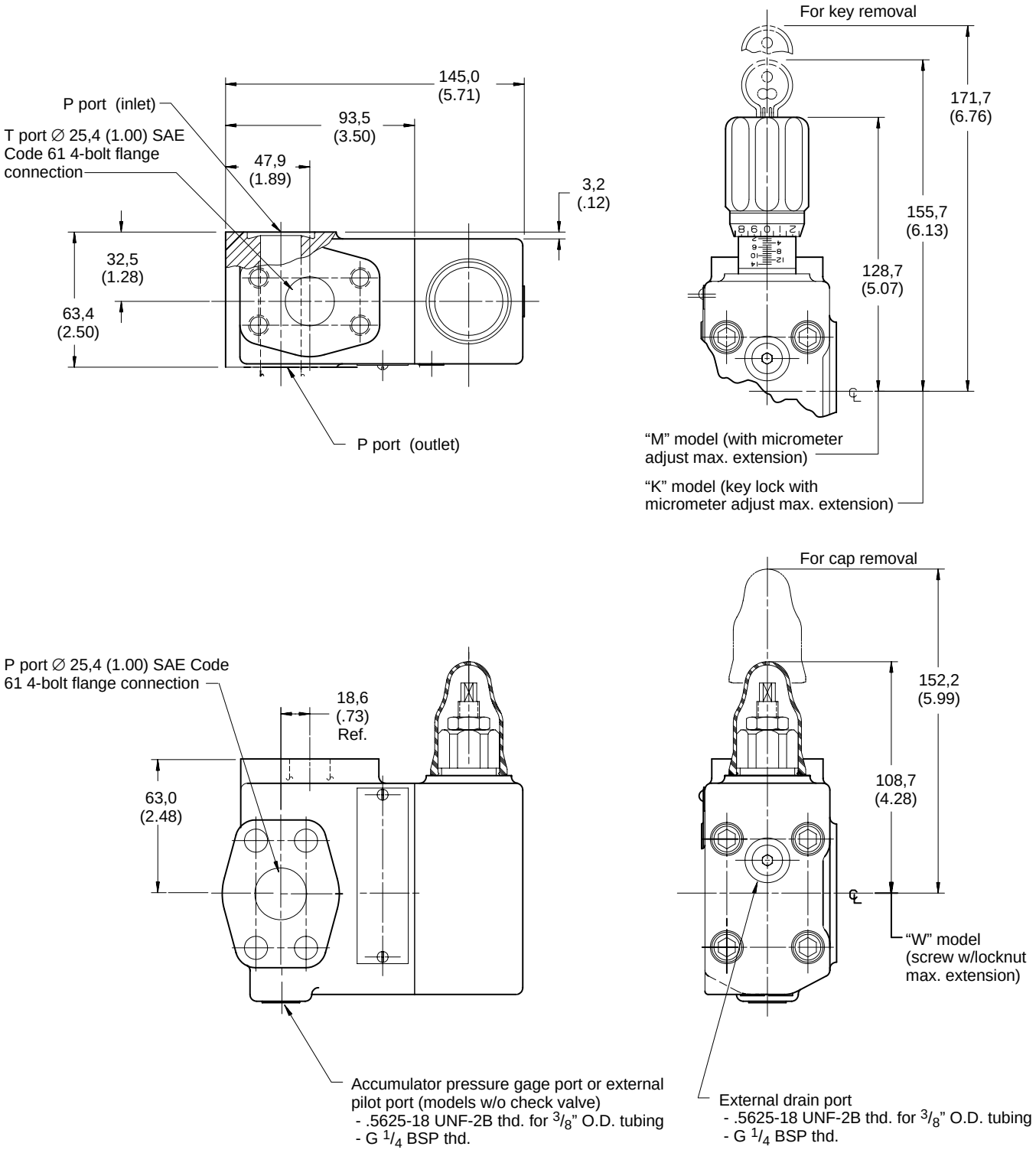


## UPF1S-08 1” Flange - Unloading Valve without Vent or Check

mm (inch)

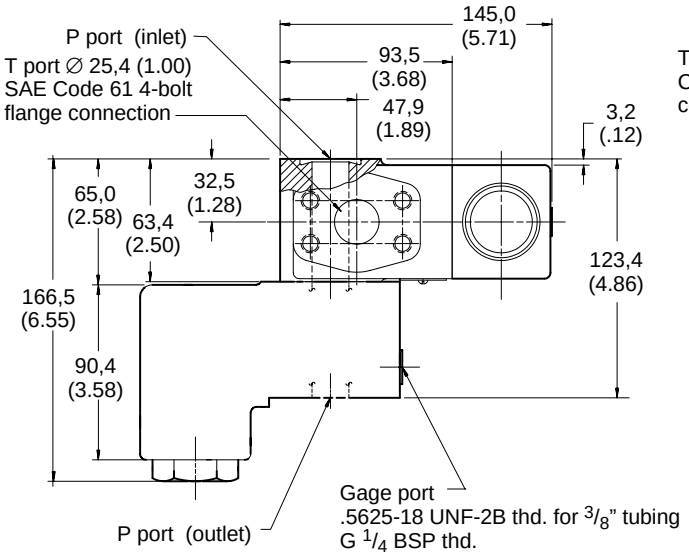


## UPF1S-C*-08 1” Flange - Unloading Valve with Check without Vent

mm (inch)

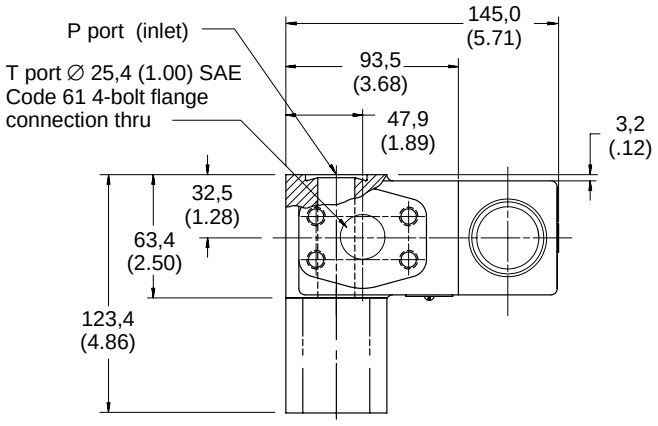
### “C” Models

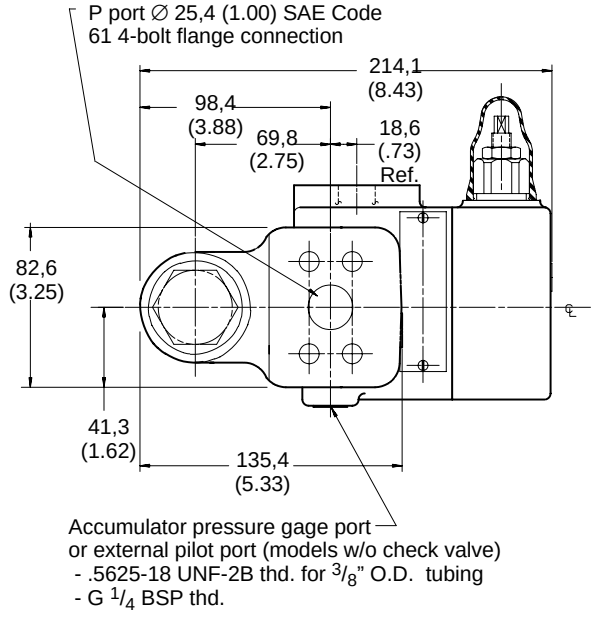
Right Angle Check

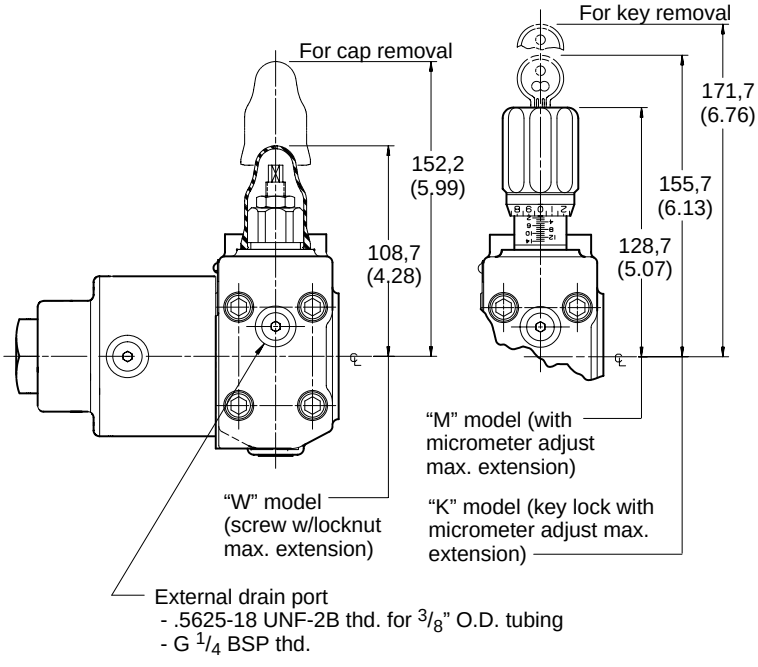



### “CL” Models

In-line Check

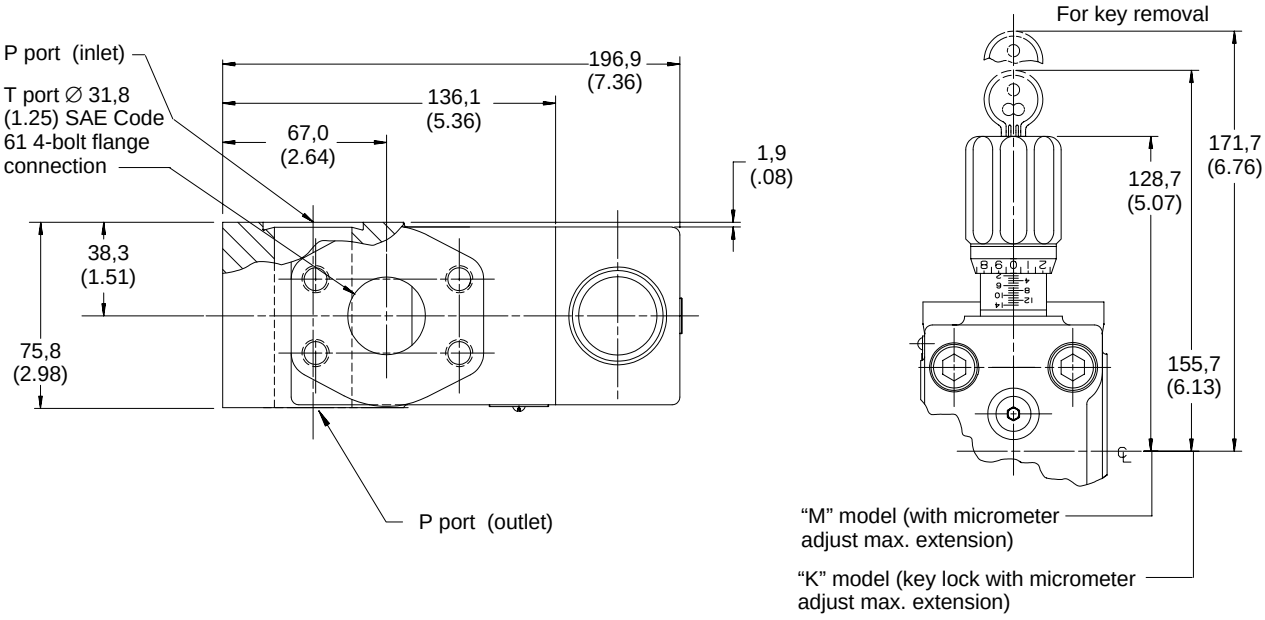


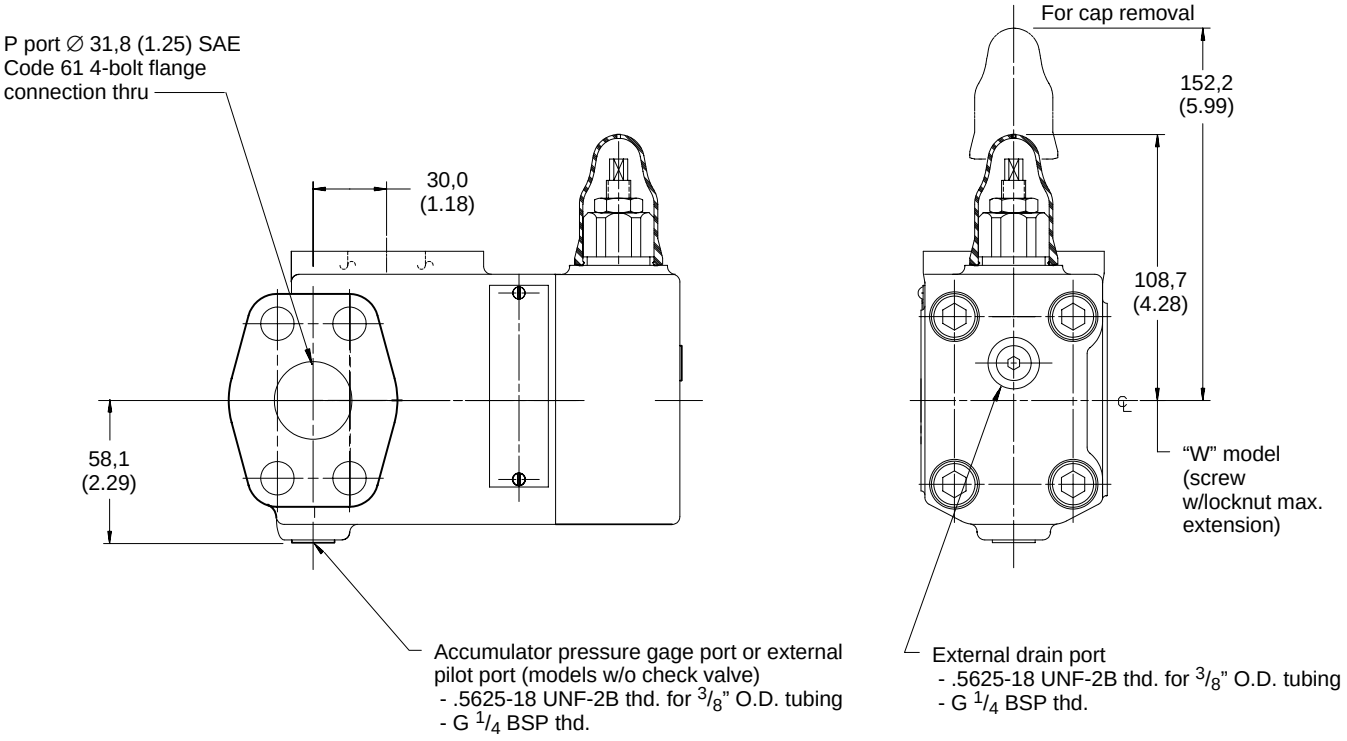



## UPF1S-10 $1^1/_4$" Flange - Unloading Valve Without Vent or Check

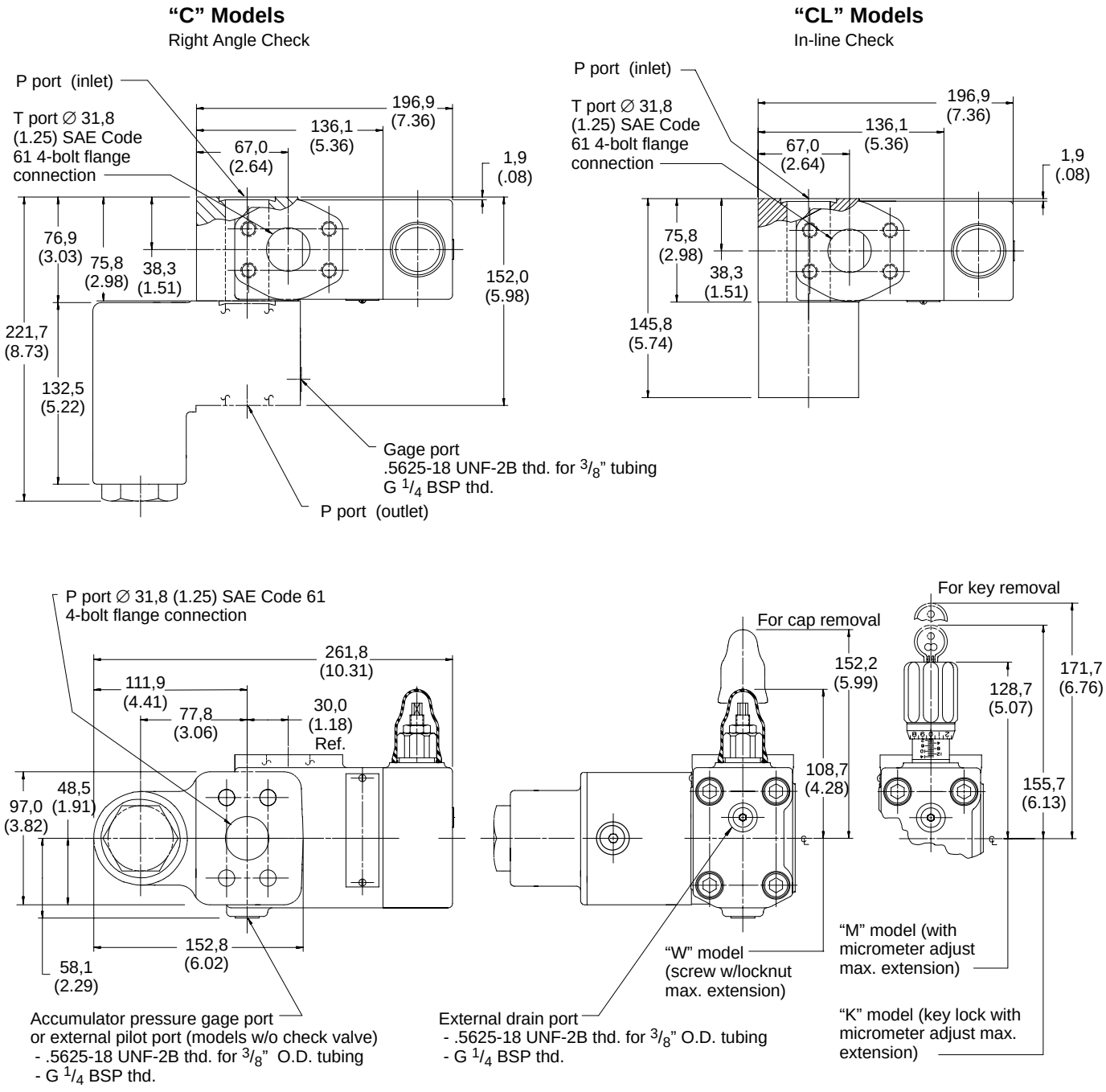
mm (inch)



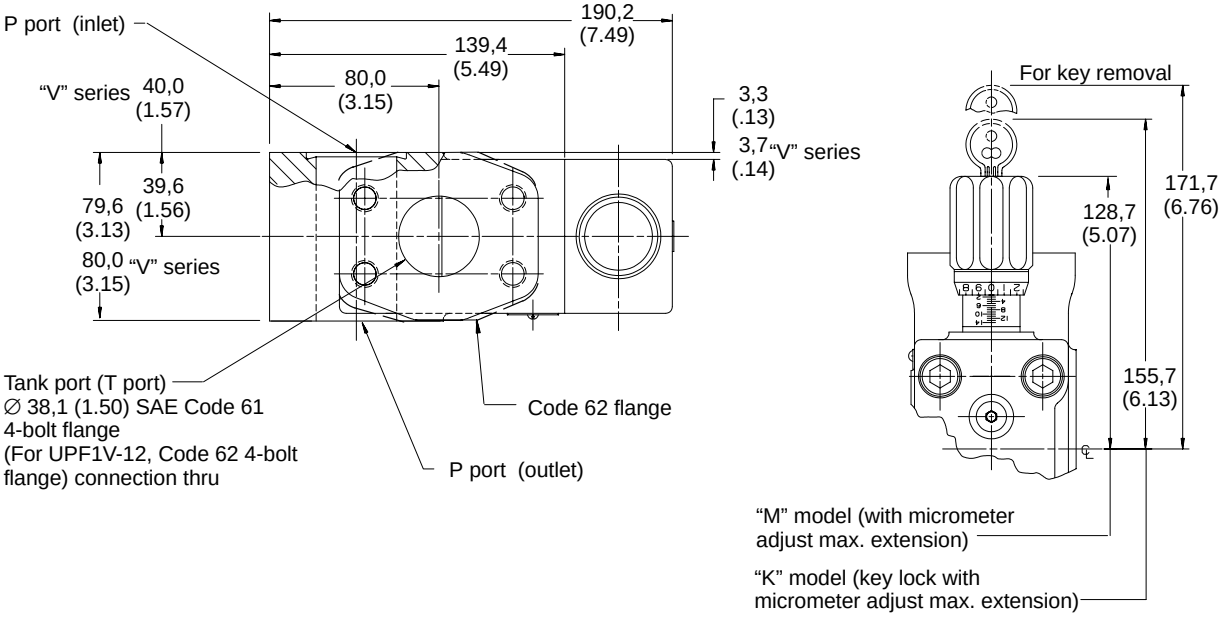
## UPF1S-C*-10 $1^{1}/_{4}$" Flange - Unloading Valve with Check without Vent

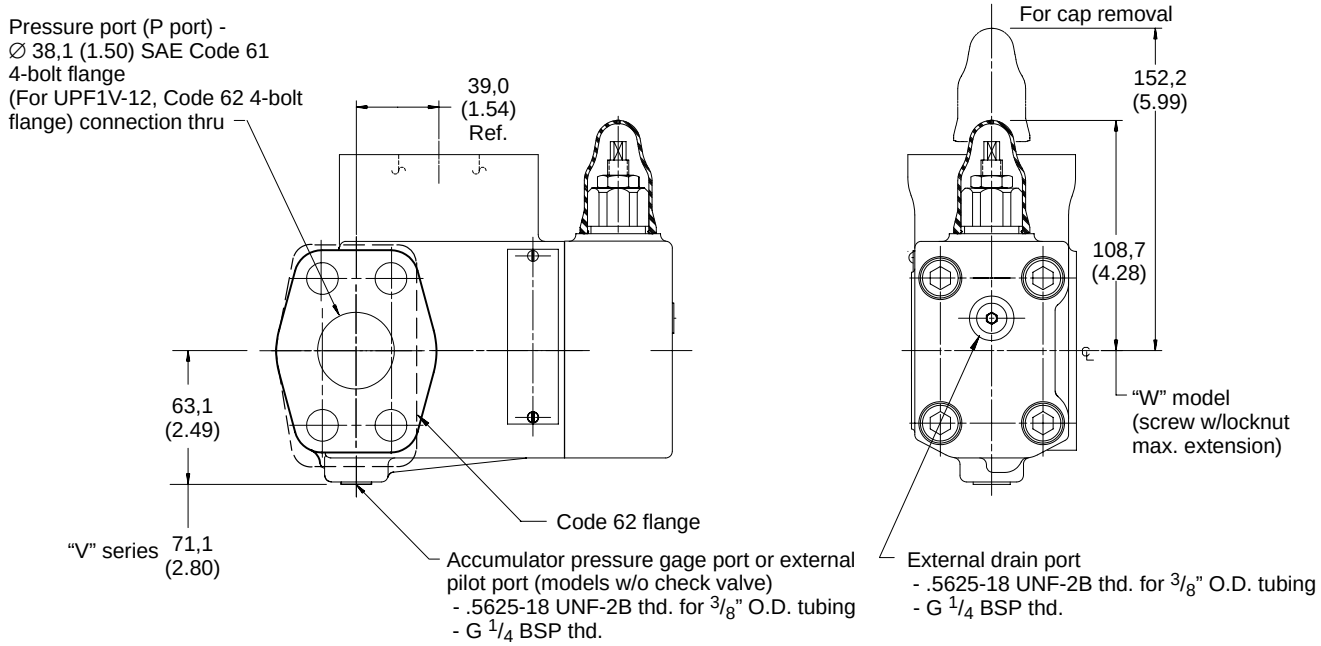
mm (inch)



## UPF1S-12 – Code 61
## UPF1V-12 – Code 62
## $1^1/_2$" Flange -
## Unloading Valve without Vent or Check

mm (inch)



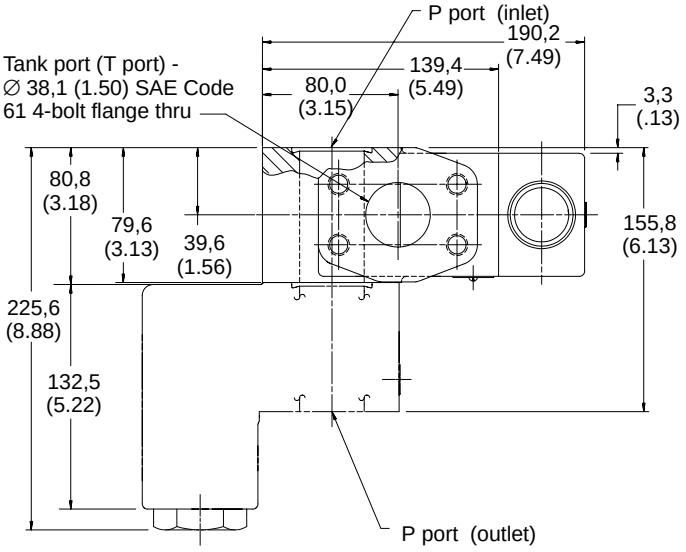



## UPF1S-C*-12 Code 61
## UPF1V-CL-12 Code 62
## $1^1/_2$" Flange -
## Unloading Valve without Vent with Check

mm (inch)

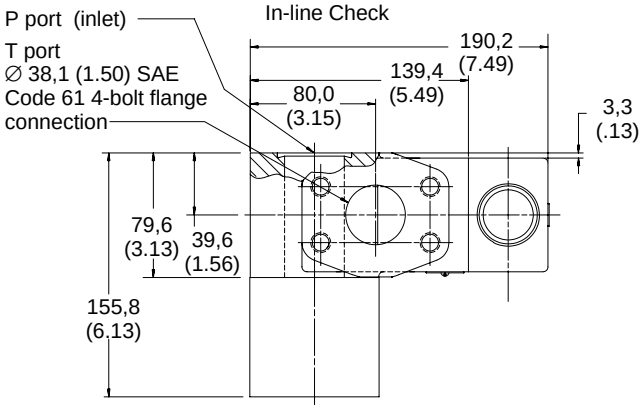
### "C" Model Code 61

Right Angle Check



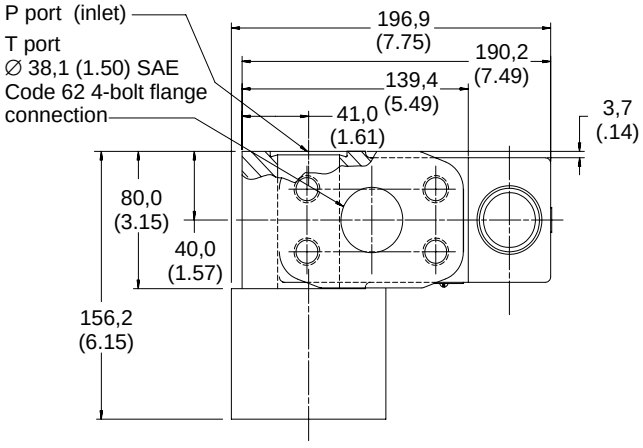

### "CL" Model Code 61

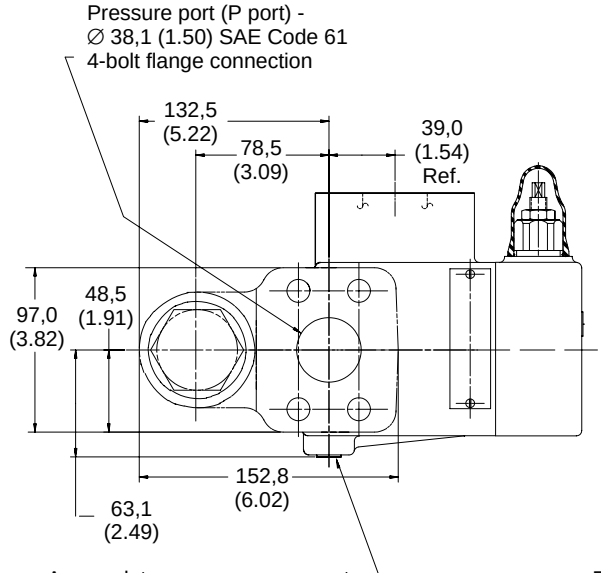
In-line Check

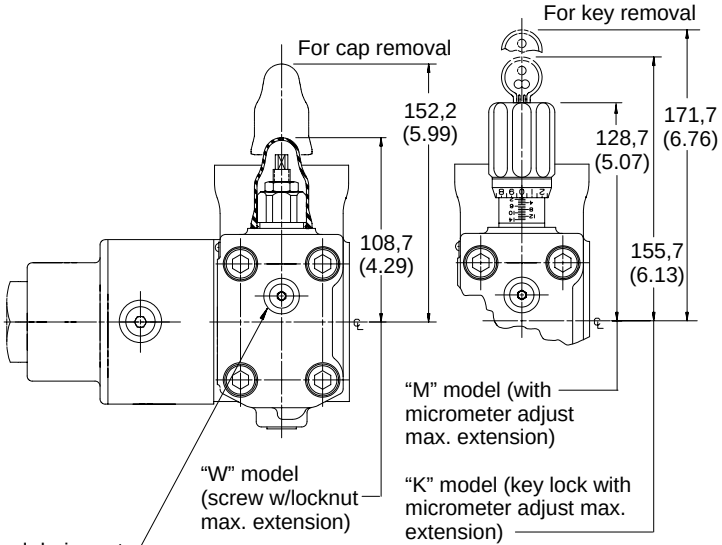



### "CL" Model Code 62

In-line Check



# UPF2*- (**) - 06/08/10/12-**-20

**Unloading Valves - With Vent**

## Flange Sizes

- 06 - $^{3}/_{4}$ inch flange
- 08 - 1 inch flange
- 10 - $1^{1}/_{4}$ inch flange
- 12 - $1^{1}/_{2}$ inch flange

### Benefits

- Excellent repeatability and stable performance from cartridge design mainstage parts.
- Reduced installed costs and space requirements.
- Easier installation and servicing of components.
- Pilot design minimizes response time and cracking flow which allows for high pressure stability thus increasing system productivity.
- Direct mounting to pump flange reduces potential leak points for superior leak resistance.

| Ratings | UPF2S—06 | UPF2S—08 | UPF2S—10 | UPF2S—12 |
|---|---|---|---|---|
| Maximum flow | 100 l/min (26 USgpm) | 300 l/min (80 USgpm) | 600 l/min (160 USgpm) | 600 l/min (160 USgpm) |
| Maximum pressure: | | | | |
| P port | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi)* |
| T port | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) | 207 bar (3000 psi) |

* The CPF2V-12 (code 62 flange) has a max. P port pressure rating of 350 bar (5000 psi).

### Pilot Valve Max. T Port Pressure Rating

100 bar (1450 psi) for DG4V-3S valve
207 bar (3000 psi) for DG4V-3 valve AC
207 bar (3000 psi) for DG4V-3 valve DC

### Electrical Response

Electrical response is defined as the time from initiation of power to the solenoid, to the initiation of pressure rise, with 1,5 liters (.4 USgpm) of oil under compression:

**06 size –**
@100 l/min (26 USgpm) = DC - 200 ms
AC - 160 ms

**08 size –**
@300 l/min (80 USgpm) = DC - 210 ms
AC - 175 ms

**10/12 size -**
@300 l/min (80 USgpm) = DC - 180 ms
AC - 160 ms

### Hydraulic Response

**06 Size:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 3450 bar (50000 psi) /second. Maximum overshoot < 8%.

**08 Size:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 2900 bar (42000 psi) /second. Maximum overshoot < 10%.

**10/12 Sizes:** Rate of pressure rise with 2,5 liters (.7 USgpm) of oil under compression = 2600 bar (37500 psi) /second. Maximum overshoot < 10%.

### General Description

This Vickers UPF2S relief valve features flange mounting for increased design flexibility and reduced external piping. The valve is designed for direct mounting on the SAE flange outlet port of a pump. Fewer leak points and SAE flange connections lead to installations with superior leak resistance.

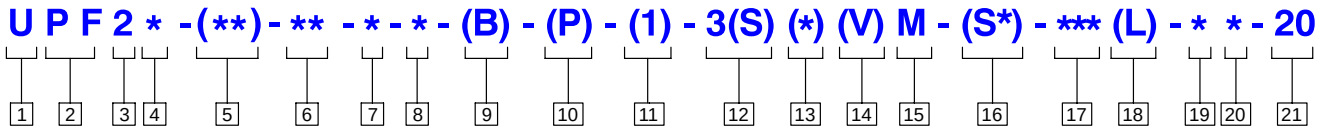
Unloading valves are used in accumulator charging circuits where a pressure regulator is required to automatically unload the pump by diverting the pump delivery to the reservoir, at low pressure, when the desired accumulator pressure is reached. These valves may also be used to unload the low pressure side of double pumps. The unloading valves also function as pressure relief valves when the remote pressure is lower than the plunger pressure setting.

The UPF2S valve has excellent dynamic and steady state operating characteristics including stability, fast response and low pressure override. UPF valves are of two-stage design with a fast-acting poppet type main stage for simple, long-lasting and effective operation. The many available control options make it possible to choose the optimum valve model for each application.

In construction, an unloading valve contains a compound relief valve with a poppet-type main stage, a check valve to prevent reverse flow from the accumulator, and a pressure operated plunger, which vents the relief valve at the selected pressure.

# UPF2* Model Series

## Model Code




**1 Valve Function**

U - Unloading valve

**2 Mounting Type**

PF - Pump flange mounting

**3 Unit Type**

2 - Single pressure with vent

**4 Flange Type**

S - SAE J518 4-bolt flange standard series code 61 (available all sizes)
V - SAE J518 4-bolt high pressure series code 62 (size 12 only)

**5 Integral Check Valve* (0,3 bar (5 psi) cracking pressure only)**

Blank - Without right angle check
C - With right angle check - Not available with UPF2V-12
CL - In-line check

**6 Valve Size**

06 - $^{3}/_{4}$ inch
08 - 1 inch
10 - 1 $^{1}/_{4}$ inch
12 - 1 $^{1}/_{2}$ inch

**7 Pressure Adjustment Range**

A - 9 - 70 bar (130 - 1000 psi)
B - 9 - 125 bar (130 - 1800 psi)
F - 9 - 245 bar (130 - 3600 psi)
G - 9 - 275 bar (130 - 4000 psi)
350 bar (5000 psi) - (UPF2V-12 models only)

**8 Control Type**

W - Screw adjust with locknut
K - Micrometer adjust with keylock
M - Micrometer adjust w/o keylock

**9 Thread Type (remote control/vent connection)**

Blank - SAE-6 O-ring boss port (.5625-18 UNF-2B thd.)
B - BSP-G $^{1}/_{4}$ ($^{1}/_{4}$" BSPF)

**10 Accumulator Sense Port**

Blank - Internal sense port
P - External sense port (not available w/check models)

**11 Pilot Drain**

Blank - Internal drain
1 - External drain

**12 Vent Valve**

3S - Standard performance
3 - High performance
Uses 22A type spool/spring; other features are optional. Refer to Vickers literature # GB-C-2015B Solenoid Operated Directional Control Valves catalog.

**13 Manual Override Options**

**14 Solenoid Energization Identification**

**15 Electrical Options Flag**

**16 Spool Position Monitoring Switch**

**17 Solenoid Type/Electrical Connections**

**18 Indicator Lights**

**19 Coil Voltage Identification**

**20 Tank Rating Pressure**

2 - 10 bar (145 psi) for spool position indicator models.
5 - 100 bar (1450 psi) for standard performance models, DG4V-3S, with AC or DC solenoids.
6 - 207 bar (3000 psi) for high performance models, DG4V-3, with AC solenoids.
7 - 207 bar (3000 psi) for high performance models, DG4V-3 with DC solenoids.

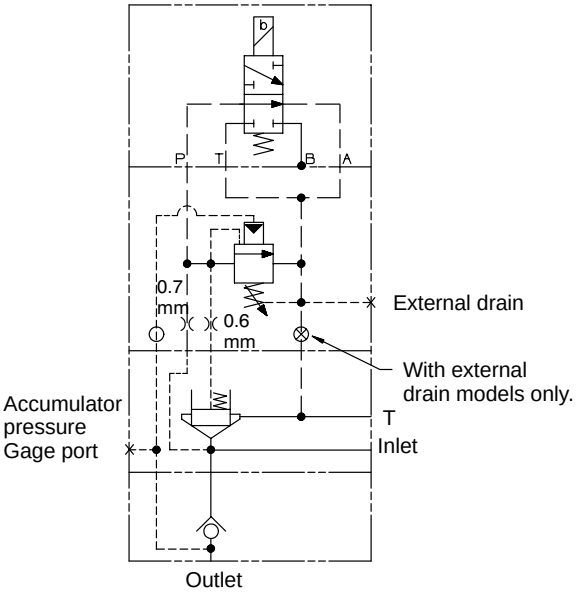
**21 Design Number, 20 Series**

Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusive.

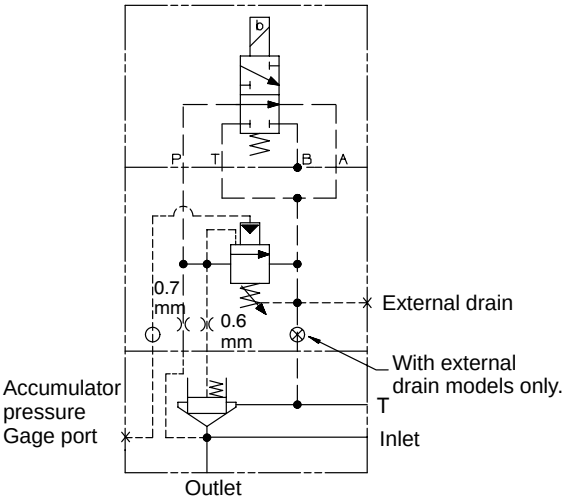
* The integral check valve is not the same as the DCPFS right angle check valve.

# Circuit Schematics

**UPF2S-C*-06/08-*-20 with check valve and vent**

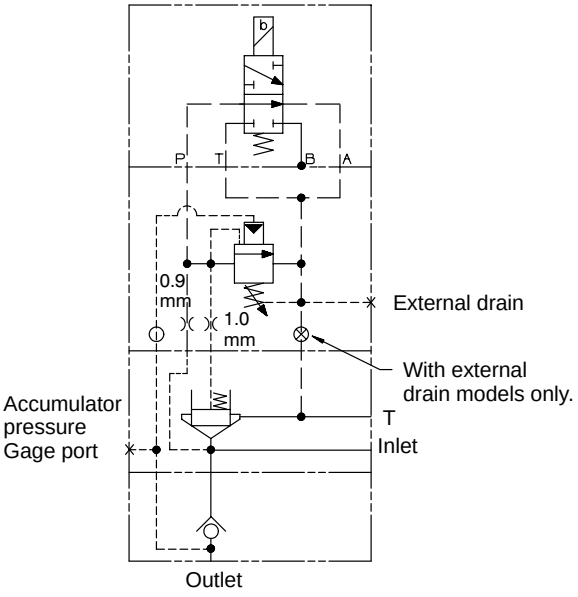



**UPF2S-06/08-(P)-*-20 with vent and without check valve**

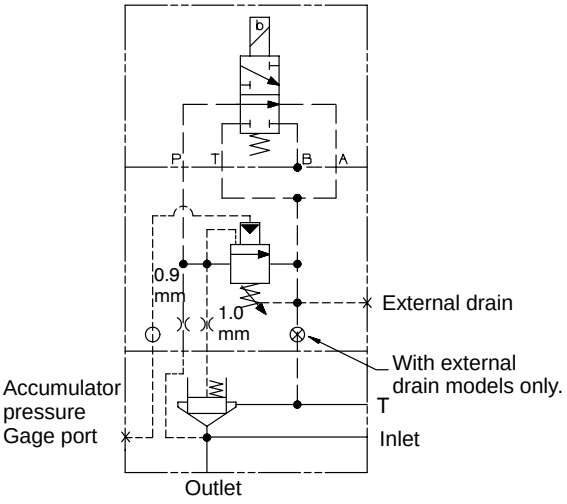



–06 size 100 l/min (26 USgpm) max. flow
–08 size 300 l/min (80 USgpm) external drain
150 l/min (40 USgpm) internal drain max. flow

**UPF2S-C*-10/12-*-20 with check valve and vent**




**UPF2S-10/12-(P)-*-20 with vent and without check valve**

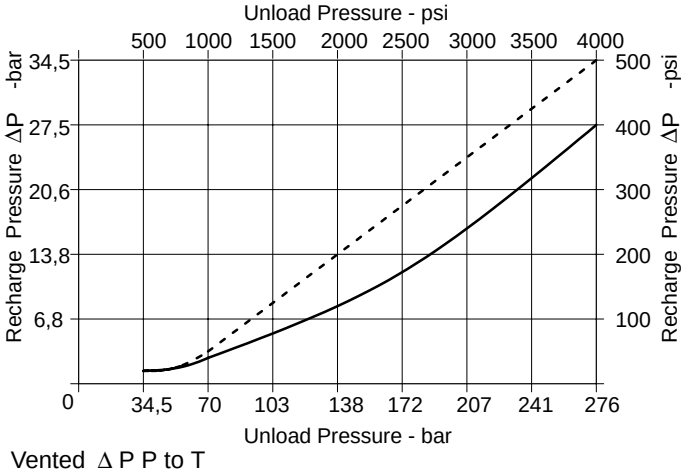



–10/-12 sizes 600 l/min (160 USgpm) max. flow

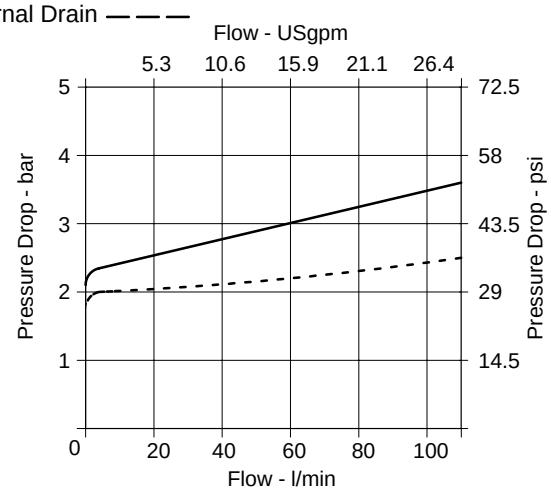
# Pressure Curves

## UPF2S-06

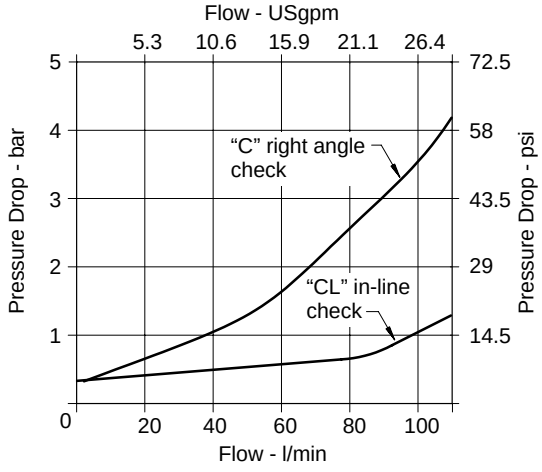
Unload vs Recharge Δ P Pressure @100 l/min (26 USgpm) with integral check valve as supplied.
Internal Drain ———
External Drain — — —




Vented Δ P P to T
Internal Drain ———
External Drain — — —

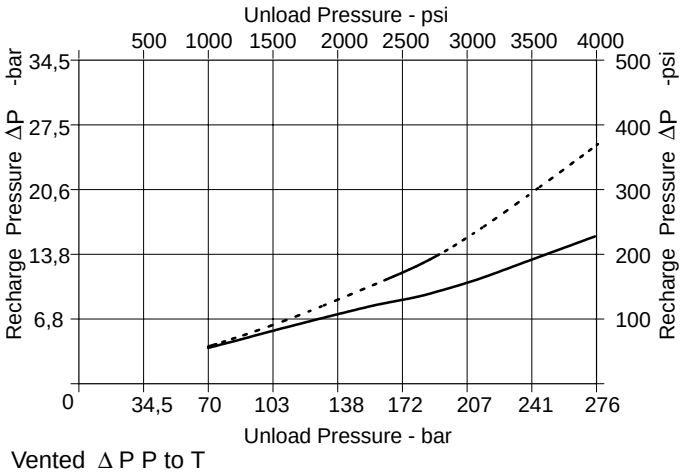



Δ P P to P
With 0,3 bar (5 psi) Check Valve

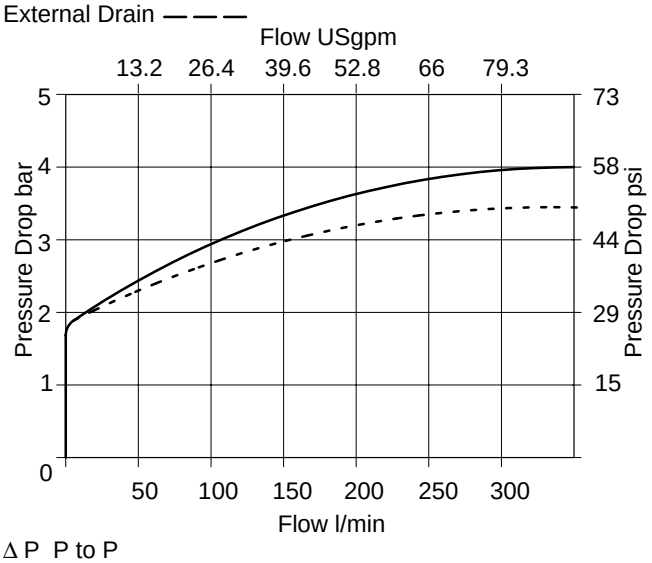



## UPF2S-08

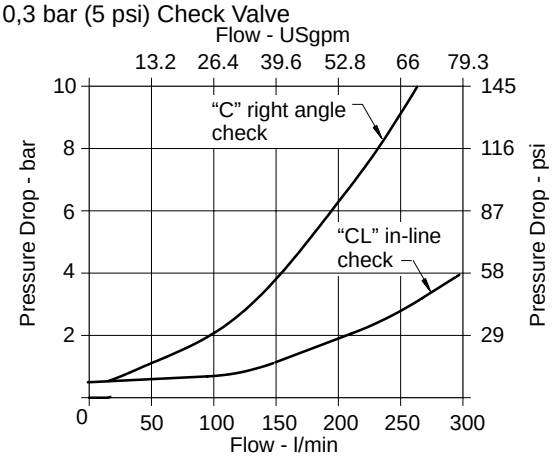
Unload vs Recharge Δ P Pressure with integral check valve as supplied.
Internal Drain ——— @150 l/min (40 USgpm)
External Drain — — — — @300 l/min (80 USgpm)




Vented Δ P P to T
Internal Drain ———
External Drain — — —

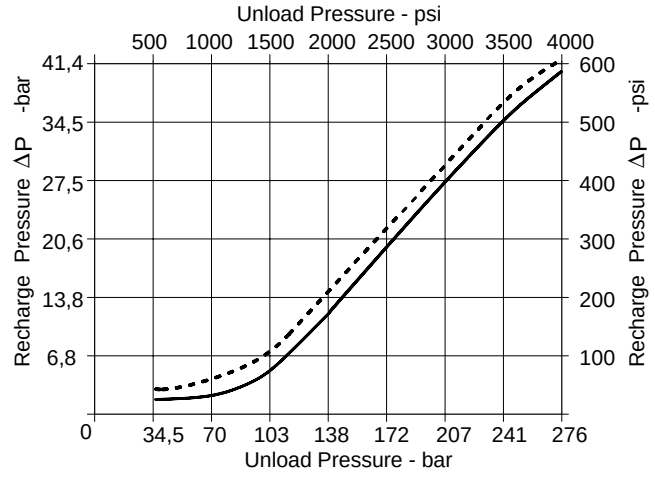



Δ P P to P
With 0,3 bar (5 psi) Check Valve

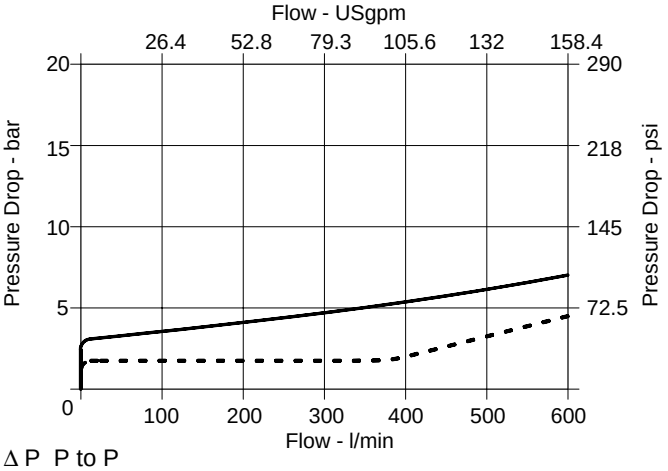


## UPF2S-10

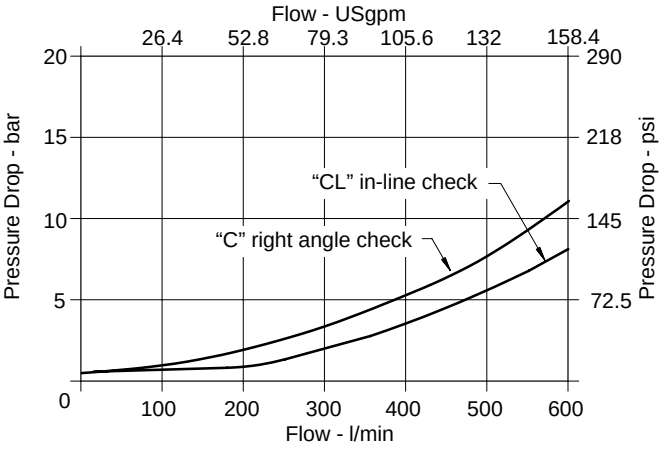
Unload vs Recharge Δ P Pressure with integral check valve as supplied.
Internal Drain ——— @600 l/min (160 USgpm)
External Drain — — — — @600 l/min (160 USgpm)




Vented Δ P P to T
Internal Drain ——— @600 l/min (160 USgpm)
External Drain — — — — @600 l/min (160 USgpm)

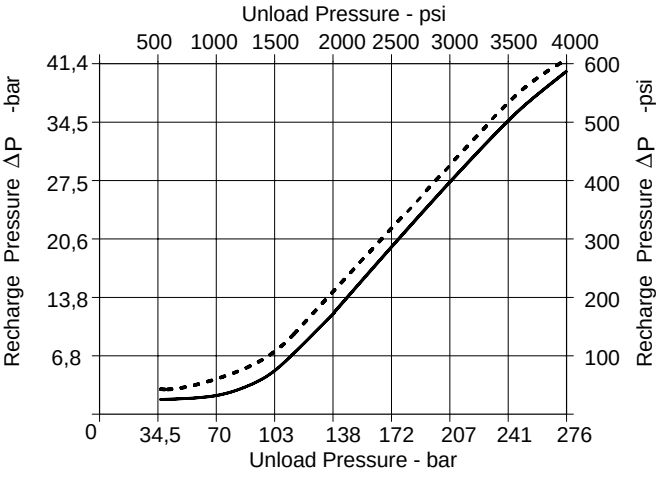



Δ P P to P
With 0,34 bar (5 psi) Check Valve

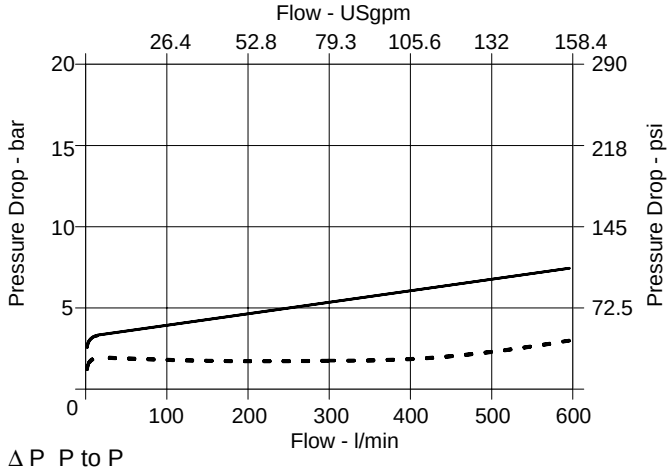



## UPF2S(V)-12

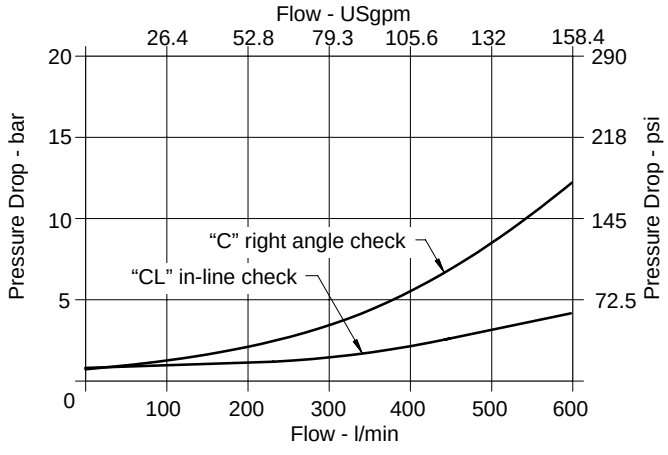
Unload vs Recharge Δ P Pressure with integral check valve as supplied.
Internal Drain ——— @600 l/min (160 USgpm)
External Drain — — — — @600 l/min (160 USgpm)




Vented Δ P P to T
Internal Drain ——— @600 l/min (160 USgpm)
External Drain — — — — @600 l/min (160 USgpm)



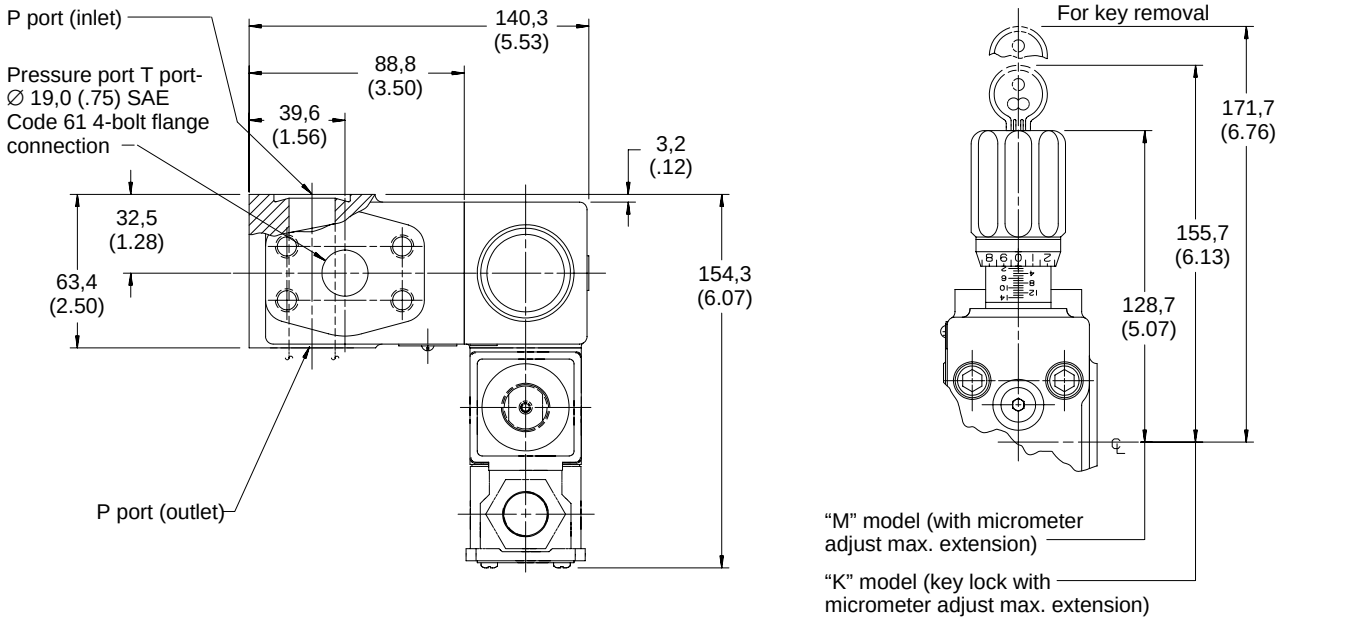

Δ P P to P
With 0,34 bar (5 psi) Check Valve

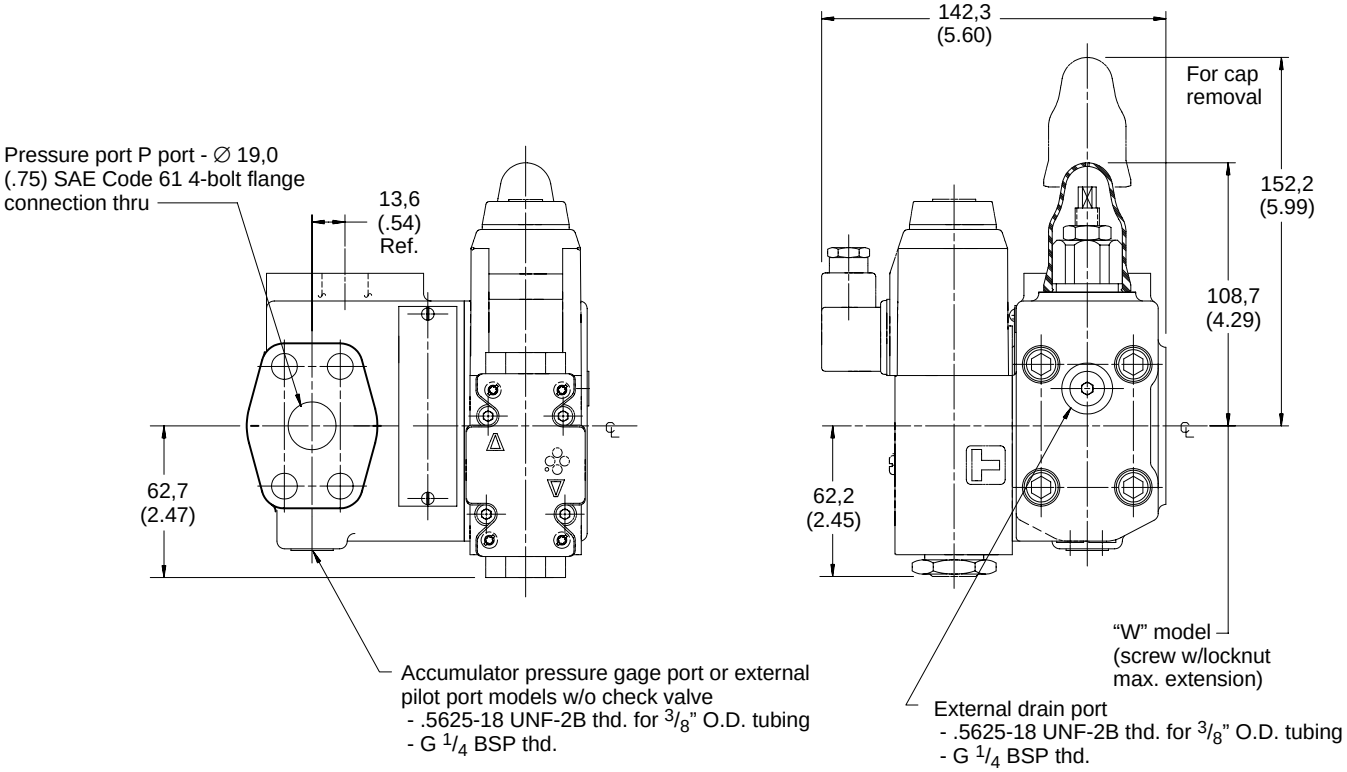


# Installation Dimensions

## UPF2S-06
## $^{3}/_{4}$" Flange -
## Unloading with Vent without Check

mm (inch)

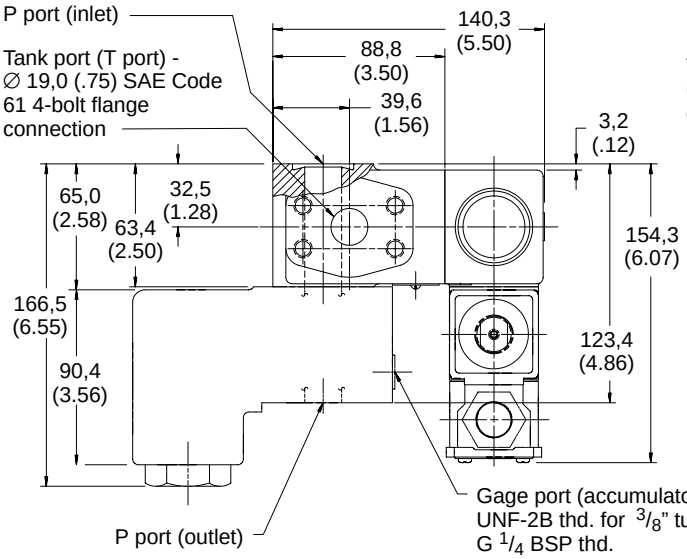


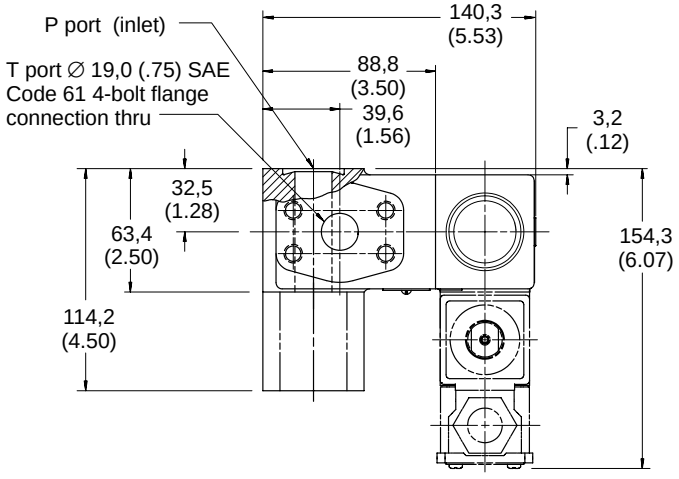
## UPF2S-C*-06
## $^3/_4$" Flange -
## Unloading with Vent & Check

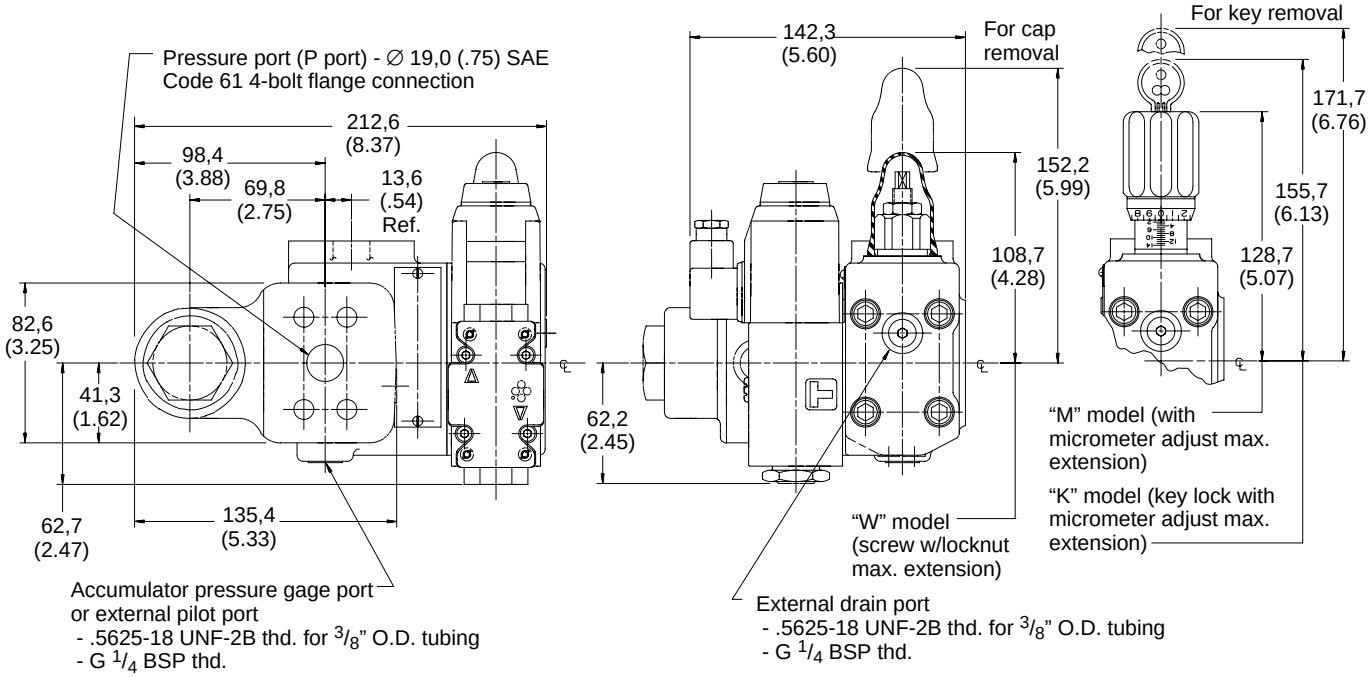
mm (inch)

**"C" Models**
Right Angle Check



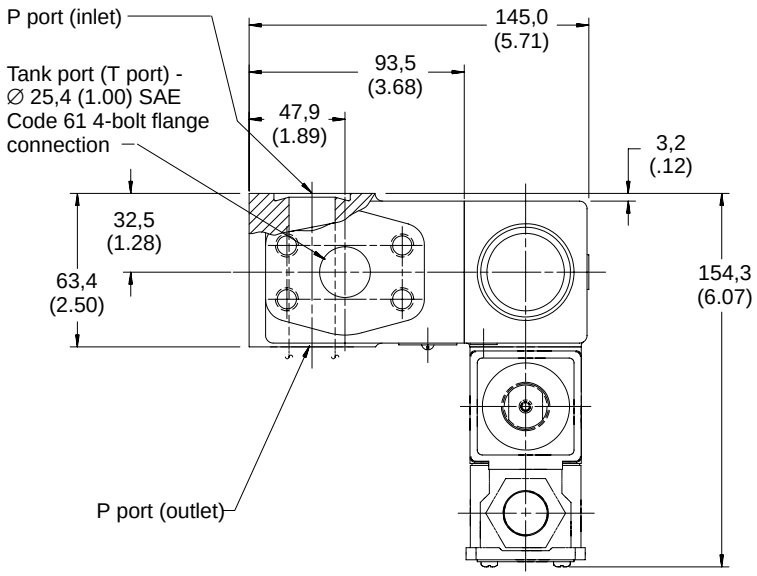

**"CL" Models**
In-line Check

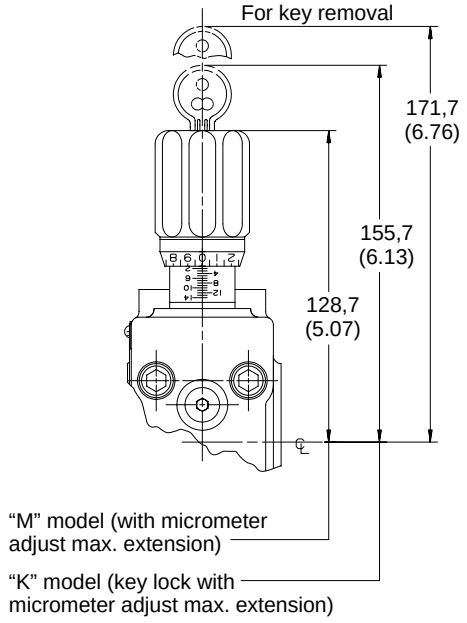


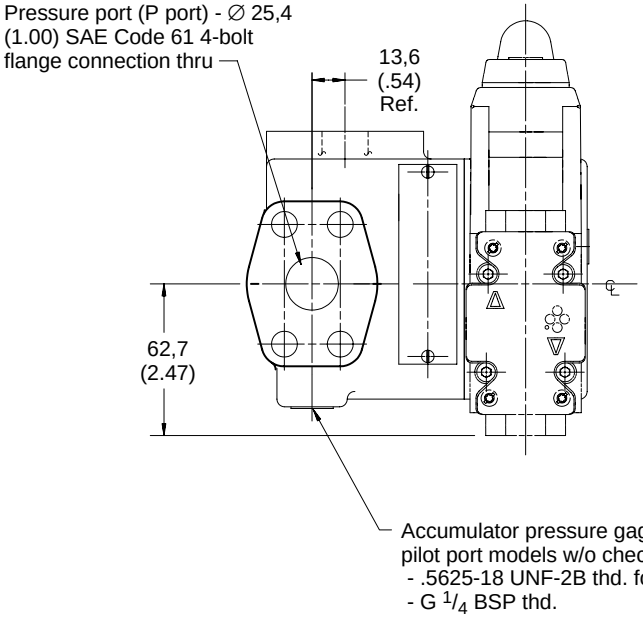



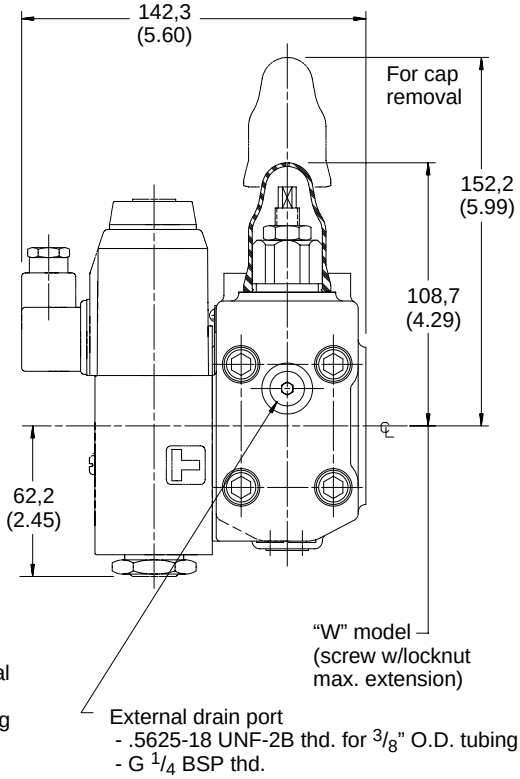
## UPF2S-08
## 1” Flange -
## Unloading with Vent without Check

mm (inch)



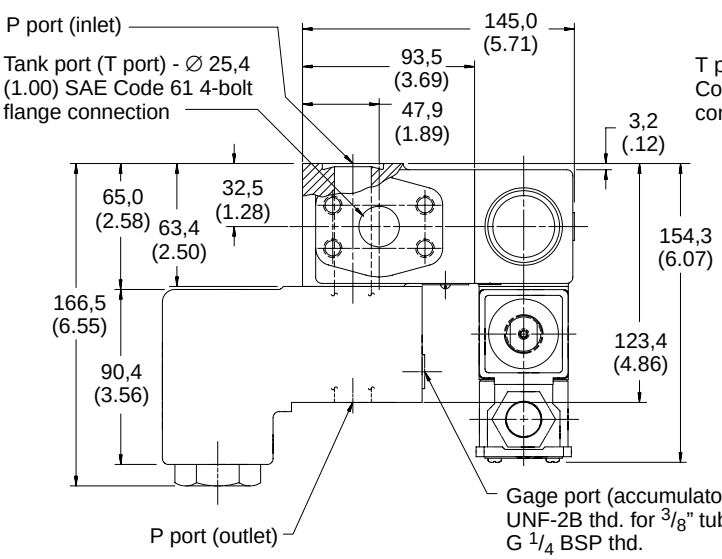



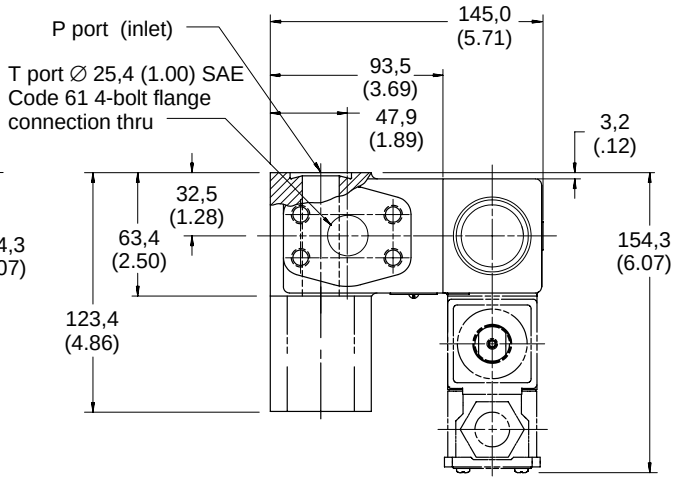
## UPF2S-C*-08
## 1” Flange -
## Unloading with Vent & Check

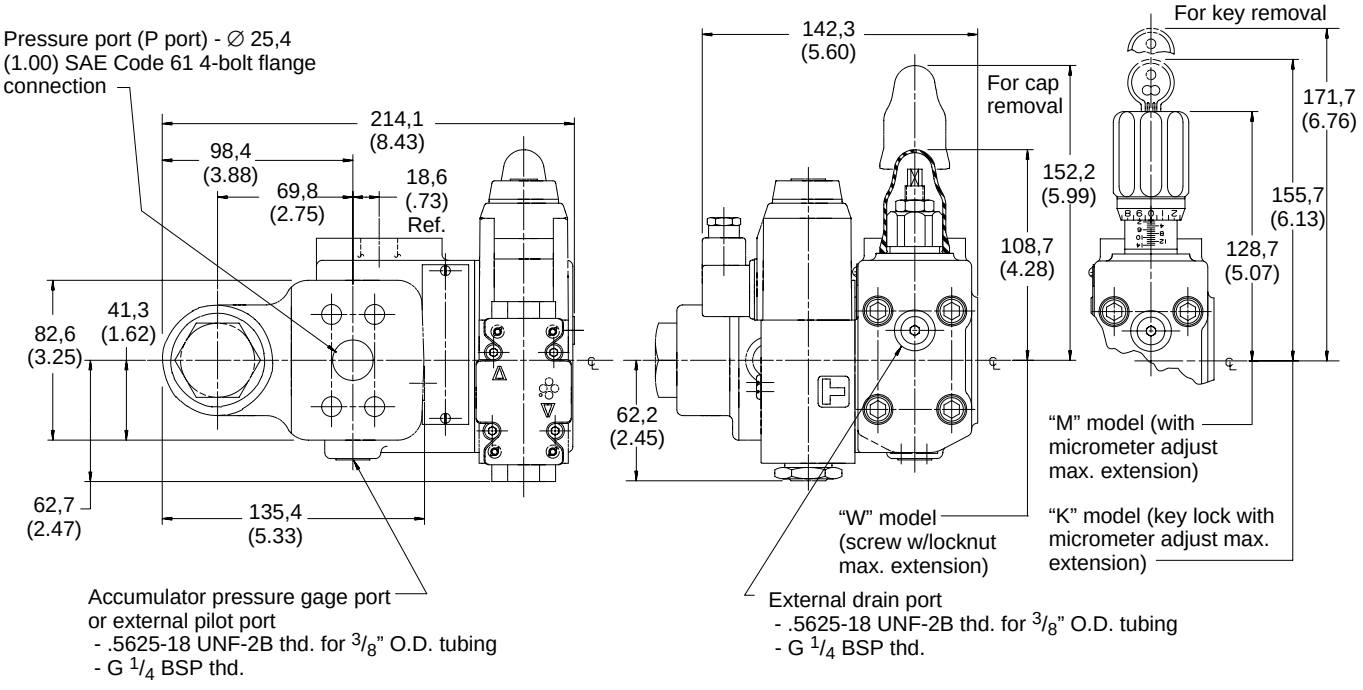
mm (inch)

### “C” Models
Right Angle Check



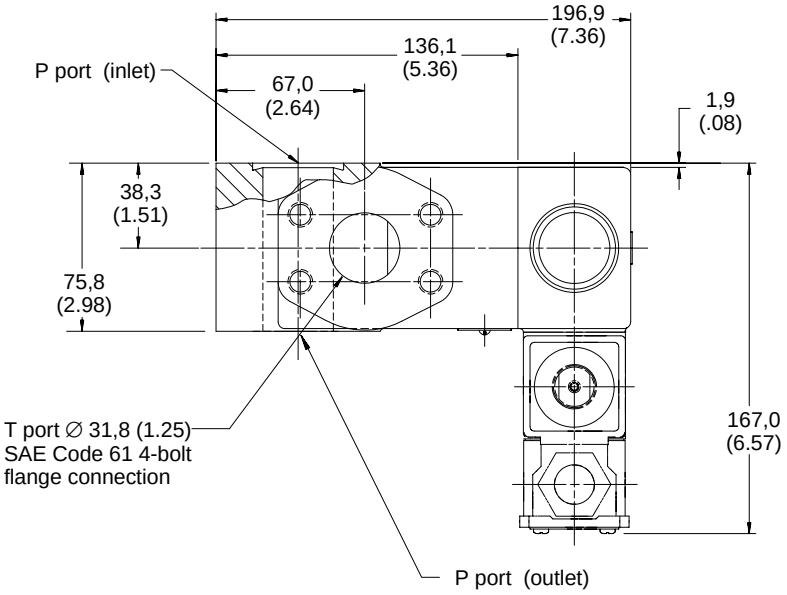

### “CL” Models
In-line Check

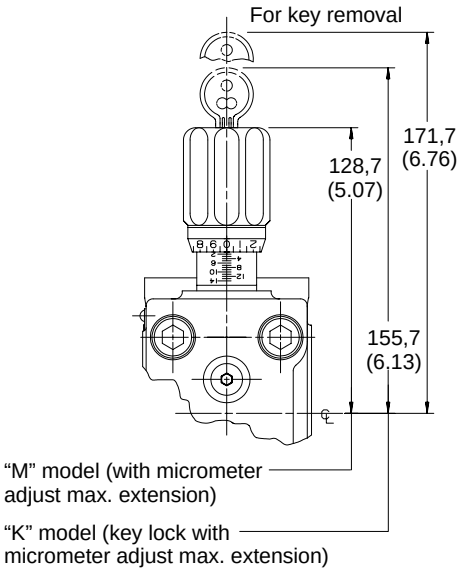


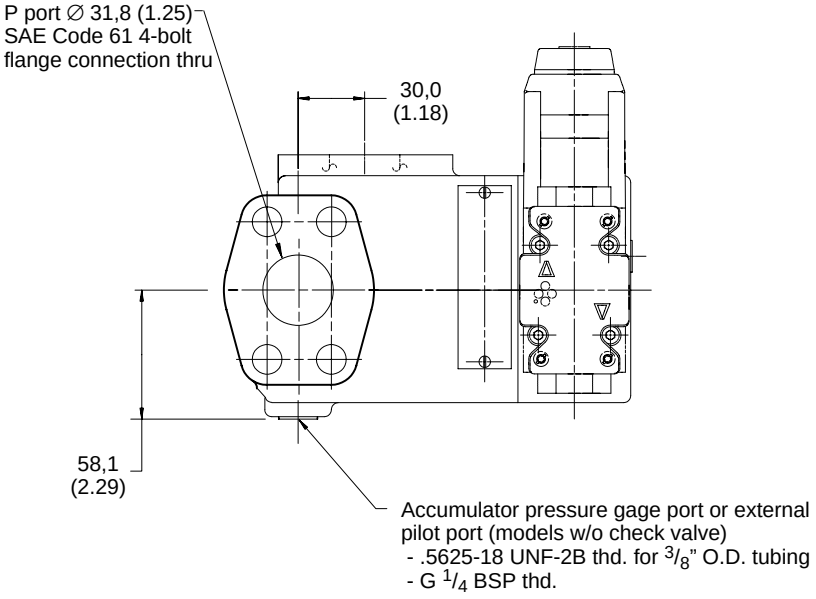



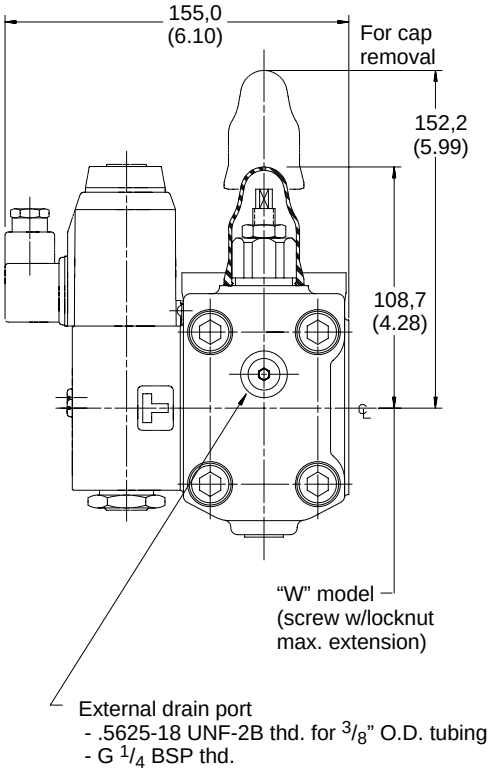
## UPF2S-10
## $1^1/_4$" Flange -
## Unloading with Vent without Check

mm (inch)



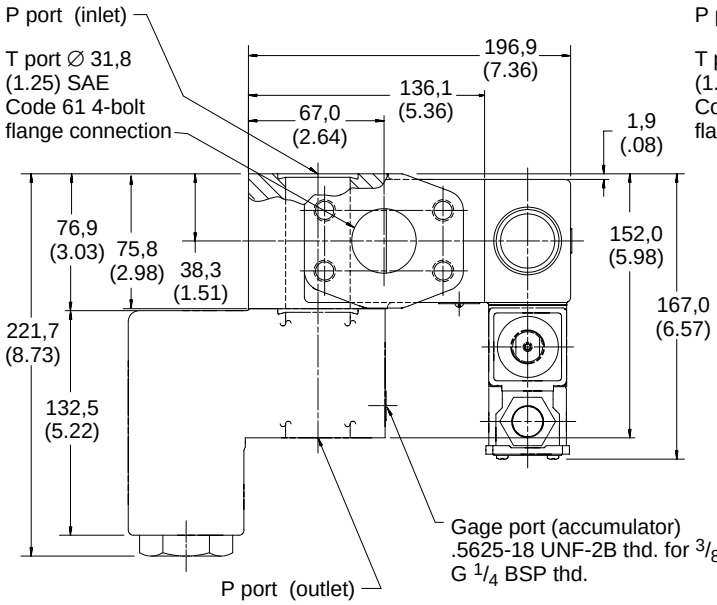



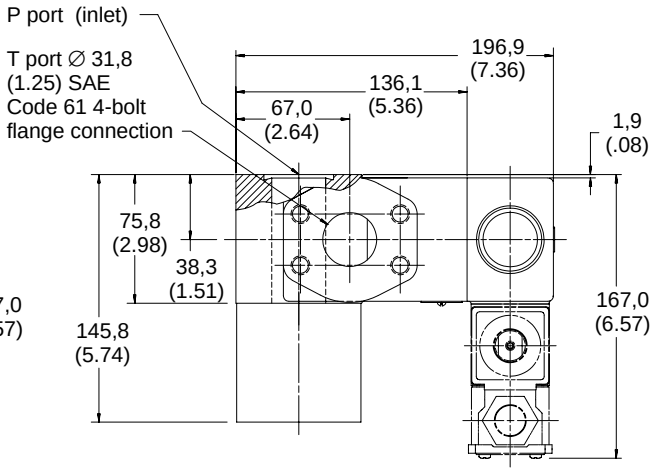
## UPF2S-C*-10
## $1^1/_4$" Flange -
## Unloading with Vent & Check

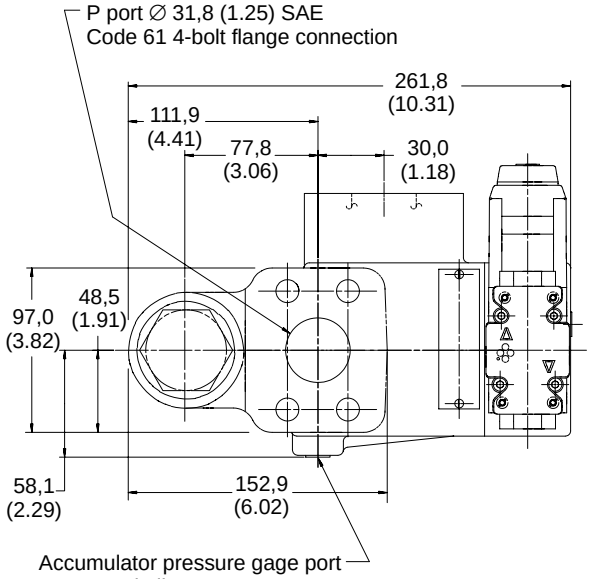
mm (inch)

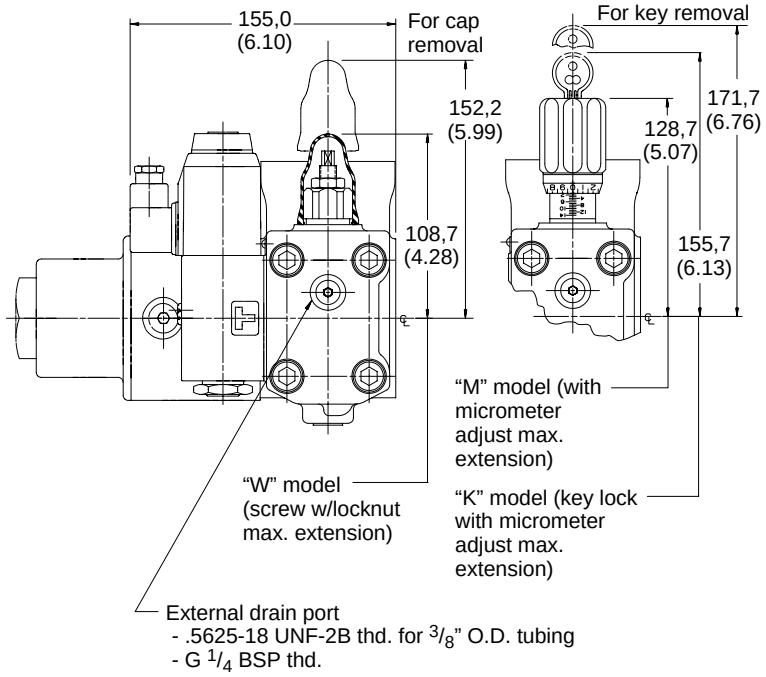
### "C" Models
Right Angle Check




### "CL" Models
In-line Check

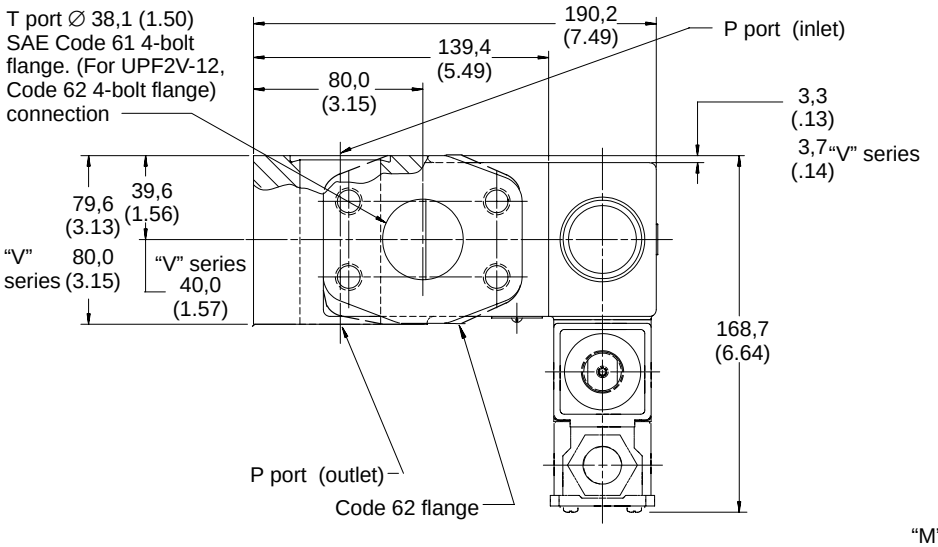


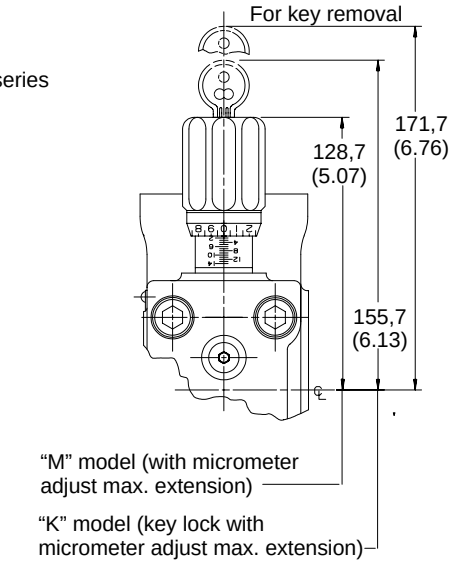



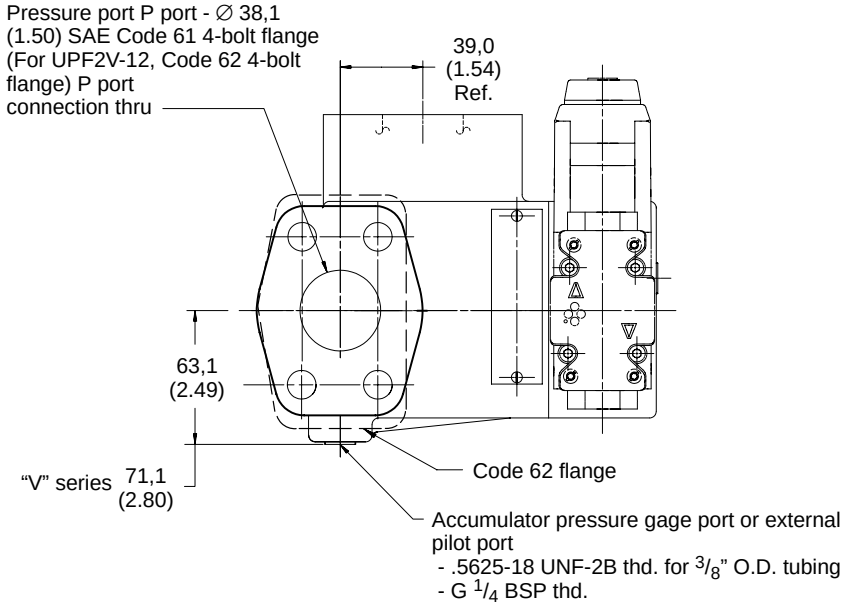



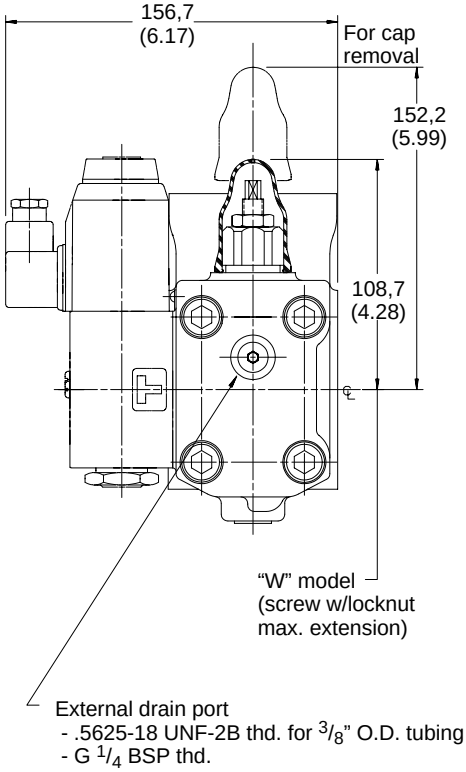
## UPF2S-12 – Code 61
## UPF2V-12 – Code 62
## $1^1/_2$" Flange -
## Unloading with Vent without Check

mm (inch)



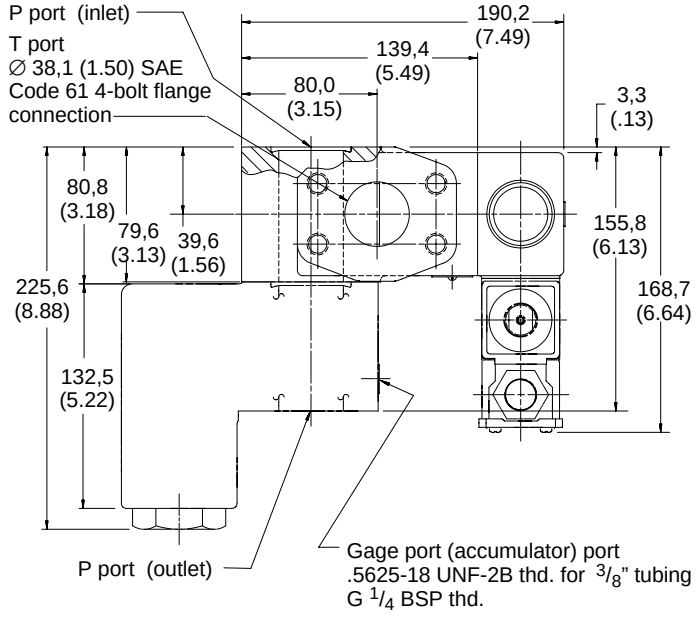



## UPF2S-C*-12 Code 61
## UPF2V-CL-12 Code 62
## $1^1/_2$" Flange -
## Unloading with Vent & Check

mm (inch)

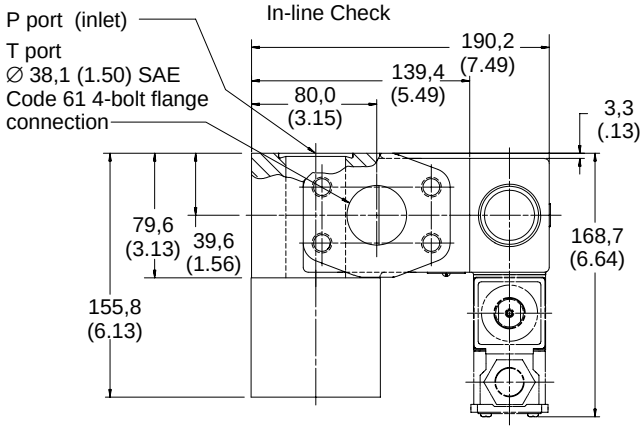
### "C" Model Code 61

Right Angle Check



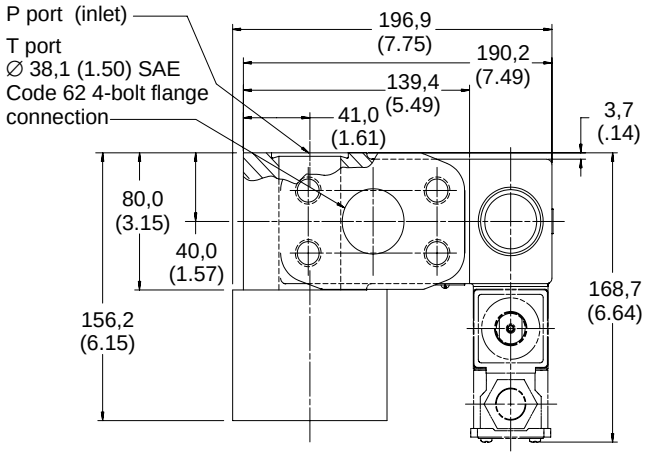

### "CL" Model Code 61

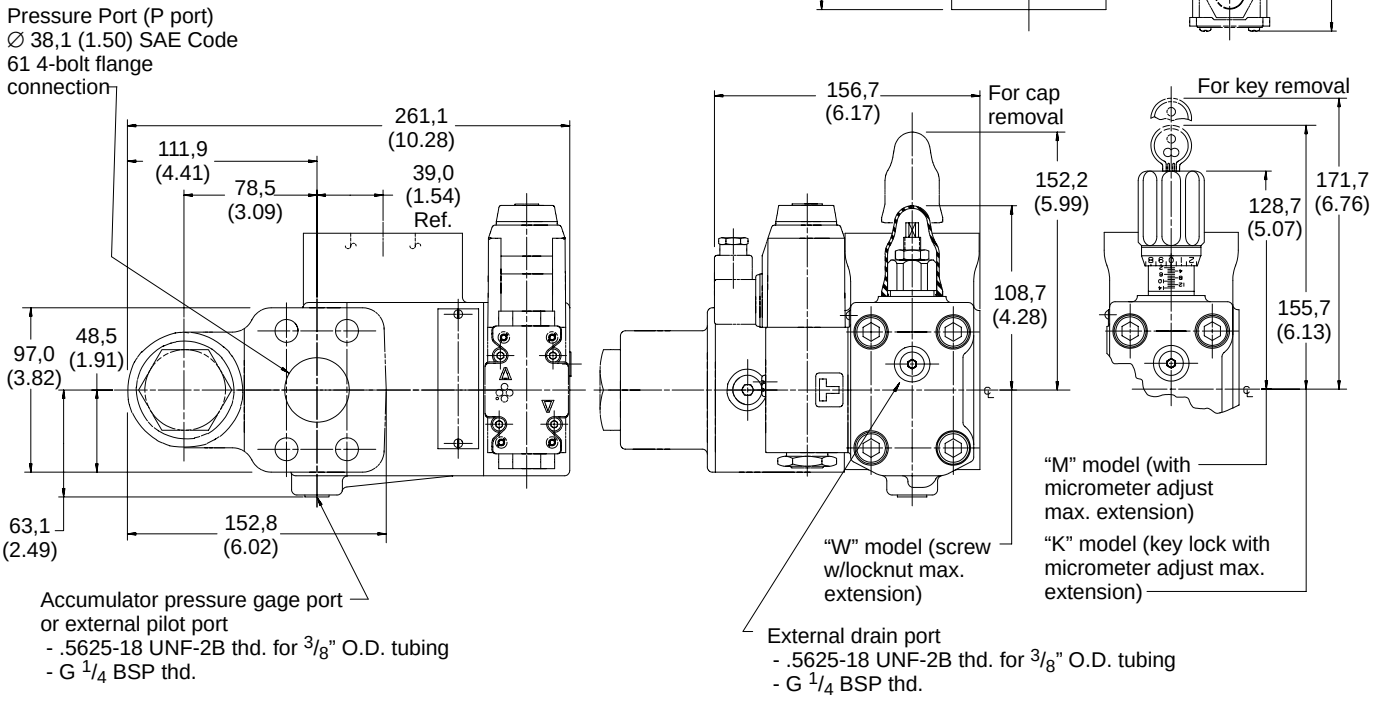
In-line Check




### "CL" Model Code 62

In-line Check



# DCPFS-08/10/12-**-20

**Right Angle Check Valves**

## Flange Sizes

- 08 - 1 inch flange
- 10 - $1^1/_4$ inch flange
- 12 - $1^1/_2$ inch flange (Not available with Code 62 flanges.)

### Benefits

- Fast opening and closing and stable performance.
- Rugged, shock resistant, offset poppet design ensures long service life.
- Easier installation and servicing of components.
- Superior leak resistance due to SAE flange mounting and reduced piping.

| Ratings | DCPFS—08 | DCPFS—10 | DCPFS—12 |
|---|---|---|---|
| Maximum flow | 114 l/min (30 USgpm) | 227 l/min (60 USgpm) | 378 l/min (100 USgpm) |
| Maximum pressure | 275 bar (4000 psi) | 275 bar (4000 psi) | 275 bar (4000 psi) |

### General Description

This Vickers DCPFS check valve is flange mounted to increase design flexibility and reduce external piping. Fewer leak points and SAE flange connections lead to installations with superior leak resistance.

The DCPFS check valve is designed for direct mounting on a pump flange, or may be stacked with the CPF series relief valves to provide a pump unloading function. The DCPF is not intended to be used with the UPFS unloading valve.

Poppet design lifts easily to permit flow and reseats quickly to form a leakproof check to block flow in the opposite direction. The DCPFS check valves can be mounted in any position.

The DCPFS check valve has excellent operating characteristics with sizes that make it possible to choose the optimum model for each application.

## Right Angle Check Model Code

**(F3) DC PF S - ** - ** - 20**

1 2 3 4 5 6 7

**1 Special Seals**

F3 - For mineral oil & fire resistant fluids. (Omit if not required)

**2 Valve Function**

DC - Check valve

**3 Mounting Type**

PF - Pump flange mounting

**4 Flange Type**

S - SAE J518 4-bolt flange standard, series code 61

**5 Valve Size**

08 - 1” flange
10 - 1 $^1/_4$” flange
12 - 1 $^1/_2$” flange

**6 Spring Cracking Pressure**

5 - 0,3 bar (5 psi)
50 - 3,4 bar (50 psi)
75 - 5,2 bar (75 psi)

**7 Design Number, 20 Series**

Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusive.

# DICPFS-06/08/10/12-**-10

**In-Line Check Valves**

## Flange Sizes

- 06 - $^{3}/_{4}$ inch flange
- 08 - 1 inch flange
- 10 - $1^{1}/_{4}$ inch flange
- 12 - $1^{1}/_{2}$ inch flange (Available with Code 62 high pressure.)

| Ratings | DICPFS–06 | DICPFS–08 | DICPFS–10 | DICPFS–12* |
|---|---|---|---|---|
| Maximum flow | 120 l/min (32 USgpm) | 300 l/min (80 USgpm) | 600 l/min (160 USgpm) | 750 l/min (200 USgpm) |
| Maximum pressure | 350 bar (5000 psi) | 350 bar (5000 psi) | 280 bar (4000 psi) | 207 bar (3000 psi) |

* DICPFV-12 Code 62 high pressure flange is rated at 750 l/min (200 USgpm) at 350 bar (5000 psi)

### Features

- Direct mounting to SAE flange.
- Compact, robust design.
- Low pressure drop design.
- Wide flow/pressure range.

### General Description

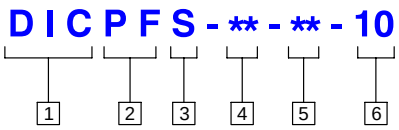
Vickers flange mounted in-line check valves can be used with the existing line of flange mounted pressure controls. The DICPF in-line check valves come in four sizes, 06 (.75”), 08 (1”), 10 (1.25”) and 12 (1.50”).

These are direct, flange mounted, in-line check valves with SAE 4-bolt mounting. They may be mounted directly on an SAE pump flange, actuator, manifold or may be stacked with a Vickers CPF relief valve to provide a pump unloading function.

This mounting style results in a much smaller space requirement and eliminates plumbing and potential leak points that result from installation of conventional line mounted check valves.

These check valves are not to be used with the UPF flange mounted unloading relief valves.

### In-Line Check Model Code




**1 Valve Function**

DIC – Direct inline check

**2 Mounting Type**

PF – Pump flange mounting

**3 Flange Type**

S – SAE J518 4-bolt flange, std. pressure series, code 61
V – SAE J518 4-bolt flange, high pressure series, code 62 (1.50 in. models only)

**4 Valve Size**

06 – 0.75 in. flange, SAE-12
08 – 1.00 in. flange, SAE-16
10 – 1.25 in. flange, SAE-20
12 – 1.50 in. flange, SAE-24

**5 Cracking Pressure**

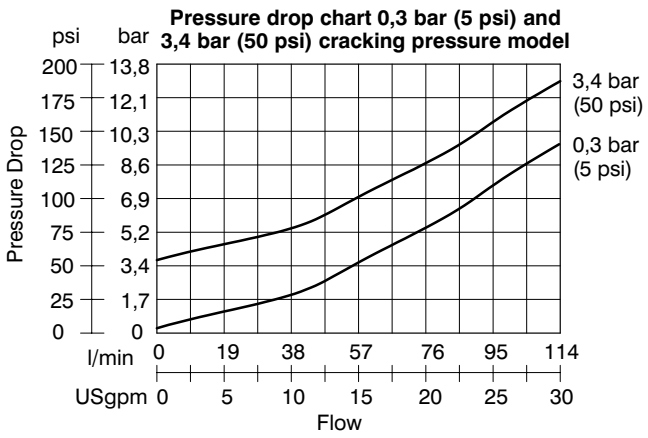
05 – 0,3 bar (5 psi)
25 – 1,7 bar (25 psi)

**6 Design Number**

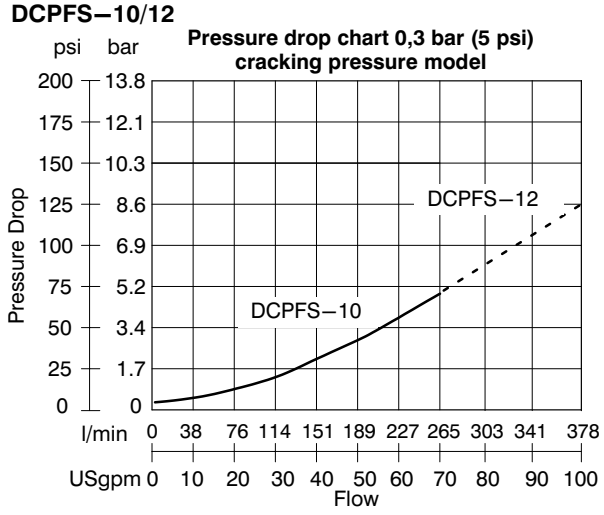
# Pressure Drop Data

## Right Angle Check Valves

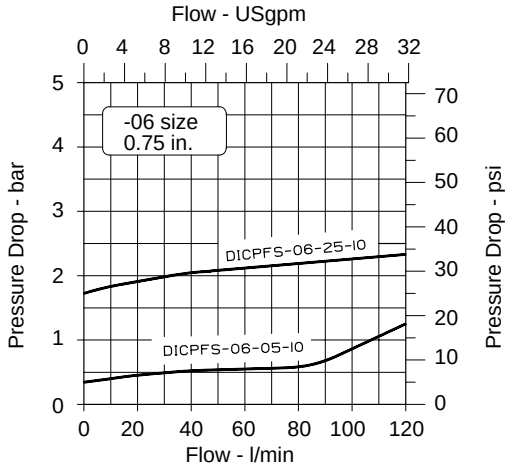
### DCPFS–08

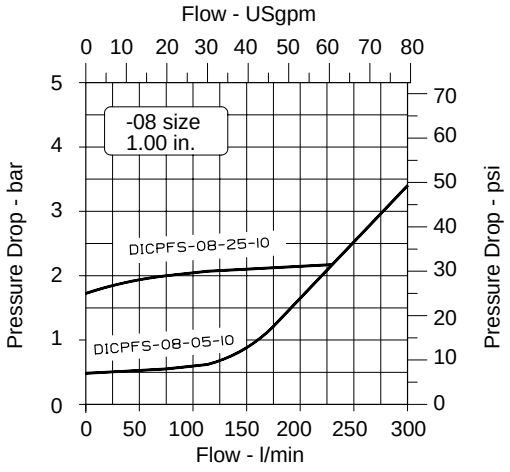


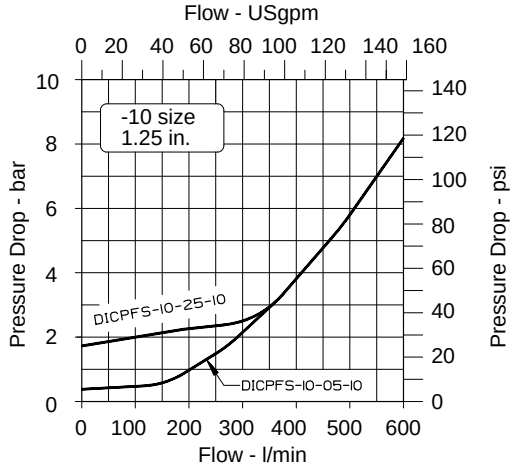

### DCPFS–10/12

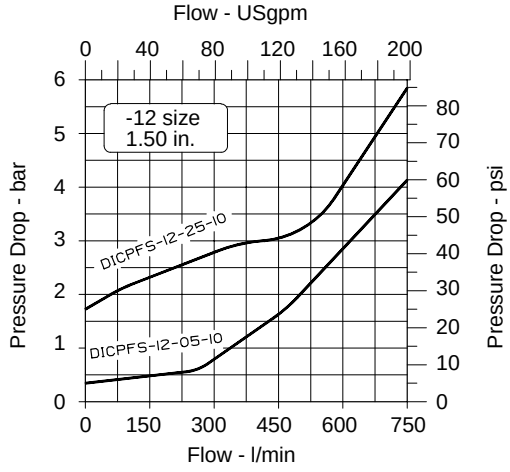



## In-Line Check Valves



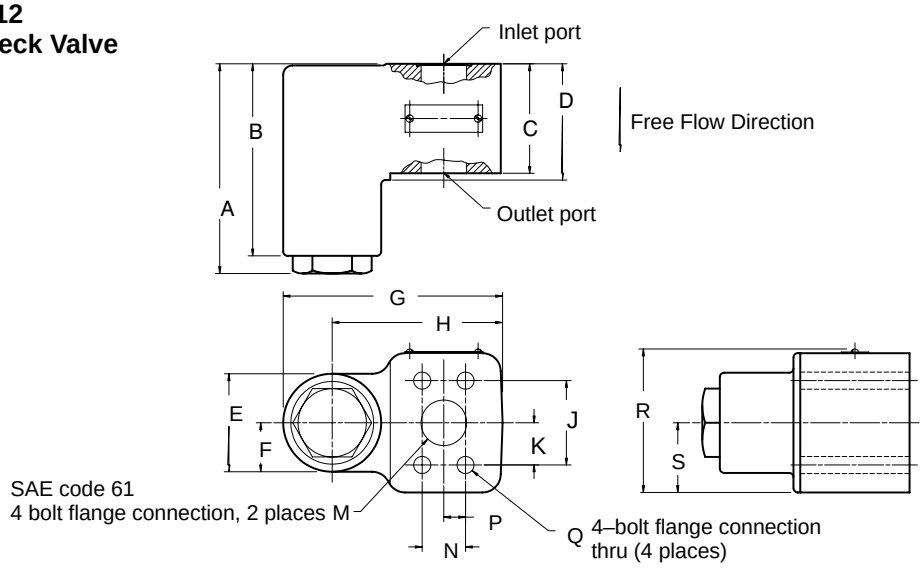



# Installation Dimensions

## DCPFS - 08/10/12
## Right Angle Check Valve

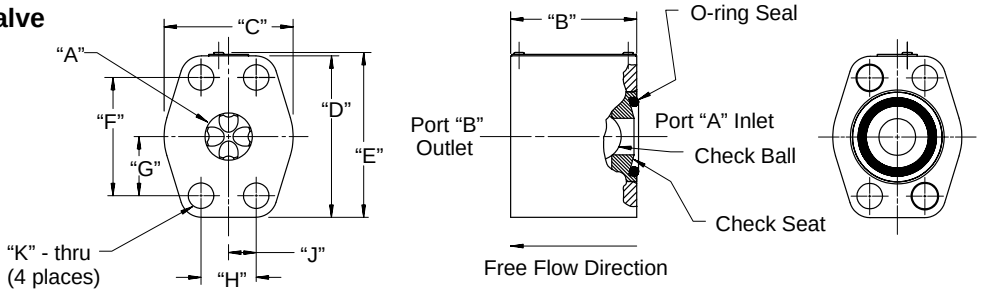
mm (inch)




### Dimensions

| Model | A | B | C | D | E | F | G | H | J | K | SAE flange M | N | 4–bolt flange P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DCPFS–08** | 102,9 (4.05) | 91,9 (3.62) | 59,9 (2.36) | 64,8 (2.55) | 57,2 (2.25) | 28,4 (1.12) | 135,1 (5.32) | 106,7 (4.20) | 52,3 (2.06) | 26,2 (1.03) | 25,4 (1.00) Dia. | 26,2 (1.03) | 13,2 (.52) | 10,3 (.406) Dia. | 85,3 (3.36) | 41,1 (1.62) |
| **DCPFS–10** | 146,0 (5.75) | 133,6 (5.26) | 76,2 (3.00) | 80,8 (3.18) | 68,3 (2.69) | 34,0 (1.34) | 152,9 (6.02) | 118,6 (4.67) | 58,7 (2.31) | 29,5 (1.16) | 31,7 (1.25) Dia. | 30,2 (1.19) | 15,0 (.59) | 11,9 (.469) Dia. | 99,8 (3.93) | 48,5 (1.91) |
| **DCPFS–12** | 146,0 (5.75) | 133,6 (5.26) | 76,2 (3.00) | 80,8 (3.18) | 68,3 (2.69) | 34,0 (1.34) | 152,9 (6.02) | 118,6 (4.67) | 69,8 (2.75) | 35,1 (1.38) | 38,1 (1.50) Dia. | 35,8 (1.41) | 17,8 (.70) | 13,5 (.531) Dia. | 99,8 (3.93) | 48,5 (1.91) |

## DICPF* -06/ 08/10/12
## In-Line Check Valve




### Standard Pressure Series (Code 61) mm (inch)

| Flange Size (inch) | Model Code | "A" | "B" | "C" | "D" | "E" | "F" | "G" | "H" | "J" | "K" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/4" | S - 06 | 19,1 (.75) | 50,8 (2.0) | 52,0 (2.05) | 65,0 (2.56) | 66,5 (2.61) | 47,6 (1.88) | 23,8 (.906) | 22,2 (.875) | 11,1 (.437) | 10,4 (.407) |
| 1" | S - 08 | 25,4 (1.00) | 60,0 (2.36) | 58,5 (2.30) | 70,0 (2.76) | 71,5 (2.81) | 52,4 (2.06) | 26,2 (1.03) | 26,2 (1.03) | 13,1 (.516) | 10,4 (.407) |
| 1 1/4" | S - 10 | 31,6 (1.25) | 70,0 (2.76) | 73,0 (2.88) | 79,0 (3.11) | 80,5 (3.16) | 58,7 (2.31) | 29,4 (1.16) | 30,2 (1.19) | 15,1 (.594) | 12,0 (.470) |
| 1 1/2" | S - 12 | 38,1 (1.50) | 76,2 (3.00) | 82,5 (3.25) | 93,5 (3.68) | 95,0 (3.74) | 69,9 (2.75) | 34,9 (1.38) | 35,7 (1.41) | 17,9 (.703) | 13,5 (.532) |

### High Pressure Series (Code 62) mm (inch)

| Flange Size (inch) | Model Code | "A" | "B" | "C" | "D" | "E" | "F" | "G" | "H" | "J" | "K" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 1/2" | V - 12 | 38,1 (1.50) | 76,2 (3.00) | 95,0 (3.74) | 112,5 (4.43) | 114,0 (4.48) | 79,4 (3.13) | 39,7 (1.56) | 35,7 (1.44) | 18,3 (.720) | 16,7 (.657) |

# Application Data

## Service Information

Refer to the following service drawings for parts breakdown:

| | |
|---|---|
| CPF1S-06/08/10/12 | I-3777-S |
| CPF2S-06/08/10/12 | I-3778-S |
| CPF3/4S-06/08/10/12 | I-3779-S |
| UPF1S-06/08/10/12 | I-3768-S |
| UPF2S-06/08/10/12 | I-3769-S |
| DCPFS-06/08/10/12 | I-3435-S |
| Pilot valve service drawing: | |
| DG4V–3(S)–**–60 | I-3886-S |

## Weights

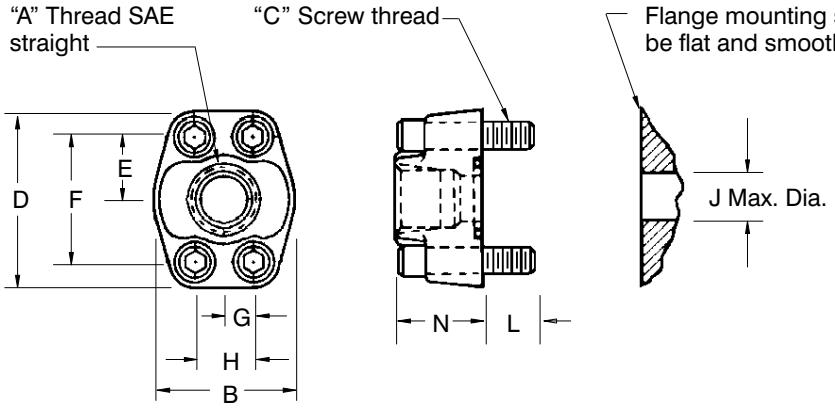
| | | |
|---|---|---|
| CPF1S – 06 | 5,4 kg | (12 lbs) |
| CPF2S – 06 | 6,9 kg | (15.5 lbs) |
| CPF3/4S– 06 | 9,2 kg | (20.5 lbs) |
| CPF1S – 08 | 5,5 kg | (12.3 lbs) |
| CPF2S – 08 | 7,1 kg | (15.8 lbs) |
| CPF3/4S– 08 | 9,4 kg | (20.8 lbs) |
| CPF1S – 10 | 8,2 kg | (18 lbs) |
| CPF2S – 10 | 9,5 kg | (21 lbs) |
| CPF3/4S– 10 | 12 kg | (26.5 lbs) |
| CPF1* – 12 | 9,6 kg | (21.3 lbs) |
| CPF2* – 12 | 11 kg | (24.3 lbs) |
| CPF3/4*– 12 | 13,5 kg | (29.8 lbs) |
| UPF1S-06 w/check | 8,9 kg | (19.8 lbs) |
| UPF1S-06 w/o check | 5,3 kg | (11.8 lbs) |
| UPF2S-06 w/check | 10,6 kg | (23.5 lbs) |
| UPF2S-06 w/o check | 7 kg | (15.5 lbs) |
| UPF1S-08 w/check | 8,9 kg | (19.8 lbs) |
| UPF1S-08 w/o check | 5,3 kg | (11.8 lbs) |
| UPF2S-08 w/check | 10,6 kg | (23.5 lbs) |
| UPF2S-08 w/o check | 7 kg | (15.5 lbs) |
| UPF1S-10 w/check | 14,5 kg | (32 lbs) |
| UPF1S-10 w/o check | 8,2 kg | (18 lbs) |
| UPF2S-10 w/check | 15,9 kg | (35 lbs) |
| UPF2S-10 w/o check | 9,5 kg | (21 lbs) |
| UPF1*-12 w/check | 16 kg | (35.3 lbs) |
| UPF1*-12 w/o check | 9,6 kg | (21.3 lbs) |
| UPF2*-12 w/check | 17,3 kg | (38,3 lbs) |
| UPF2*-12 w/o check | 11 kg | (24,3 lbs) |
| DCPFS – 08 | 3.6 kg | (8 lbs) |
| DCPFS – 10 | 5.9 kg | (13 lbs) |
| DCPFS – 12 | 5.9 kg | (13 lbs) |
| DICPFS – 06 | 0,8 kg | (1.59 lbs) |
| DICPFS – 8 | 1,2 kg | (2.43 lbs) |
| DICPFS – 10 | 1,9 kg | (4.23 lbs) |
| DICPFS – 12 | 2,6 kg | (5.58 lbs) |

## Ordering Procedure

When ordering a unit please specify the complete model code, as detailed in the model code sections, which is applicable to your requirements.

## 4–Bolt SAE Code 61 Flanges* (Maximum operating pressure 207 bar (3000 psi)

mm (inches)




* For additional information on SAE 4-bolt flanges see Vickers Catalog 700 or GB-C-2005A

| Model | Assembly | A SAE Straight Thread | B | C | D | E | F | G | H | J | L | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FL1–6–12S–10 | 683829 | 1.0625–12 ($^3/_4$" tube) | 52,3 (2.06) | $^3/_8$-16 | 65,0 (2.56) | 23,6 (.93) | 47,8 (1.88) | 10,9 (0.43) | 22,2 (.875) | 19,1 (.750) | 13,5 (0.53) | 31,8 (1.25) |
| FL1–8–16S–10 | 683830 | 1.3125–12 (1.0" tube) | 58,7 (2.31) | $^3/_8$-16 | 70 (2.75) | 26,2 (1.03) | 52,4 (2.06) | 13,2 (0.52) | 26,2 (1.03) | 25,4 (1.00) | 16,8 (0.66) | 35,1 (1.38) |
| FL1–10–20S–10 | 683831 | 1.625–12 ($1^1/_4$" tube) | 73,2 (2.88) | $^7/_{16}$-14 | 79,2 (3.12) | 29,5 (1.16) | 58,7 (2.31) | 15 (0.59) | 30,2 (1.19) | 31,8 (1.25) | 21,3 (0.84) | 38,1 (1.50) |
| FL1–12–24S–10 | 683832 | 1.875–12 ($1^1/_2$" tube) | 82,6 (3.25) | $^1/_2$-13 | 93,7 (3.69) | 35,1 (1.38) | 69,9 (2.75) | 17,8 (0.70) | 35,8 (1.41) | 38,1 (1.50) | 18,5 (0.73) | 41,1 (1.62) |

# Fluid Cleanliness

## Hydraulic Fluid Information

Essential information on the correct methods for treating hydraulic fluid is included in **Vickers publication 561**; "Vickers Guide to Systemic Contamination Control," available from your local Vickers distributor or by contacting Vickers, Incorporated.

Recommendations on filtration and the selection of products to control fluid condition are included in Vickers publication 561.

Recommended cleanliness levels using petroleum oil under common conditions is based on the highest fluid pressure levels in the system:

In referencing the table below, the shaded area highlights the recommended cleanliness level for flange mounted valves.

Fluids other than petroleum, severe service cycles or temperature extremes are cause for adjustment of these cleanliness codes. See Vickers publication 561 for exact details.

| | SYSTEM PRESSURE LEVEL | | |
|---|---|---|---|
| **PRODUCT** | **69 bar (1000 psi)** | **138 bar (2000 psi)** | **207+ bar (3000+ psi)** |
| Vane Pumps – FIxed | 20/18/15 | 19/17/14 | 18/16/13 |
| Vane Pumps – Variable | 18/16/14 | 17/15/13 | |
| Piston Pumps – Fixed | 19/17/15 | 18/16/14 | 17/15/13 |
| Piston Pumps – Variable | 18/16/14 | 17/15/13 | 16/14/12 |
| Directional Valves | 20/18/15 | 20/18/15 | 19/17/14 |
| Pressure/Flow Control Valves | 19/17/14 | 19/17/14 | 19/17/14 |
| Servo Valves | 16/14/11 | 16/14/11 | 16/13/10 |
| Proportional Valves | 16/14/12 | 16/14/12 | 15/13/11 |
| Cylinders | 20/18/15 | 20/18/15 | 20/18/15 |
| Vane Motors | 20/18/15 | 19/17/14 | 18/16/13 |
| Axial Piston Motors | 19/17/14 | 18/16/13 | 17/15/12 |
| Radial Piston Motors | 20/18/14 | 19/17/13 | 18/16/13 |