# Motion control valves

## Motion control functions for applications up to 350 bar (5000 psi) and 550 L/min (143 USgpm)

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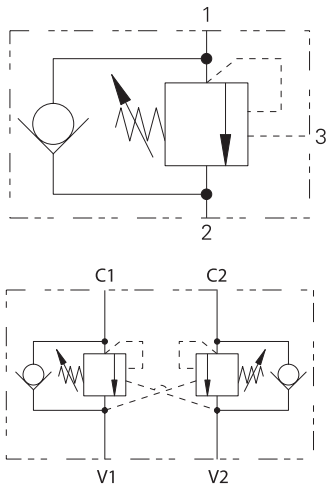
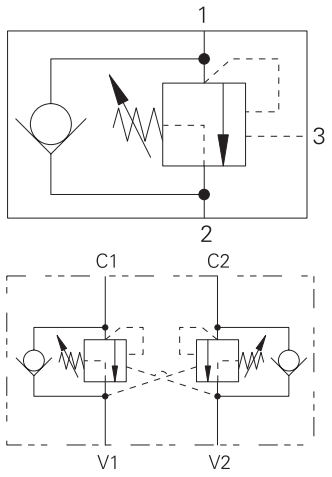
# Motion control valves

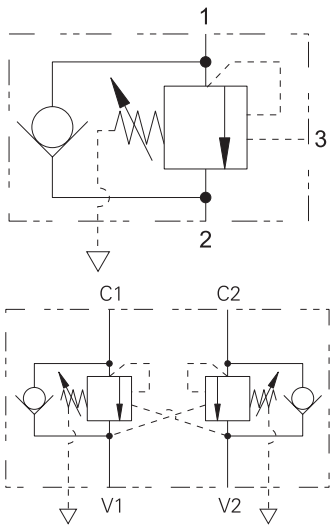
## Functional symbol




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *OCV standard* | | L/min (USgpm) | bar (psi) | |
| 1CE20 | A22903 | 20 (5) | 270 (4000) | F-10 |
| 1CE30 | A6610 | 30 (8) | 270 (4000) | F-12 |
| 1CEH30 | A6610 | 30 (8) | 350 (5000) | F-14 |
| 1CE90 | A12336 | 90 (23) | 270 (4000) | F-30 |
| 1CEH90 | A12336 | 90 (23) | 350 (5000) | F-32 |
| 1CE120 | A877 | 120 (32) | 270 (4000) | F-48 |
| 1CE140 | A20081 | 140 (37) | 340 (4390) | F-58 |
| 1CE300 | A6935 | 300 (80) | 270 (4000) | F-64 |
| 1SE30 | A20090-T11A | 30 (8) | 270 (4000) | F-76 |
| 1SE90 | A20092-T2A | 90 (23) | 270 (4000) | F-84 |
| 1SE140 | A20094-T17A | 140 (37) | 340 (4390) | F-92 |



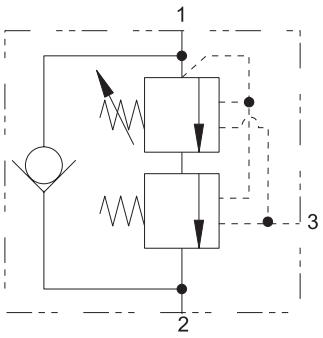

| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *OCV part balanced* | | L/min (USgpm) | bar (psi) | |
| 1CER30 | A6610 | 30 (8) | 270 (4000) | F-16 |
| 1CERH30 | A6610 | 30 (8) | 350 (5000) | F-18 |
| 1CER90 | A12336 | 90 (23) | 270 (4000) | F-34 |
| 1CERH90 | A12336 | 90 (23) | 350 (5000) | F-36 |
| 1CER140 | A20081 | 140 (37) | 340 (4390) | F-60 |
| 1SER30 | A20090-T11A | 30 (8) | 270 (4000) | F-78 |
| 1SER90 | A20092-T2A | 90 (23) | 270 (4000) | F-86 |
| 1SER140 | A20094-T17A | 140 (37) | 340 (4390) | F-96 |



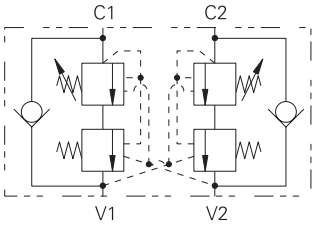

| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *OCV fully balanced* | | L/min (USgpm) | bar (psi) | |
| 1CEB30 | A6610 | 30 (8) | 270 (4000) | F-20 |
| 1CEB90 | A12336 | 90 (23) | 270 (4000) | F-38 |
| 1CEB120 | A877 | 120 (32) | 270 (4000) | F-50 |
| 1CEB300 | A6935 | 300 (80) | 270 (4000) | F-66 |
| 1SEB30 | A20090-T11A | 30 (8) | 270 (4000) | F-80 |
| 1SEB90 | A20092-T2A | 90 (23) | 270 (4000) | F-88 |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

## Functional symbol




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *OCV counterbalanced* | | L/min (USgpm) | bar (psi) | |
| 1CEL30 | A6610 | 30 (8) | 380 (5510) | F-24 |
| 1CEL90 | A12336 | 90 (23) | 380 (5510) | F-42 |
| 1CEL140 | A20081 | 140 (37) | 380 (5510) | F-62 |
| 1SEL30 | A20090-T11A | 30 (8) | 380 (5510) | F-82 |
| 1SEL90 | A20092-T2A | 90 (23) | 380 (5510) | F-90 |
| 1SEL140 | A20094-T17A | 140 (37) | 380 (5310) | F-96 |

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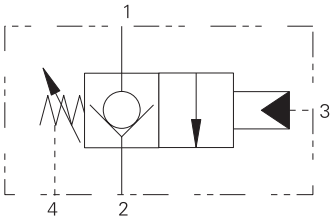
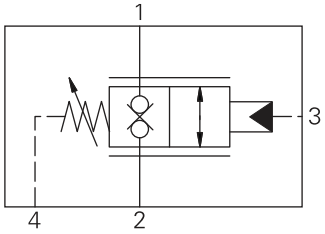
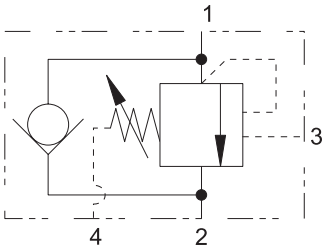


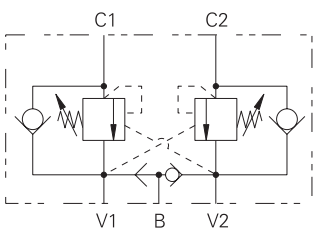

| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *OCV zero differential* | | L/min (USgpm) | bar (psi) | |
| 1CPBD30 | AXP 20530 | 30 (8) | 350 (5000) | F-26 |
| 1CPBD90 | A12196 | 90 (23) | 350 (5000) | F-44 |
| 1CPBD120 | A6726 | 180 (47) | 400 (5800) | F-54 |
| 1CPBD300 | A13098 | 300 (80) | 400 (5800) | F-70 |




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *OCV normally closed zero differential* | | L/min (USgpm) | bar (psi) | |
| 1CPPD90 | A12196 | 90 (23) | 350 (5000) | F-46 |
| 1CPPD300 | A13098 | 300 (80) | 350 (5000) | F-72 |




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *OCV fully balanced* | | L/min (USgpm) | bar (psi) | |
| 1CEBD30 | A20530 | 30 (8) | 350 (5000) | F-22 |
| 1CEBD90 | A12196 | 90 (23) | 270 (4000) | F-40 |
| 1CEBD120 | A6726 | 180 (47) | 270 (4000) | F-52 |
| 1CEBD300 | A13098 | 300 (80) | 270 (4000) | F-68 |



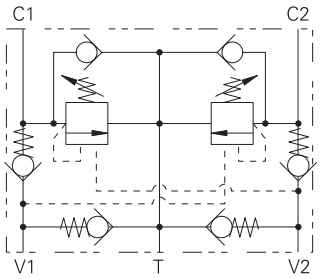

| Model | Cavity | | | |
|---|---|---|---|---|
| *Motion control valve, with brake shuttle* | | L/min (USgpm) | bar (psi) | Page |
| 1CEESH35 | | 30 (8) | 270 (4000) | F-98 |
| 1CEESH95 | | 90 (23) | 270 (4000) | F-100 |
| 1CEESH150 | | 150 (40) | 270 (4000) | F-102 |
| 1CEESH350 | | 300 (80) | 270 (4000) | F-104 |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

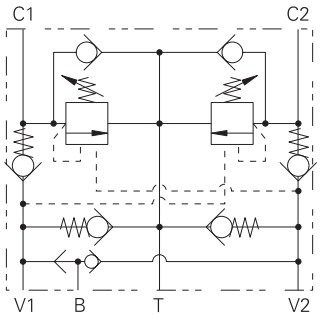
# Motion controls

Valve locator

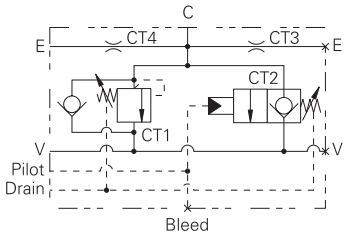
## Functional symbol



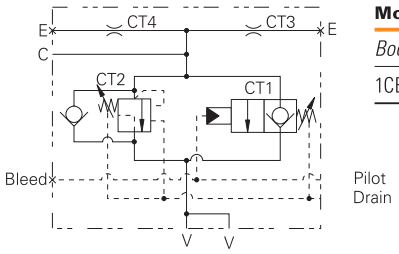

| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *Motion control valve & lock* | | **L/min (USgpm)** | **bar (psi)** | |
| 1CEEC35 | | 30 (8) | 270 (4000) | F-106 |
| 1CEEC95 | | 95 (25) | 270 (4000) | F-108 |
| 1CEEC150 | | 150 (40) | 270 (4000) | F-110 |
| 1CEEC350 | | 300 (80) | 270 (4000) | F-112 |



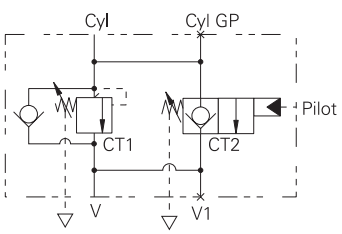

| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *Motion control valve & lock with brake shuttle* | | **L/min (USgpm)** | **bar (psi)** | |
| 1CEECSH35 | | 30 (8) | 270 (4000) | F-114 |
| 1CEECSH95 | | 95 (25) | 270 (4000) | F-116 |
| 1CEECSH150 | | 150 (40) | 270 (4000) | F-118 |
| 1CEECSH350 | | 350 (80) | 270 (4000) | F-120 |




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *BoomLoc* | | **L/min (USgpm)** | **bar (psi)** | |
| 1CEBL256 | | 250 (66) | 350 (5000) | F-124 |
| 1CEBL356 | | 350 (92) | 350 (5000) | F-126 |




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *BoomLoc* | | **L/min (USgpm)** | **bar (psi)** | |
| 1CEBL556 | | 550 (145) | 400 (5800) | F-128 |



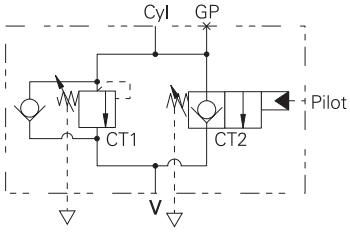

| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *BoomLoc* | | **L/min (USgpm)** | **bar (psi)** | |
| 1CEBL31F3W35P | | 30 (8) | 350 (5000) | F-130 |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

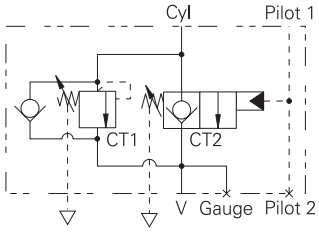


F

## Functional symbol




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *BoomLoc* | | L/min (USgpm) | bar (psi) | |
| 1CEBL31F1/2635P | | 30 (8) | 350 (5000) | F-133 |




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *BoomLoc* | | L/min (USgpm) | bar (psi) | |
| 1CEBL31F4W35P | | 30 (8) | 350 (5000) | F-135 |

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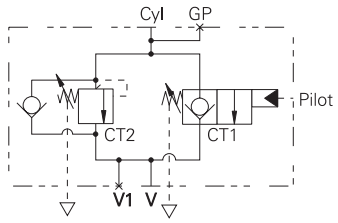
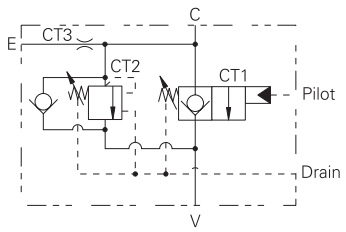
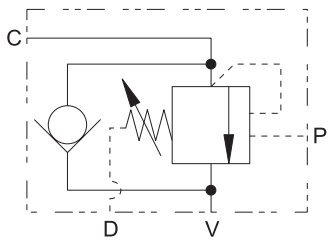



| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *BoomLoc* | | L/min (USgpm) | bar (psi) | |
| 1CEBL91F4W35P | | 90 (24) | 350 (5000) | F-136 |




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *BoomLoc* | | L/min (USgpm) | bar (psi) | |
| 1CEBL151F4W35P | | 150 (40) | 350 (5000) | F-138 |




| Model | Cavity | Flow rating | Typical pressure | Page |
|---|---|---|---|---|
| *BoomLoc* | | L/min (USgpm) | bar (psi) | |
| 1CEBL153F4W35P | | 150 (40) | 350 (5000) | F-140 |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# Motion control valves

Section contents

This section contains a most extensive range of overcenter and motion control cartridges, including normal, part vented and fully vented versions. Suitable for load holding, load safety and to prevent load runaway, giving low pressure drops, various pilot ratios and excellent stability to all types of moving loads.

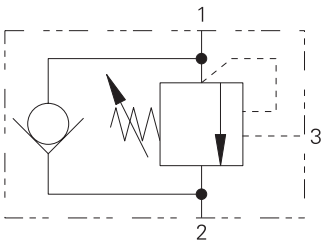
### Adjustments

The adjustment range and Max setting figures shown throughout this catalogue give the design range for each valve, higher or lower values may be attainable but should not be used without first contacting our Engineering department. Setting must ALWAYS be carried out using an appropriate gauge and it must NOT be assumed that screwing an adjuster to its maximum or minimum position will yield the maximum or minimum stated design setting for that valve.

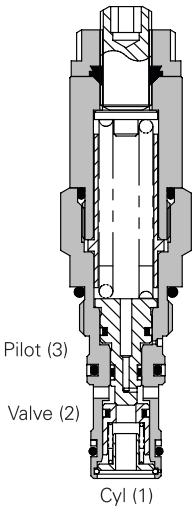
| | |
|---|---|
| **1CE/1CEE**<br>Overcenter cartridge pilot assisted relief with check | To control moving loads and prevent load runaway, giving load holding and hose failure safety |
| **1CER**<br>Overcenter cartridge as 1CE series with relief balanced | As 1CE series but with relief balanced against back pressure allowing the valve to be used with closed center DCV with service line reliefs |
| **1CEB/1CEBD**<br>Overcenter cartridge as 1CE series with relief and pilot balanced | As 1CE series but balanced on relief and pilot areas. For use on proportional systems or applications with widely varying back pressures |
| **1CEL**<br>Overcenter cartridge with constant counterbalance pressure | This valve is used in systems where the machine framework introduces instability, such as telescopic handlers, cranes and concrete pumps |
| **1CPB/1CPBD**<br>Pilot controlled cartridges without relief function, unaffected by back pressure | For use on boom lock applications giving load-holding and hose failure safety. With or without internal relief |
| **1CEEC**<br>Line mounted overcenter with make up checks. Piece parts in body style | Motion control valves with make up checks and cross line relief function for use on transmission systems or single rod cylinders when dual relief is required |
| **1CEESH/1CEECSH**<br>As ICEEC series with brake shuttle. Piece parts in body style | As ICEEC series but with added brake shuttle for removal of spring applied park brakes |
| **1CEBL**<br>In-line or cylinder mounted BoomLoc valves incorporating 1CPB(D) cartridge and additional relief cartridge element | These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643. |

# 1CE20 - Overcenter valve

Pilot assisted relief with check
20 L/min (5 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

3:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

4.5:1 Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

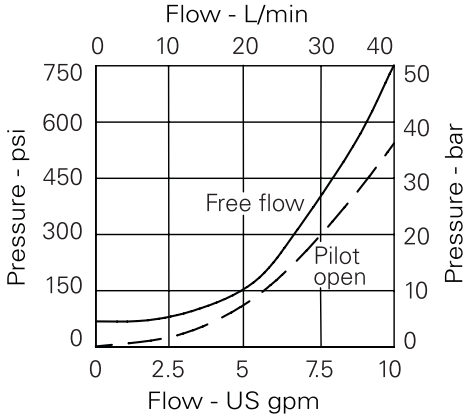
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40° C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 20 L/min (5 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A22903 (See Section M) |
| Torque cartridge into cavity | 40 Nm (30 lbs ft) |
| Weight | 1CE20 0.16 kg (0.35 lbs)<br>1CE25 0.37 kg (0.82 lbs)<br>1CEE24 0.41 kg (0.89 lbs) |
| Seal kit number | SK1276 (Nitrile)<br>SK1276V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30°C to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE20 - Overcenter valve

Pilot assisted relief with check
20 L/min (5 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE*** – F 3W – 35 S 3**
1 2 3 4 5 6

## 1 Basic code

**1CE20 -** Cartridge Only
**1CE25 -** Cartridge and Body
**1CEE24 -** Cartridges and Dual Body

## 2 Adjustment means

**F** - Screw Adjustment
**N** - Fixed - State pressure setting required.

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port sizes

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminum single | Steel single | Aluminum dual | Steel dual |
| 3W | 3/8" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B24255 | B24254 | B24261 | B24260 |
| 6T | 3/8" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B24257 | B24256 | B24264 | B24263 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 100-230 bar.
Std setting 140 bar

**35** - 200-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min
Other pressure ranges available on request

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 Pilot ratio

**3** - 3:1

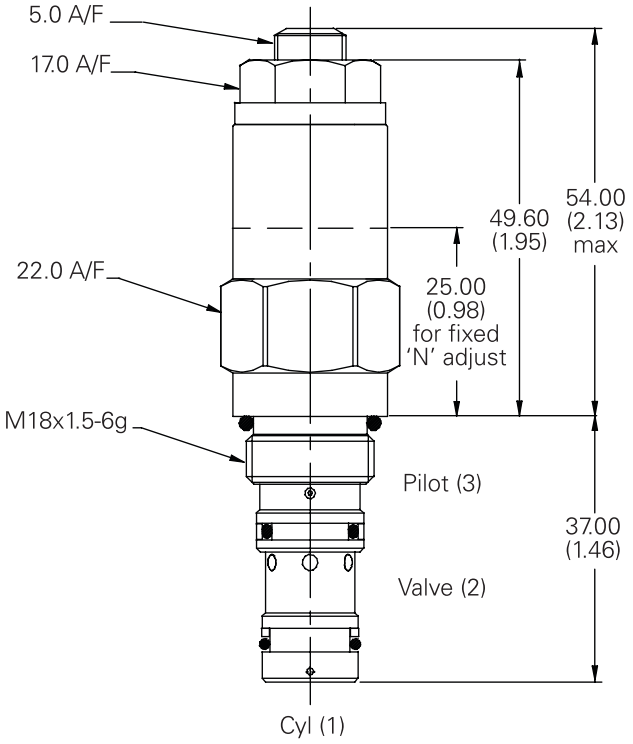
**4** - 4.5.1

**8** - 8:1

## Dimensions

mm (inch)

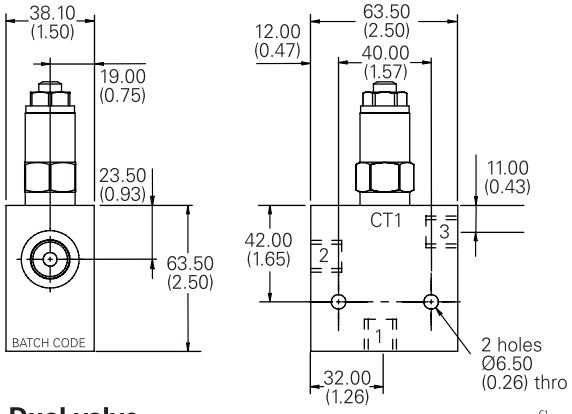
**Cartridge only**
Basic Code
1CE20



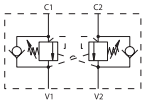

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option.

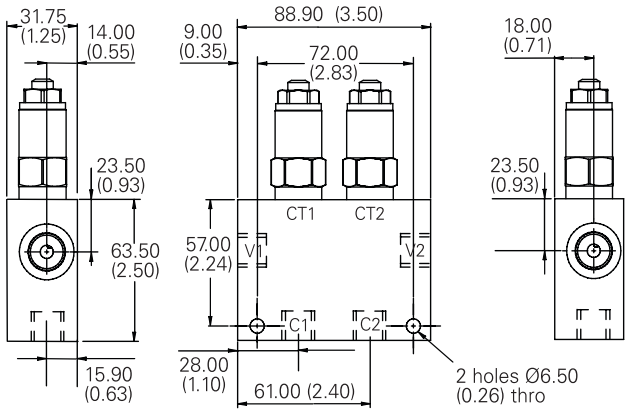
**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Single valve**
3/8" Ports
Basic Code 1CE25




**Dual valve**
3/8" Ports
Basic Code 1CEE24 (Internally Cross Piloted)

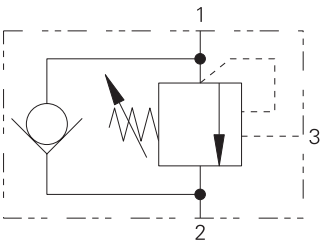


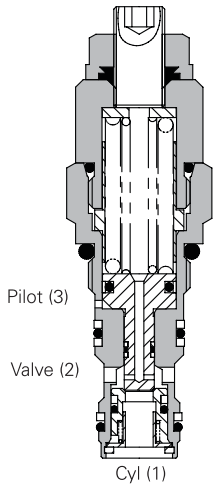

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE30 - Overcenter valve

Pilot assisted relief with check
30L/min (8 USgpm) • 270 bar (4000 psi)




## Sectional View




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

2.5:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

5:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

10:1 Best suited for applications where the load remains relatively constant.

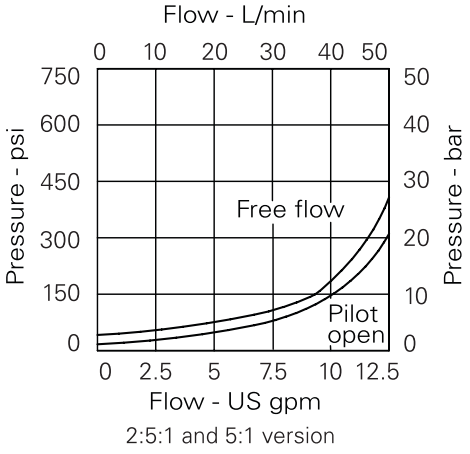
## Performance data

**Ratings and specifications**

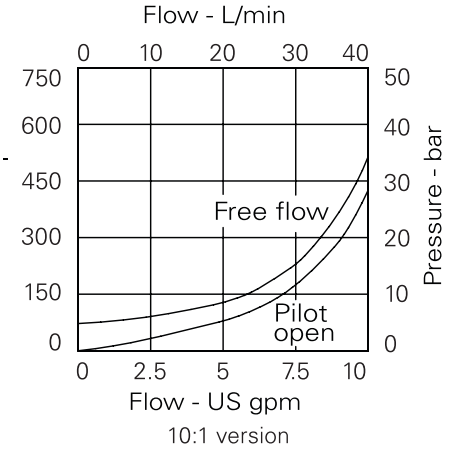
| *Figures based on: Oil Temp = 40° C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar). Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity | A6610 (See Section M) |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 1CE30 0.15 kg (0.33 lbs)<br>1CE35 0.41 kg (0.90 lbs)<br>1CEE34 0.90 kg (1.98 lbs) |
| Seal kits | SK395 (Nitrile)<br>SK395V (Viton®) |
| Filtration | Cleanliness code 18/13 (25 micron nominal) |
| Temperature range | -30°C to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




2:5:1 and 5:1 version




10:1 version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE30 - Overcenter valve

Pilot assisted relief with check
30L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE*** – F 3W – 35 S 5**
1 2 3 4 5 6

## 1 Function

**1CE30** - Cartridge Only

**1CE35** - Cartridge in body

**1CEE34** - Cartridges in dual body

## 2 Adjustment

**F -** Screw adjustment

**N -** Fixed

For fixed versions add setting in 10 bar increments to end of part number. Subject to a +/-10% tolerance.

## 3 Port size

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminum single | Steel single | Aluminum dual | Steel dual |
| 3W | 3/8" BSPP | B6743 | B12823 | B6836 | B13803 |
| 6T | 3/8" SAE | B10536 | | B10805 | |
| 8T | 1/2" SAE | B7884 | | B30237 | |

## 4 Pressure range

**Note:** Code based on pressure in bar.

**20** - (2.5:1 and 5:1): 70-210 bar.
Std setting 100 bar
(10:1): 100-210 bar.
Std setting 100 bar

**35** - (2.5:1 and 5:1): 100-350 bar.
Std setting 210 bar
(10:1): 120-350 bar.
Std setting 210 bar

## 5 Seal material

**S** - Buna-N

**SV** - Viton

## 6 Pilot ratio

**2** - 2:1

**5** - 5:1

**10** - 10:1

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option

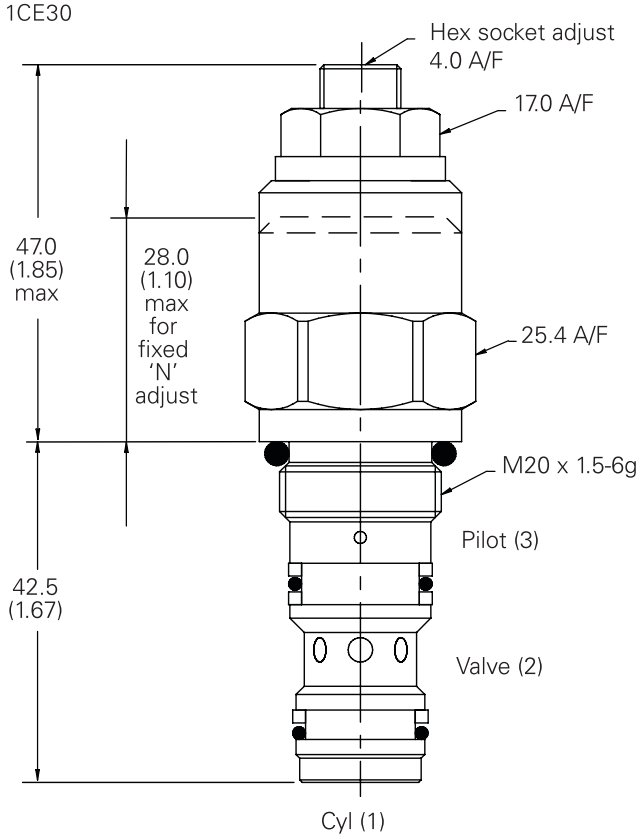
**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

## Dimensions

mm (inch)

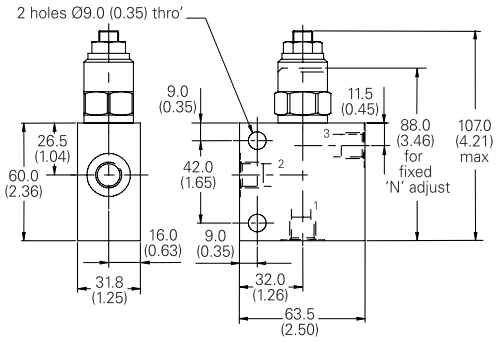
### Cartridge only

Basic Code
1CE30



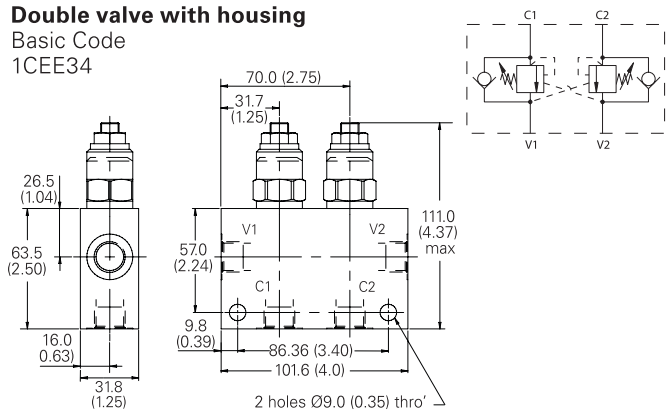

### Single valve with housing

Basic Code
1CE35




### Double valve with housing

Basic Code
1CEE34



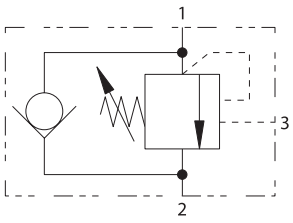

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



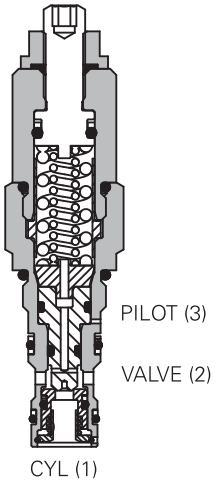
F

# 1CEH30 - High pressure overcenter valve

Pilot assisted relief with check
30L/min (8 USgpm) • 350 bar (5000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

Dynamic seals on the internal moving parts to provide longer fatigue life.

## Pilot ratio

3:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

5:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

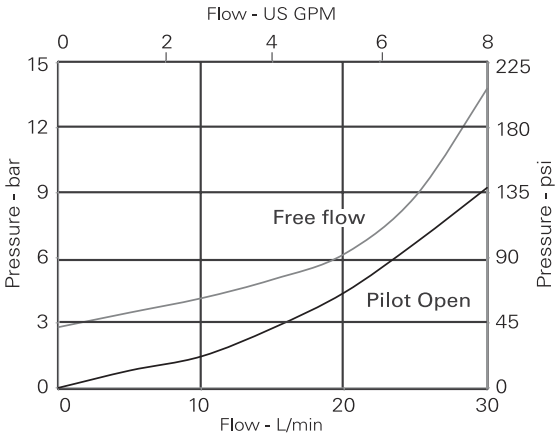
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40° C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief pressure | 430 bar (6240 psi) |
| Max load induced pressure | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing material | Steel. Add suffix "377". |
| Mounting position | Unrestricted |
| Cavity | A6610 (See Section M) |
| Torque cartridge into cavity | 68-75 Nm (50-56 lbs ft) |
| Weight | 1CEH30 0.25 kg (0.55 lbs)<br>1CEH35 0.51 kg (1.12 lbs)<br>1CEEH34 1 kg (2.2 lbs) |
| Seal kits | 9900925-000 (Nitrile)<br>9900926-000 (Viton®) |
| Filtration | Cleanliness code 18/13 (25 micron nominal) |
| Temperature range | -30°C to +90°C (-22° to +194°F) |
| Internal leakage | 5 dpm - Leakage at 85% of Crack Pressure |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




3:1 and 5:1 version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEH30 - High pressure overcenter valve

Pilot assisted relief with check
30L/min (8 USgpm) • 350 bar (5000 psi)

**Model code**

**1CEH*** – F 3W – 43 S ***

1 2 3 4 5 6

## 1 Function

**1CEH30** - Cartridge Only

**1CEH35** - Cartridge in body

**1CEEH34** - Cartridges in dual body

## 2 Adjustment

**F** - Screw adjustment

## 3 Port size

| Code | Port size | Housing number - body only | |
|---|---|---|---|
| | | Steel single | Steel dual |
| **3W** | 3/8" BSPP | B12823 | B13803 |
| **8T** | 1/2" SAE | B11811 | B11812 |

## 4 Pressure range

**Note:** Code based on pressure in bar.

**43** - (3:1 and 5:1): 250-430 bar.
Std setting 350 bar.
Std setting made at
1 L/min

**Note:** Contact CSR for special pressure setting.

## 5 Seal material

**S** - Buna-N

**SV** - Viton

## 6 Pilot ratio

**2** - 3:1

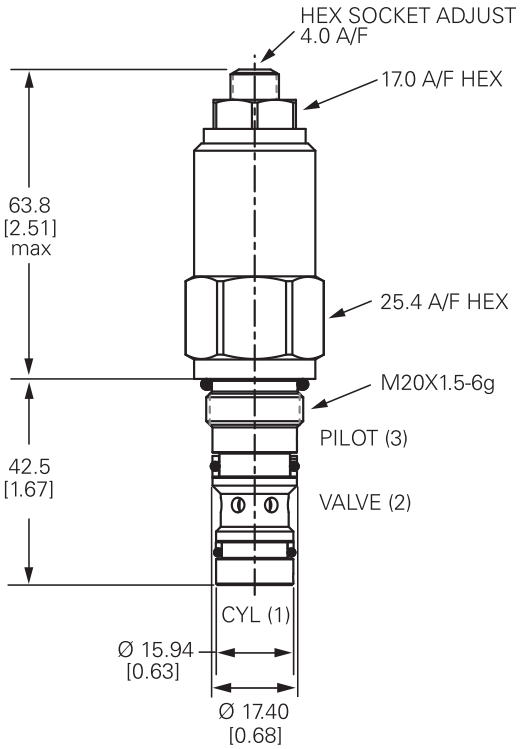
**5** - 5:1

## Dimensions

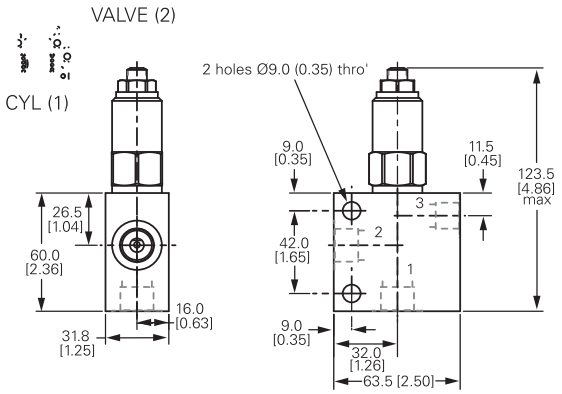
mm (inch)

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

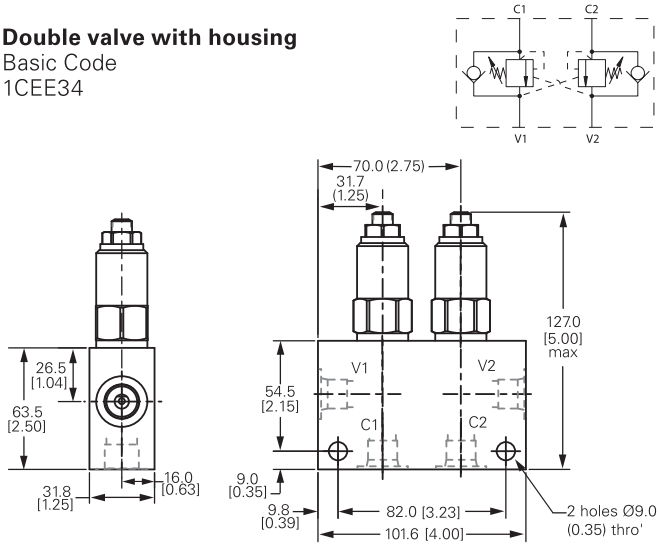
**Cartridge only**
Basic Code
1CEH30




**Single valve with housing**
Basic Code
1CEH35




**Double valve with housing**
Basic Code
1CEE34



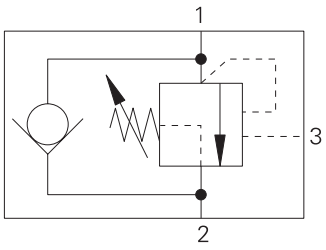

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CER30 - Overcenter valve

**Part balanced, pilot assisted relief with check**
**30 L/min (8 USgpm) • 270 bar (4000 psi)**




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

Pilot Pressure =

$$\frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

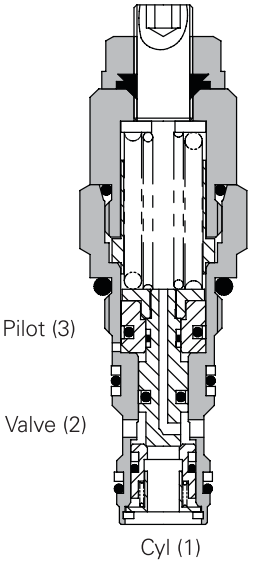
Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

2.5:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

4:1 Best suited for applications where load varies and machine structure can induce instability.

## Sectional view




## Description

The 1CER series overcenter valve performs all duties of a regular overcenter but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed center directional valve which has service line reliefs. The poppet is pressure balanced, preventing relief setting increase due to back pressure.

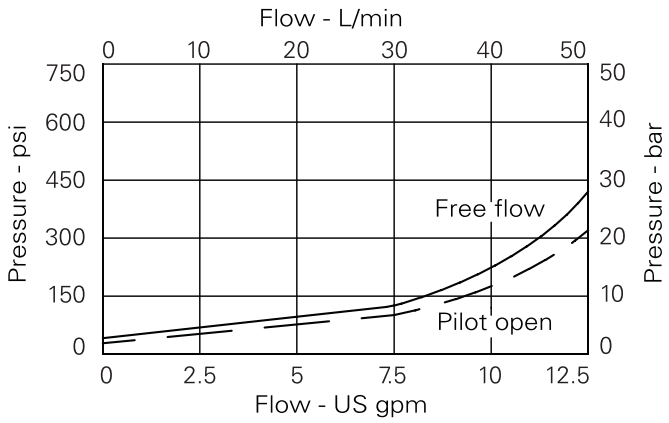
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40° C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar). Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity | A6610 (See Section M) |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 1CER30 0.15 kg (0.33 lbs)<br>1CER35 0.41 kg (0.90 lbs)<br>1CEER34 0.90 kg (1.98 lbs) |
| Seal kits | SK395 (Nitrile)<br>SK395V (Viton®) |
| Filtration | Cleanliness code 18/13 (25 micron nominal) |
| Temperature range | -30°C to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CER30 - Overcenter valve

Part balanced, pilot assisted relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE**** – F 3W – 35 S 4**

1 2 3 4 5 6

## 1 Basic code

**1CER30** - Cartridge only

**1CER35** - Cartridge and body

**1CEER34** - Cartridges and dual body

## 2 Adjustment

**F** - Screw adjustment

**N** - Fixed - State pressure setting required.

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port sizes - bodied valves only

| Code | Port size | Housing number | | | |
|---|---|---|---|---|---|
| Body Only | | Aluminum single | Steel single | Aluminum dual | Steel dual |
| **3W** | 3/8" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B6743 | B12823 | B6836 | B13803 |
| **6T** | 3/8" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10536 | | B10805 | |
| **8T** | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B7884 | B11811 | B30237 | B11812 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 100-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile

**SV** - Viton

## 6 Pilot ratio

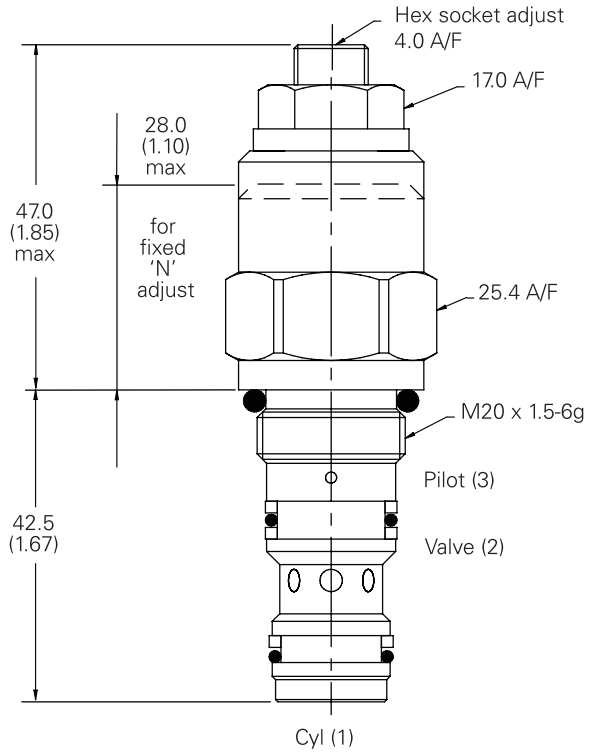
**2** - 2.5:1

**4** - 4:1

## Dimensions

mm (inch)

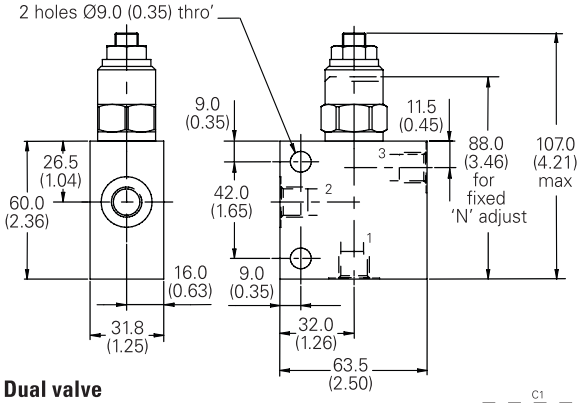
**Cartridge only**
Basic Code
1CER30



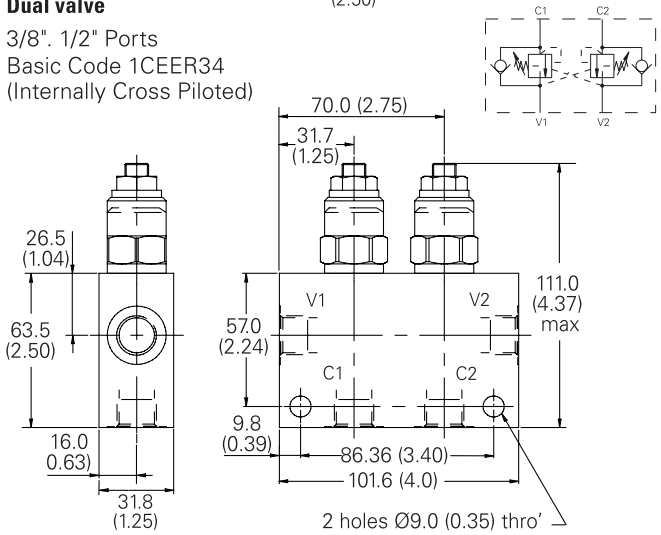

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

**Single valve**
3/8". 1/2" Ports
Basic Code 1CER35



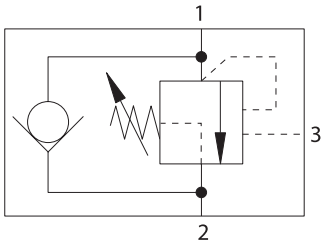

**Dual valve**
3/8". 1/2" Ports
Basic Code 1CEER34
(Internally Cross Piloted)




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CERH30 - High pressure overcenter valve

Pilot assisted relief with check
30L/min (8 USgpm) • 350 bar (5000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

Pilot Pressure =

$$\frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

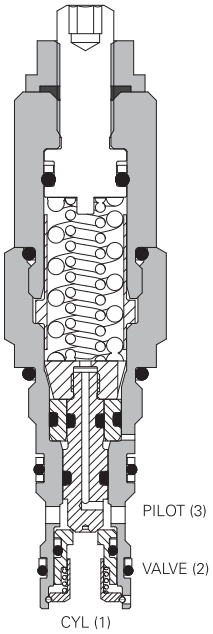
Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

3:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

5:1 Best suited for applications where load varies and machine structure can induce instability.

## Sectional view




## Description

The 1CERH series overcenter valve performs all duties of a regular overcenter but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed center directional valve which has service line reliefs. The poppet is pressure balanced, preventing relief setting increase due to back pressure.

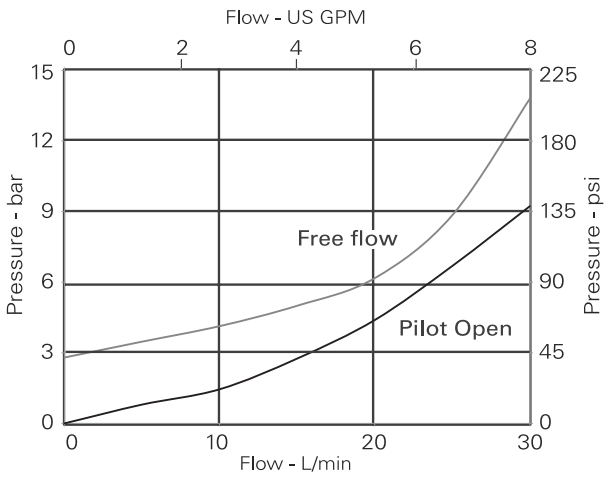
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40° C Viscosity = 32 cSt (150 SUS)* | | |
|---|---|---|
| Rated flow | | 30 L/min (8 USgpm) |
| Max relief pressure | | 430 bar (6240 psi) |
| Max load induced pressure | | 350 bar (5000 psi) |
| Cartridge material | | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing material | | Steel. Add suffix "377". |
| Mounting position | | Unrestricted |
| Cavity | | A6610 (See Section M) |
| Torque cartridge into cavity | | 68-75 Nm (50-56 lbs ft) |
| Weight | 1CERH30<br>1CERH35<br>1CEERH34 | 0.2 kg (0.55 lbs)<br>0.51 kg (1.12 lbs)<br>1.0 kg (2.2 lbs) |
| Seal kits | | 9900925-000 (Nitrile)<br>9900926-000 (Viton®) |
| Filtration | | Cleanliness code 18/13 (25 micron nominal) |
| Temperature range | | -30°C to +90°C (-22° to +194°F) |
| Internal leakage | | 5 dpm @ 85% of Cracking |
| Nominal viscosity range | | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




3:1 and 5:1 version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CERH30 - High pressure overcenter valve

Pilot assisted relief with check
30L/min (8 USgpm) • 350 bar (5000 psi)

**Model code**

**1CERH**** – F 3W – 43 S ***

1 2 3 4 5 6

## 1 Basic code

**1CERH30** - Cartridge only

**1CERH35** - Cartridge and body

**1CEER34** - Cartridges and dual body

## 2 Adjustment

**F** - Screw adjustment

## 3 Port sizes - bodied valves only

| Code | Port size | Housing number | |
|---|---|---|---|
| **Body Only** | | **Steel single** | **Steel dual** |
| **3W** | 3/8" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B12823 | B13803 |
| **8T** | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B11811 | B11812 |

## 4 Pressure range

**Note:** Code based on pressure in bar.

**43** - 250-430 bar. Std setting 350 bar
Std setting made at 1 L/min

**Note:** Contact CSR for special pressure setting.

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

## 5 Seals

**S** - Nitrile

**SV** - Viton

## 6 Pilot ratio

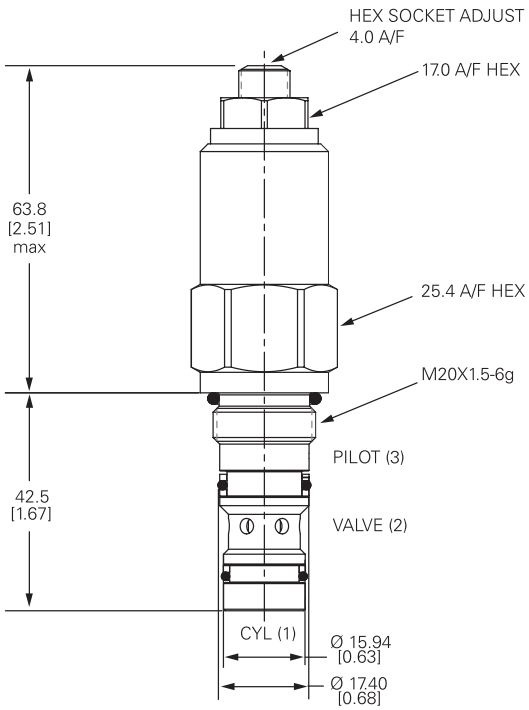
**3** - 3:1

**5** - 5:1

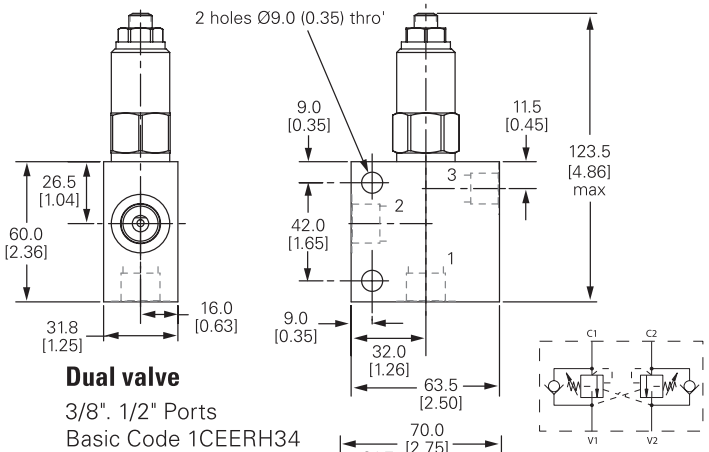
## Dimensions

mm (inch)

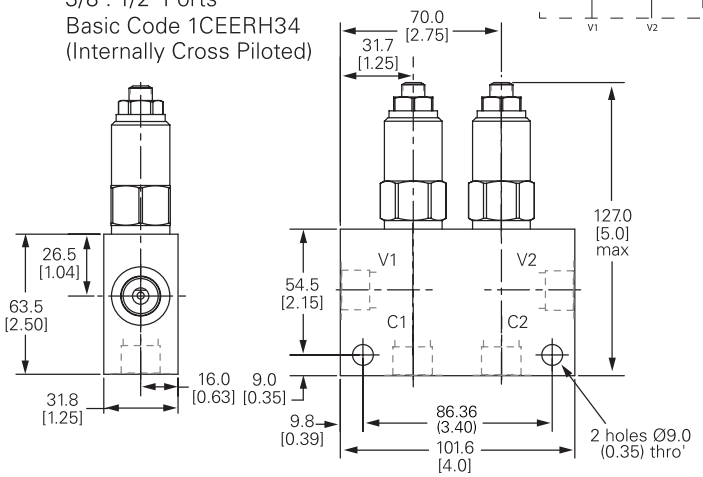
**Cartridge only**
Basic Code
1CERH30




**Single valve**
3/8". 1/2" Ports
Basic Code 1CERH35



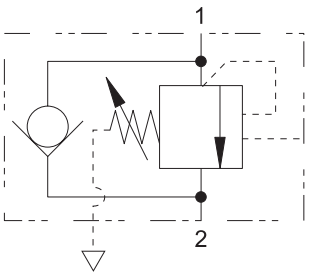

**Dual valve**
3/8". 1/2" Ports
Basic Code 1CEERH34
(Internally Cross Piloted)



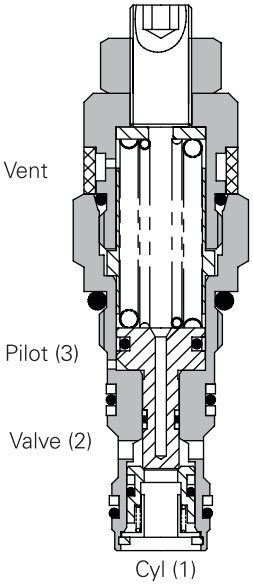

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEB30 - Overcenter valve

Fully balanced, pilot assisted, relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)




## Sectional View




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They prevent runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced valve is unaffected by back pressure, allowing service line reliefs to operate and for the valve to be used in regenerative or proportional valve systems.

The overcenter valve should be mounted either into, onto or as close to the actuator as possible to give maximum protection.

Single overcenter valves control unidirectional loads such as in aerial platforms, cranes or winches and dual overcenters are suited to bi-directional motion such as wheel motor applications or cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

5.1:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

**Note:** This valve is not suitable for high frequency applications and aggressive environmental conditions.

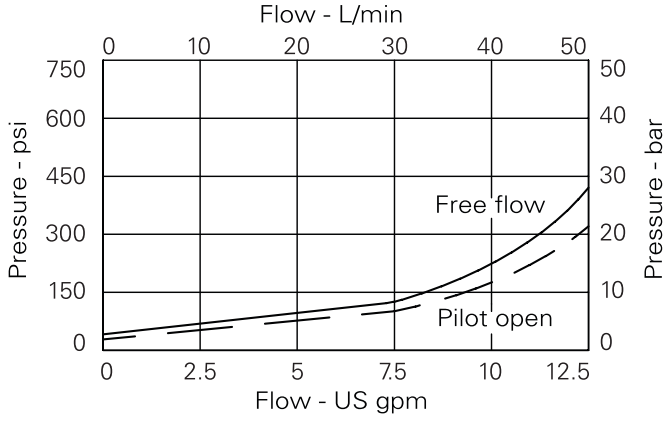
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Tem = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A6610 (See Section M) |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 1CEB30 0.14 kg (0.30 lbs)<br>1CEB35 0.40 kg (0.88 lbs)<br>1CEEB34 0.88 kg (1.94 lbs) |
| Seal kit number | SK395 (Nitrile<br>SK395V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30°C to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEB30 - Overcenter valve

Fully balanced, pilot assisted, relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

1CE*** -F 3W – 35 S 5

1 2 3 4 5 6

## 1 Function

**1CEB30 -** Cartridge Only
**1CEB35 -** Cartridge and Body
**1CEEB34 -** Cartridges and Dual Body

## 2 Adjustment means

**F** -Screw Adjustment

**N** - Fixed - State pressure setting required.

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## Dimensions

mm (inch)

## 3 Port sizes

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| 3W | 3/8" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B6743 | B12823 | B6836 | B13803 |
| 6T | 3/8" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10536 | | B10805 | |
| 8T | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B7884 | B11811 | B30237 | B11812 |

## 4 Pressure range

@ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 100-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

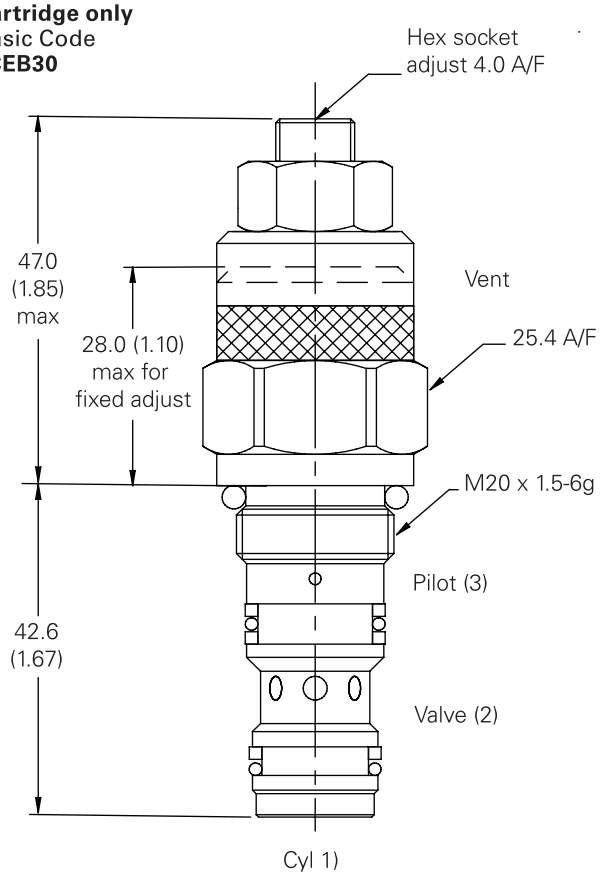
**S** -Nitrile (For use with most industrial hydraulic oils)

**SV** -Viton (For high temperature and most special fluid applications)

## 6 Pilot ratio

**5** - 5:1

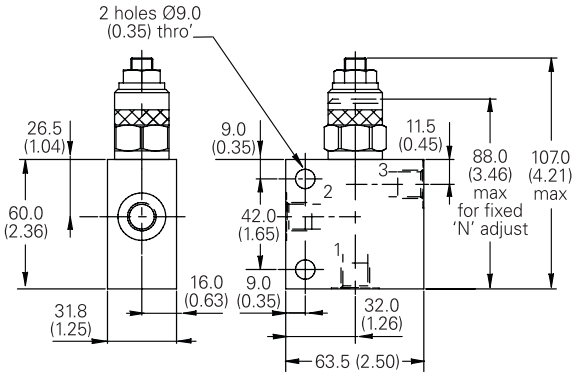
**Cartridge only**
Basic Code
**1CEB30**



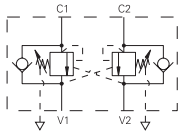

**Note**: For applications above 210 bar - please consult our technical department or use the steel body option

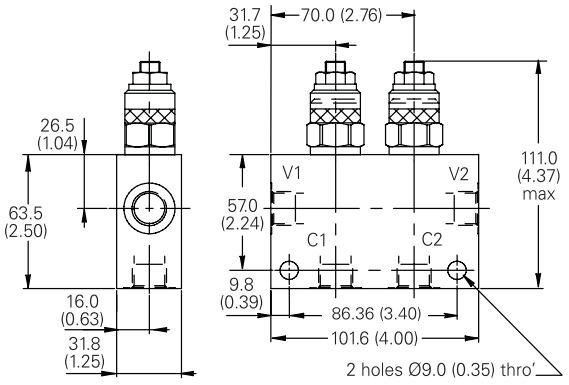
**Note**: Tightening torque of "F" adjuster locknut - 20 to 25 Nm

**Single valve**
3/8". 1/2" Ports
Basic Code
1CEB35




**Dual valve**
3/8". 1/2" Ports
Basic Code
1CEEB34
Internally Cross Piloted



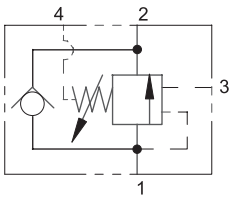

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



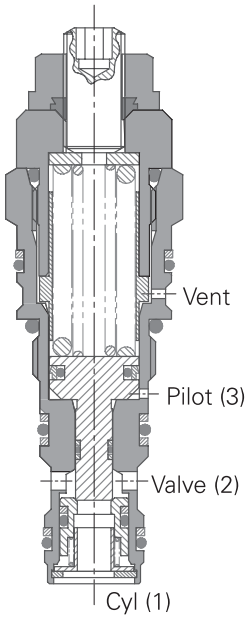
F

# 1CEBD30 - Overcenter valve

Fully balanced, pilot assisted, relief
30 L/min (8 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They prevent runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced valve is unaffected by back pressure, allowing service line reliefs to operate and for the valve to be used in regenerative or proportional valve systems.

The overcenter valve should be mounted either into, onto or as close to the actuator as possible to give maximum protection.

Single overcenter valves control unidirectional loads such as in aerial platforms, cranes or winches and dual overcenters are suited to bi-directional motion such as wheel motor applications or cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve.

For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple 'dual purpose' cavity. Allows quick, easy field service - reduces down time. Directly interchangeable with 30 litres/min pilot check valve.

## Pilot ratio

5.1:

## Performance data

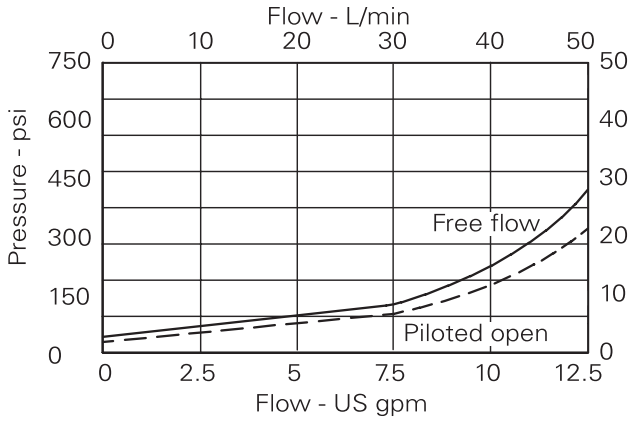
**Ratings and specifications**

| *Figures based on Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure* | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity | A20530 (See section M) |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 0.14 kg (0.30 lbs) |
| Seal kit | SK1159 (Nitrile)<br>SK1159V (Viton®)<br>SK634P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -20° to +90°C (-4° to +194°F) |
| Leakage | 0.3 milliliters/min (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

*For applications above 210 bar please consult our technical department or use the steel body option.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBD30 - Overcenter valve

Fully balanced, pilot assisted, relief
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEBD30 – F 35 – S 5**

1 2 3 4 5

**1 Function**
**1CEBD30** - Cartridge Only

**2 Adjustment**
**F -** Screw adjustment

**3 Pressure range @4.8L/min**
**Note:** Code based on pressure in bar.
**20** - 70-210 bar.
Standard setting 100 bar
**20** - 100-350 bar.
Standard setting made at 4.8 L/min

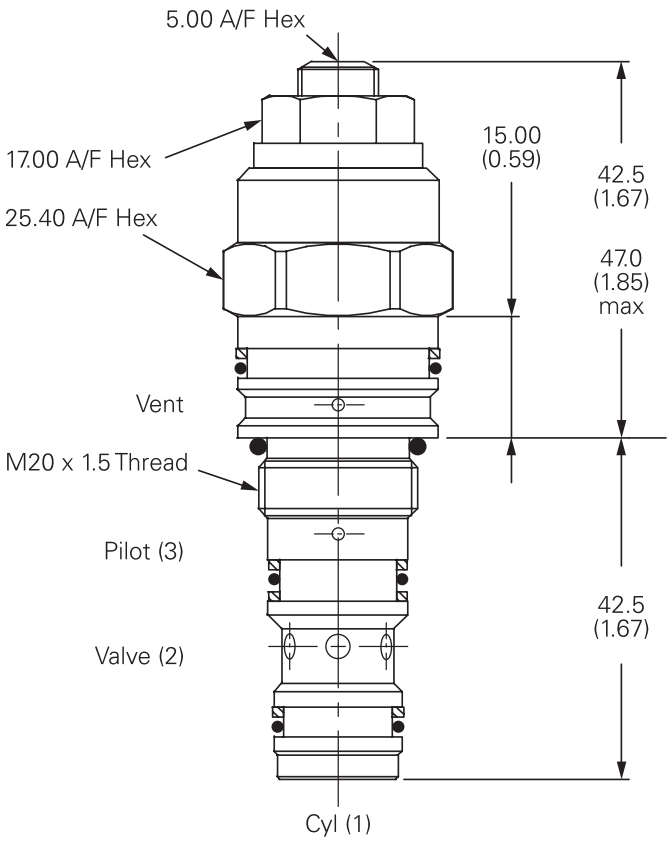
**4 Seal**
**S** - Nitrile (for use with most industrial hydraulic oils)
**SV** - Viton (for high temperature and most special fluid applications)

**5 Pilot ratio**
**5** - 5:1

## Dimensions

mm (inch)

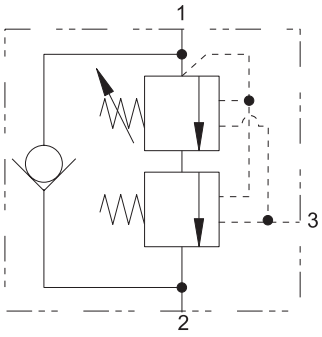
**Cartridge only**
Basic Code
1CEBD30




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEL30 - Overcenter valve

Counterbalance pilot assisted relief with check
30 L/min (8 USgpm) •380 bar (5510 psi)




## Operation

The check section allows free flow and then locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied, maintaining a counterbalance pressure to prevent initial pressure loss and therefore instability. The total pressure setting will normally be set at 1.3 times the load induced pressure. The counterbalance pressure reduces as the pilot pressure increases.

## Features

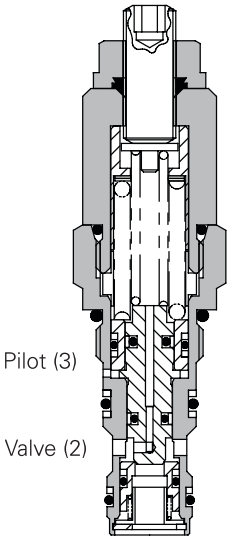
Cartridge is economical and fits simple cavity.
Allows quick, easy field service - reduces down time.
Interchangeable with pilot check valve of a similar size.

## Pilot ratio

Primary 4.3:1

Secondary 0.4:1

## Sectional view




## Description

The 1CEL overcenter valve performs all duties of a regular overcenter but maintains a counterbalance pressure to provide dampening of cylinders when there is a rapid loss in stored pressure. This counterbalance pressure reduces as the pilot pressure increases. Typical applications include extension cylinders on telescopic handlers where it is important to have a smooth operation when retracting from full extension.

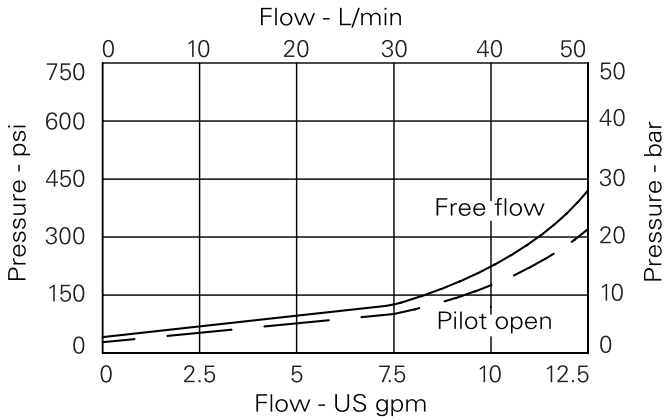
## Performance data

**Ratings and specifications**

| *Performance data is typical with fluid at 32 cST (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max setting | 380 bar (5510 psi) |
| Internal leakage | 0.3 ml/min (5 dpm) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Cavity | A6610 (see Section M) |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Mounting position | Unrestricted |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Nominal viscosity range | 5 to 500 cSt |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing materials | Aluminium up to 210 bar. Add suffix "377" for steel option. |
| Weight | 0.15 kg (0.33 lbs) |
| Seal kit | SK395 (Nitrile) SK395V (Viton®) |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




**Note:** This valve has been designed to eliminate instability from flexible boom applications or where he load induced pressure varies greatly. To get the best results, the settings should be adjusted for each application and then factory set for production quantities. Please contact our Technical Department for more information.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEL30 - Overcenter valve

Counterbalance pilot assisted relief with check
30 L/min (8 USgpm) • 380 bar (5510 psi)

**Model code**

**1CE**** – F 3W – 30 S 230 / 50**

1 2 3 4 5 6 7

## 1 Function

**1CEL30** - Cartridge only

**1CEL35** - Cartridge and body

**1CEEL34** - Cartridges and dual body

## 2 Adjustment means/ counterbalance setting

**F** - Screw adjustment

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port size

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| 3W | 3/8" BSP valve & cylinder port. 1/4" BSP pilot port | B6743 | B12823 | B6836 | B13803 |
| 6T | 3/8" SAE valve & cylinder port. 1/4" SAE pilot port | B10536 | B10805 | | |
| 8T | 1/2" SAE valve & cylinder port. 1/4" SAE pilot port | B7884 | B11811 | B30237 | B11812 |

## 4 Pressure range bar @ 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 170-300 bar.
Std setting 220 bar

**30** - 240-370 bar.
Std setting 280 bar

**40** -270-380 bar.
Std setting 350 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile

**SV** - Viton

## 6 High pressure setting bar

10 bar increments
150 to 310 bar
(2175 to 5000 psi)

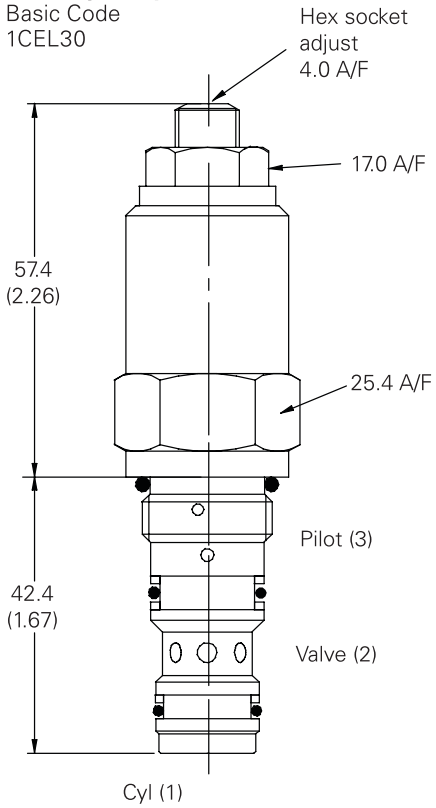
## 7 Counterbalance setting bar

10 bar increments
20 to 120 bar (300 to 1740 psi)

## Dimensions

mm (inch)

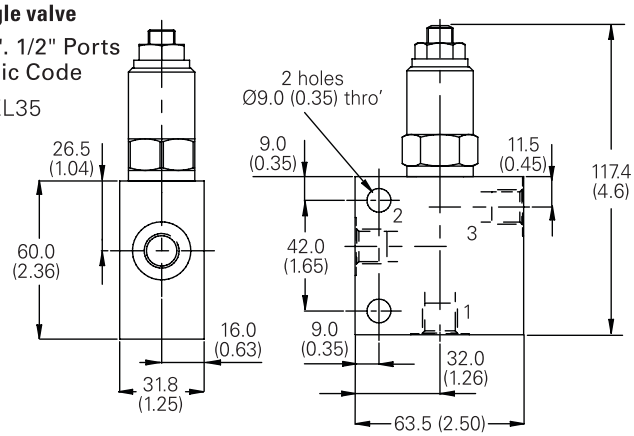
**Cartridge only**
Basic Code
1CEL30



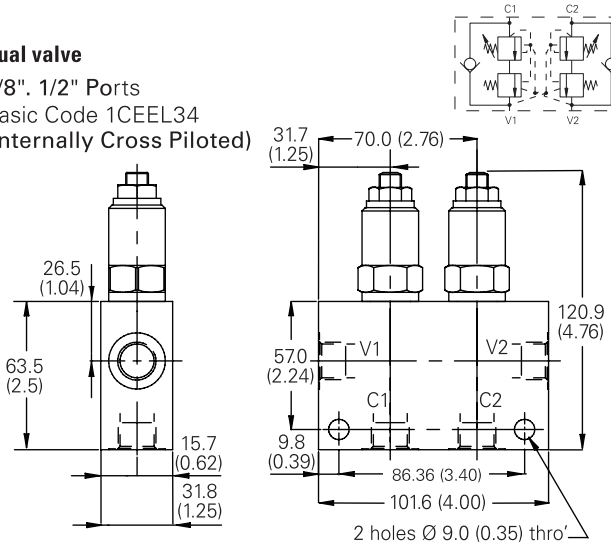

**Note:** Tightening torque of "F" adjuster locknut= 20-25 Nm.

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option

**Single valve**
3/8". 1/2" Ports
Basic Code
1CEL35




**Dual valve**
3/8". 1/2" Ports
Basic Code 1CEEL34
(Internally Cross Piloted)

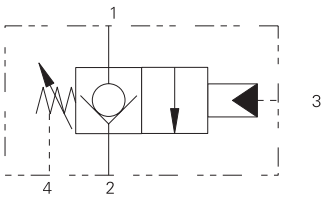



*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

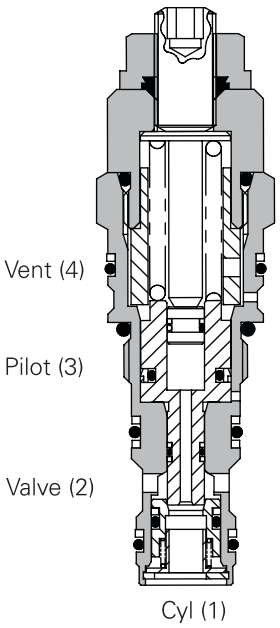
F

# 1CPBD30 - Overcenter valve

Zero differential with check
30 L/min (8 USgpm) • 350 bar (5000 psi)




## Sectional view




## Description

Zero differential overcenter valves give static and dynamic control of loads by supplying a restriction to flow related to the opening of the valve created by the pilot pressure.

The valve is used in conjunction with a remote pilot source to provide hose failure protection, load control and load holding functions.

If over-pressure or shock pressure protection is required then a separate relief valve should be used

The drain line allows the valve to be used in corrosive atmospheres preventing the ingress of atmospheric contaminant.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. By the application of pilot pressure to the pilot port the poppet moves back against the main spring opening the cylinder port to the valve port. The metering characteristic of the valve is controlled by the rate of the spring, the seat angle and the pilot pressure applied.

Due to the balanced poppet design load induced pressure will not open the valve and once open valve port pressure will not increase the pilot pressure required to keep the valve open

## Features

The cartridge fits a simple cavity allowing quick, easy field service reducing down time. Hardened poppet and seat provide for long leak free performance.

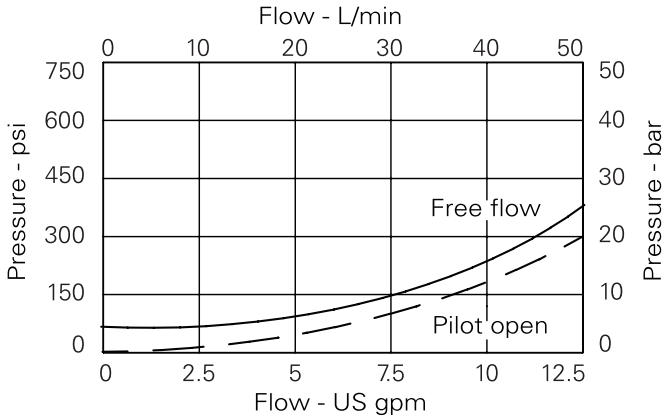
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max working pressure | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity | AXP20530 (See Section M) |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 0.15 kg (0.33 lbs) |
| Seal kit | SK1159 (Nitrile)<br>SK1159V (Viton®)<br>SK1159P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min max (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPBD30 - Overcenter valve

Zero differential with check
30 L/min (8 USgpm) • 350 bar (5000 psi)

**Model code**

**1CPBD30 – F – 2 P**

1 2 3 4

**1 Function**
**1CPBD30** - Cartridge only

**2 Adjustment**
**F** - Screw adjustment

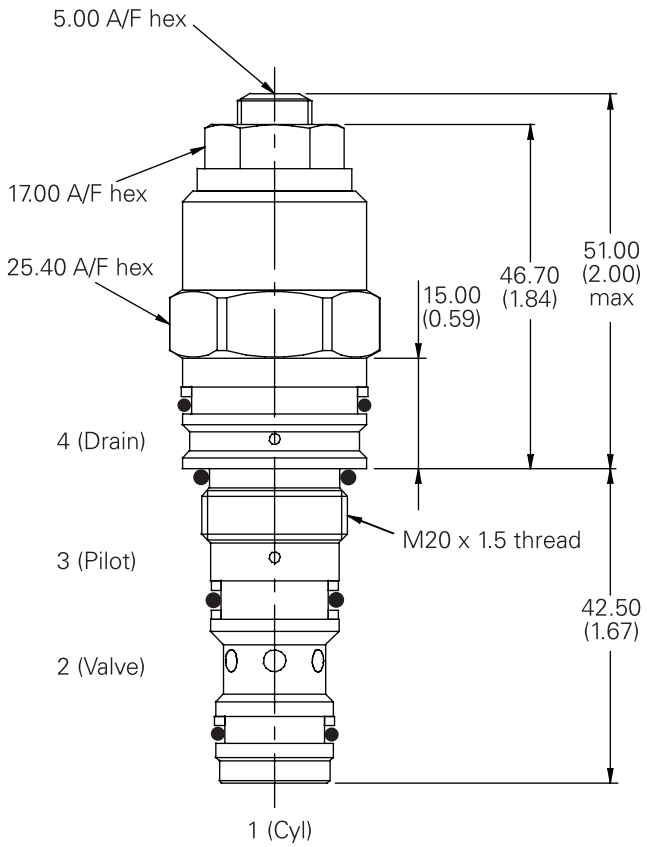
**3 Pilot adjust range**
**Note:** Code based on pressure in bar.
**2** - 5-20 bar. Std setting 10 bar
Std setting made at 4.8 L/min

**4 Seal material**
**S** - Nitrile (For use with most industrial hydraulic oils)
**SV** - Viton (For high temperature and most special fluid applications)
**P** -Polyurethane/Nitrile (For arduous applications)

## Dimensions

mm (inch)

**Cartridge only**
Basic Code 1CPBD30




**Note:** Tightening torque of "F" adjuster locknut= 20-25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

**Model code**

**1C***** – F 3W – 35 S 5 230 / 50**

1 2 3 4 5 6 7 8

## 1 Function

**1CE36/1CEB36/1CER36/1CEL36 -** Cartridge & Body Through Ported

**1CBE35/1CBEB35/1CBER35/1CBEL35 -** Cartridge & Body Banjo

**1CEG35/1CEBG35/1CERG35/1CELG35 -** Cartridge & BodyGasket

**1CEE35/1CEEB35/1CEER35/1CEEL35 -** Cartridges & Dual Body

## 2 Adjustment means

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port sizes

| Code | Port size | Housing number | |
|---|---|---|---|
| | | **Aluminium** | **Steel** |
| Through Ported | | | |
| **3W** | 3/8" BSP - Body ONLY | B13542 | B13543 |
| Banjo Mounted | | | |
| **3W** | 3/8" BSP - Sub Assembly | AXP13617-3W-S | |
| Gasket Mounted | | | |
| **3W** | 3/8" BSP - Sub Assembly | BXP13621-3W-S | |
| Dual Overcenter (Internally Cross Piloted) | | | |
| **3W** | 3/8" BSP - Sub Assembly | BXP24147-3W-S | BXP24147-3W-S-377 |
| 6T | 3/4" SAE - Sub Assembly | BXP24147-6T-S | |

## 4 Pressure range @ 4.8 L/min

See cartridge data sheet

## 5 Seals

S - Nitrile (For use with most industrial hydraulic oils)

SV - Viton (For high temperature and most special fluid applications)

## 6 Pilot ratio

(omit for 1CEL30 based options)

**2** - 2.5:1 **4** - 4:1
**5** - 5:1 **10** - 10:1
(See cartridge details)

## 7 High pressure setting

(1CEL30 based options only)

**bar** in 10 bar increments.

## 8 Counterbalance setting

(1CEL30 based options only)

**bar** in 10 bar increments.

F

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE Series - Overcenter valve

Alternative body arrangements for 30 L/min valves

## Dimensions

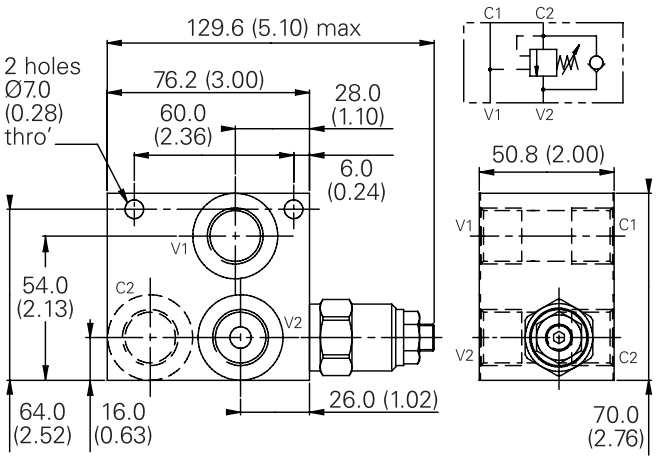
mm (inch)

### Complete valve - through ported

3/8" Ports
Basic Code

1CE36/1CEB36/1CER36/1CEL36

Banjo Bolt torque - 47 Nm

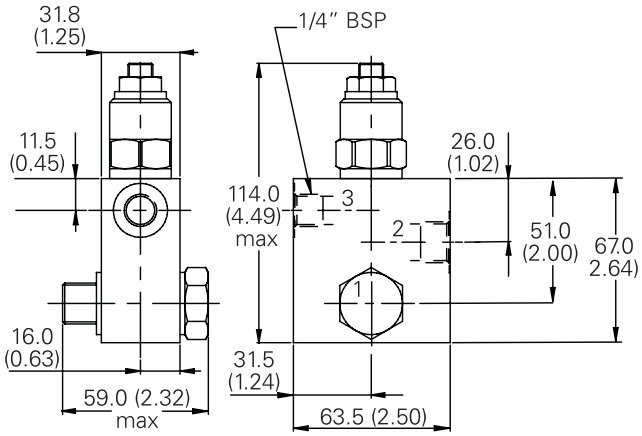



### Complete valve - banjo mounted

3/8" Ports
Basic Code

1CBE35 / 1CBEB35 / 1CBER35 / 1CBEL35

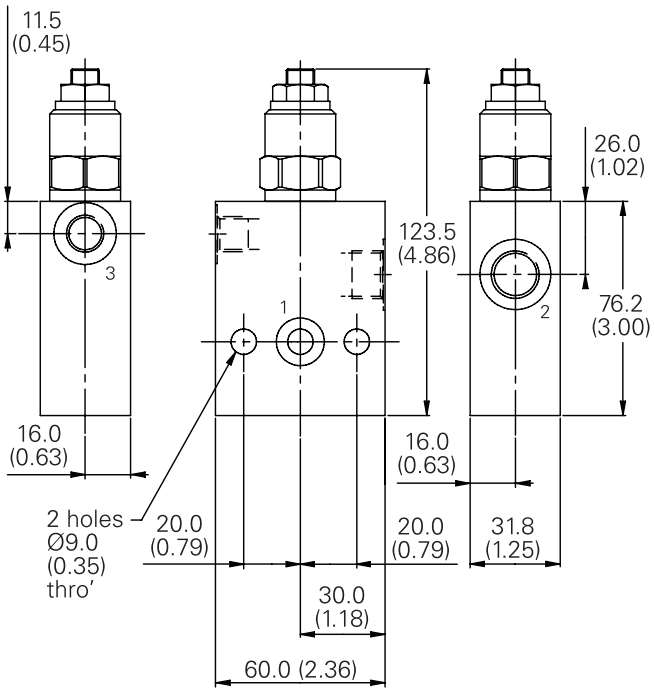
Banjo Bolt torque - 47 Nm




### Complete valve - gasket mounted

3/8" Ports
Basic Code

1CEG35/1CEBG35/1CERG35/1CELG35



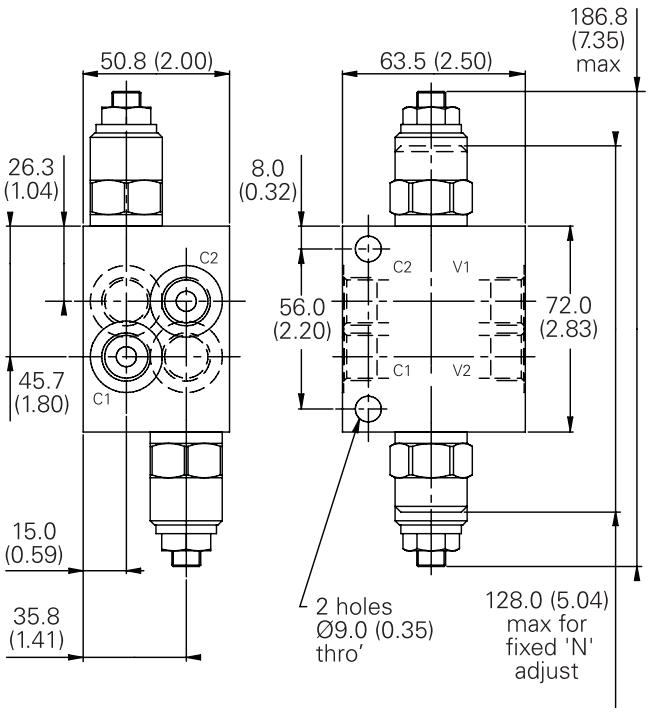

**Note:** Tightening torque of "F" adjuster locknut= 20-25 Nm.

### Complete valve - dual overcenter

3/8" Ports
Basic Code

1CEE35/1CEEB35/1CEER35/1CEEL35

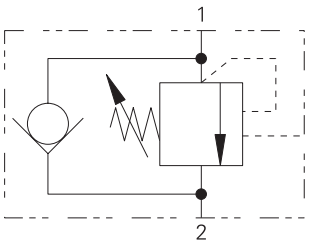
(Internally Cross-Piloted)



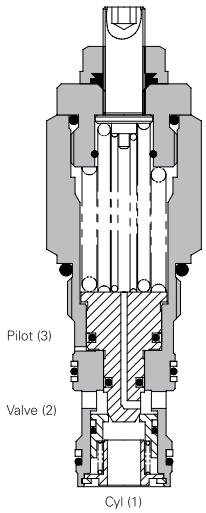

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE90 - Overcenter valve

Pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

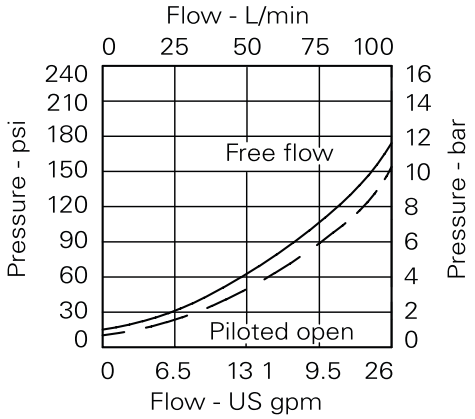
## Performance data

**Ratings and specifications**

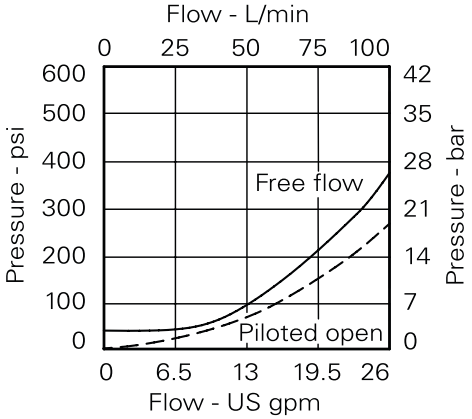
| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief setting | 350 bar (5000 psi). |
| Max load Induced pressure | 270 bar (4000 psi). |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing materials | Aluminum (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A12336 (See Section M) |
| Torque cartridge into cavity | 60 Nm (44 lbs ft) |
| Weight | 1CE90 0.29 kg (0.63 lbs)<br>1CE95 1.35 kg (2.97 lbs)<br>1CEE95 2.10 kg (4.62 lbs) |
| Seal kit number | SK633 (Nitrile)<br>SK633V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

**Pressure drop**




4:1 Version




8:1 Version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE90 - Overcenter valve

Pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE***– F 4W – 35 S 4**

1 2 3 4 5 6

## 1 Function

**1CE90 -** Cartridge Only

**1CE95 -** Cartridge and Body

**1CEE95 -** Cartridges and Dual Body

## 2 Adjustment means

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required.

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port Sizes

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| Body only | | Aluminum single | Steel single | Aluminum dual | Steel dual |
| 4W | 1/2" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B13625 | B13626 | C13627 | C13628 |
| 8T | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10806 | B10922 | C10807 | C11561 |

## 4 Pressure range @ 4.8 l/min

**Note:** Code based on pressure in bar.

**20** - 70-225 bar.
Std setting 100 bar

**35** - 200-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 Pilot Ratio

**4** - 4:1

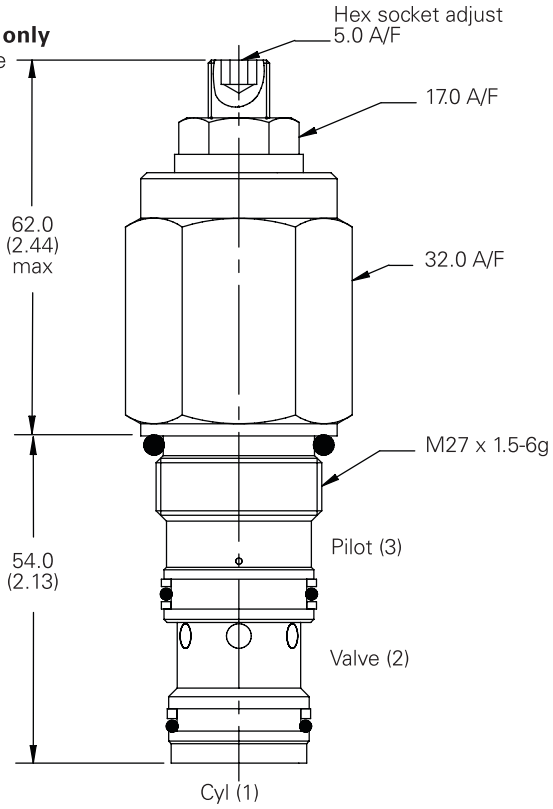
**8** - 8:1

Other ratios available upon request

## Dimensions

mm (inch)

**Cartridge only**
Basic Code
1CE90

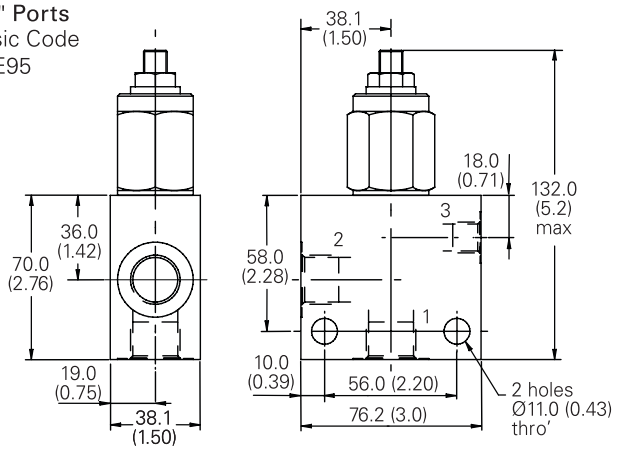



**Note:** For applications above 210 bar - please consult our technical department or use the steel body option

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

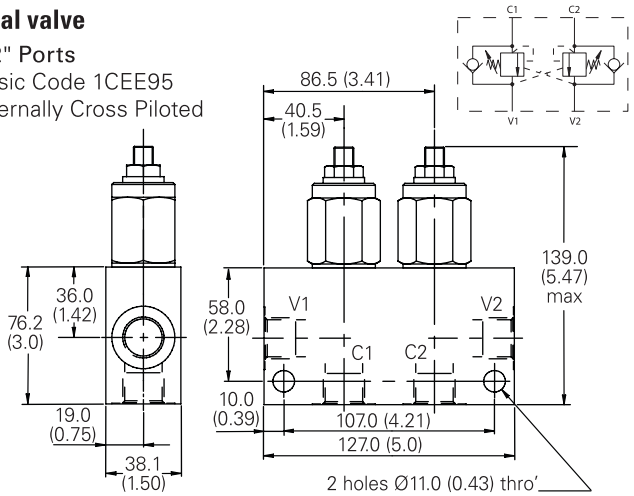
**Single valve**

**1/2" Ports**
Basic Code
1CE95




**Dual valve**

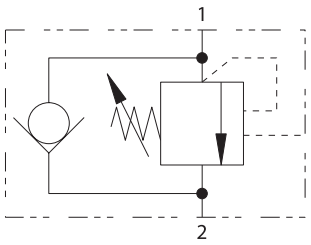
**1/2" Ports**
Basic Code 1CEE95
Internally Cross Piloted



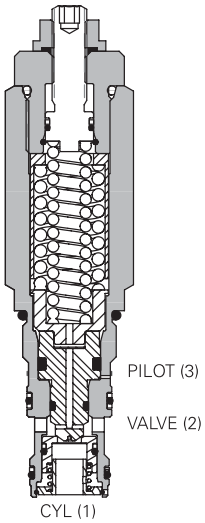

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEH90 - High pressure overcenter valve

Pilot assisted relief with check
90 L/min (23 USgpm) • 350 bar (5000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcente valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

Pilot Pressure =

$$\frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

Dynamic seals on the internal moving parts to provide longer fatigue life.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

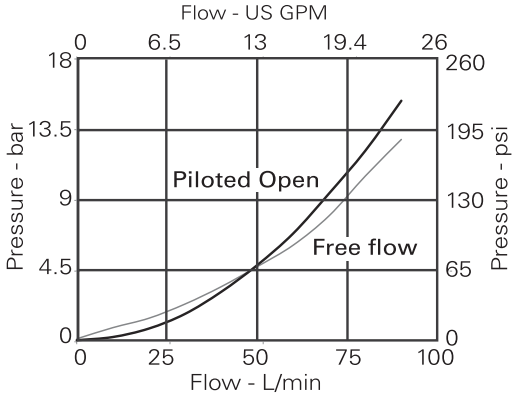
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief setting | 430 bar (6240 psi). |
| Max load Induced pressure | 350 bar (5000 psi). |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing materials | Steel. Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A12336 (See Section M) |
| Torque cartridge into cavity | 100-110 Nm (73-81 lbs ft) |
| Weight | 1CEH90 0.6 kg (1.32 lbs)<br>1CEH95 1.66 kg (3.66 lbs)<br>1CEEH95 2.72 kg (6.00 lbs) |
| Seal kit number | 9900927-000 (Nitrile)<br>9900928-000 (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 5 dpm @ 85% of Cracking |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




4:1 Version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEH90 - High pressure overcenter valve

Pilot assisted relief with check
90 L/min (23 USgpm) • 350 bar (5000 psi)

**Model code**

**1CEH*** – F 4W – 43 S 4**

1 2 3 4 5 6

## 1 Function

**1CEH90 -** Cartridge Only

**1CEH95 -** Cartridge and Body

**1CEEH95 -** Cartridges and Dual Body

## 2 Adjustment means

**F** - Screw Adjustment

## 3 Port sizes

| Code | Port size | Housing number - body only | |
|---|---|---|---|
| | | Steel single | Steel dual |
| 4W | 1/2" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B13626 | C13628 |
| 8T | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10922 | C11561 |

## 4 Pressure range

**Note:** Code based on pressure in bar.

**43** - (4:1) 275 - 430 bar. Std setting 350 bar

Std setting made at 1 L/min

**Note:** Contact CSR for special pressure setting requirement

**Note:** Co Tightening torque of "F" adjuster locknut - 20 to 25 Nm

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 Pilot Ratio

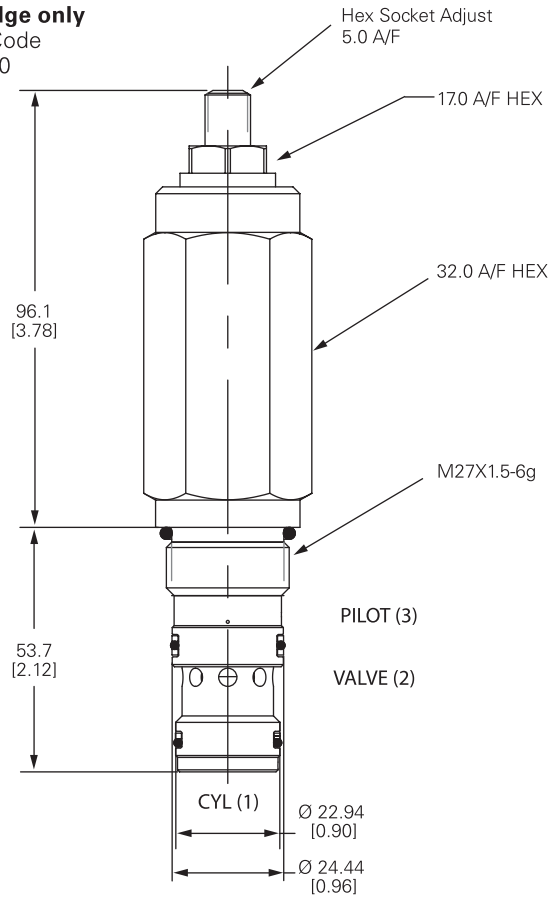
**4** - 4:1

Other ratios available upon request

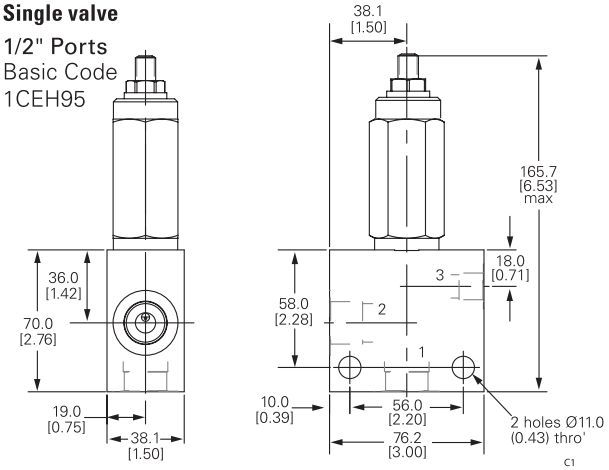
## Dimensions

mm (inch)

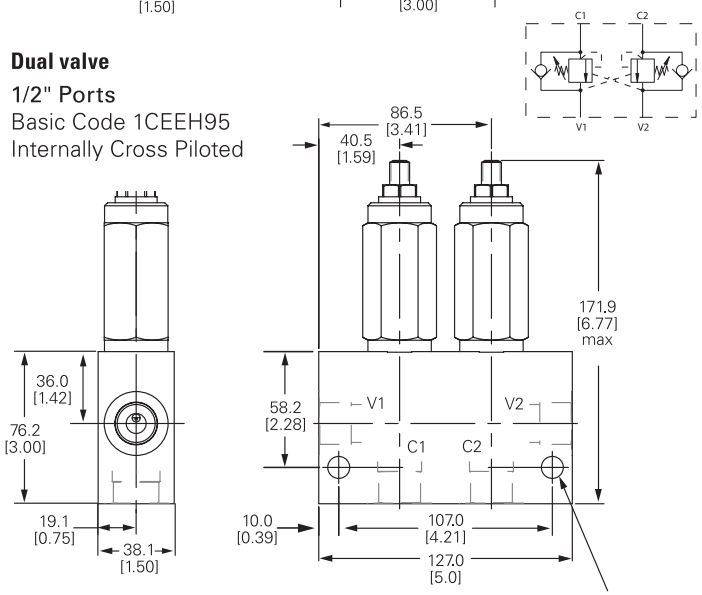
**Cartridge only**
Basic Code
1CEH90




**Single valve**
1/2" Ports
Basic Code
1CEH95




**Dual valve**
1/2" Ports
Basic Code 1CEEH95
Internally Cross Piloted

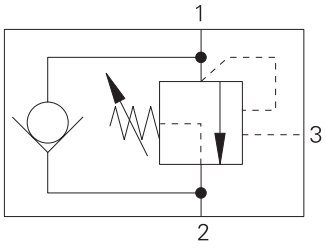



*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

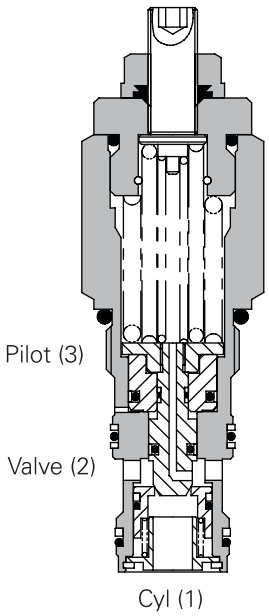
F

# 1CER90 - Overcenter valve

**Part balanced, pilot assisted relief with check**
**90 L/min (23 USgpm) • 270 bar (4000 psi)**




## Sectional view




## Description

The 1CER series overcenter valve performs all duties of a regular overcenter but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed center directional valve which has service line reliefs. The poppet is pressure balanced, preventing relief setting increase due to back pressure.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

Other ratios available upon request.

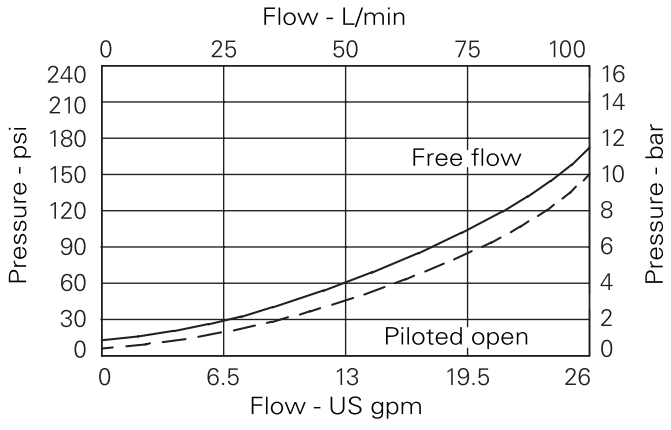
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing materials | Aluminum up to 210 bar.<br>Add suffix "377" for steel option. |
| Cavity | A12336 (see Section M) |
| Mounting position | Unrestricted |
| Torque cartridge into cavity | 60 Nm (44 lbs ft) |
| Weight | 1CER90  29 kg (.63 lbs)<br>1CER95  1.35 kg (2.97 lbs)<br>1CEER95  2.10 kg (4.62 lbs) |
| Seal kit | SK633  (Nitrile)<br>SK633V  (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 ml/min (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CER90 - Overcenter valve

Part balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE**** – F 4W – 35 S 4**

1 2 3 4 5 6

## 1 Function

**1CER90** - Cartridge only

**1CER95** - Cartridge and body

**1CEER95** - Cartridges and body

## 2 Adjustment

**F** - Screw adjustment

**N** - Fixed - State pressure setting required.

For fixed versions add setting in 10 bar increments to end of part number. Subject to a +/-10% tolerance.

## 3 Port size

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminum single | Steel single | Aluminum dual | Steel dual |
| 4W | 1/2" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B13625 | B13626 | C13627 | C13628 |
| 8T | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10806 | B10922 | C10807 | C11561 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 70-225 bar. Std setting 100 bar

**35** - 200-350 bar. Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seal material

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

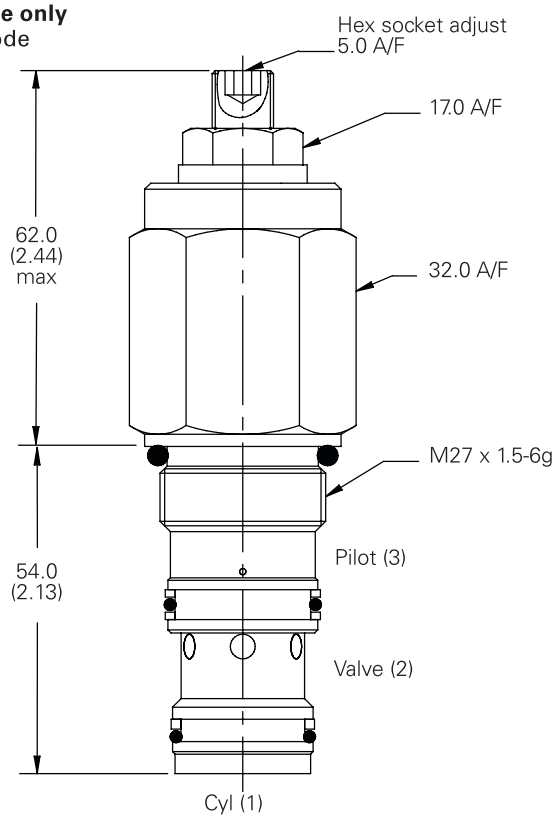
## 6 Pilot ratio

**4 - 4:1** Other ratios available upon request

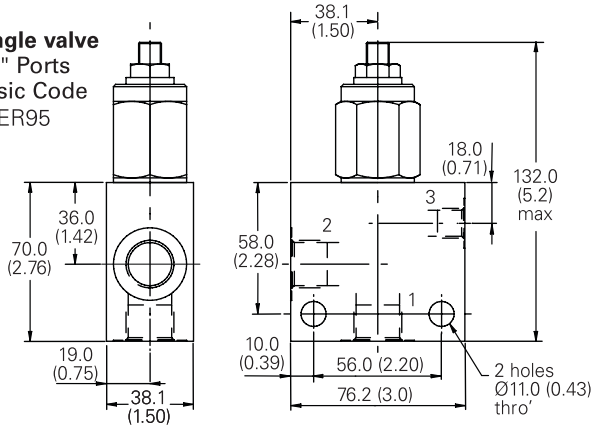
## Dimensions

mm (inch)

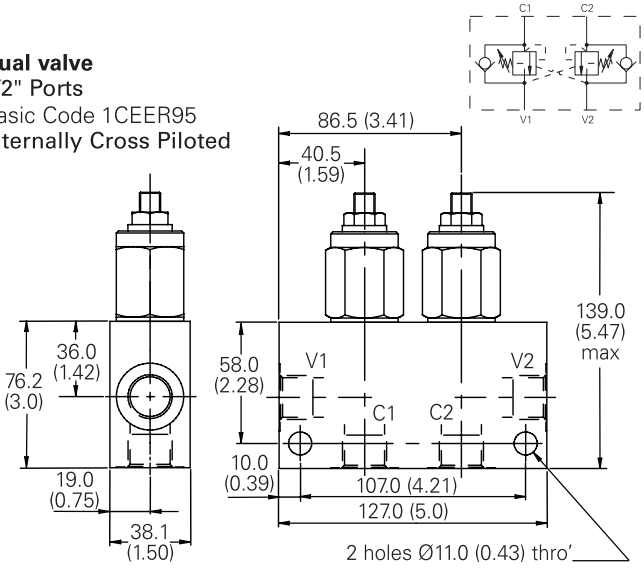
**Cartridge only**
Basic Code
1CER90




**Single valve**
1/2" Ports
Basic Code
1CER95




**Dual valve**
1/2" Ports
Basic Code 1CEER95
Internally Cross Piloted



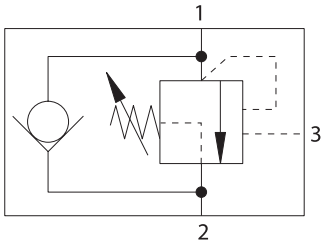

**Note**: For applications above 210 bar - please consult our technical department or use the steel body option.

**Note**: Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

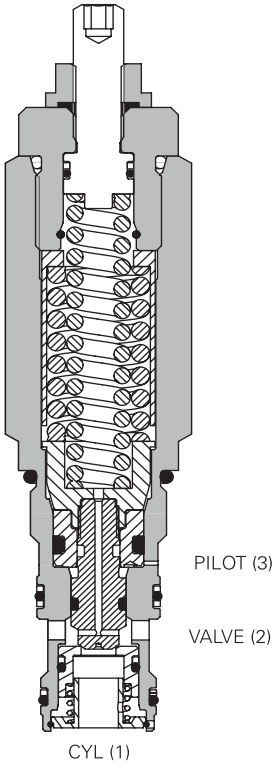
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CERH90 - High pressure overcenter valve

Part balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 350 bar (5000 psi)




## Sectional view




## Description

The 1CERH series overcenter valve performs all duties of a regular overcenter but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed center directional valve which has service line reliefs. The poppet is pressure balanced, preventing relief setting increase due to back pressure.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

Dynamic seals on the internal moving parts to provide longer fatigue life.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

Other ratios available upon request.

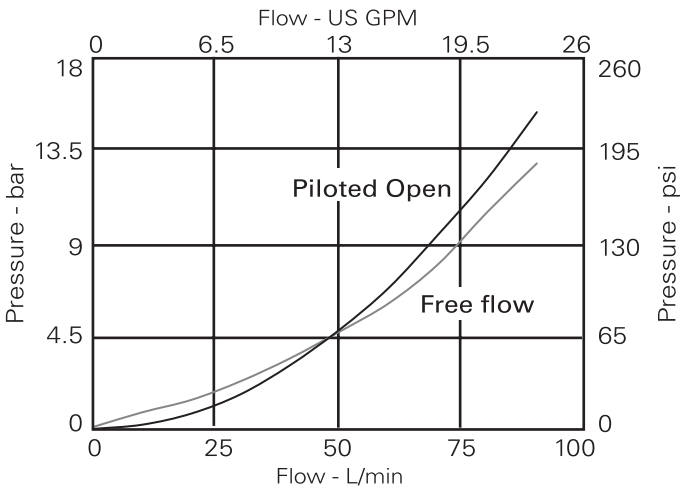
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief pressure | 430 bar (6240 psi) |
| Max load induced pressure | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing materials | Steel. Add suffix "377". |
| Cavity | A12336 (see Section M) |
| Mounting position | Unrestricted |
| Torque cartridge into cavity | 100-110 Nm (73-81lbs ft) |
| Weight | 1CERH90 0.6 kg (1.32 lbs)<br>1CERH95 1.66 kg (3.66 lbs)<br>1CEERH95 2.72 kg (6.00 lbs) |
| Seal kit | 9900927-000 (Nitrile)<br>9900928-000 (Viton ®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 5 dpm @ 85% of Cracking |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CERH90 - High pressure overcenter valve

Part balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 350 bar (5000 psi)

**Model code**

**1CERH*** – F 4W – 43 S 4**

1 2 3 4 5 6

## 1 Function

**1CERH90** - Cartridge only

**1CERH95** - Cartridge and body

**1CEERH95** - Cartridges and body

## 2 Adjustment

**F** - Screw adjustment

## 3 Port size

| Code | Port size | Housing number - body only | |
|---|---|---|---|
| | | Steel single | Steel dual |
| 4W | 1/2" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B13626 | C13628 |
| 8T | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10922 | C11561 |

## 4 Pressure range

**Note:** Code based on pressure in bar.

**43** - (4:1) 275-430 bar. Std setting 350 bar

Std setting made at 1L/min

**Note:** Contact CSR for special pressure setting requirement

**Note:** Note: Tightening torque of "F" adjuster locknut - 20 to 25 Nm

## 5 Seal material

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

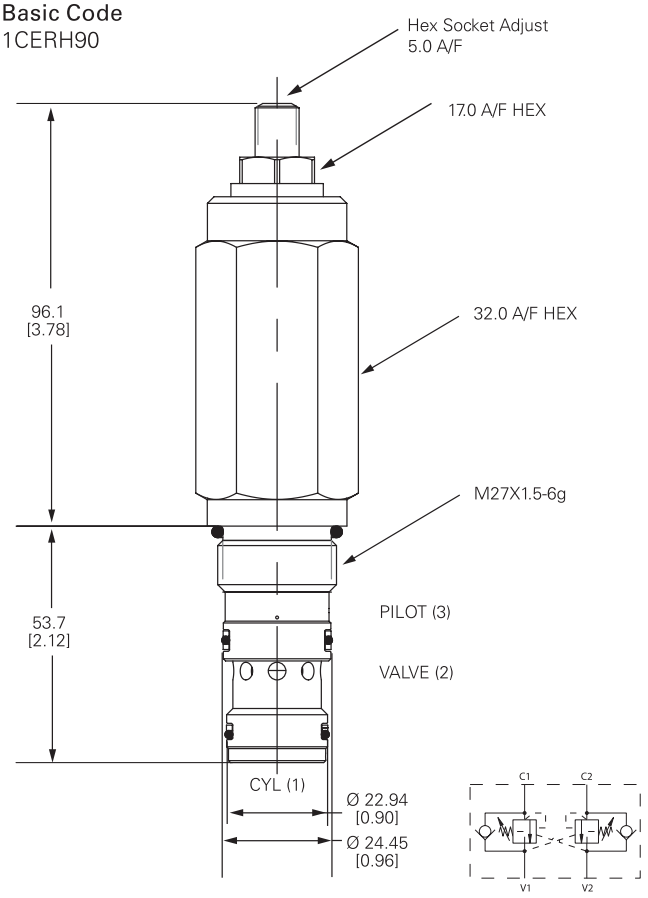
## 6 Pilot ratio

**4 - 4:1** Other ratios available upon request

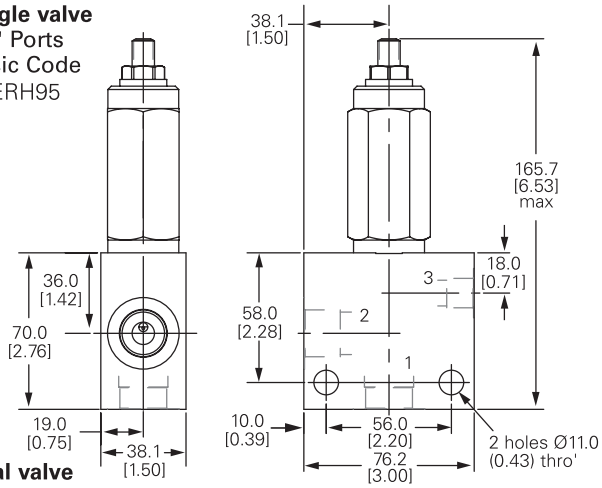
## Dimensions

mm (inch)

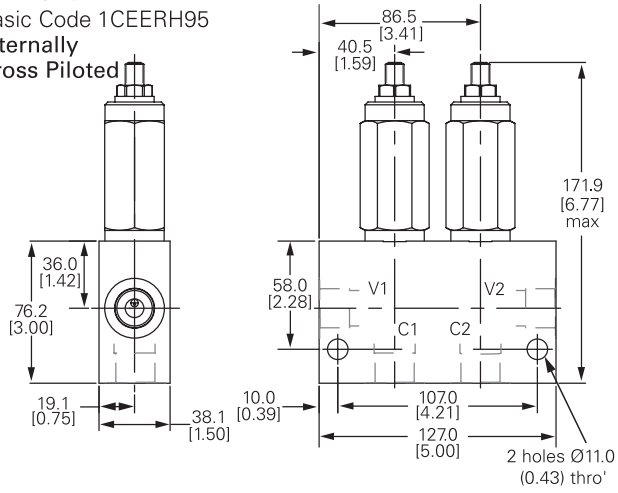
**Cartridge only**
Basic Code
1CERH90




**Single valve**
1/2" Ports
Basic Code
1CERH95



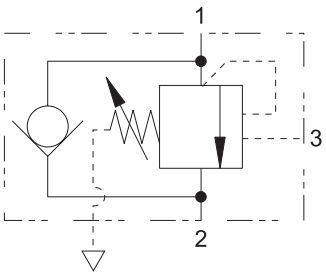

**Dual valve**
1/2" Ports
Basic Code 1CEERH95
Internally
Cross Piloted



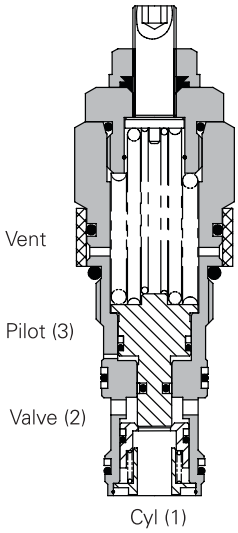

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEB90 - Overcenter valve

Fully balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They prevent runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced valve is unaffected by back pressure, allowing service line reliefs to operate and for the valve to be used in regenerative or proportional valve systems.

The overcenter valve should be mounted either into, onto or as close to the actuator as possible to give maximum protection.

Single overcenter valves control unidirectional loads such as in aerial platforms, cranes or winches and dual overcenters are suited to bi-directional motion such as wheel motor applications or cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

Other ratios available upon request.

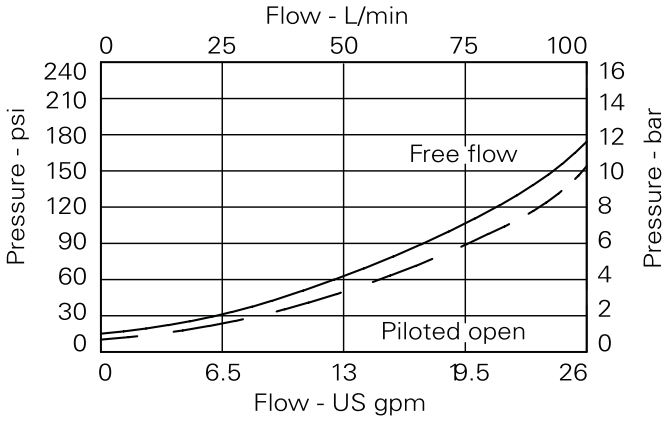
## Performance data

**Ratings and specifications**

| *Performance data is typical with fluid at 32 cST (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts steel.<br>External surfaces zinc plated. |
| Standard housing materials | Aluminum up to 210 bar.<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity | A12336 (see Section M) |
| Torque cartridge into cavity | 60 Nm (44 lbs ft) |
| Weight | 1CEB90: .29 kg (.63 lbs)<br>1CEB95: 1.35 kg (2.97 lbs)<br>1CEEB95: 2.10 kg (4.62 lbs) |
| Seal kit | SK634 (Nitrile)<br>SK634V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 ml/min (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEB90 - Overcenter valve

Fully balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE**** – F 4W – 35 S 4**

1 2 3 4 5 6

## 1 Function

**1CEB90** - Cartridge only

**1CEB95** - Cartridge and body

**1CEEB95** - Cartridges and dual body

## 2 Adjustment

**F** - Screw adjustment

**N** - Fixed - State pressure setting required.

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port size

| Code | Port Size | Housing number - body only | | | |
|---|---|---|---|---|---|
| Body Only | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| 4W | 1/2" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B13625 | B13626 | C13627 | C13628 |
| 8T | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10806 | B10922 | C10807 | C11561 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 70-225 bar. Std setting 100 bar

**35** - 200-350 bar. Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seal material

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

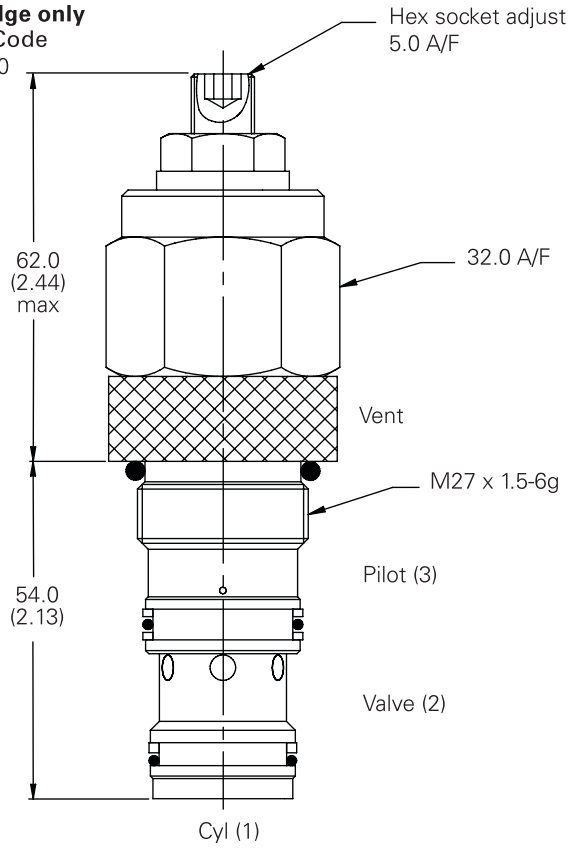
## 6 Pilot ratio

**4 - 4:1** Other ratios available upon request

## Dimensions

mm (inch)

**Cartridge only**
Basic Code
1CEB90

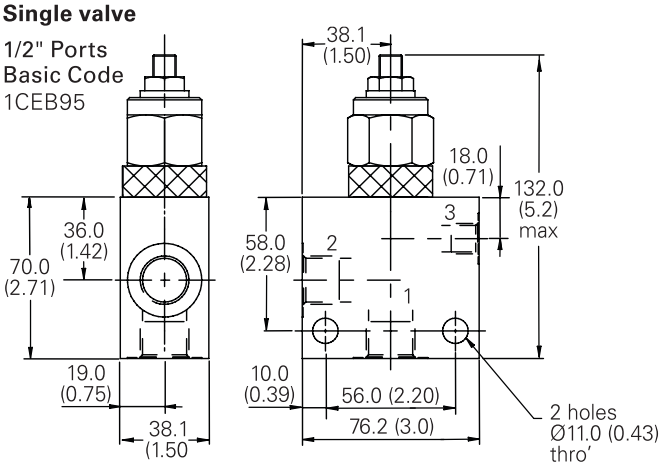



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option.

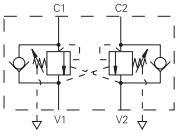
**Single valve**

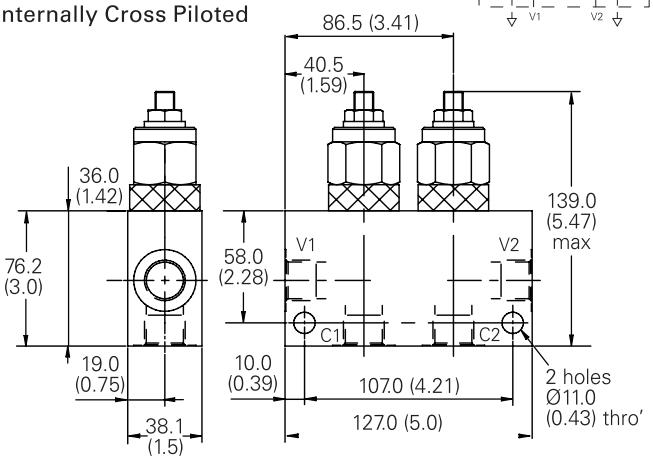
1/2" Ports
Basic Code
1CEB95




**Dual valve**

1/2" Ports
Basic Code 1CEEB95
Internally Cross Piloted



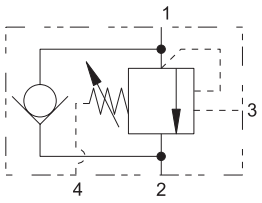

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



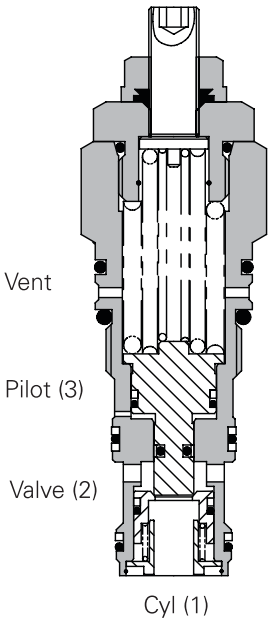
F

# 1CEBD90 - Overcenter valve

Fully balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They will stop runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced overcenter relief setting is unaffected by back pressure, enabling the valve to stay open when the valve port pressure rises. This will allow service line reliefs to work normally and will also allow the control of regenerative or proportional systems. The drain line allows the valve to be used in corrosive atmospheres preventing the ingress of atmospheric contaminant.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

Other ratios available upon request.

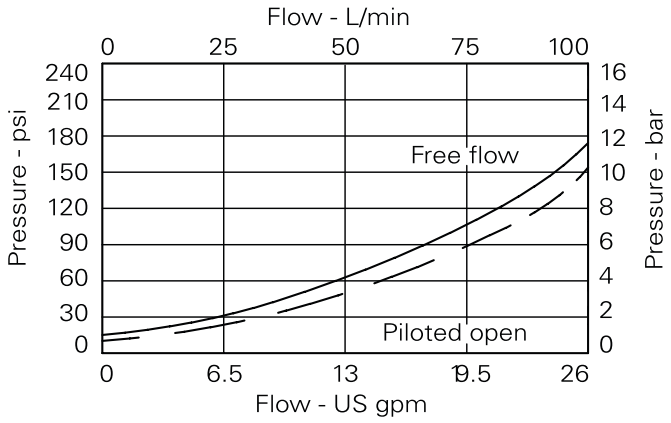
## Performance data

**Ratings and specifications**

| *Figures based on Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity | A12196 (See section M) |
| Torque cartridge into cavity | 60 Nm (44 lbs ft) |
| Weight | 0.29 kg (0.63 lbs) |
| Seal kit | SK634 (Nitrile)<br>SK634V (Viton®)<br>SK634P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBD90 - Overcenter valve

Fully balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)

**Model Code**

**1CEBD90 – F – ** P 4**

1 2 3 4 5

**1 Function**
**1CEBD90**

**2 Adjustment means**
**F** Screw adjustment

Line body available on request.

**3 Pressure range @ 4.8 L/min**

**Note:** Code based on pressure in bar.

**20** - 70-225 bar
Standard setting 100 bar

**35** - 200-350 bar
Standard setting 210 bar

Standard setting made at 4.8 L/min

**4 Seals**

**S** - Nitrile (for use with most industrial hydraulic oils)

**SV** - Viton (for high temperature and most special fluid applications)

**P** - Polyurethane/Nitrile (for arduous applications)

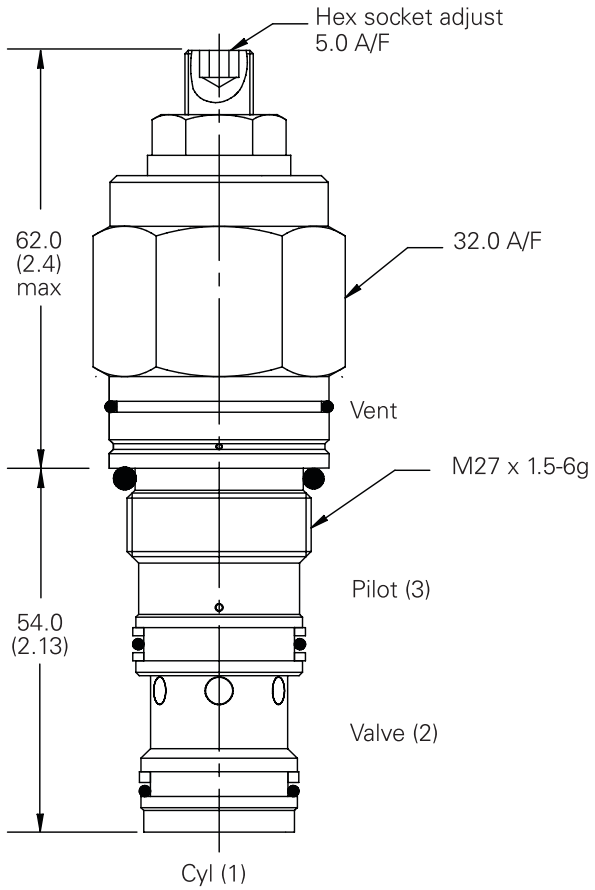
**5 Pilot ratio**

**4** - 4:1 Other ratios available upon request

**Dimensions**

mm (inch)

**Cartridge only**
Basic Code
1CEBD90




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

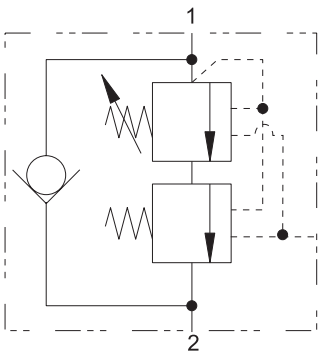
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CEL90 - Overcenter valve

Counterbalance, pilot assisted relief with check
90 L/min (23 USgpm) • 280 bar (4000 psi)




## Operation

The check section allows free flow and then locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied, maintaining a counterbalance pressure to prevent initial pressure loss and therefore instability. The total pressure setting will normally be set at 1.3 times the load induced pressure. The counterbalance pressure reduces as the pilot pressure increases.

## Features

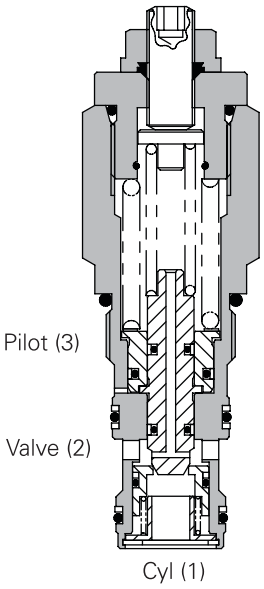
Cartridge is economical and fits simple cavity.
Allows quick, easy field service - reduces down time.
Interchangeable with pilot check valve of a similar size.

## Pilot ratio

Primary 5.6:1

Secondary 0.7:1

## Sectional view




## Performance data

**Ratings and specifications**

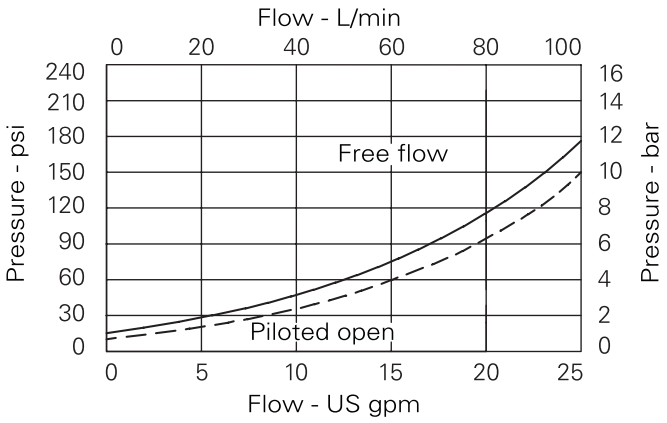
| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Maximum setting | 1SEL30 |
| Max load induced pressure | 280 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A12336 (See Section M) |
| Torque cartridge into cavity | 60 Nm (44 ft. lbs.) |
| Weight | 1CEL90 0.29 kg (0.63 lbs.)<br>1CEL95 1.35 kg (2.97 lbs.)<br>1CEEL95 2.10 kg (4.62 lbs.) |
| Seal kit number | SK633 (Nitrile)<br>SK633V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° C to +90° C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Description

The 1CEL overcenter valve performs all duties of a regular overcenter but maintains a counterbalance pressure to provide dampening of cylinders when there is a rapid loss in stored pressure. This counterbalance pressure reduces as the pilot pressure increases. Typical applications include extension cylinders on telescopic handlers where it is important to have a smooth operation when retracting from full extension.

## Pressure drop




**Note:** This valve has been designed to eliminate instability from flexible boom applications or where the load induced pressure varies greatly. To get the best results, the settings should be adjusted for each application and then factory set for production quantities. Please contact our Technical Department for more information.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEL90 - Overcenter valve

Counterbalance, pilot assisted relief with check
90 L/min (23 USgpm) • 280 bar (4000 psi)

**Model code**

**1CE*** – F 4W – 30 S 220 / 60**

1 2 3 4 5 6 7

## 1 Function

**1CEL90 -** Cartridge Only

**1CEL95 -** Cartridge and Body

**1CEEL95 -** Cartridges and Dual Body

## 2 Adjustment means counterbalance setting

**F** - Screw Adjustment
**N** - Fixed - State pressure setting required.

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port sizes

| Code | Port Size | Housing Number - Body Only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel Single | Aluminium dual | Steel dual |
| 4W | 1/2" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B13625 | B13626 | C13627 | C13628 |
| 8T | 1/2" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10806 | B10922 | C10807 | C11561 |

## 4 Pressure range bar @ 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 170-350 Standard 220 (160/60)

**30** - 210-380 Standard 280 (220/60).
Standard setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (for use with most industrial hydraulic coils)

**SV** - Viton (for high temperature and most special fluid applications)

## 6 High pressure setting bar

(10 bar increments) 150 to 230 bar (2175 to 3335 psi)

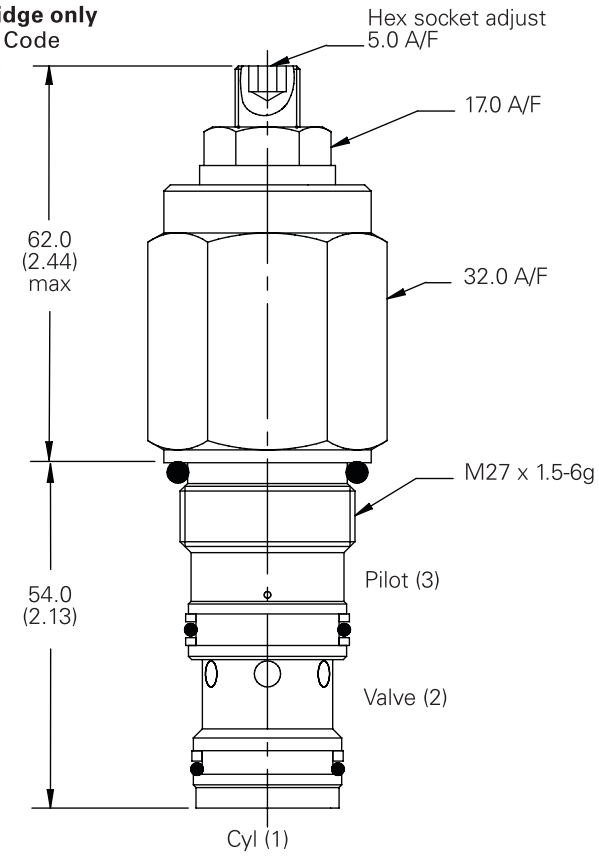
## 7 Counterbalance setting bar

(10 bar increments)
20 to 170 bar (300 tp 250 psi)

## Dimensions

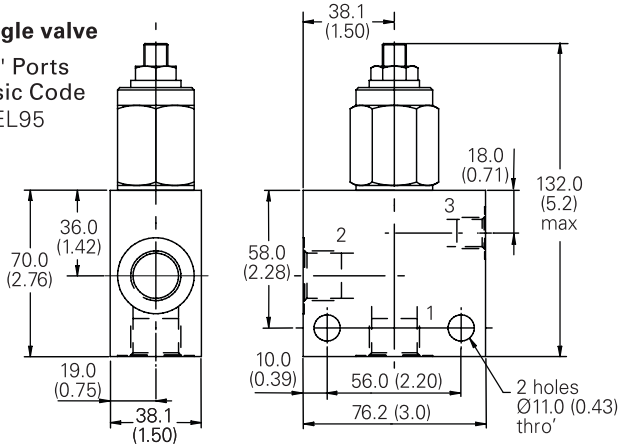
mm (inch)

**Cartridge only**
Basic Code
1CEL90



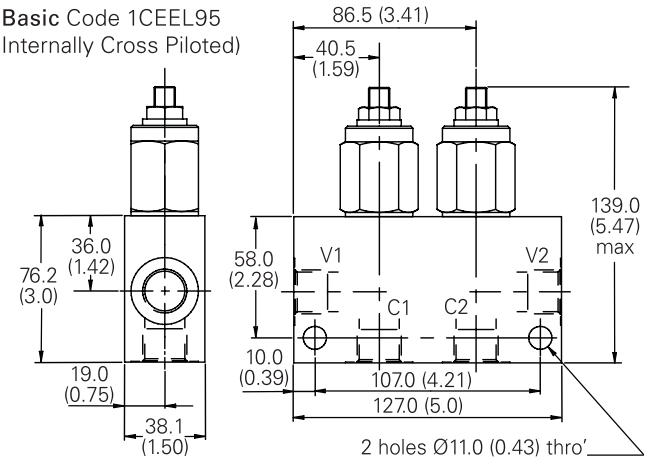

**Single valve**

1/2" Ports
Basic Code
1CEL95




**Dual valve**

1/2" Ports
Basic Code 1CEEL95
Internally Cross Piloted)



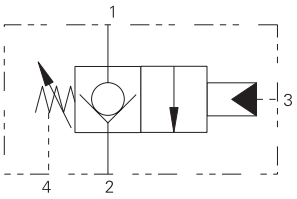

**Note:** For applications above 210 bar, please consult our technical department or use the steel body option.

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

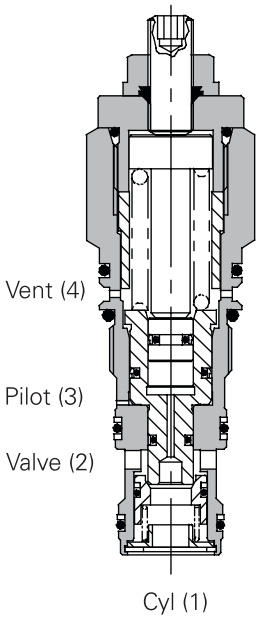
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPBD90 - Overcenter valve

Zero differential with check
90 L/min (23 USgpm) • 350 bar (5000 psi)




## Sectional view




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. By the application of pilot pressure to the pilot port the poppet moves back against the main spring opening the cylinder port to the valve port. The metering characteristic of the valve is controlled by the rate of the spring, the seat angle and the pilot pressure applied.

Due to the balanced poppet design load induced pressure will not open the valve and once open valve port pressure will not increase the pilot pressure required to keep the valve open.

## Pilot ratios

The cartridge fits a simple cavity allowing quick, easy field service reducing down time. Hardened poppet and seat provide for long leak free performance.

## Performance data

**Ratings and Specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Maximum working pressure | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A12196 (See Section M) |
| Torque cartridge into cavity | 60 Nm (44 ft. lbs.) |
| Weight | 0.29 kg (0.63 lbs.) |
| Seal kit number | SK634 (Nitrile)<br>SK634V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature | -30° C to +90° C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Application

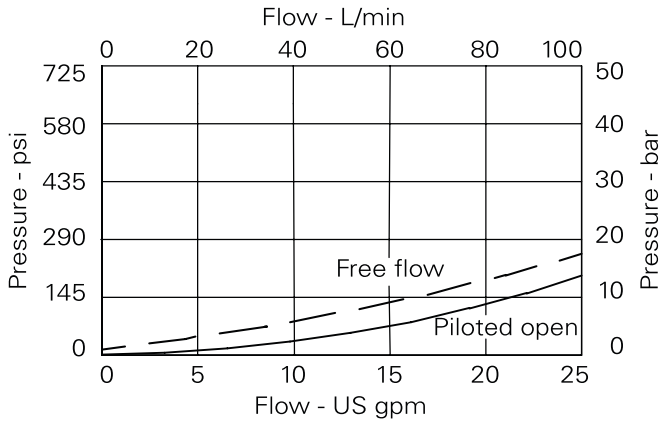
Zero differential overcenter valves give static and dynamic control of loads by supplying a restriction to flow related to the opening of the valve created by the pilot pressure.

The valve is used in conjunction with a remote pilot source to provide hose failure protection, load control and load holding functions.

If over-pressure or shock pressure protection is required then a separate relief valve should be used.

The drain line allows the valve to be used in corrosive atomspheres preventing the ingestion of atomosphere contamination.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPBD90 - Overcenter valve

Zero differential with check
90 L/min (23 USgpm) • 350 bar (5000 psi)

**Model code**

**1CPBD90 – F – 2 P**

1 2 3 4

**1 Function**

**1CPBD90 -** Cartridge Only

Line body available on request.

**2 Adjustment means**

**F** - Screw Adjustment

**3 Pilot adjustment range @ 4.8 L/min**

**Note:** Code based on pressure in bar.

**2** - 5 - 20 bar.
Standard setting: 10 bar

Standard setting made at 4.8 L/min

**4 Seals**

**S** - Nitrile (for use with most industrial hydraulic coils).

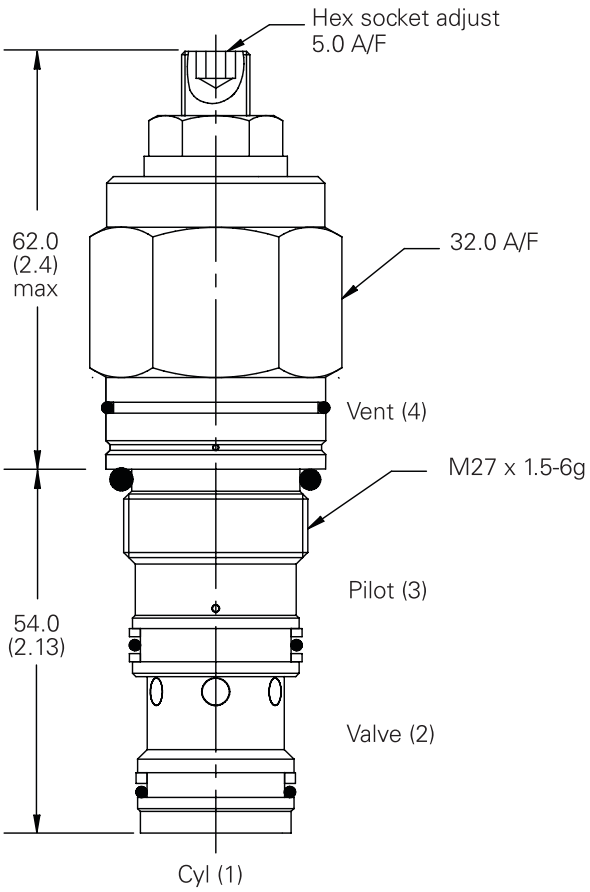
**SV** - Viton (for high temperature andmost special fluid applications).

**P** -Polyurethane/Nitrile (for arduous applications)

## Dimensions

mm (inch)

**Cartridge only**
Basic Code
1CPBD90

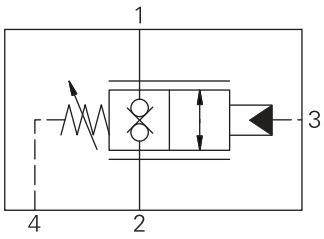



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPPD90 - Piloted Bi-directional poppet valve

Poppet, pilot operated, normally closed, zero differential
90 L/min (23 USgpm) • 350 bar (5000 psi)




## Operation

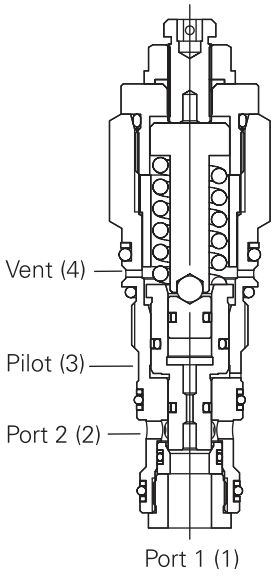
By the application of pilot pressure to the pilot port the poppet moves back against the main spring opening. The metering characteristic of the valve is controlled by the rate of the spring, the seat angle and the pilot pressure applied.

Due to the balanced poppet design load induced pressure will not open the valve and once open valve port pressure will not increase the pilot pressure required to keep the valve open.

## Features

The cartridge fits a simple cavity allowing quick, easy field service reducing down time. Hardened poppet and seat provide for long leak free performance.

## Sectional view




## Performance data

**Ratings and Specifications**

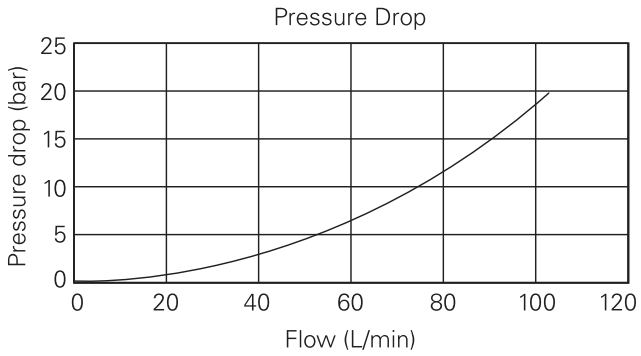
| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Maximum working pressure | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel. |
| Mounting position | External surfaces Nickel/ Zinc plated. |
| Cavity number | Unrestricted |
| Torque cartridge into cavity | A12196 (See Section M) |
| Weight | 60 Nm (44 ft. lbs.) |
| Seal kit number | SK1453 (Nitrile)<br>SK1453V (Viton*)<br>SK1453P (Polyurethane/ Nitrile) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature | -30° C to +90° C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Application

Normally closed pilot operated zero differential bi-directional poppet valve providing flow control by application of pilot pressure to actuate the poppet and increase the flow path

Balanced construction ensures predictable switching regardless of pressure in port 1 or 2. The drain line allows the valve to be used in corrosive atmospheres preventing the ingress of atmospheric contamination.




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPPD90 - Piloted Bi-directional poppet valve

Poppet, pilot operated, normally close, zero differential
90 L/min (23 USgpm) • 350 bar (5000 psi)

**Model code**

**1CPPD90 – F – 2 P**

1 2 3 4

**1 Function**

**1CPPD90 -** Cartridge Only

**2 Adjustment means**

**F** - Screw Adjustment
**G** - Tamperproof Cap
**N** - Fixed - State pressure setting required

**3 Pilot adjustment range @ 4.8 L/min**

**Note:** Code based on pressure in bar.

**2** - 8 - 25 bar.
Standard setting: 10 bar

Standard setting made at 4.8 L/min

**4 Seals**

**S** - Nitrile (for use with most industrial hydraulic coils).

**SV** - Viton (for high temperature andmost special fluid applications).

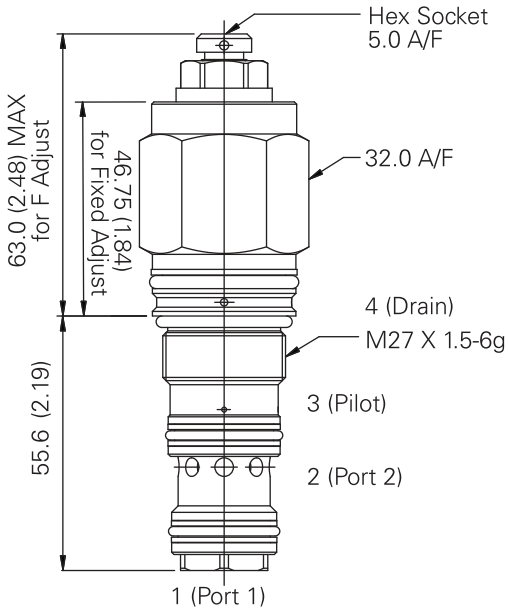
**P** -Polyurethane/Nitrile (for arduous applications)

Line body available on request.

## Dimensions

mm (inch)

**Cartridge only**
Basic Code
1CPPD90

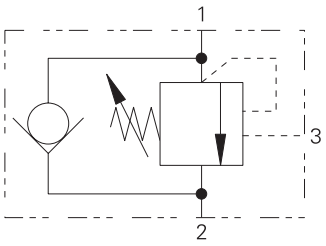



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

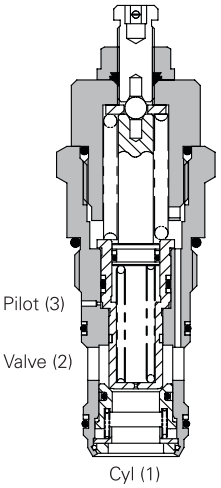
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE120 - Overcenter valve

Pilot assisted relief with check
120 L/min (32 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

3.5:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

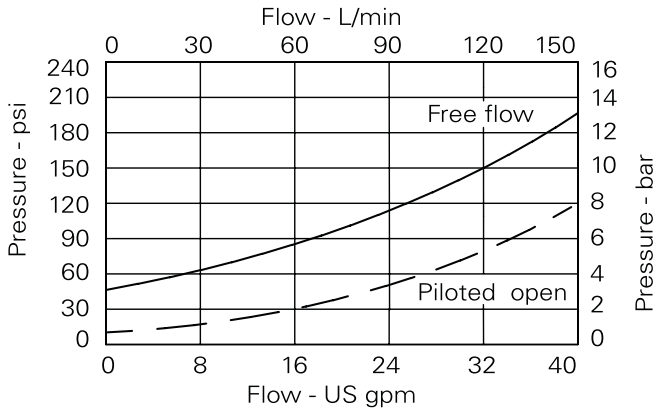
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 120 L/min (32 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A877 (See Section M) |
| Torque cartridge into cavity | 100 Nm (74 lbs ft) |
| Weight | 1CE120 0.59 kg (1.30 lbs)<br>1CE150 1.46 kg (3.20 lbs<br>1CEE150 2.58 kg (5.70 lbs) |
| Seal kit number | SK417 (Nitrile)<br>SK417V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30°C to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE120 - Overcenter valve

Pilot assisted relief with check
120 L/min (32 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE**** – F 6W – 35 S 3**
1 2 3 4 5 6

## 1 Function

**1CE120** - Cartridge Only
**1CE150** - Cartridge and Body
**1CEE150** - Cartridges and Dual Body

## 2 Adjustment means

**F** - Screw Adjustment

## 3 Port sizes

| Code | Port size | Housing number | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| 6W | 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B6898 | B5544 | C2543 | C1200 |
| 12T | 3/4" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B8200 | | C10629 | C16434 |
| 16T | 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B10708 | B11814 | | |

## 4 Pressure range @ 4.8 l/min

**Note:** Code based on pressure in bar.

**35** - 70-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 Pilot Ratio

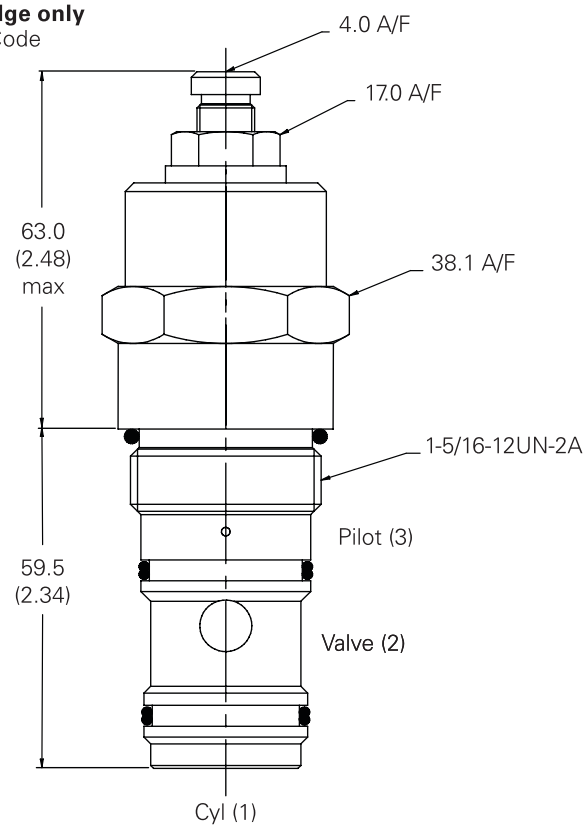
**3** - 3.5:1

**8** - 8:1

## Dimensions

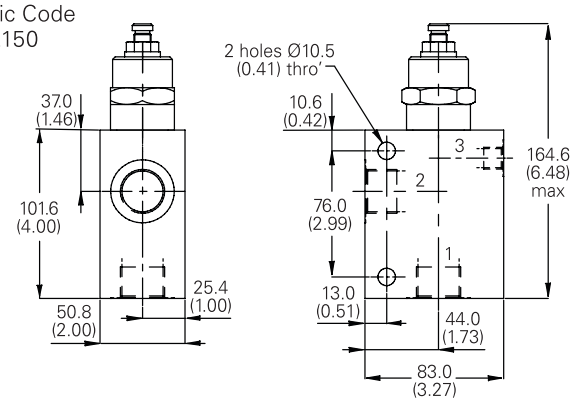
mm (inch)

**Cartridge only**
Basic Code
ICE120



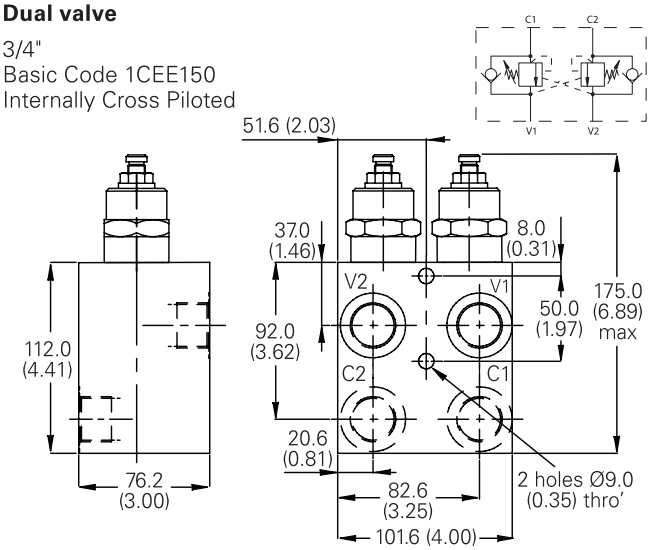

**Single valve**

3/4" , 1" Ports
Basic Code
1CE150




**Dual valve**

3/4"
Basic Code 1CEE150
Internally Cross Piloted




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option.

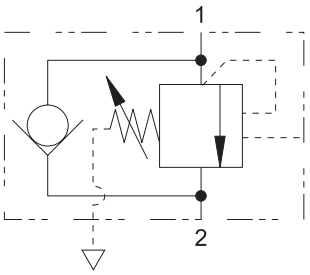
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CEB120 - Overcenter valve

**Fully balanced, pilot assisted relief with check**
**120 L/min (32 USgpm) • 270 bar (4000 psi)**




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

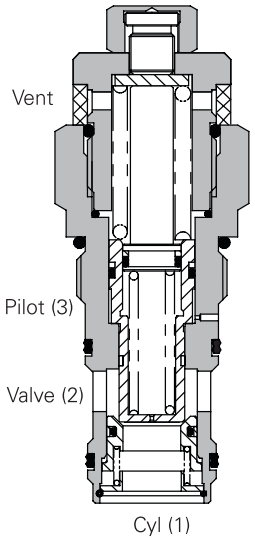
Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

3:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They prevent runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced valve is unaffected by back pressure, allowing service line reliefs to operate and for the valve to be used in regenerative or proportional valve systems.

The overcenter valve should be mounted either into, onto or as close to the actuator as possible to give maximum protection.

Single overcenter valves control unidirectional loads such as in aerial platforms, cranes or winches and dual overcenters are suited to bi-directional motion such as wheel motor applications or cylinders going over center.

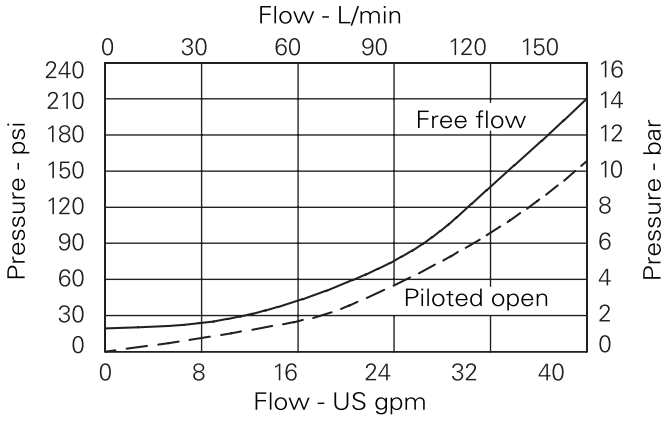
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 120 L/min (32 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A877 (See Section M) |
| Torque cartridge into cavity | 100 Nm (74 lbs ft) |
| Weight | 1CEB120 0.59 kg (1.30 lbs)<br>1CEB150 1.46 kg (3.20 lbs)<br>1CEEB150 2.58 kg (5.70 lbs) |
| Seal kit number | SK417 (Nitrile)<br>SK417V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEB120 - Overcenter valve

Fully balanced, pilot assisted relief with check
120 L/min (32 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE***** – P 6W – 35 S 3**

1 2 3 4 5 6

## 1 Function

**1CEB120** - Cartridge only

**1CEB150** -Cartridge in body

**1CEEB150** - Cartridges in dual body

## 2 Adjustment means

**P** - Leakproof screw adjustment

## 3 Port sizes

| Code | Port Size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| **6W** | 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B6898 | B5544 | C2543 | C1200 |
| **12T** | 3/4" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B8200 | | C10629 | C16434 |
| **16T** | 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B10708 | B11814 | | |

## 4 Pressure range @ 4.8 l/min

**Note:** Code based on pressure in bar.

**35** - 70-350 bar.
Std setting 210 bar
Std setting made at 4.8 L/min

## 5 Seals

**S** -Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

**P** -Polyurethane/Nitrile (For arduous applications)

## 6 Pilot ratio

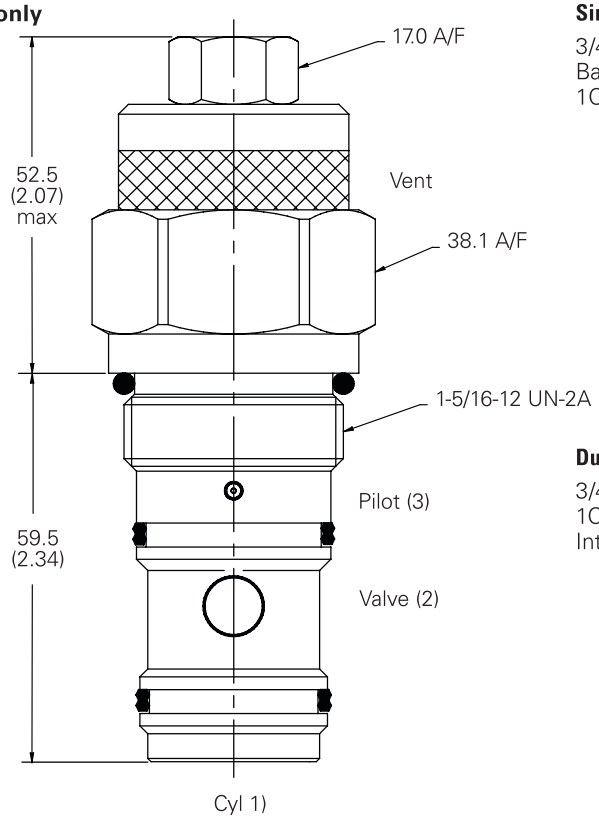
**3** - 3:1 (Standard)

**8** - 8:1

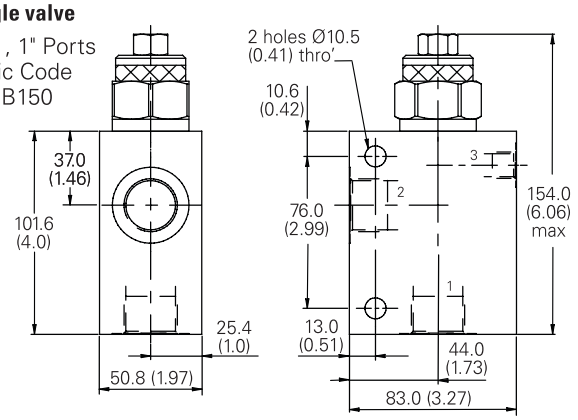
## Dimensions

mm (inch)

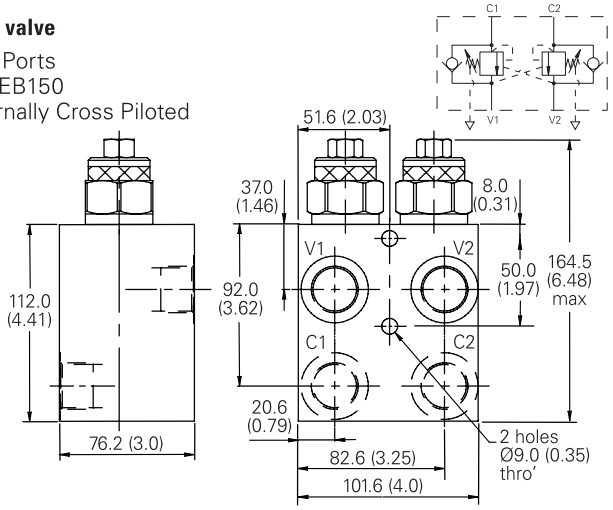
**Cartridge only**
Basic Code
ICEB120




**Single valve**
3/4" , 1" Ports
Basic Code
1CEB150




**Dual valve**
3/4" Ports
1CEEB150
Internally Cross Piloted



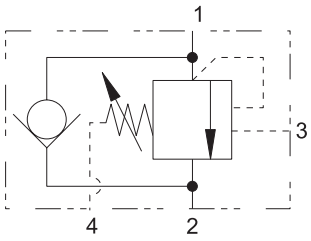

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

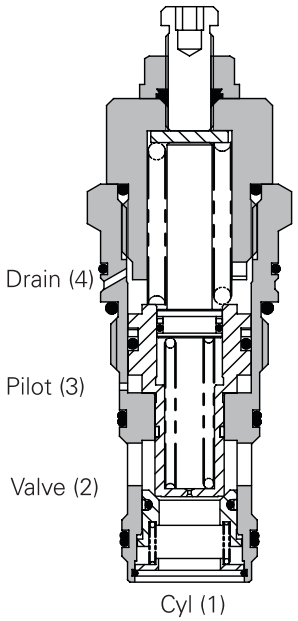
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBD120 - Overcenter valve

Fully balanced, pilot assisted relief with check
180 L/min (47 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They will stop runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced overcenter relief setting is unaffected by back pressure, enabling the valve to stay open when the valve port pressure rises. This will allow service line reliefs to work normally and will also allow the control of regenerative or proportional systems. The drain line allows the valve to be used in corrosive atmospheres preventing the ingress of atmospheric contaminant.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time.

## Pilot ratio

3:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

8:1 & 12:1 Best suited for applications where the load remains relatively constant.

22:1 Specifically designed for Boom Loc applications.

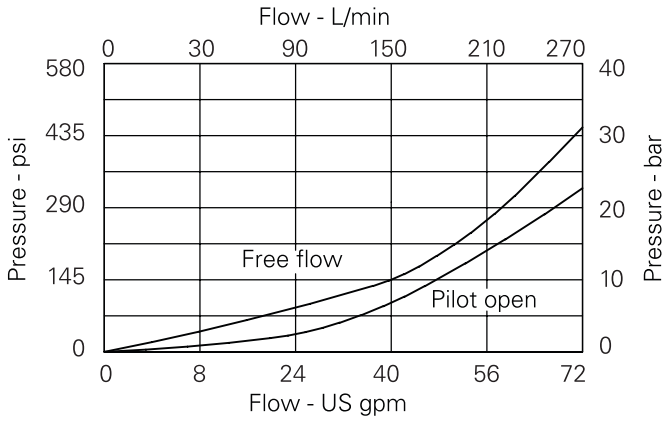
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 180 L/min (47 USgpm) |
| Max relief setting | 400 bar (5800 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated. |
| Mounting position | Unrestricted |
| Cavity number | A6726 (See Section M) |
| Torque cartridge into cavity | 100 Nm (74 lbs ft) |
| Weight | 0.59 kg (1.30 lbs) |
| Seal kit number | SK830 (Nitrile)<br>SK830V (Viton®)<br>SK830P (Polyurethane/Nitrile) |
| Recommended filtration level | BS5540/4 Class 18/13<br>(25 micron nominal) |
| Operating temperature | -30°C to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min max (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |
| Bar per turn | 65 bar |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBD120 - Overcenter valve

Fully balanced, pilot assisted relief with check
180 L/min (47 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEBD120 – F – 35 P 8**

1 2 3 4 5

**1 Function**

**1CEBD120** - Cartridge only

**2 Adjustment means**

**F** - Screw adjustment

**3 Pressure range @ 4.8 l/min**

**Note:** Code based on pressure in bar.

**35** - (3:1, 8:1 and 22:1):
70-350 bar
Std setting 350 bar

**40** - (12:1): 70-400 bar.
Std setting 350 bar
Std setting made at 4.8 L/min

**4 Seals**

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

**P** -Polyurethane/Nitrile (For arduous applications)

**5 Pilot ratio**

**3** - 3:1

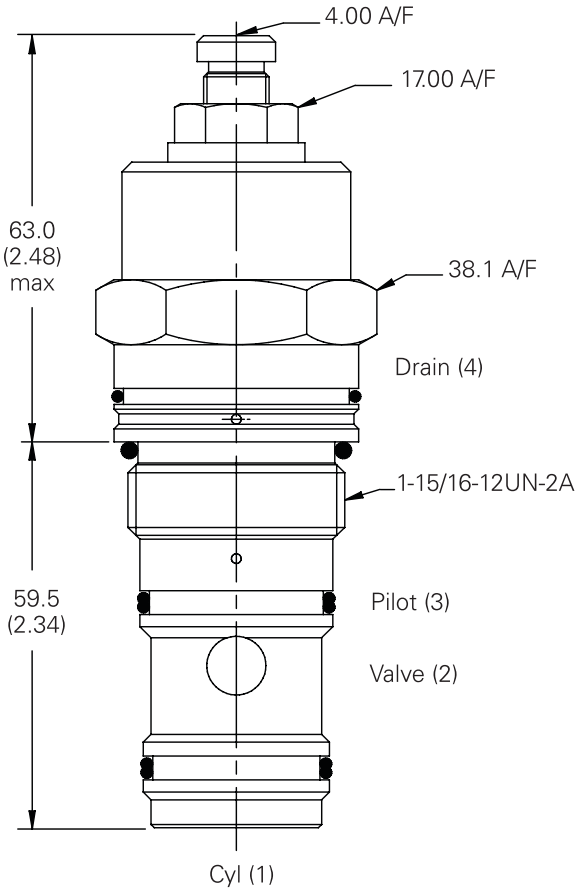
**8** - 8:1

**12** - 12:1
**22** - 22:1

**Dimensions**

mm (inch)

**Cartridge only**
Basic Code
**1CEBD120**



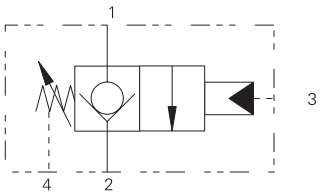

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPBD120 - Overcenter valve

Zero differential with check
180 L/min (47 USgpm) • 400 bar (5800 psi)




## Operation

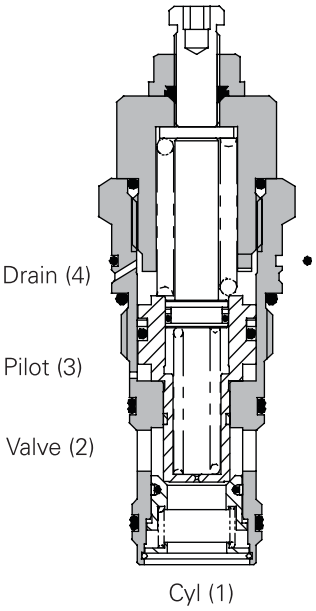
The check section allows free flow into the actuator then holds and locks the load against movement. By the application of pilot pressure to the pilot port the poppet moves back against the main spring opening the cylinder port to the valve port. The metering characteristic of the valve is controlled by the rate of the spring, the seat angle and the pilot pressure applied.

Due to the balanced poppet design load induced pressure will not open the valve and once open valve port pressure will not increase the pilot pressure required to keep the valve open.

## Features

The cartridge fits a simple cavity allowing quick, easy field service reducing down time. Hardened poppet and seat provide for long leak free performance.

## Sectional view




## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 180 L/min (47 USgpm) |
| Max working pressure | 400 bar (5800 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A6726 (See Section M) |
| Torque cartridge into cavity | 100 Nm (74 lbs ft) |
| Weight | 0.59 kg (1.30 lbs) |
| Seal kit number | SK830 (Nitrile)<br>SK830V (Viton®)<br>SK830P (Polyurethane/Nitrile) |
| Recommended filtration level | BS5540/4 Class 18/13<br>(25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min max (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |
| Bar per turn | 5 bar |

Viton® is a registered trademark of E.I. DuPont

## Description

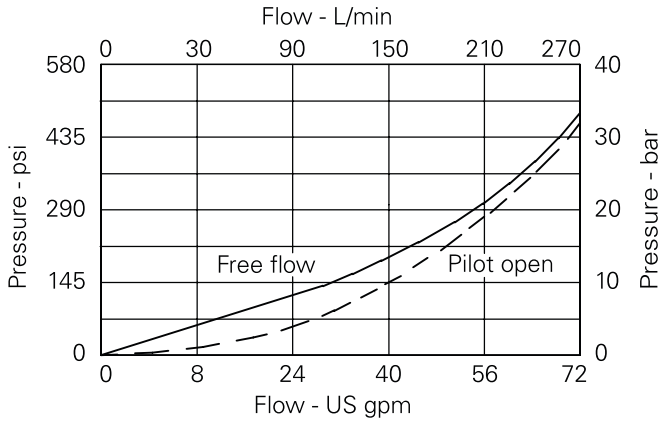
Zero differential overcenter valves give static and dynamic control of loads by supplying a restriction to flow related to the opening of the valve created by the pilot pressure.

The valve is used in conjunction with a remote pilot source to provide hose failure protection, load control and load holding functions.

If over-pressure or shock pressure protection is required then a separate relief valve should be used.

The drain line allows the valve to be used in corrosive atmospheres preventing the ingress of atmospheric contaminant.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPBD120 - Overcenter valve

Zero differential with check
180 L/min (47 USgpm) • 400 bar (5800 psi)

**Model code**

**1CPBD120 – F – 2 P**

1 2 3 4

**1 Function**
**1CPBD120** - Cartridge only

**2 Adjustment means**
**F** - Screw adjustment

**3 Pilot adjust range**
**Note:** Code based on pressure in bar.

**2** - 5-20 bar.
Std setting 10 bar
Std setting made at 4.8 L/min

**4 Seals**
**S** - Nitrile (For use with most industrial hydraulic oils)

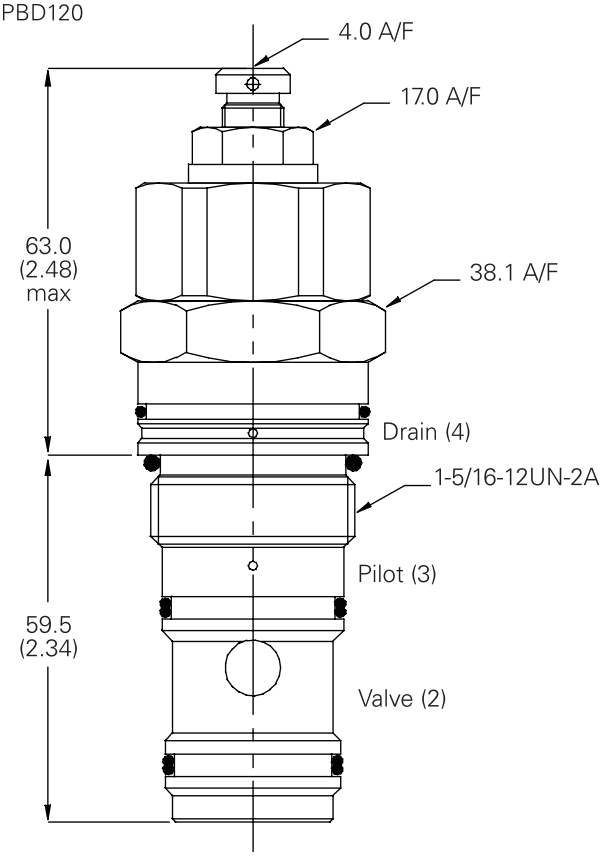
**SV** - Viton (For high temperature and most special fluid applications)

**P** -Polyurethane/Nitrile (For arduous applications)

## Dimensions

mm (inch)

**Cartridge only**
Basic Code
1CPBD120




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

**Model code**

**1C**** – F 6W – 35 S 3**

1 2 3 4 5 6

## 1 Function

**1CE156/1CEB156** - Cartridge & Body Through Ported

**1CBE150/1CBEB150** - Cartridge & Body Banjo Mounted

**1CEG150/1CEBG150** - Cartridge & Body Gasket Mounted

## 2 Adjustment means

**P** - Leakproof Screw Adjust (1CEB156/1CBEB150/ 1CEBG150)

**F** - Screw Adjust (1CE156/1CBE150/ 1CEG150

## 3 Port sizes

| Code | Port size | Housing number - body only | |
|---|---|---|---|
| | | Aluminum | Steel |
| 1CE156/1CE156 Complete Valve Body ONLY part numbers | | | |
| **6W** | 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B13629 | B13630 |
| 1CBE150/1CBEB150 Sub-assembly part numbers | | | |
| **6W** | 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | AXP13565-6W-S | |
| 1CEG150/1CEBG150 Gasket Mounted numbers | | | |
| **6W** | 3/4" SAE 6000 PSI Flange Ports | BXP13634-6W-S | BXP13634-6W-S-377 |

## 4 Pressure range @ 4.8 l/min

**Note:** Code based on pressure in bar.

**35** - 70-350 bar. Std setting 210 bar Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

**P** -Polyurethane/Nitrile (For arduous applications)

## 6 Pilot ratio

**3** - 3.5:1 - 1CE156/1CBE150/ 1CEG150

**3** - 3:1 - 1CEB156/1CBEB150/ 1CEBG150 (Standard)

**8** - 8:1 - 1CEB156/1CBEB150/ 1CEBG150

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

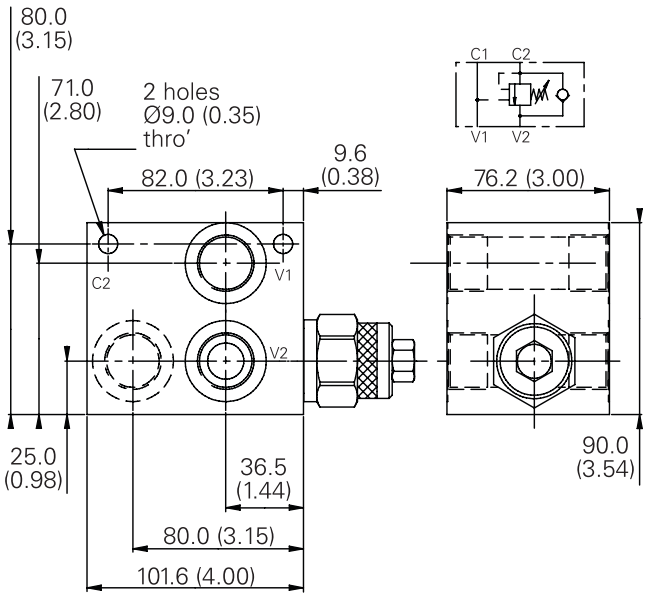
# 1CE - Overcenter valve

Alternative body arrangements
for 100 Liters/min valves

## Dimensions

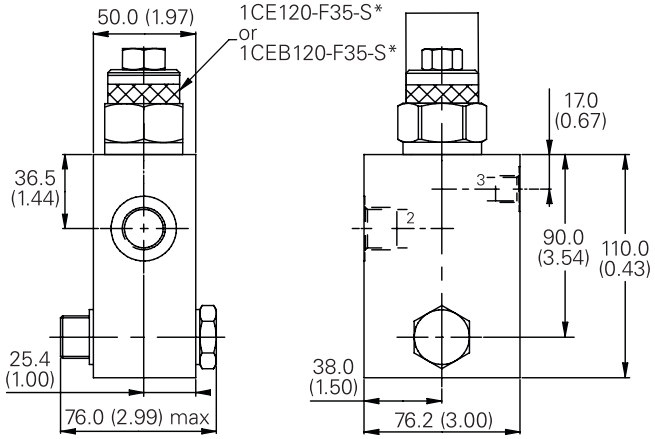
mm (inch)

**Complete valve**
Through Ported
3/4" Ports
Basic Code
1CE156/1CEB156

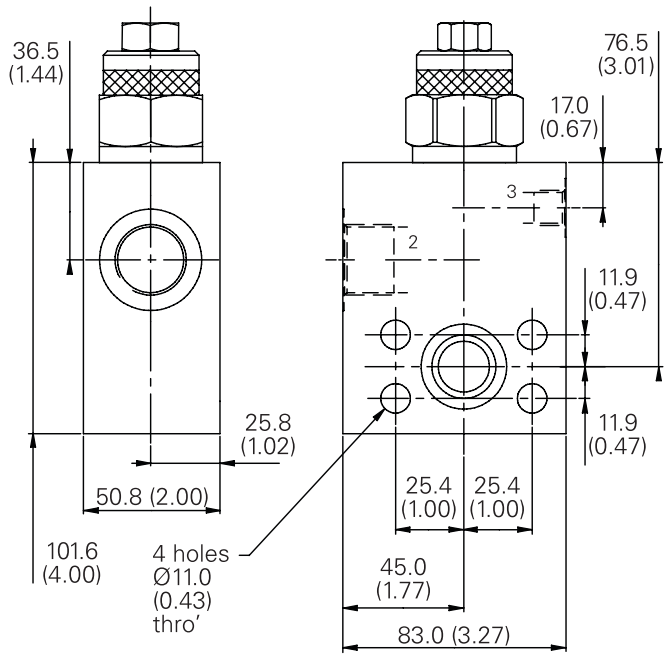



**Complete valve**
3/4" Ports

Banjo Mounted
Basic Code
1CBE150/1CBEB150




**Complete valve**
3/4" Ports SAE 6000 PSI Flange Ports
1CEG150/1CEBG150
Gasket Mounted




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Note:** For applications above 210 please consult our Technical Department or use the steel body option.

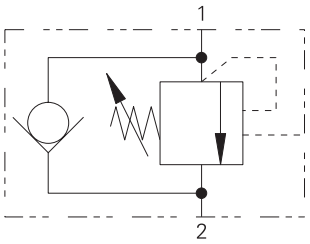
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



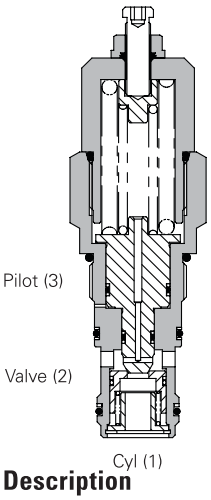
F

# 1CE140 - Overcenter valve

Pilot assisted relief with check
140 L/min (37 USgpm) • 340 bar (4930 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

6:1 Best suited for applications where the load remains relatively constant.

Other options available upon request.

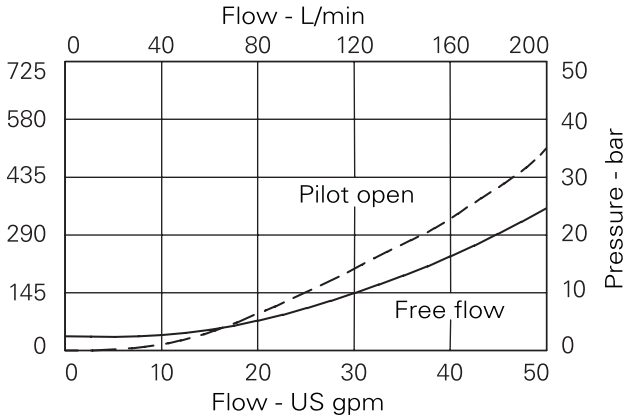
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 140 L/min (37 USgpm) |
| Max relief setting | 420 bar (6090 psi) |
| Max load induced pressure | 340 bar (4930 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar). Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A20081 |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight | 1CE140 1.2 kg (2.5 lbs)<br>1CE145 (aluminium) 2.2 kg (4.5 lbs)<br>1CE145 (steel) 4.0 kg (8.8 lbs)<br>1CEE145 (aluminium) 2.9 kg (6.4 lbs)<br>1CEE145 (steel) 6.0 kg (13.2 lbs) |
| Seal kit number | SK1108 (Nitrile)<br>SK1108V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30°C to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE140 - Overcenter valve

Pilot assisted relief with check
140 L/min (37 USgpm) • 340 bar (4930 psi)

**Model code**

**1CE**** – F 6W – 40 S 4**

1 2 3 4 5 6

## 1 Function

**1CE140** - Cartridge only

**1CE145** - Cartridge and body

**1CEE145** - Cartridges and body

## 2 Adjustment means

**F** - Screw adjustment

## 3 Port sizes

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| **6W** | 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B20105 | B20106 | | |
| **8W** | 1" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B20107 | B20108 | C20285 | C20287 |
| **16T** | 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B11946 | B11947 | C30105 | C30106 |

## 4 Pressure range @ 4.8 l/min

**Note:** Code based on pressure in bar.

**20** - 140-250 bar.
Std setting 190 bar

**30** - 220-330 bar.
Std setting 270 bar

**40** - 310-420 bar.
Std setting 370 bar
Std setting made at 4.8 liter/min

## 5 Seals

**S**- Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 Pilot ratio

**4** - 4:1

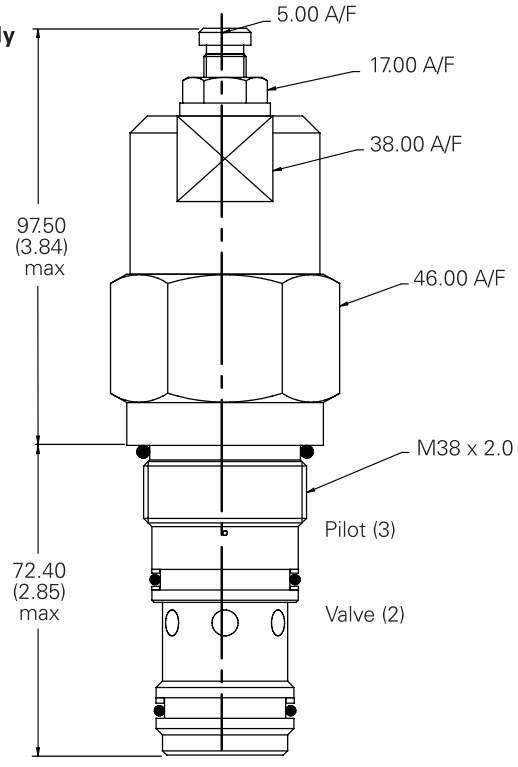
**6** - 6:1

Other ratios available upon request

## Dimensions

mm (inch)

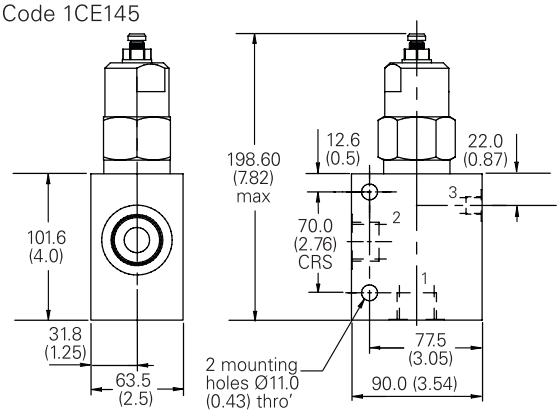
**Cartridge only**
Basic Code
1CE140



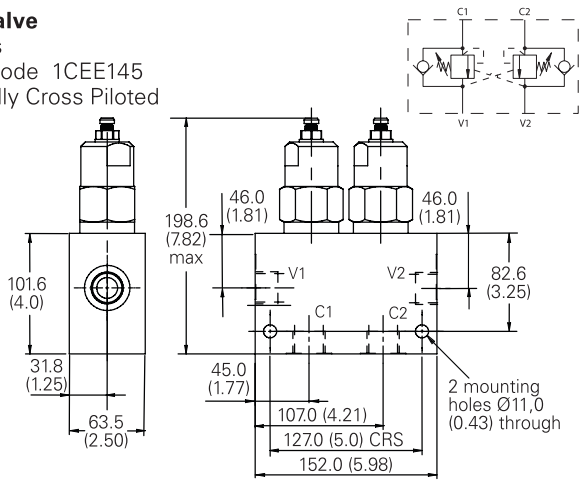

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Single valve**
3/4" , 1" Ports
Basic Code 1CE145




**Dual valve**
1" Ports
Basic Code 1CEE145
Internally Cross Piloted



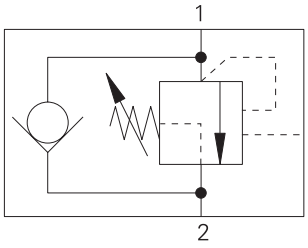

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CER140 - Overcenter valve

**Part balanced, pilot assisted relief with check**
**140 L/min (37 USgpm) • 340 bar (4930 psi)**




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

Pilot Pressure =

$$\frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

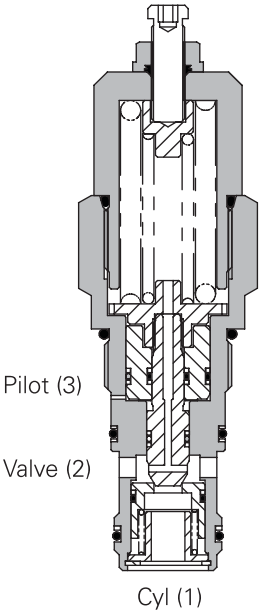
Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

6:1 Best suited for applications where the load remains relatively constant.

## Sectional view




## Description

The 1CER series overcenter valve performs all duties of a regular overcenter but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed center directional valve which has service line reliefs. The poppet is pressure balanced, preventing relief setting increase due to back pressure.

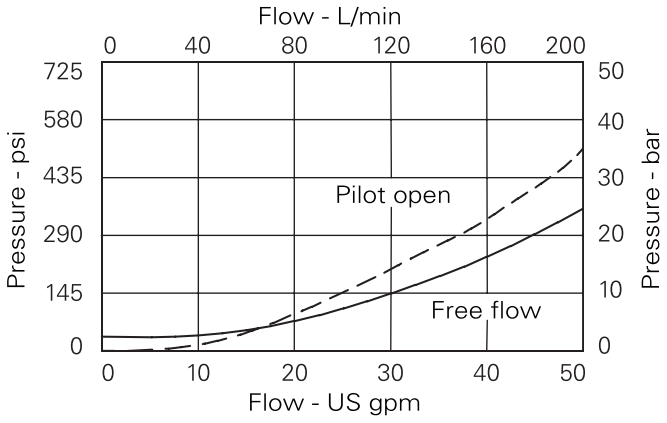
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 140 L/min (37 USgpm) |
| Max relief setting | 420 bar (6090 psi) |
| Max load induced pressure | 340 bar (4930 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A20081 |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight | 1CER140 1.2 kg (2.6 lbs)<br>1CER145 (aluminium) 2.2 kg (4.8 lbs)<br>1CER145 (steel) 4.0 kg (8.8 lbs)<br>1CEER145 (aluminium) 2.9 kg (6.4 lbs)<br>1CEER145 (steel) 6.0 kg (13.2 lbs) |
| Seal kit number | SK1108 Nitrile)<br>SK1108V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CER140 - Overcenter valve

Part balanced, pilot assisted relief with check
140 L/min (37 USgpm) • 340 bar (4930 psi)

**Model code**

**1CER*** – F 6W – 40 S 4**

1 2 3 4 5 6

## 1 Function

**1CER140** - Cartridge Only

**1CER145** - Cartridge and Body

**1CEER145** - Cartridges and Body

## 2 Adjustment means

**F** - Screw Adjustment

## 3 Port sizes

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel Dual |
| **6W** | 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B20105 | B20106 | | |
| **8W** | 1" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B20107 | B20108 | C20285 | C20287 |
| **12T** | 3/4" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B11952 | B11953 | | |
| **16T** | 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B11946 | B11947 | C30105 | C30106 |

## 4 Pressure range @ 4.8 l/min

**Note:** Code based on pressure in bar.

**20** - 140-250 bar.
Std setting 190 bar

**30** - 220-330 bar.
Std setting 270 bar

**40** - 310-420 bar.
Std setting 370 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 Pilot ratio

**4** - 4:1

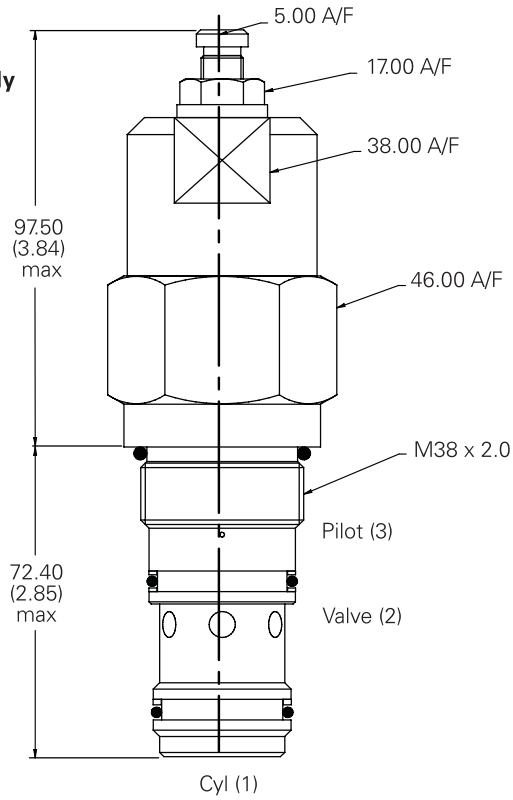
**6** - 6:1

Other ratios available upon request

## Dimensions

mm (inch)

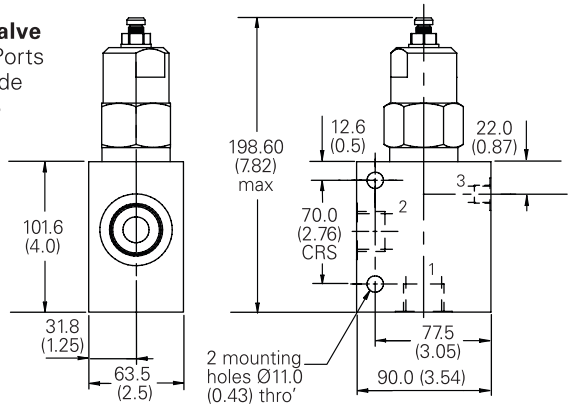
**Cartridge only**
Basic Code
1CER140



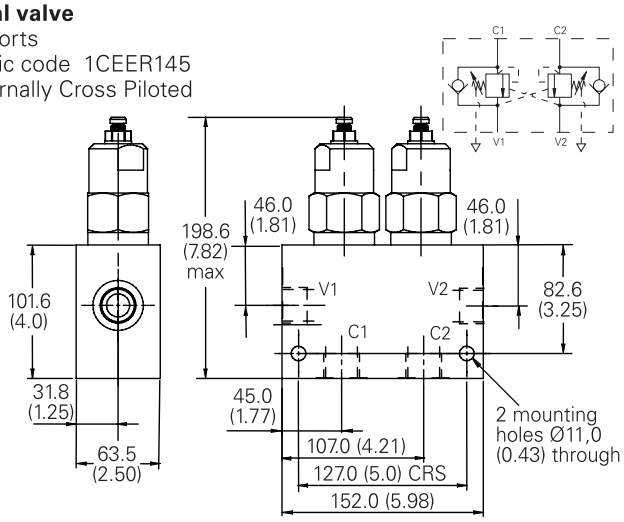

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Single valve**
3/4" , 1" Ports
Basic Code
1CER145




**Dual valve**
1" Ports
Basic code 1CEER145
Internally Cross Piloted



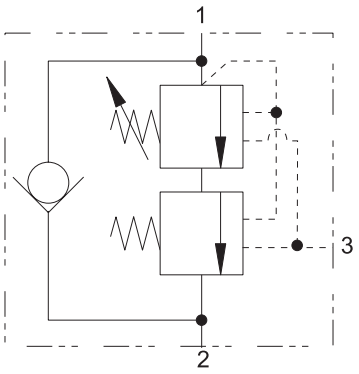

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CEL140 - Overcenter valve

Counterbalance, pilot assisted relief with check
140 L/min (37 USgpm) • 380 bar (5510 psi)




## Operation

The check section allows free flow and then locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied, maintaining a counterbalance pressure to prevent initial pressure loss and therefore instability. The total pressure setting will normally be set at 1.3 times the load induced pressure. The counterbalance pressure reduces as the pilot pressure increases.

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

Primary 6.1:1

Secondary 0.5:1

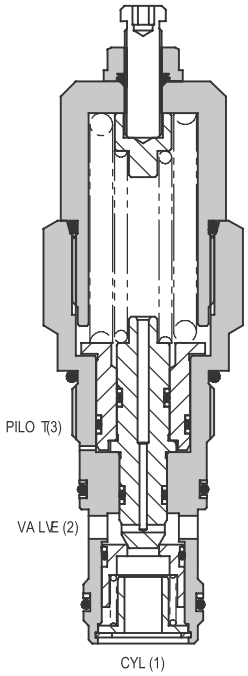
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 140 L/min (37 USgpm) |
| Max setting | 380 bar (5510 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Aluminum (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity number | A20081 |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight | 1CEL140 1.2 kg (2.6 lbs)<br>1CEL145 (aluminium) 2.2 kg (4.8 lbs)<br>1CEL145 (steel) 4.0 kg (8.8 lbs)<br>1CEEL145 (aluminium) 2.9 kg (6.4 lbs)<br>1CEEL145 (steel) 6.0 kg (13.2 lbs) |
| Seal kit number | SK1108 (Nitrile)<br>SK1108V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13<br>(25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

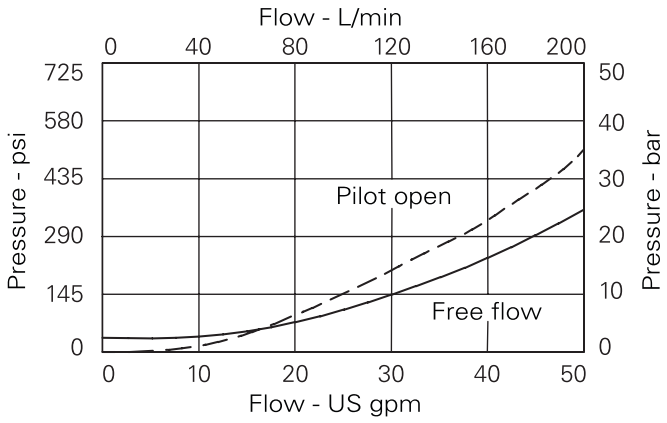
## Sectional view




## Description

The 1CEL overcenter valve performs all duties of a regular overcenter but maintains a counterbalance pressure to provide dampening of cylinders when there is a rapid loss in stored pressure. This counterbalance pressure reduces as the pilot pressure increases. Typical applications include extension cylinders on telescopic handlers where it is important to have a smooth operation when retracting from full extension.

## Pressure drop




**Note:** This valve has been designed to eliminate instability from flexible boom applications or where the load induced pressure varies greatly. To get the best results, the settings should be adjusted for each application and then factory set for production quantities. Please contact Eaton/ Integrated Hydraulics for more information.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEL140 - Overcenter valve

Counterbalance, pilot assisted relief with check
140 L/min (37 USgpm) • 380 bar (5510 psi)

**Model code**

**1CEL*** – F 6W – 30 S 220 / 60**

1 2 3 4 5 6 7

## 1 Function

**1CEL140** - Cartridge Only

**1CEL145** - Cartridge and Body

**1CEEL145** - Cartridges and Body

## 2 Adjustment means counterbalance setting

**F** - Screw Adjustment

## 3 Port sizes

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| **6W** | 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B20105 | B20106 | | |
| **8W** | 1" BSP Valve & Cyl Port. 1/4" BSP Pilot Port | B20107 | B20108 | C20285 | C20287 |
| **16T** | 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port | B11946 | B11947 | C30105 | C30106 |

## 4 Pressure Range @ 4.8 l/min

**Note:** Code based on pressure in bar.

**20** - 170-320. Std 220 (160/60)

**30** - 230-380. Std 280 (220/60)

**40** - 310-380. Std 350 (290/60)

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 High pressure setting bar

(10 bar increments).
150 to 350 bar
(2175 to 5000 psi)

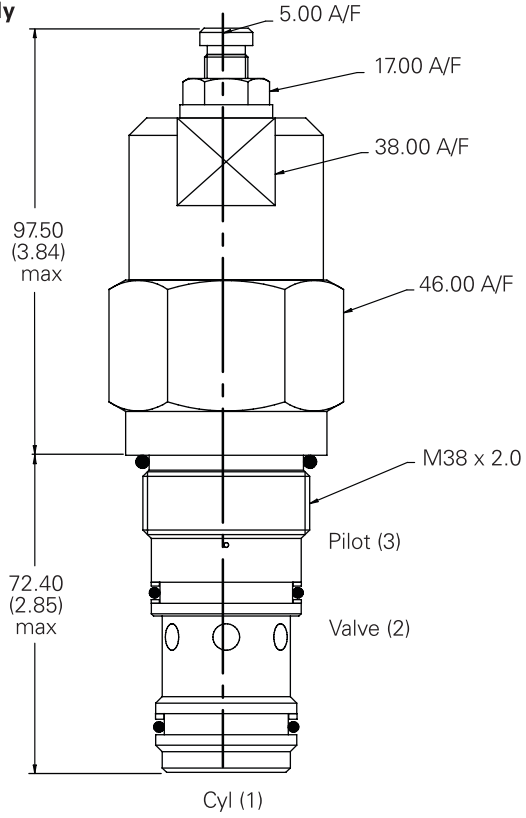
## 7 Counterbalance setting bar

(10 bar increments).
20 to 100 bar (300 to 1500 psi)

## Dimensions

mm (inch)

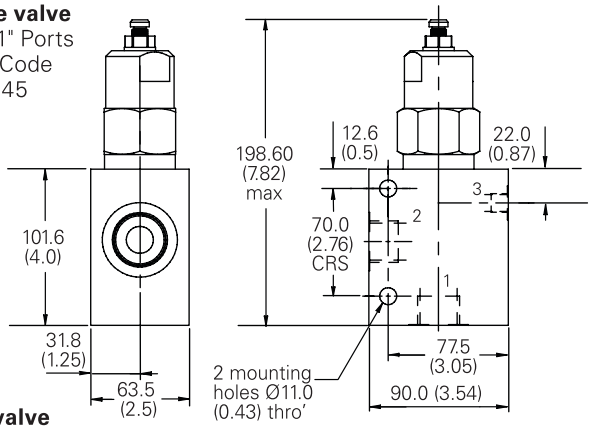
**Cartridge only**
Basic Code
1CEL140



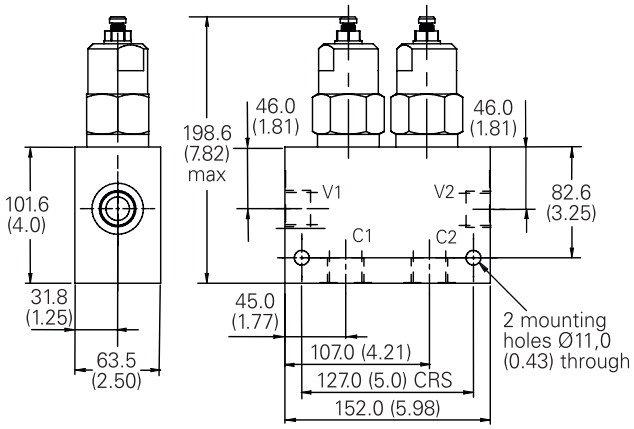

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option.

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Single valve**
3/4", 1" Ports
Basic Code
1CEL145



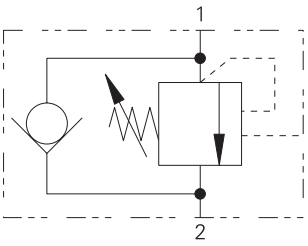

**Dual valve**
1" Ports
Basic code 1CEEL145
Internally Cross Piloted



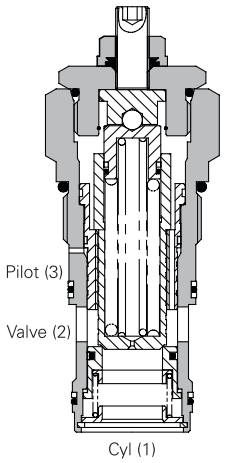

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE300 - Overcenter valve

Pilot assisted relief with check
300 L/min (80 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

3:1 Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

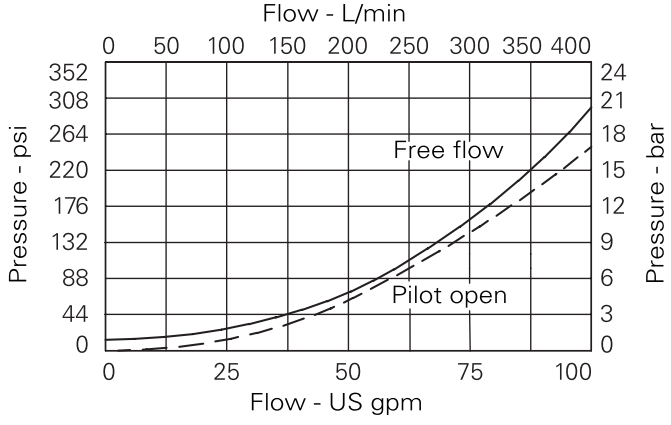
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 300 L/min (80 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Alumiium (up to 210 bar).<br>Add suffix "377" for steel option. |
| Mounting position | Unrestricted |
| Cavity | A6935 (See Section M) |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight cartridge only | 1CE300 0.91 kg ( 2.00 lbs)<br>1CE350 2.71 kg ( 5.96 lbs)<br>1CEE350 5.42 kg (11.92 lbs) |
| Seal kit | SK437 (Nitrile)<br>SK437V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30°C to +90°C (-22° to +194°F) |
| Internal leakage | 4 milliliters/min nominal (60 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CE300 - Overcenter valve

Pilot assisted relief with check
300 L/min (80 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE**** – F 10W – 35 S 3**

1 2 3 4 5 6

## 1 Function

**1CE300** - Cartridge only

**1CE350** - Cartridge and Body

**1CEE350** - Cartridges and Body

## 2 Adjustment

**F** - Screw adjustment

## 3 Port size

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| **10W** | 1 1/4" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B6814 | B8610 | C8704 | C8705 |
| **20T** | 1 1/4" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10630 | B11474 | C10811 | C11564 |

## 4 Pressure range

**Note:** Code based on pressure in bar.

**35** - 70-350 bar.

Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seal material

**S** - Buna-N

**SV** - Viton

## 6 Pilot ratio

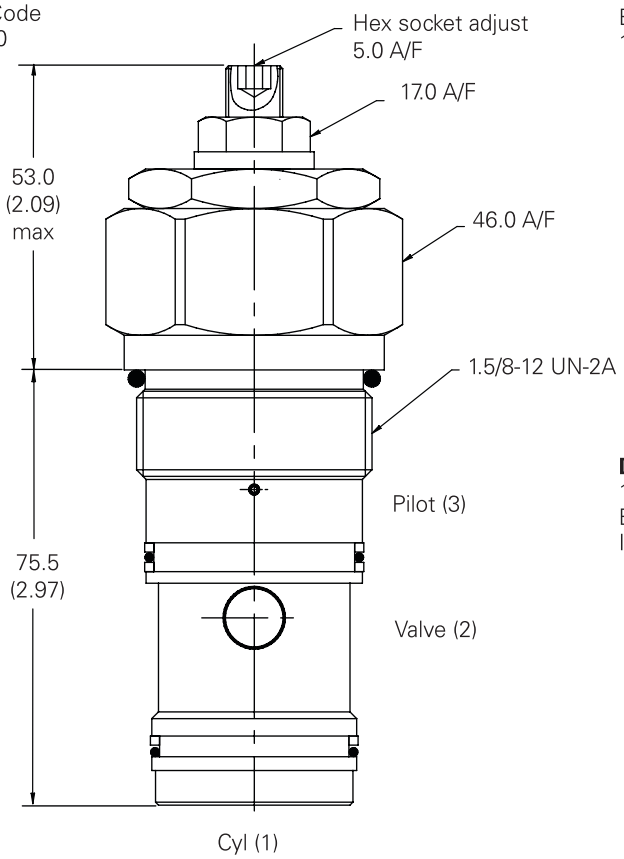
**3** - 3:1 - (Standard)

**8** - 8:1

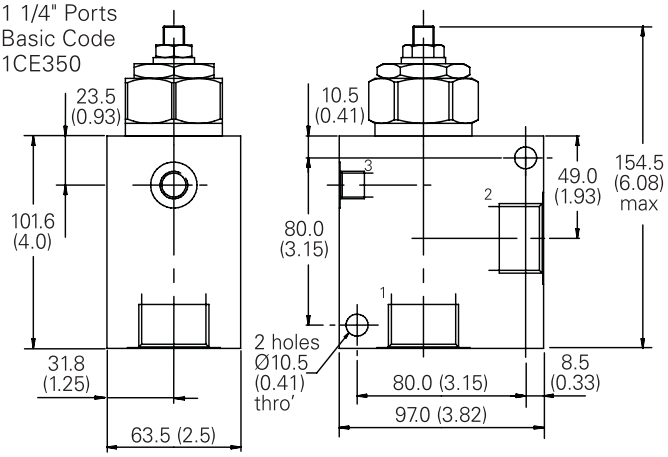
## Dimensions

mm (inch)

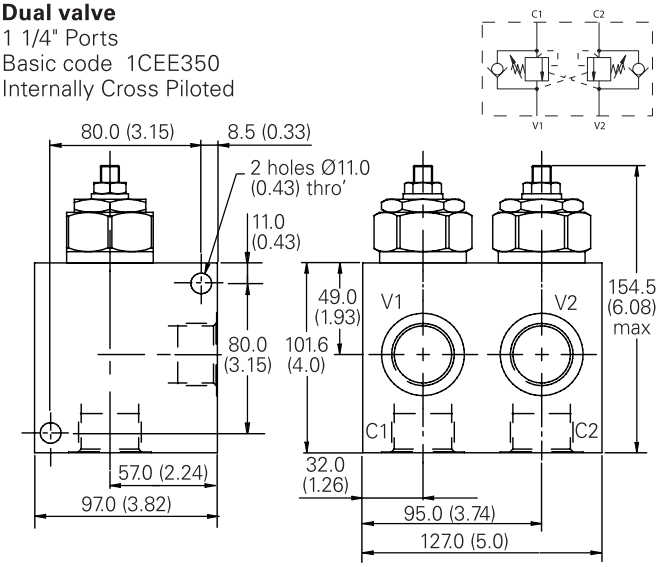
**Cartridge only**
Basic Code
1CE300




**Single valve**
1 1/4" Ports
Basic Code
1CE350




**Dual valve**
1 1/4" Ports
Basic code 1CEE350
Internally Cross Piloted



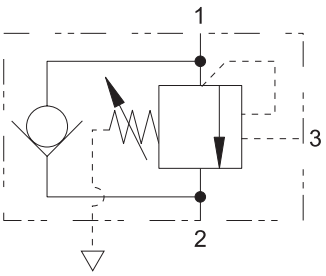

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option.

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

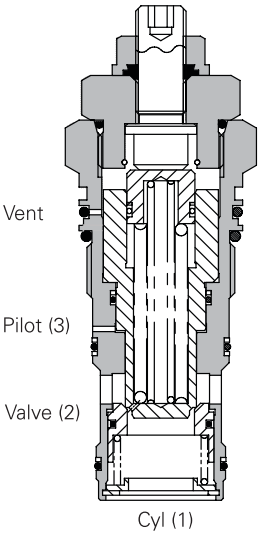
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEB300 - Overcenter valve

Fully balanced, pilot assisted
300 L/min (80 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They prevent runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced valve is unaffected by back pressure, allowing service line reliefs to operate and for the valve to be used in regenerative or proportional valve systems.

The overcenter valve should be mounted either into, onto or as close to the actuator as possible to give maximum protection.

Single overcenter valves control unidirectional loads such as in aerial platforms, cranes or winches and dual overcenters are suited to bi-directional motion such as wheel motor applications or cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

3:1 Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

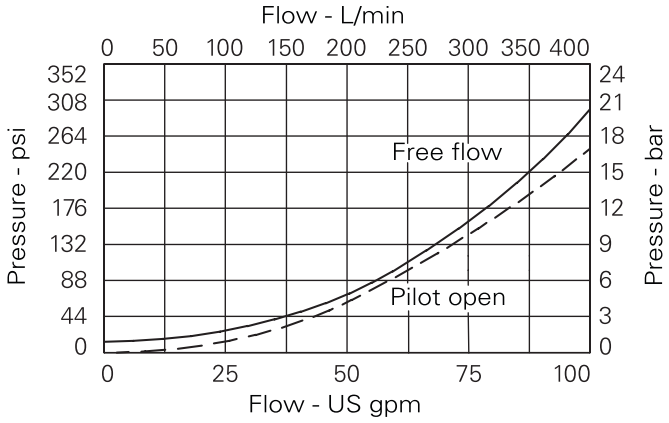
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 300 L/min (80 USgpm) |
| Max working pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing material | Aluminium (up to 210 bar)<br>Add suffix "377" for steel option |
| Mounting position | Unrestricted |
| Cavity | A6935 (See Section M) |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight cartridge only | 1CE300 0.91 kg ( 2.00 lbs)<br>1CE350 2.71 kg ( 5.96 lbs)<br>1CEE350 5.42 kg (11.92 lbs) |
| Seal kit | SK686 (Nitrile)<br>SK686V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30°C to +90°C (-22° to +194°F) |
| Internal leakage | 4 milliliters/min nominal (60 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEB300 - Overcenter valve

Fully balanced, pilot assisted
300 L/min (80 USgpm) • 270 bar (4000 psi)

**Model code**

**1CE*****– F 10W – 35 S 3**

1 2 3 4 5 6

## 1 Basiccode

**1CEB300** - Cartridge only

**1CEB350** - Cartridge and Body

**1CEEB350** - Cartridges and Body

## 2 Adjustment means

**F** - Screw adjustment

## 3 Port sizes

| Code | Port size | Housing number - body only | | | |
|---|---|---|---|---|---|
| | | Aluminium single | Steel single | Aluminium dual | Steel dual |
| **10W** | 1 1/4" BSP Valve & Cyl Port 1/4" BSP Pilot Port | B6814 | B8610 | C8704 | C8705 |
| **20T** | 1 1/4" SAE Valve & Cyl Port 1/4" SAE Pilot Port | B10630 | B11474 | C10811 | C11564 |

## 4 Pressure Range @4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 70-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 Pilot ratio

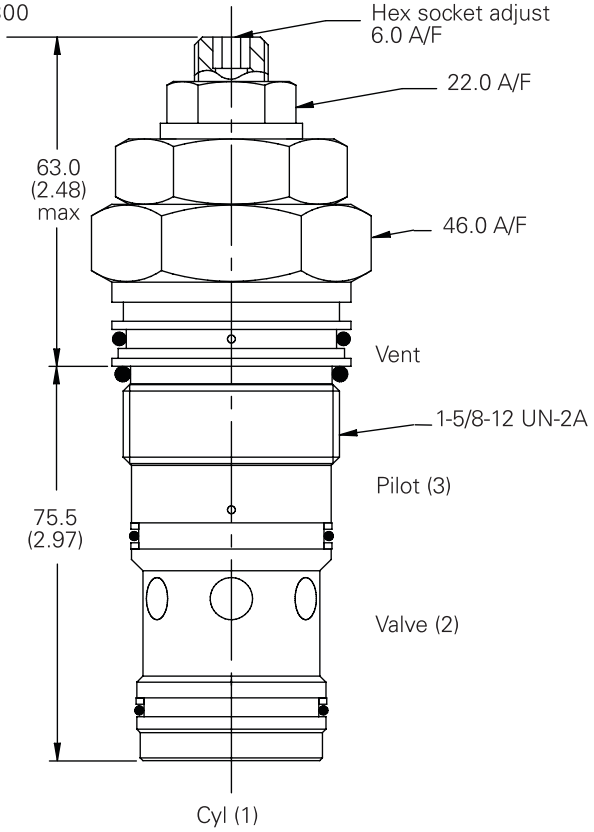
**3** - 3:1 - (Standard)

**8** - 8:1

## Dimensions

mm (inch)

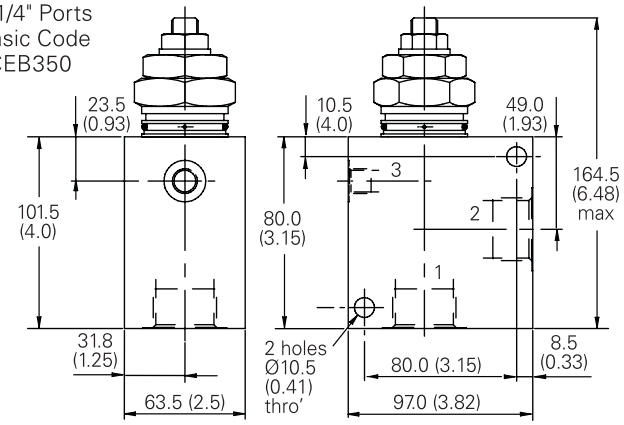
**Cartridge only**
Basic Code
1CEB300



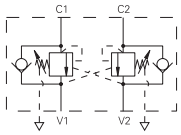

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

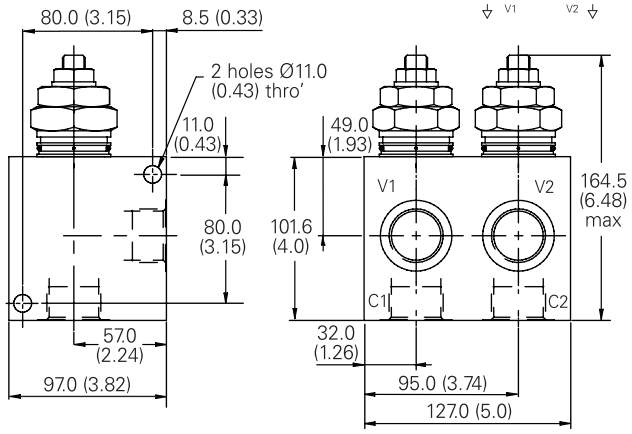
**Note:** For applications above 210 bar - please consult our technical department or use the steel body option.

**Single valve**
1 1/4" Ports
Basic Code
1CEB350




**Dual valve**
1 1/4" Ports
Basic Code 1CEEB350
Internally Cross Piloted



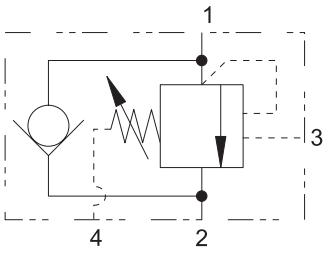

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



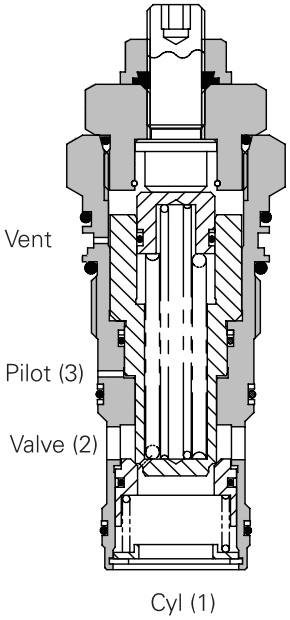
F

# 1CEBD300 - Overcenter valve

Fully balanced, pilot assisted relief with check
300 L/min (80 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They prevent runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced valve is unaffected by back pressure, allowing service line reliefs to operate and for the valve to be used in regenerative or proportional valve systems.

The overcenter valve should be mounted either into, onto or as close to the actuator as possible to give maximum protection.

Single overcenter valves control unidirectional loads such as in aerial platforms, cranes or winches and dual overcenters are suited to bi-directional motion such as wheel motor applications or cylinders going over center.

## Operation

"The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time.

## Pilot ratio

3:1 Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

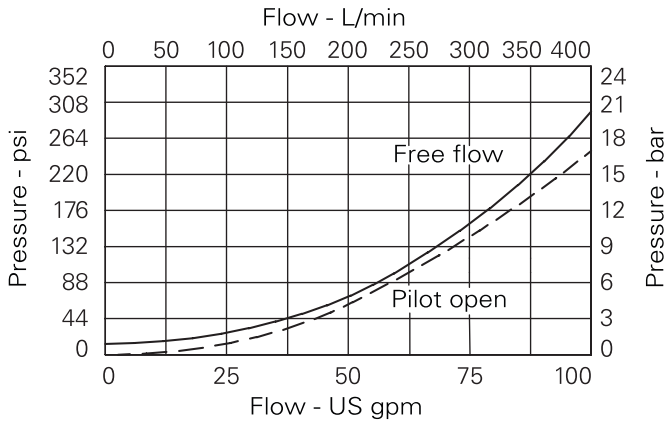
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 300 L/min (80 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity | A13098 (See Section M) |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight cartridge only | 0.91 kg (2.00 lbs) |
| Seal kit | SK686 (Nitrile)<br>SK686V (Viton®)<br>SK686P (Polyurethane Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 4 milliliters/min (60 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

**Pressure drop**




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBD300 - Overcenter valve

Fully balanced, pilot assisted relief with check
300 L/min (80 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEBD300 – F – 35 S 3**

1 2 3 4 5

**1 Basic Code**

**1CEBD300** - Cartridge only

**2 Adjustment**

**F** - Screw adjustment

**3 Pressure range @4.8 L/min**

**Note:** Code based on pressure in bar.

**35** - 70-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min

**4 Seals**

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

**P** -Polyurethane/Nitrile (For arduous applications)

**5 Pilot ratio**

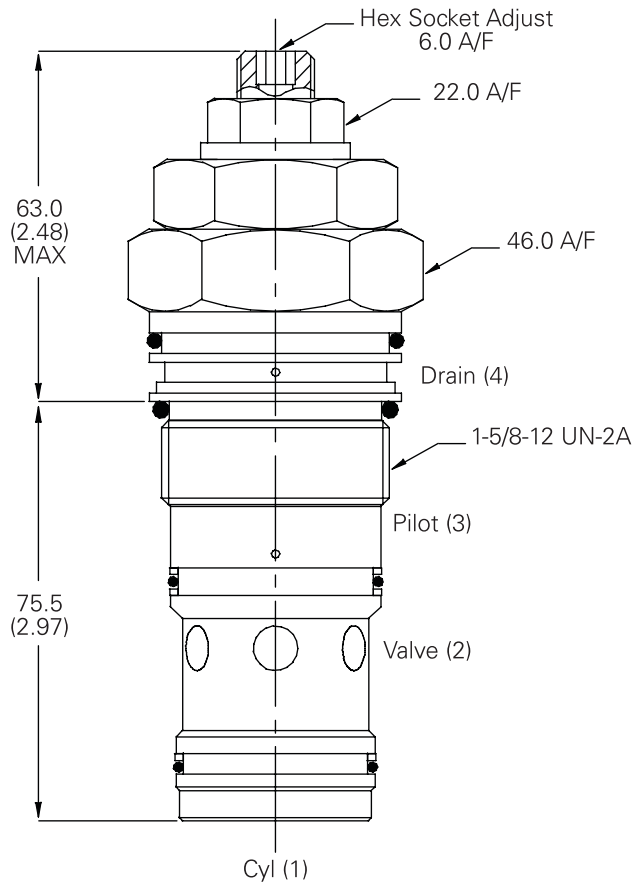
**3** - 3:1 - (Standard)

**8** - 8:1

## Dimensions

mm (inch)

**Cartridge only**
Basic Code
1CEBD300




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

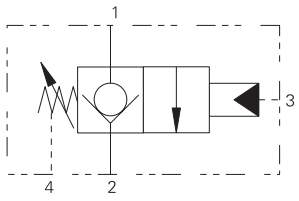
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CPBD300 - Overcenter valve

Zero differential with check
300 L/min (80 USgpm) • 400 bar (5800 psi)




## Operation

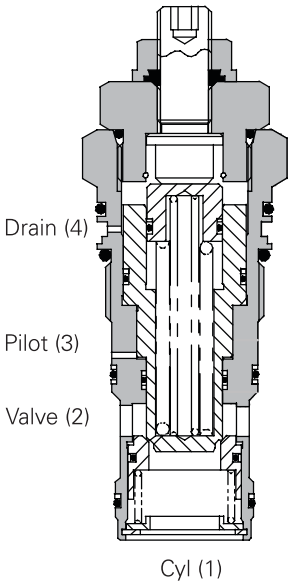
The check section allows free flow into the actuator then holds and locks the load against movement. By the application of pilot pressure to the pilot port the poppet moves back against the main spring opening the cylinder port to the valve port. The metering characteristic of the valve is controlled by the rate of the spring, the seat angle and the pilot pressure applied.

Due to the balanced poppet design load induced pressure will not open the valve and once open valve port pressure will not increase the pilot pressure required to keep the valve open.

## Features

The cartridge fits a simple cavity allowing quick, easy field service reducing down time. Hardened poppet and seat provide for long leak free performance.

## Sectional view




## Description

Zero differential overcenter valves give static and dynamic control of loads by supplying a restriction to flow related to the opening of the valve created by the pilot pressure.

The valve is used in conjunction with a remote pilot source to provide hose failure protection, load control and load holding functions.

If over-pressure or shock pressure protection is required then a separate relief valve should be used.

The drain line allows the valve to be used in corrosive atmospheres preventing the ingress of atmospheric contaminant.

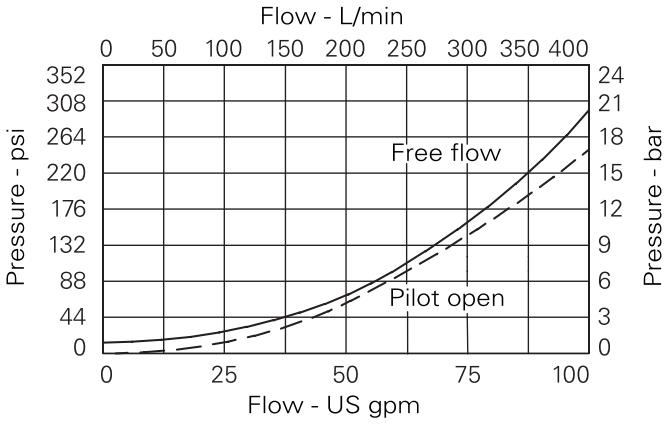
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 300 L/min (80 USgpm) |
| Max working pressure | 400 bar (5800 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity | A13098 (See Section M) |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight cartridge only | 0.91 kg (2.00 lbs) |
| Seal kit | SK971 (Nitrile)<br>SK971V (Viton®)<br>SK971P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 4 milliliters/min nominal (60 dpm) |
| Nominal viscosity range | 5 to 500 cSt |
| Bar per turn | 5 bar |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPBD300 - Overcenter valve

Zero differential with check
300 L/min (80 USgpm) • 400 bar (5800 psi)

**Model code**

**1CPBD300 F 2 P**

1 2 3 4

**1 Function**
**1CEBD300** - Cartridge only

**2 Adjustment**
**F** - Screw adjustment

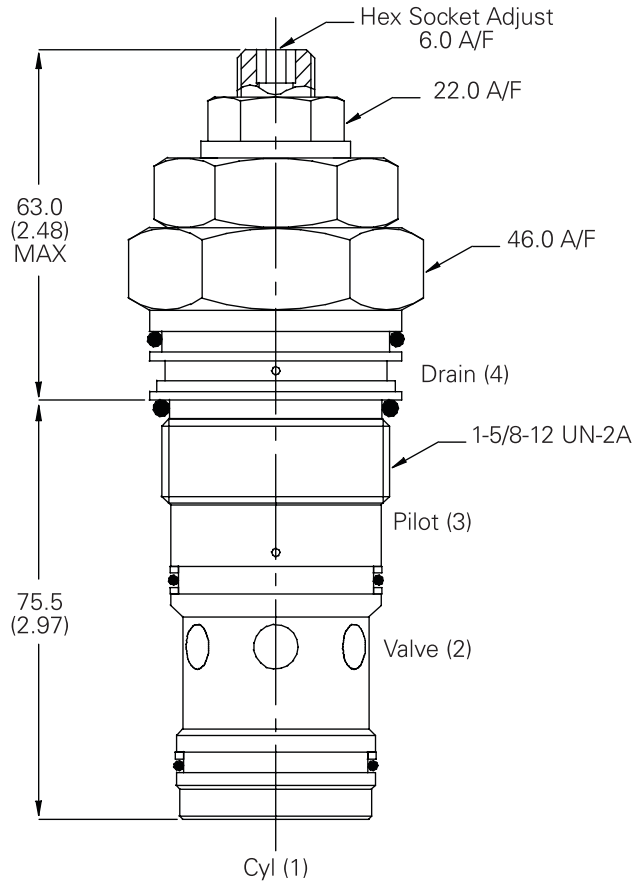
**3 Pilot adjust range**
**Note:** Code based on pressure in bar.
**2** - 5-20 bar. Std setting 10 bar
Std setting made at 4.8 L/min

**4 Seal material**
**S** - Nitrile (For use with most industrial hydraulic oils)
**SV** -Viton® (For high temperature and most special fluid applications)
**P** -Polyurethane/Nitrile (For arduous applications)

## Dimensions

mm (inch)

**Cartridge only**
Basic Code
1CPBD300

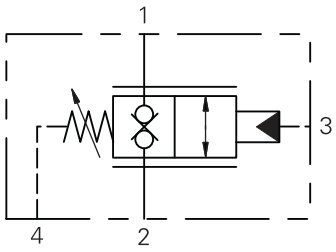



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPPD300 - Piloted Bi-directional poppet valve

Poppet, pilot operated, normally closed, zero differential
300 L/min (80 USgpm) • 350 bar (5000 psi)




## Operation

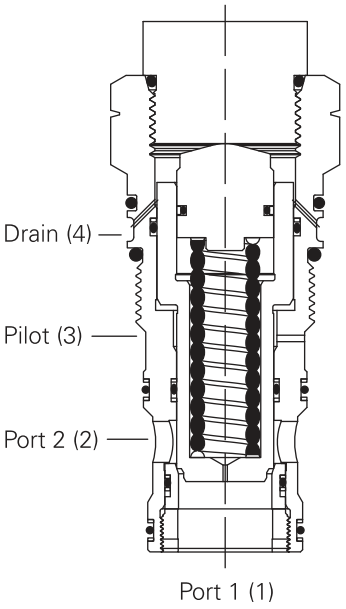
By the application of pilot pressure to the pilot port the poppet moves back against the main spring opening. The metering characteristic of the valve is controlled by the rate of the spring, the seat angle and the pilot pressure applied.

Due to the balanced poppet design load induced pressure will not open the valve and once open valve port pressure will not increase the pilot pressure required to keep the valve open.

## Features

The cartridge fits a simple cavity allowing quick, easy field service reducing down time. Hardened poppet and seat provide for long leak free performance.

## Sectional view




## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 300 L/min (80 USgpm) |
| Max working pressure | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces Nickel / Zinc plated. |
| Mounting position | Unrestricted |
| Cavity | A13098 (See Section M) |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight cartridge only | 1.02 kg (2.25 lbs) |
| Seal kit | SK1454 (Nitrile)<br>SK1454V (Viton®)<br>SK1454P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 4 milliliters/min nominal (60 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

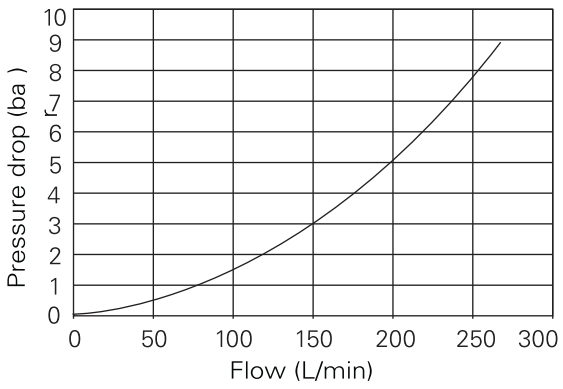
Viton is a registered trademark of E.I. DuPont.

## Description

Normally closed pilot operatedzero differential bi directional poppet valve providing flow control by application of pilot pressure to actuate the poppet and increase the flow path

Balanced construction ensures predictable switching regardless of pressure in port 1 or 2. The drain line allows the valve to be used in corrosive atmospheres preventing the ingress of atmospheric contamination.

**Pilot open pressure drop - both directions**




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CPPD300 - Piloted Bi-directional poppet valve

Poppet, pilot operated, normally closed, zero differential
300 L/min (80 USgpm) • 350 bar (5000 psi)

**Model code**

**1CPPD300** **N** **2** **P**

1 2 3 4

**1 Function**

**1CPPD300** - Cartridge only

**2 Adjustment**

**N** - Fixed - State pressure setting required

**3 Pilot pressure**

**Note:** Code based on pressure in bar.

**2** - 14 bar.

Std setting made at 4.8 L/min

**4 Seal material**

**S** - Nitrile (For use with most industrial hydraulic oils)

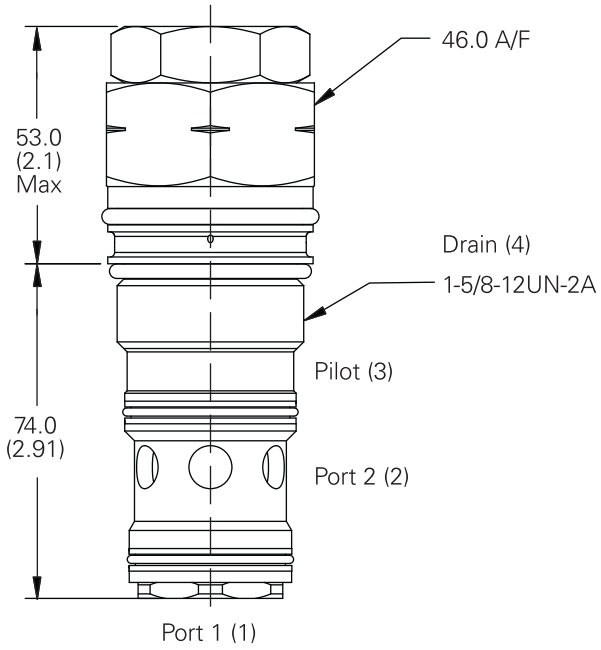
**SV** -Viton® (For high temperature and most special fluid applications)

**P** -Polyurethane/Nitrile (For arduous applications)

## Dimensions

mm (inch)

**Cartridge only**
Basic Code
1CPPD300




F

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

**Model code**

1CE**** | F | 10W | 35 | S | 3
1 | 2 | 3 | 4 | 5 | 6

## 1 Function

**1CE356** - Cartridge and Body Through Ported

**1CEG350** - Cartridge and Body Gasket Mounted

## 2 Adjustment

**F** - Screw adjustment

## 3 Port size - bodied valves only

| Code | Port size | Housing number | |
|---|---|---|---|
| 1CE356 Through Ported, Body Only | | **Aluminium** | **Steel** |
| **10W** | 1 1/4" BSP Valve & Cyl Port 1/4" BSP Pilot Port | C13637 | C13638 |
| 1CEG356 Gasket Mounted, Sub Assembly | | | |
| **10W** | 1 1/4" BSP Valve & Cyl Port 1/4" BSP Pilot Port | CXP20647-10W-S | CXP20647-10W-S-377 |

## 4 Pressure range

**Note:** Code based on pressure in bar.

**35** - 70-350 bar.
Std setting 210 bar
(10:1): 100-210 bar

Std setting made at 4.8 L/min

## 5 Seal material

**S** - Buna-N

**SV** - Viton

## 6 Pilot ratio

**3** - 3:1 - (Standard)

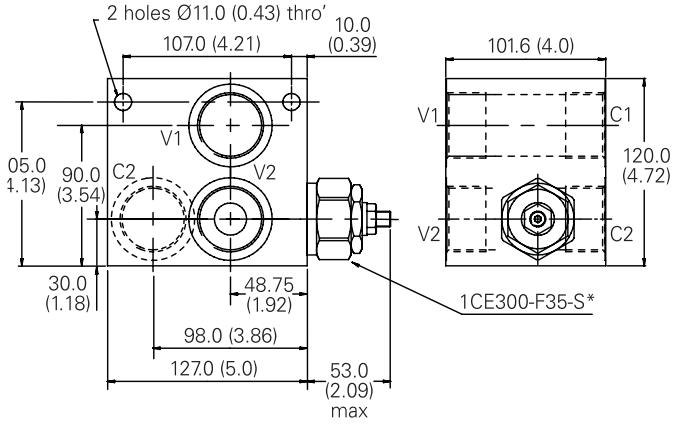
**8** - 8:1

F

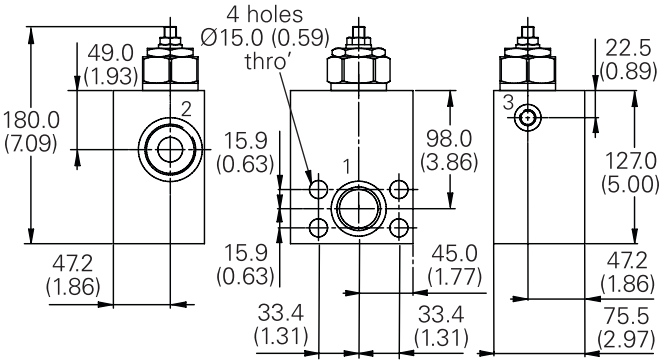
## Dimensions

mm (inch)

**Complete valve - through ported**
1 1/4" Ports
Basic Code
1CE356




**Complete valve - gasket mounted**
1 1/4" Ports
Basic Code
1CEG350



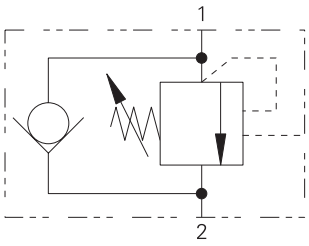

**Note:** For applications above 210 bar - please consult our technical department or use the steel body option.

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

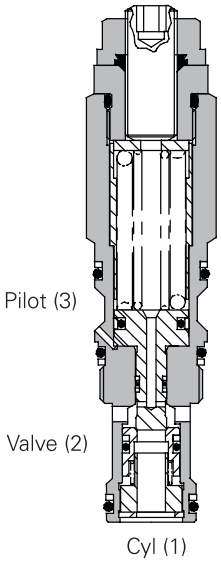
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SE30 - Overcenter valve

Pilot assisted relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

2.5:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

5:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

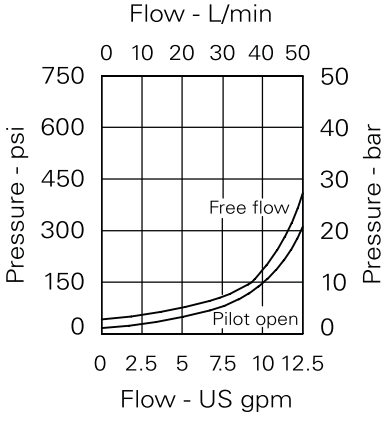
10:1 Best suited for applications where the load remains relatively constant.

## Performance data

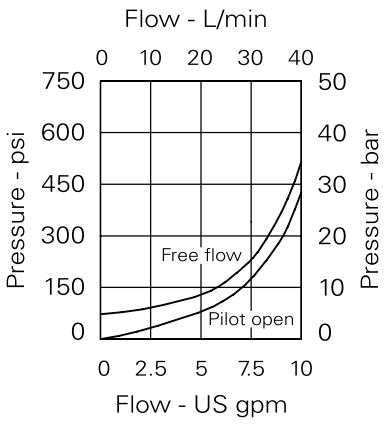
**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20090-T11A |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 0.15 kg (0.33 lbs) |
| Seal kit number | SK1079 (Nitrile) SK1079V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

## Pressure drop




2:5:1 and 5:1 version




10:1 version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SE30 - Overcenter valve

Pilot assisted relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1SE30 – F – 35 S 5**

1 2 3 4 5

## 1 Function

**1SE30**

## 2 Adjustment means

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Pressure range

**Note:** Code based on pressure in bar.h

**20** - (All pilot ratios):
70-225 bar.
Std setting 100 bar

**35** -(2.5:1 and 5:1): 70-350 bar.
Std setting 210 bar
(10:1): 90-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min
Other pressure ranges available on request

## 4 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton
(For high temperature and most special fluid applications)

## 5 Pilot ratio

**2** - 2.5:1

**5** - 5:1

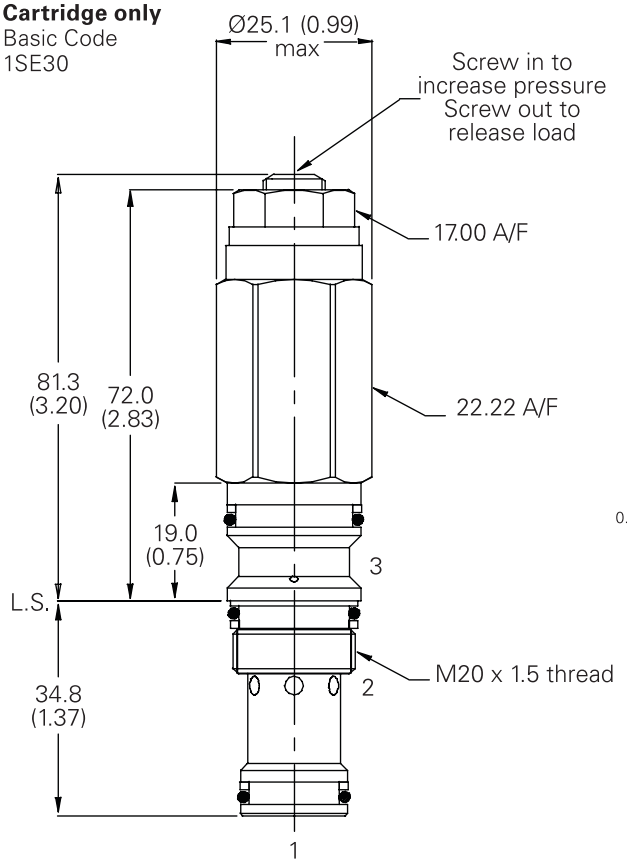
**10** - 10:1

F

## Dimensions

mm (inch)

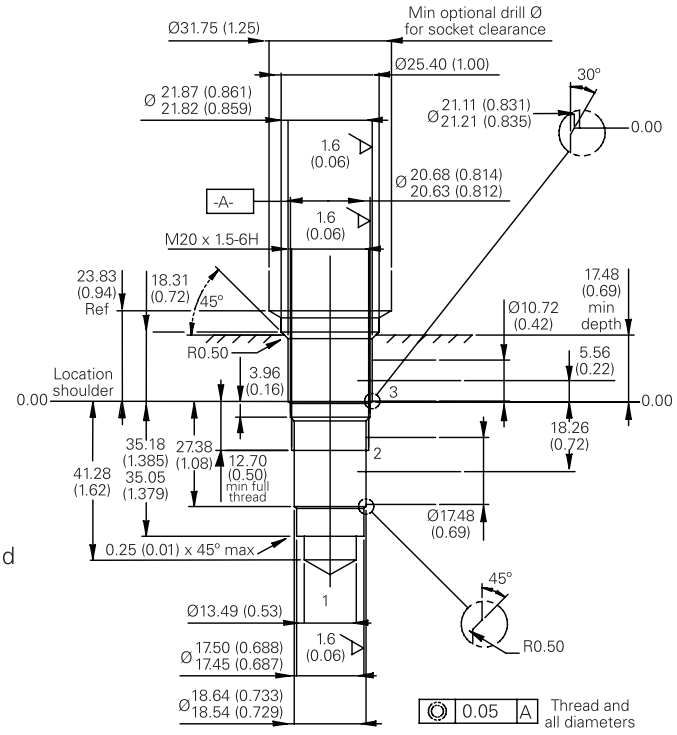
**Cartridge only**
Basic Code
1SE30




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Cavity**

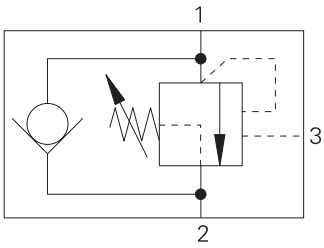
| | |
|---|---|
| Model | A20090- |
| T11A | Form Drill |
| TD-11A | |
| Form Reamer | TD-11A |



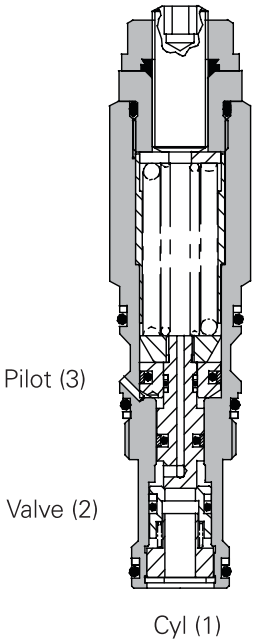

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SER30 - Overcenter valve

Part balanced, pilot assisted relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

The 1SER series overcenter valve performs all duties of a regular overcenter but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed center directional valve which has service line reliefs. The poppet is pressure balanced, preventing relief setting increase due to back pressure.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

Pilot Pressure =

$$\frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

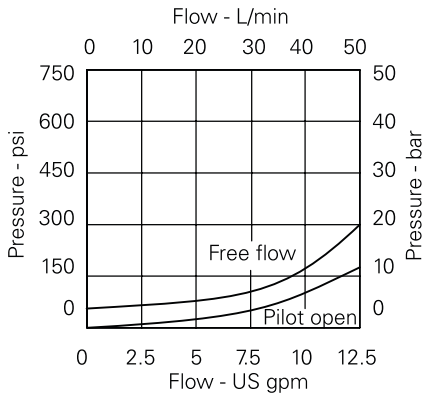
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20090-T11A |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 0.15 kg (0.33 lbs) |
| Seal kit number | SK1079 (Nitrile)<br>SK1079V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SER30 - Overcenter valve

Part balanced, pilot assisted relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1SER30 – F – 35 S 4**
1 2 3 4 5

## 1 Function

**1SER30**

## 2 Adjustment means

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 75-350 bar
Std setting 210 bar
Std setting made at 4.8 L/min

## 4 Seals

**S** - Nitrile
(For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

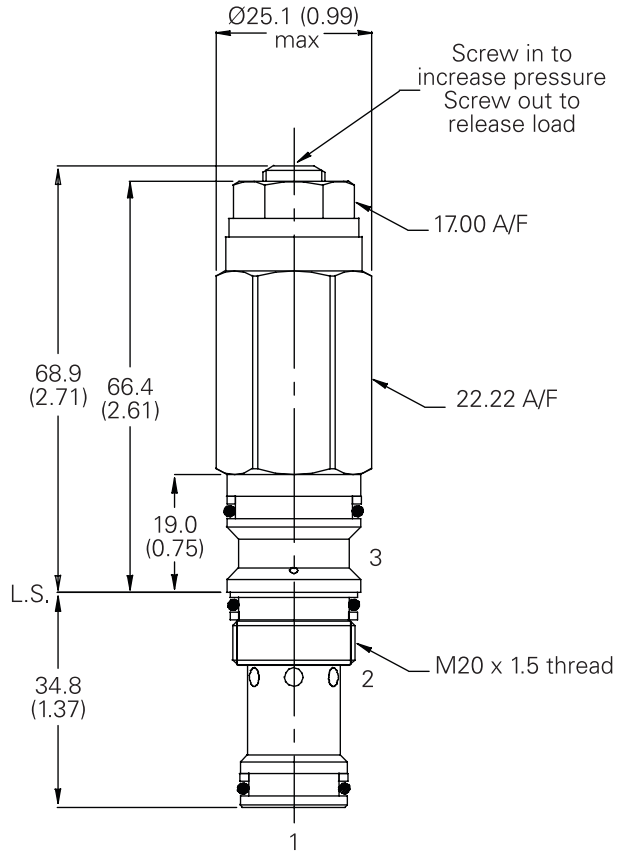
## 5 Pilot ratio

**4** - 4:1

## Dimensions

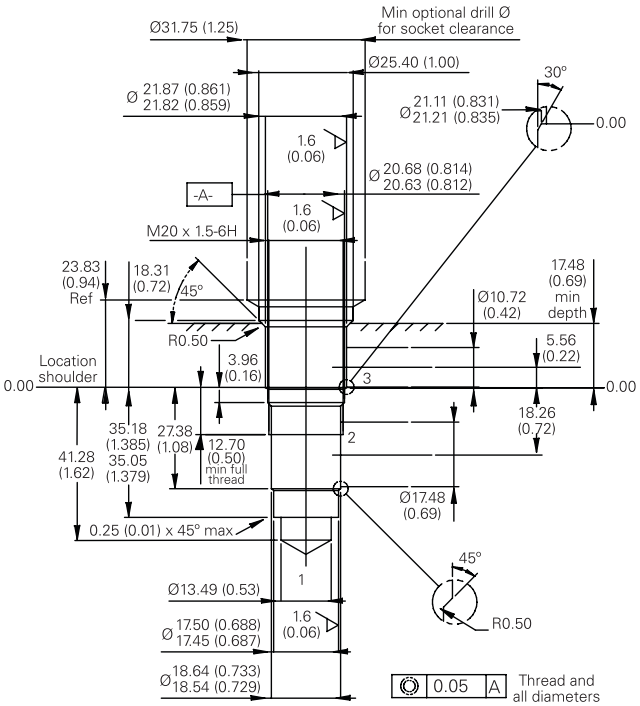
mm (inch)

**Cartridge only**
Basic Code
1SER30




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

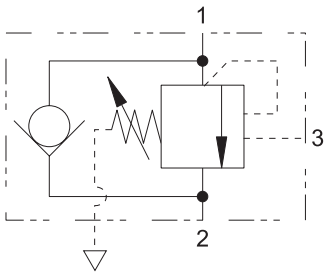
**Cavity**
Model A20090-T11A
Form Drill TD-11A
Form Reamer TR-11A



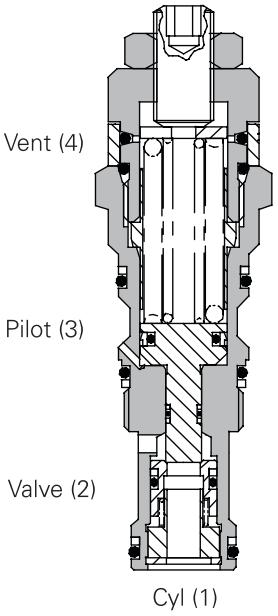

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEB30 - Overcenter valve

Fully balanced, pilot assisted relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They prevent runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced valve is unaffected by back pressure, allowing service line reliefs to operate and for the valve to be used in regenerative or proportional valve systems.

The overcenter valve should be mounted either into, onto or as close to the actuator as possible to give maximum protection.

Single overcenter valves control unidirectional loads such as in aerial platforms, cranes or winches and dual overcenters are suited to bi-directional motion such as wheel motor applications or cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

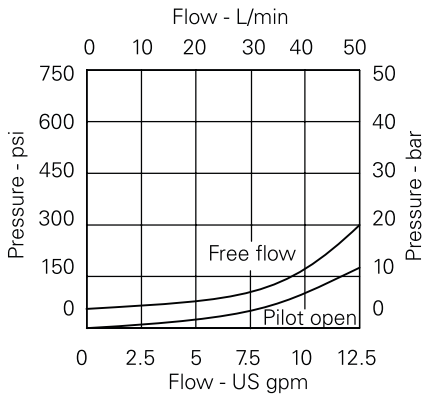
5:1

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40˚C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20090-T11A |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 0.14 kg (0.30 lbs) |
| Seal kit number | SK1079 (Nitrile)<br>SK1079V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEB30 - Overcenter valve

Fully balanced, pilot assisted relief with check
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1SEB30 – F – 35 S 5**

1 2 3 4 5

## 1 Function

**1SEB30**

## 2 Adjustment means

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 75-350 bar
Std setting 210 bar

Std setting made at 4.8 L/min

## 4 Seals

**S** - Nitrile
(For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 5 Pilot ratio

**5** - 5:1

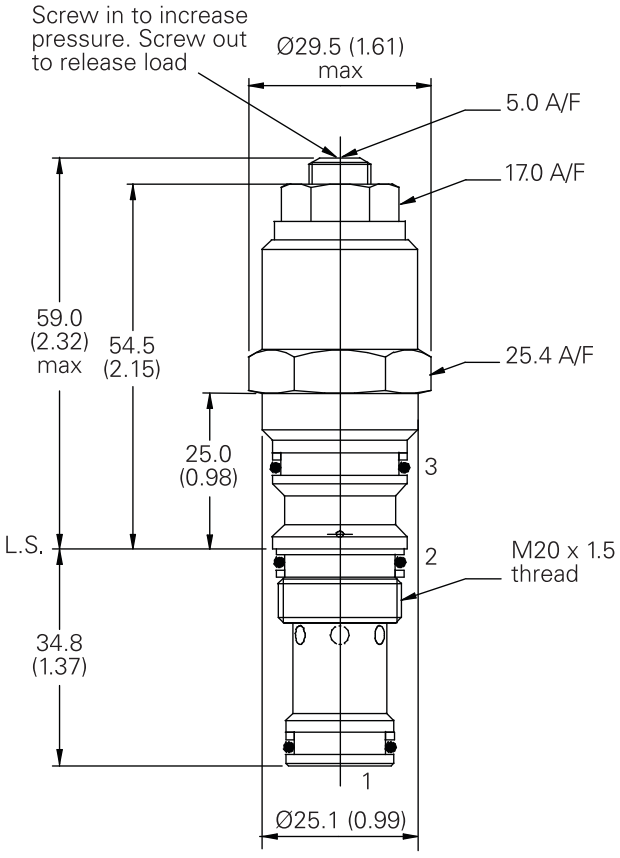
## Dimensions

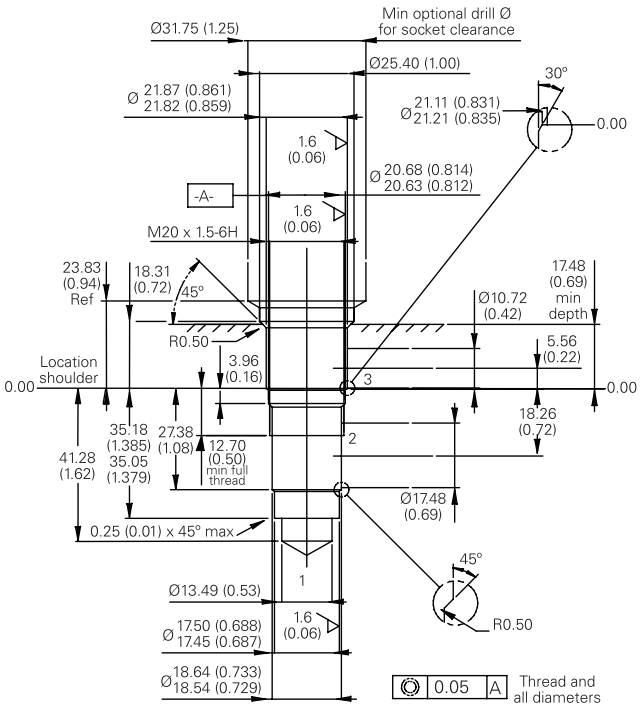
mm (inch)

**Cartridge only**
Basic Code
1SEB30

**Cavity**

| | |
|---|---|
| Model | A20090-T11A |
| Form Drill | TD-11A |
| Form Reamer | TR-11A |



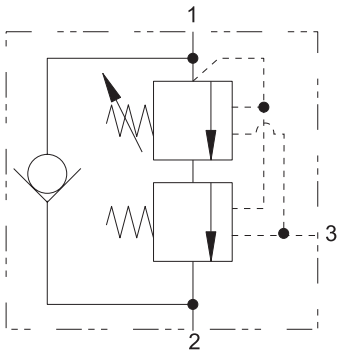




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEL30 - Overcenter valve

Counterbalanced, pilot assisted relief with check
30 L/min (8 USgpm) • 380 bar (5510 psi)




## Operation

The check section allows free flow and then locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied, maintaining a counterbalance pressure to prevent initial pressure loss and therefore instability. The total pressure setting will normally be set at 1.3 times the load induced pressure. The counterbalance pressure reduces as the pilot pressure increases.

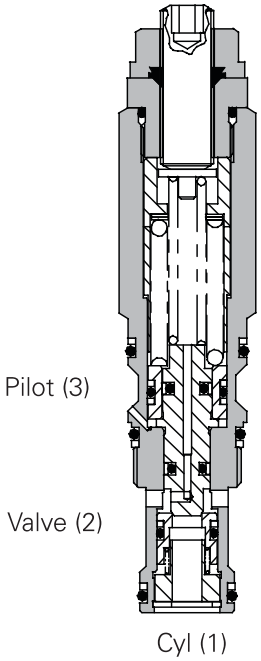
## Features

Cartridge is economical and fits simple cavity.
Allows quick, easy field service - reduces down time.
Interchangeable with pilot check valve of a similar size.

## Pilot ratio

Primary 4.3:1
Secondary 0.4:1

## Sectional view




## Performance data

**Ratings and specifications**

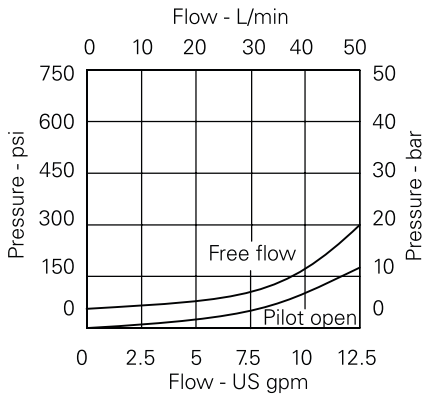
| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max setting | 380 bar (5510 psi) |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20090-T11A |
| Torque cartridge into cavity | 45 Nm (33 lbs ft) |
| Weight | 0.15 kg (0.33 lbs) |
| Seal kit number | SK1079 (Nitrile)  SK1079V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Description

The 1SEL overcenter valve performs all duties of a regular overcenter but maintains a counterbalance pressure to provide dampening of cylinders when there is a rapid loss in stored pressure. This counterbalance pressure reduces as the pilot pressure increases. Typical applications include extension cylinders on telescopic handlers where it is important to have a smooth operation when retracting from full extension.

## Pressure drop




**Note:** This valve has been designed to eliminate instability from flexible boom applications or where the load induced pressure varies greatly. To get the best results, the settings should be adjusted for each application and then factory set for porduction quantities. Please contact our Technical Department for more information.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEL30 - Overcenter valve

Counterbalanced, pilot assisted relief with check
30 L/min (8 USgpm) • 380 bar (5510 psi)

**Model code**

**1SEL30 – F – 30 S 230 / 50**

1 2 3 4 5 6

## 1 Function
**1SEL30**

## 2 Adjustment means counterbalance setting
**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Pressure range @ 4.8 L/min
**Note:** Code based on pressure in bar.

**20** - 170-300 bar Std setting 220 bar (170/50)

**30** - 240-370 bar Std setting 280 bar (230/50)

**40** - 270-380 bar Std setting 350 bar (300/50)

Std setting at 4.8 L/min

## 4 Seals
**S -** Nitrile (For use with most industrial hydraulic oils)

**SV -** Viton (For high temperature and most special fluid applications)

## 5 High pressure setting bar
(10 bar increments)

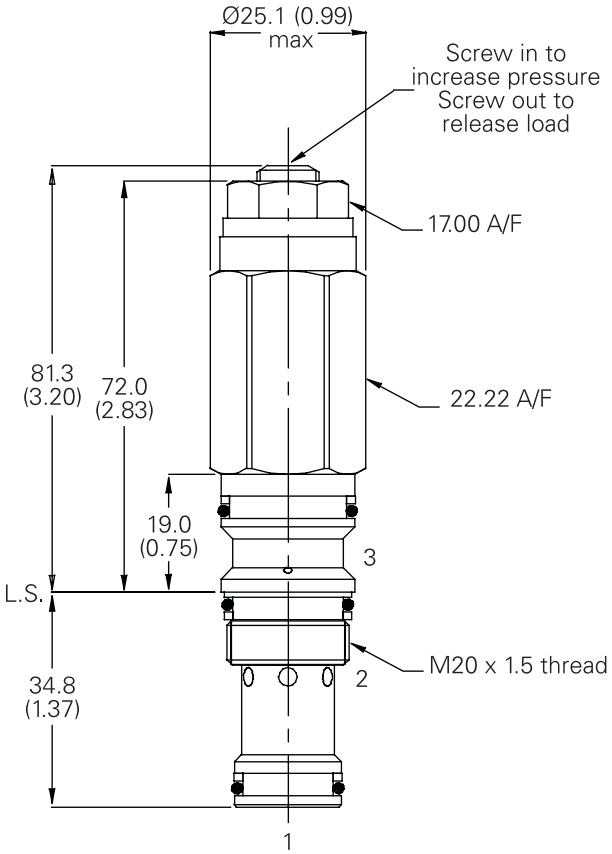
130 to 310 bar (2175 to 5000 psi)

## 6 Counterbalance setting bar
(10 bar increments)
20 to 120 bar (300 to 1740 psi)

## Dimensions
mm (inch)

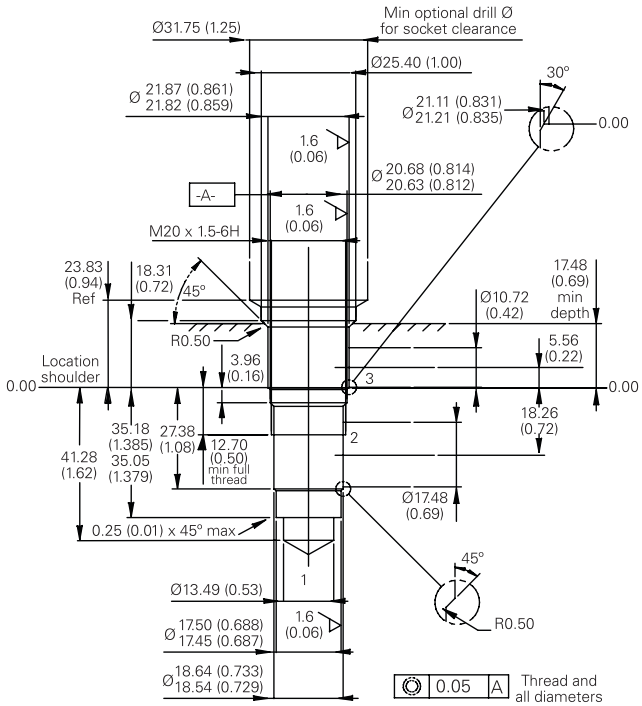
F

### Cartridge only
Basic Code
1SEL30




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

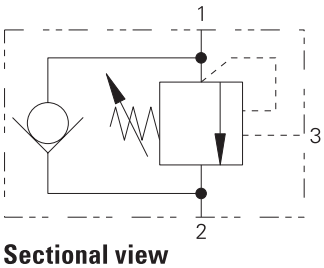
### Cavity
| | |
|---|---|
| Model | A20090-T11A |
| Form Drill | TD-11A |
| Form Reamer | TR-11A |



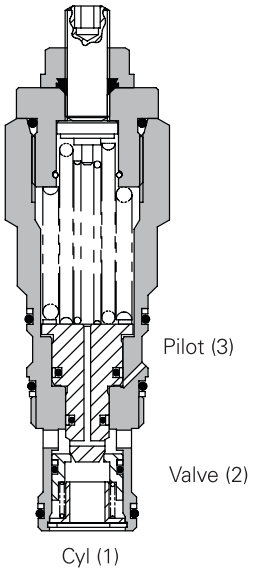

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SE90 - Overcenter valve

Pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where the load remains relatively constant.

Other ratios available on request.

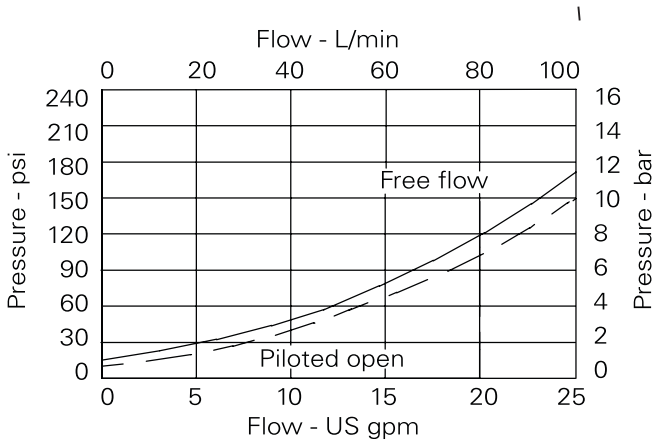
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure: | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20092-T2A |
| Torque cartridge into cavity | 60 Nm (44 lbs ft) |
| Weight | 0.42 kg (0.92 lbs) |
| Seal kit number | SK1093 (Nitrile) SK1093V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SE90 - Overcenter valve

Pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)

**Model code**

**1SE90 – F – 35 S 4**

1 2 3 4 5

## 1 Function

**1SE90**

## 2 Adjustment means

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 70-225 bar
Std setting 100 bar

**35** - 200-350 bar
Std setting 210 bar

Std setting made at 4.8 L/min

## 4 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 5 Pilot ratio

**4** - 4:1

**8** - 8:1

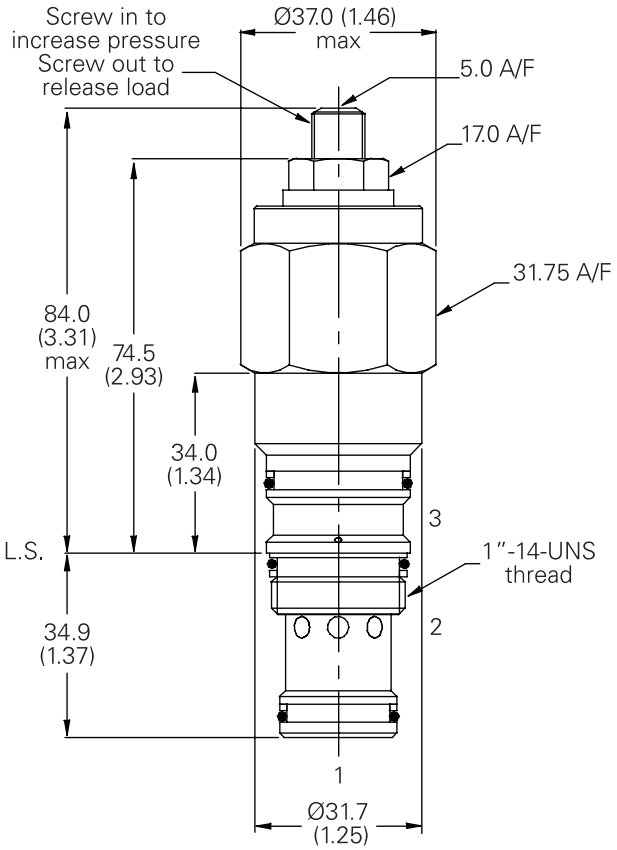
Other ratios available upon request

## Dimensions

mm (inch)

F

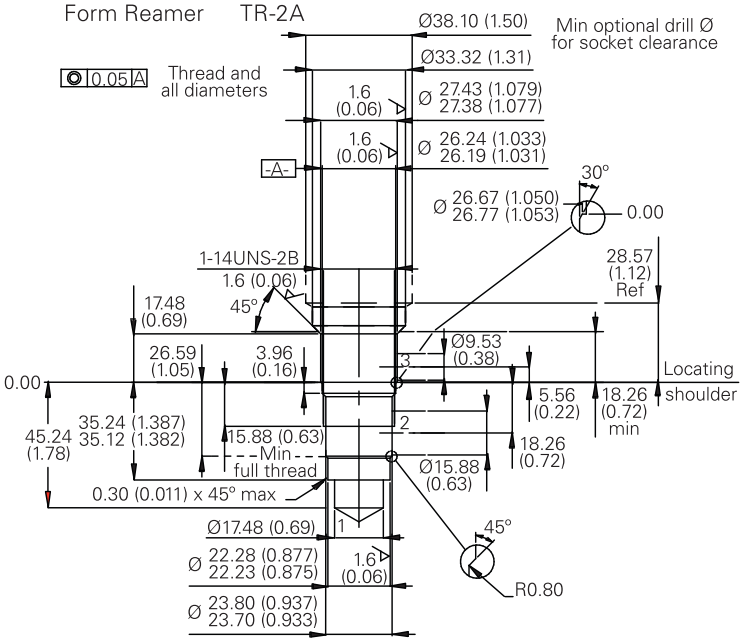
**Cartridge only**
Basic code
1SE90




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Cavity**

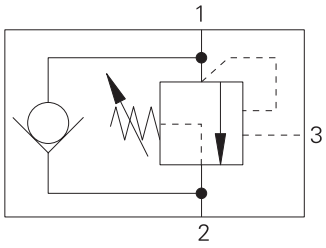
| | |
|---|---|
| Model | A20092-T2A |
| Form Drill | TD-2A |
| Form Reamer | TR-2A |



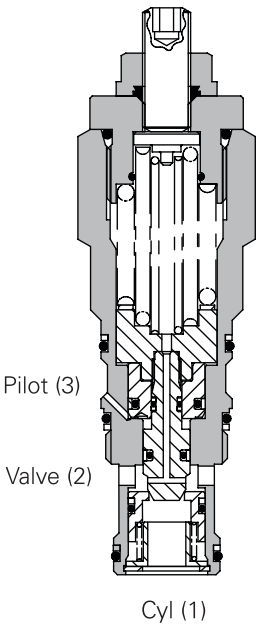

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SER90 - Overcenter valve

Part balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)




## Sectional view




## Description

The 1SER series overcenter valve performs all duties of a regular overcenter but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed center directional valve which has service line reliefs. The poppet is pressure balanced, preventing relief setting increase due to back pressure.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where the load remains relatively constant.

Other ratios available on request.

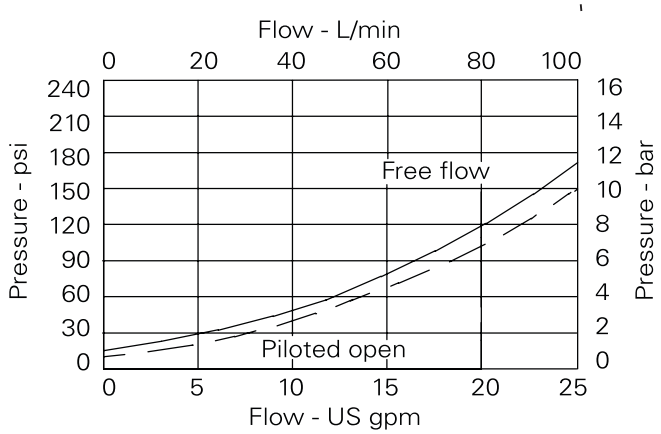
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure: | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20092-T2A |
| Torque cartridge into cavity | 60 Nm (44 lbs ft) |
| Weight | 0.42 kg (0.92 lbs) |
| Seal kit number | SK1093 (Nitrile) SK1093V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SER90 - Overcenter valve

Part balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)

**Model code**

**1SER90 – F – 35 S 4**

1 2 3 4 5

## 1 Function

**1SER30**

## 2 Adjustment means

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 70-225 bar
Std setting 100 bar

**35** - 70-350 bar
Std setting 210 bar

Std setting made at 4.8 L/min

## 4 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 5 Pilot ratio

**4** - 4:1

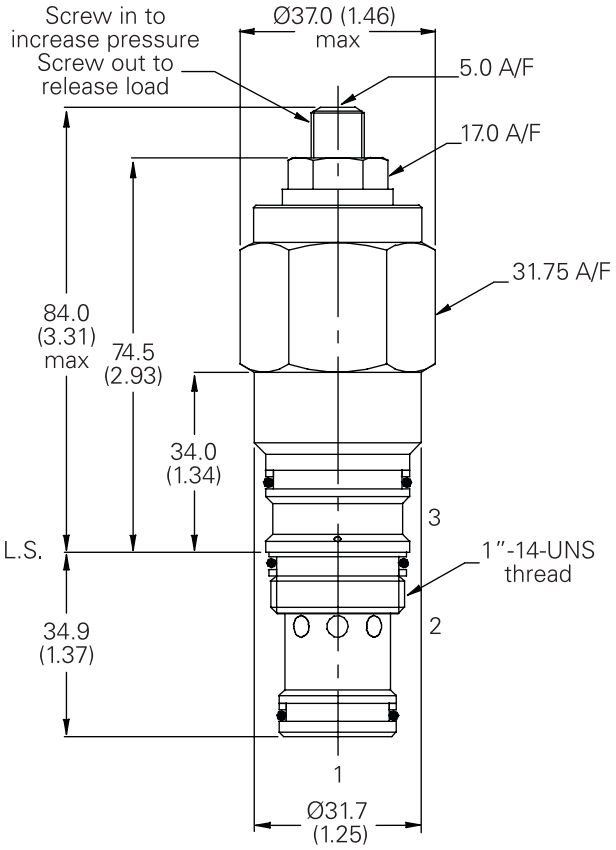
Other ratios available upon request

## Dimensions

mm (inch)

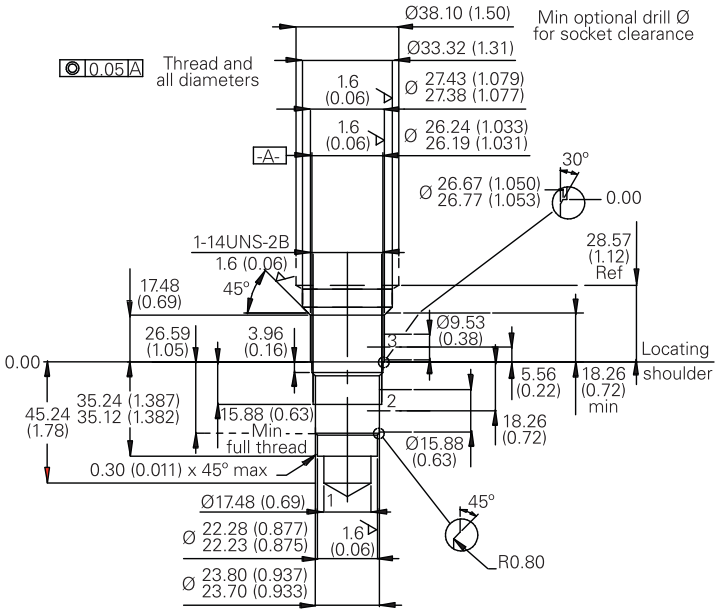
**Cartridge only**
Basic Code

1SER90




**Cavity**

| | |
|---|---|
| Model | A20092-T2A |
| Form Drill | TD-2A |
| Form Reamer | TR-2A |

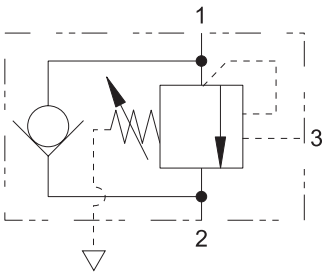



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

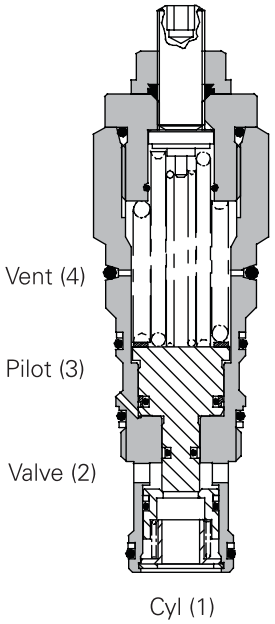
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEB90 - Overcenter valve

Fully balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)




**Sectional view**




## Description

Overcenter valves give static and dynamic control of loads by supplying a counterbalance pressure to the actuator. They prevent runaway in the event of hose burst and hold the load with minimal leakage.

The pressure balanced valve is unaffected by back pressure, allowing service line reliefs to operate and for the valve to be used in regenerative or proportional valve systems.

The overcenter valve should be mounted either into, onto or as close to the actuator as possible to give maximum protection.

Single overcenter valves control unidirectional loads such as in aerial platforms, cranes or winches and dual overcenters are suited to bi-directional motion such as wheel motor applications or cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows

Pilot Pressure =

$$\frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Feature

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where the load remains relatively constant.

Other ratios available on request.

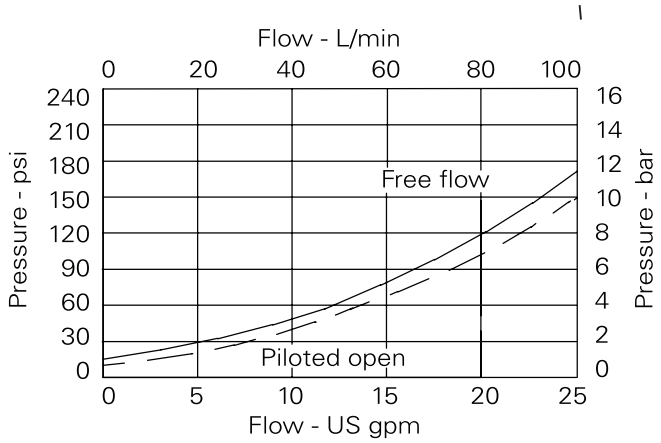
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max relief setting | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20092-T2A |
| Torque cartridge into cavity | 60 Nm (44 lbs ft) |
| Weight | 0.42 kg (0.92 lbs) |
| Seal kit number | SK1096 (Nitrile) SK1096V (Viton) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operating temperature | -30°C to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEB90 - Overcenter valve

Fully balanced, pilot assisted relief with check
90 L/min (23 USgpm) • 270 bar (4000 psi)

**Model code**

**1SEB90 – F – 35 S 4**

1 2 3 4 5

## 1 Basic code

**1SEB90**

## 2 Adjustment means

**F** - Screw Adjustment

**N** -Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Pressure range

**Note:** Code based on pressure in bar.

**20** - 70-225 bar.
Std setting 100 bar

**35** - 75-350 bar.
Std setting 210 bar
Std setting made at 4.8 L/min

## 4 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 5 Pilot ratio

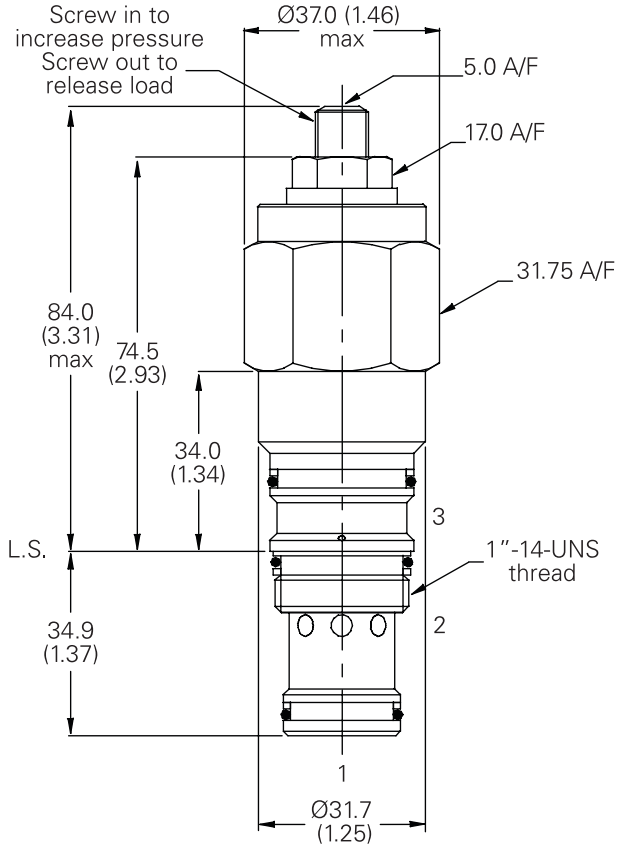
**4** - 4:1

Other ratios available upon request

## Dimensions

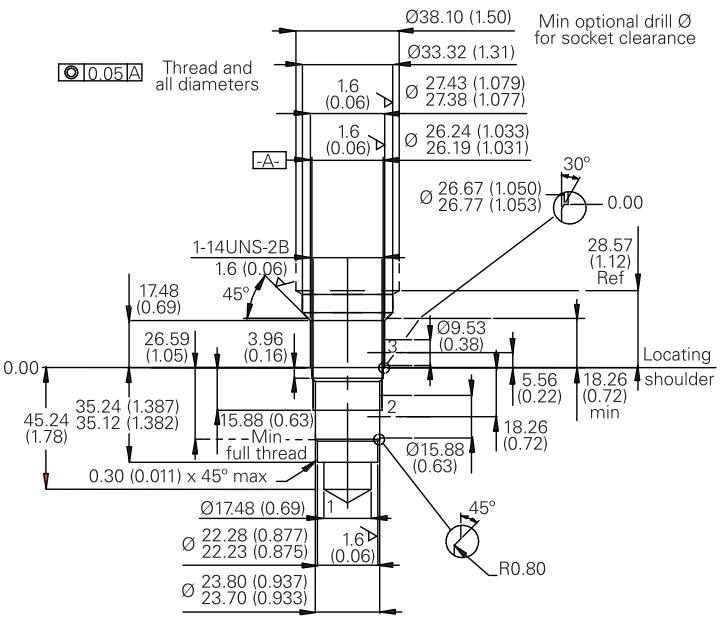
mm (inch)

**Cartridge only**
Basic Code
1SEB90




**Cavity**

| | |
|---|---|
| Model | A20092-T2A |
| Form Drill | TD-2A |
| Form Reamer | TR-2A |

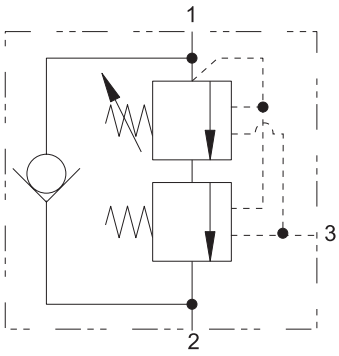



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEL90 - Overcenter valve

Counterbalance, pilot assisted relief with check
90 L/min (23 USgpm) • 380 bar (5510 psi)




## Operation

The check section allows free flow and then locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied, maintaining a counterbalance pressure to prevent initial pressure loss and therefore instability. The total pressure setting will normally be set at 1.3 times the load induced pressure. The counterbalance pressure reduces as the pilot pressure increases.

## Features

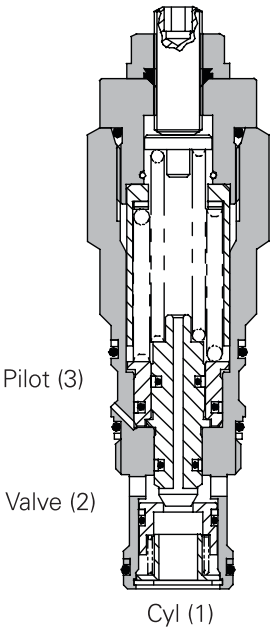
Cartridge is economical and fits simple cavity.
Allows quick, easy field service - reduces down time.
Interchangeable with pilot check valve of a similar size.

## Pilot ratio

Primary 5.6:1

Secondary 0.7:1

## Sectional view




## Performance data

**Ratings and specifications**

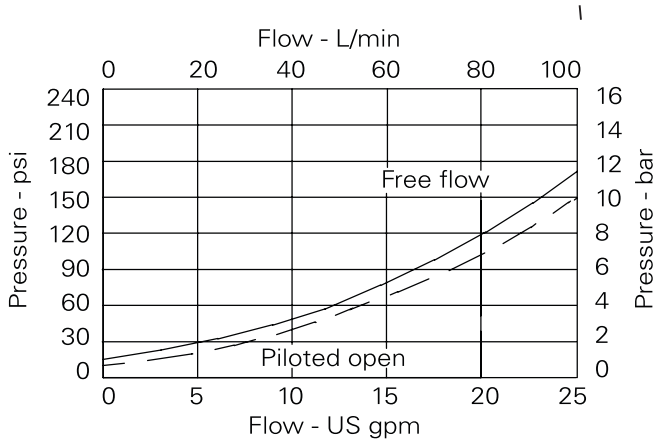
| *Figures based on: Oil Temp = 40˚C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (23 USgpm) |
| Max setting | 380 bar (5510 psi) |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20092-T2A |
| Torque cartridge into cavity | 60 Nm (44 lbs ft) |
| Weight | 0.42 kg (0.92 lbs) |
| Seal kit number | SK1093 (Nitrile) SK1093V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operation temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Description

The 1SEL overcenter valve performs all duties of a regular overcenter but maintains a counterbalance pressure to provide dampening of cylinders when there is a rapid loss in stored pressure. This counterbalance pressure reduces as the pilot pressure increases. Typical applications include extension cylinders on telescopic handlers where it is important to have a smooth operation when retracting from full extension.

## Pressure drop




**Note:** This valve has been designed to eliminate instability from flexible boom applications or where the load induced pressure varies greatly. To get the best results, the settings should be adjusted for each application and then factory set for porduction quantities. Please contact Technical Department for more information.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEL90 - Overcenter valve

Counterbalance, pilot assisted relief with check
90 L/min (23 USgpm) • 380 bar (5510 psi)

**Model code**

**1SEL90 – F – 30 S 220 60**

1 2 3 4 5 6

### 1 Function
**1SEL90 -**

### 2 Adjustment means counterbalance setting
**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

### 3 Pressure range @ 4.8 L/min
**Note:** Code based on pressure in bar.

**20** - 170-350 bar
Std setting 220 bar (160/60)

**35** - 210-380 bar
Std setting 250 bar (220/60)

Std setting made at 4.8 L/min

### 4 Seals
**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

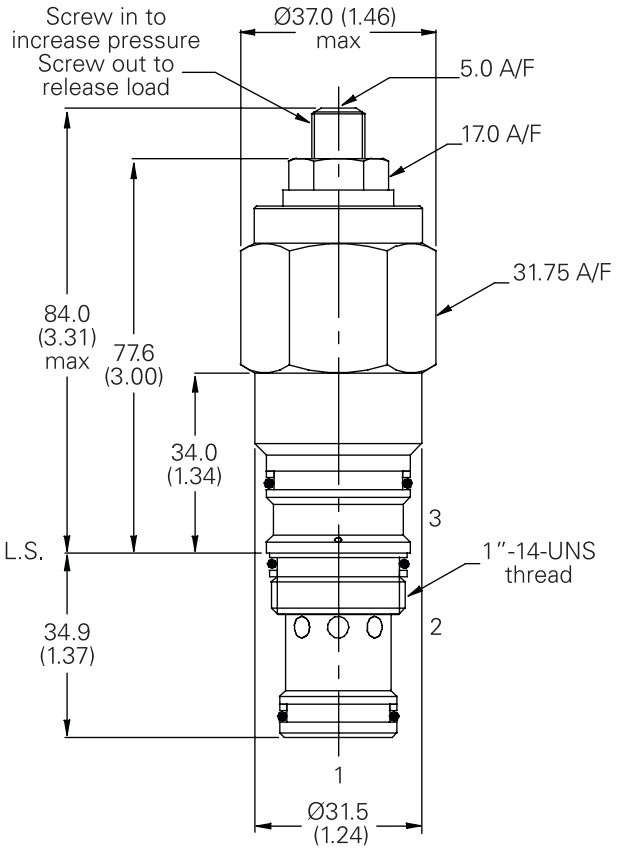
### 5 High pressure setting bar
(10 bar increments).
150 to 650 bar (2175 to 3335 psi)

### 6 Counterbalance setting bar
(10 bar increments).
20 to 170 bar (100 to 250 psi)

F

## Dimensions
mm (inch)

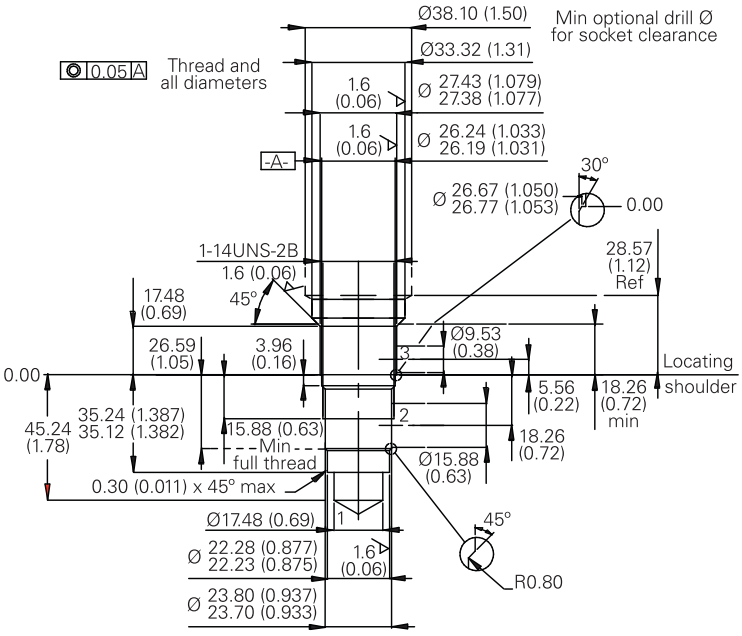
**Cartridge only**
Basic Code
1SEL90




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm

**Cavity**

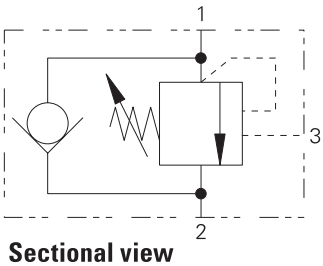
| | |
|---|---|
| Model | A20092-T2A |
| Form Drill | TD-2A |
| Form Reamer | TR-2A |



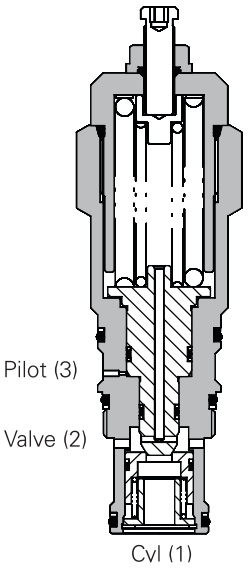

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SE140 - Overcenter valve

Pilot assisted relief with check
140 L/min (37 USgpm) • 340 bar (4930 psi)




## Sectional view




## Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

6:1 Best suited for applications where the load remains relatively constant.

Other options available upon request.

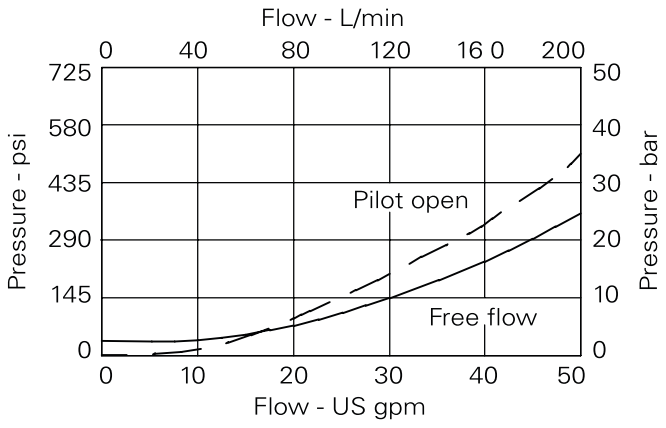
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 140 L/min (37 USgpm) |
| Max relief setting | 420 bar (6090 psi) |
| Max load induced pressure | 340 bar (4930 psi) |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20094-T17A |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight | 1.2 kg (2.5 lbs) |
| Seal kit number | SK1116 (Nitrile) SK1116V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operation temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SE140 - Overcenter valve

Pilot assisted relief with check
140 L/min (37 USgpm) • 340 bar (4930 psi)

**Model code**

**1SE**** – F – 40 S 4**

1 2 3 4 5

### 1 Basic code
**1SE140**

### 2 Adjustment means
**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

### 3 Pressure range @ 4.8 L/min
**Note:** Code based on pressure in bar.

**20** - 140-250 bar.
Std setting 190 bar

**30** - 220-330 bar.
Std setting 270 bar

**40** - 310-420 bar.
Std setting 370 bar

Std setting made at 4.8 L/min

### 4 Seals
**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

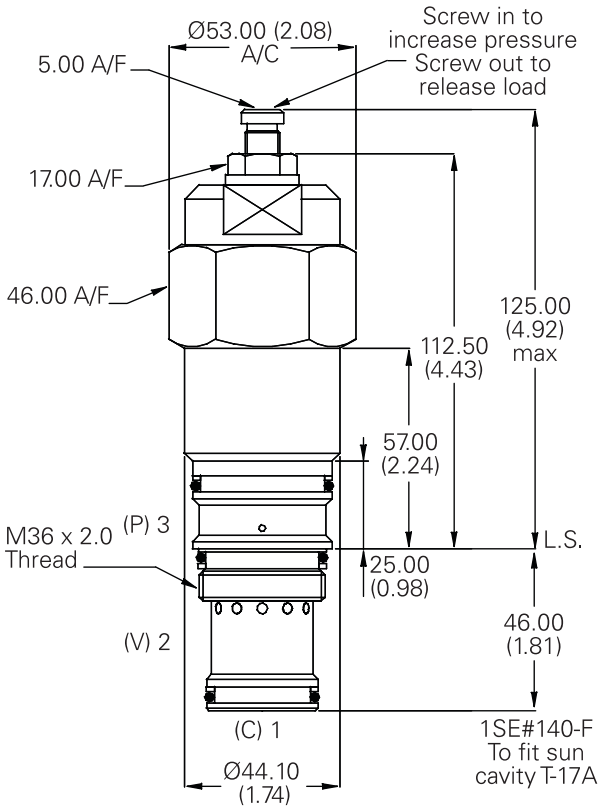
### 5 Pilot ratio
**4** - 4:1

**6** - 6:1

Other ratios available upon request

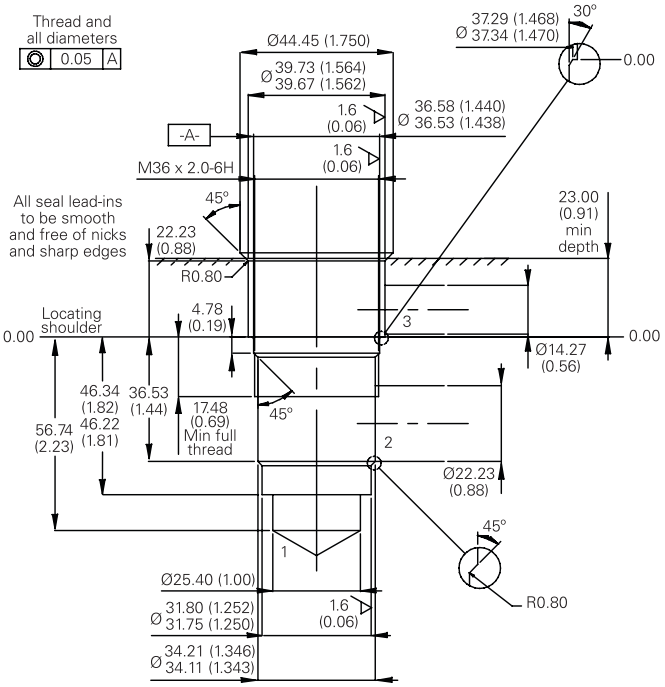
## Dimensions
mm (inch)

**Cartridge only**
Basic Code
1SE140




**Cavity**

| | |
|---|---|
| Model | A20094-T17A |
| Form Drill | TD-17A |
| Form Reamer | TR17A |

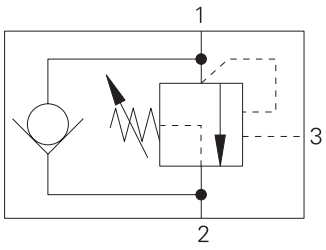



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

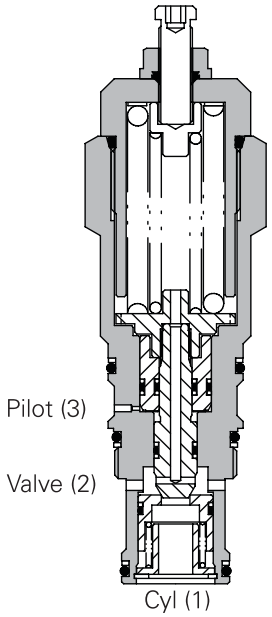
*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SER140 - Overcenter valve

Part balanced pilot assisted relief with check
140 L/min (37 USgpm) • 340 bar (4930 psi)




## Sectional view




## Description

The 1SER series overcenter valve performs all duties of a regular overcenter but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed center directional valve which has service line reliefs. The poppet is pressure balanced, preventing relief setting increase due to back pressure.

## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Interchangeable with pilot check valve of a similar size.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

6:1 Best suited for applications where the load remains relatively constant.

Other options available upon request.

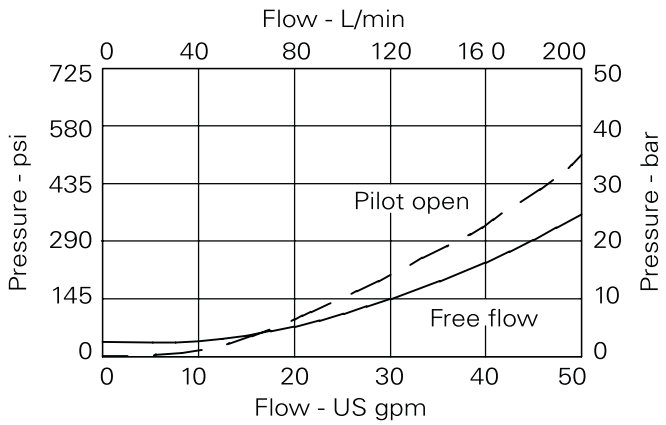
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 140 L/min (37 USgpm) |
| Max relief setting | 420 bar (6090 psi) |
| Max Load Induced pressure: | 340 bar (4930 psi |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20094-T17A |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight | 1.2 kg (2.5 lbs) |
| Seal kit number | SK1116 (Nitrile) SK1116V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operation temperature | -30°C to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SER140 - Overcenter valve

Part balanced pilot assisted relief with check
140 L/min (37 USgpm) • 340 bar (4930 psi)

**Model code**

**1SER*** – F – 40 S 4**

1 2 3 4 5

## 1 Function

**1SER140**

## 2 Adjustment means

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 140-250 bar.
Std setting 190 bar

**30** - 220-330 bar.
Std setting 270 bar

**40** - 310-420 bar.
Std setting 370 bar

Std setting made at 4.8 L/min

## 4 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 5 Pilot ratio

**4** - 4:1

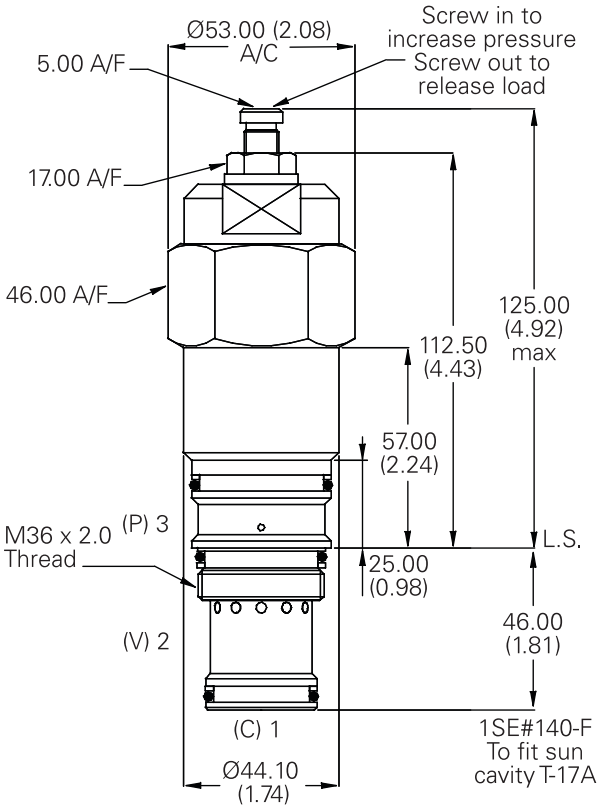
**6** - 6:1

Other ratios available upon request

## Dimensions

mm (inch)

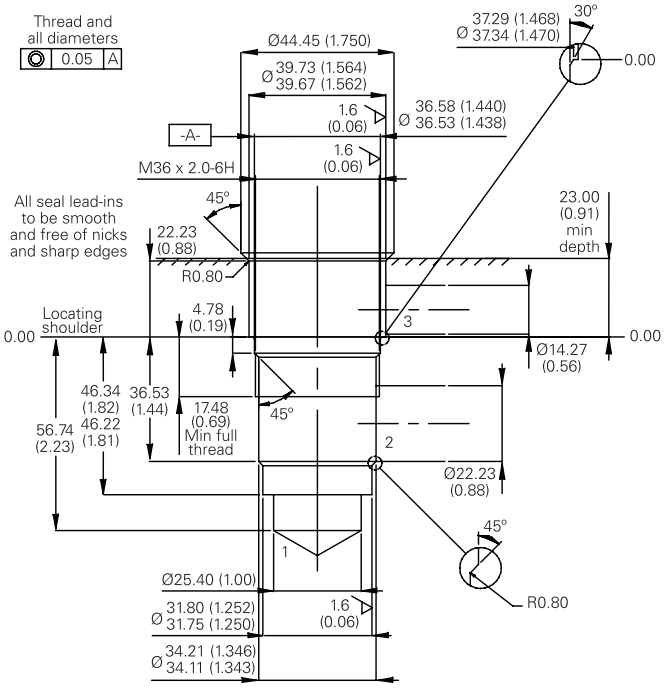
**Cartridge only**
Basic Code
1SER140




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

**Cavity**

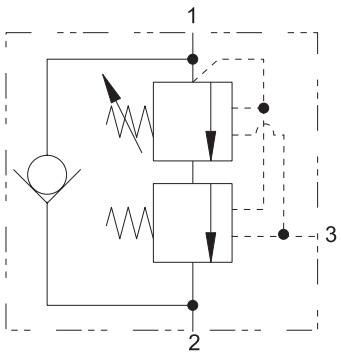
| | |
|---|---|
| Model | A20094-T17A |
| Form Drill | TD-17A |
| Form Reamer | TR17A |




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEL140 - Overcenter valve

Counterbalanced pilot assisted relief with check
140 L/min (37 USgpm) • 380 bar (5310 psi)




## Operation

The check section allows free flow and then locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied, maintaining a counterbalance pressure to prevent initial pressure loss and therefore instability. The total pressure setting will normally be set at 1.3 times the load induced pressure. The counterbalance pressure reduces as the pilot pressure increases.

## Features

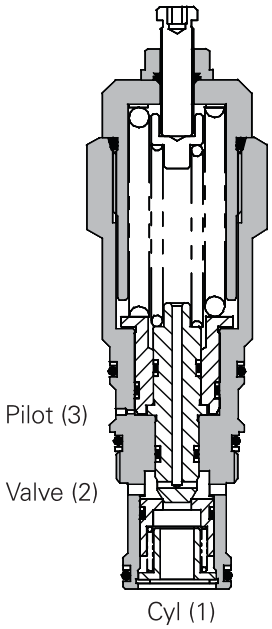
Cartridge is economical and fits simple cavity.
Allows quick, easy field service - reduces down time.
Interchangeable with pilot check valve of a similar size.

## Pilot ratio

Primary 6.1:1

Secondary 0.5:1

## Sectional view




## Performance data

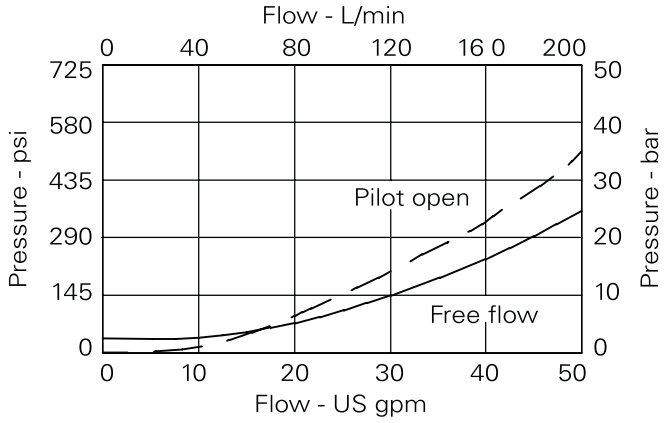
**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 140 L/min (37 USgpm) |
| Max setting | 380 bar (5310 psi) |
| Cartridge material | Working parts hardened and ground steel. External steel surfaces zinc plated. |
| Mounting position | Unrestricted |
| Cavity number | A20094-T17A |
| Torque cartridge into cavity | 150 Nm (110 lbs ft) |
| Weight | 1.2 kg (2.5 lbs) |
| Seal kit number | SK1116 (Nitrile) SK1116V (Viton®) |
| Recommended filtration level | BS5540/4 Class 18/13 (25 micron nominal) |
| Operation temperature | -30° to +90°C (-22° to +194°F) |
| Leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

## Description

The 1SEL overcenter valve performs all duties of a regular overcenter but maintains a counterbalance pressure to provide dampening of cylinders when there is a rapid loss in stored pressure. This counterbalance pressure reduces as the pilot pressure increases. Typical applications include extension cylinders on telescopic handlers where it is important to have a smooth operation when retracting from full extension.

## Pressure drop




**Note:** This valve has been designed to eliminate instability from flexible boom applications or where the load induced pressure varies greatly. To get the best results, the settings should be adjusted for each application and then factory set for porduction quantities. Please contact our Technical Department for more information.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1SEL140 - Overcenter valve

Counterbalanced pilot assisted relief with check
140 L/min (37 USgpm) • 380 bar (5310 psi)

**Model code**

**1SEL140 – F – 30 S 220 / 60**

1 2 3 4 5 6

### 1 Basic code

**1SEL140** - Cartridge and body

### 2 Adjustment means counterbalance setting

**F** - Screw Adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

### 3 Pressure range 4.8 L/min

**Note:** Code based on pressure in bar.

**20** - 170-320 bar.
Std setting 220 bar (160/60)

**30** - 230-380 bar.
Std setting 280 bar (220/60)

**40** - 310-380 bar.
Std setting 350 bar (290/60)

### 4 Seals

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

### 5 High pressure setting bar

(10 bar increments).
150 to 350 bar (2175 to 5000 psi)

### 6 Counter balance setting bar

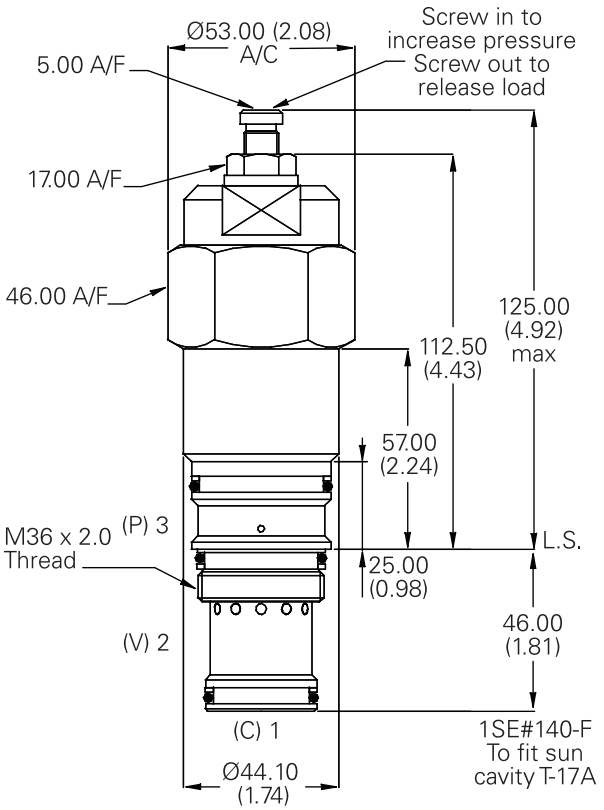
(10 bar increments).
20 to 100 bar (300 to 1500 psi)

### Dimensions

mm (inch)

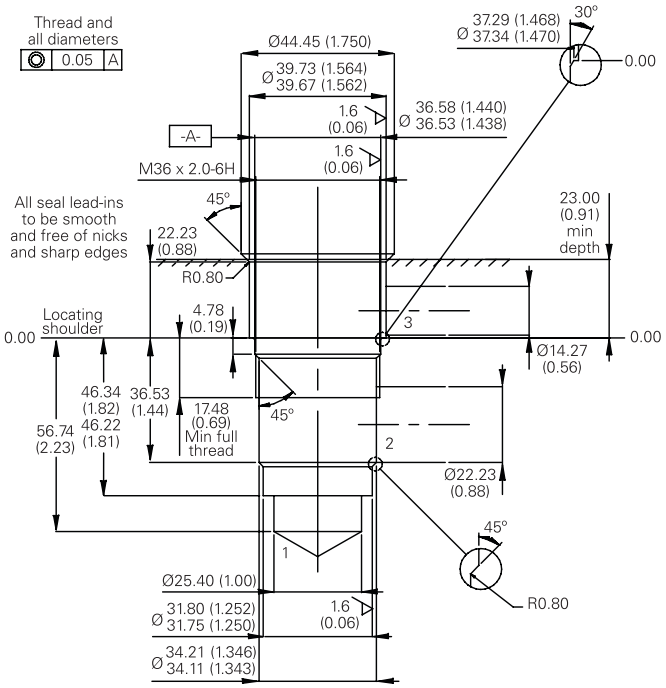
F

**Cartridge only**
Basic Code
1SEL140




**Cavity**

| | |
|---|---|
| Model | A20094-T17A |
| Form Drill | TD-17A |
| Form Reamer | TR17A |

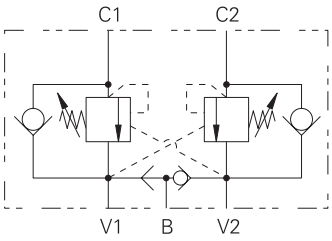



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEESH35 - Dual overcenter valve

Pilot assisted relief with brake shuffle
30 L/min (8 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

These valves have the excellent load control and safety features of the dual overcenter valve with the addition of a port for a brake release line. Smooth, safe performance.

## Pilot ratio

2.5:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

5.1 (standard) Best suited for applications where load varies and machine structure can induce instability.

10:1 Best suited for applications where the load remains relatively constant.

## Description

Overcenter Valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open centre directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

These dual overcenter valves also contain a brake release shuttle valve which ensures that pressure is applied to a brake release circuit regardless of whether pressure is applied to ports V1 or V2. These multifunction valves are normally used for the static and dynamic control of systems using motors or semi-rotary actuators.

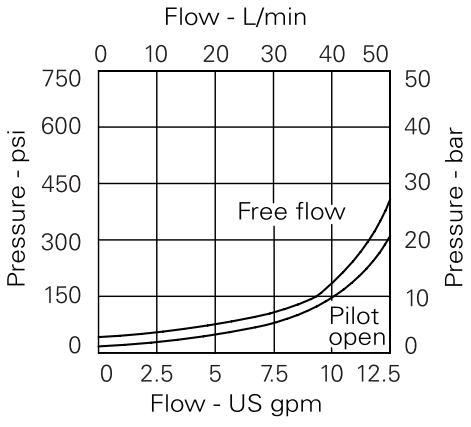
## Performance data

**Ratings and specifications**

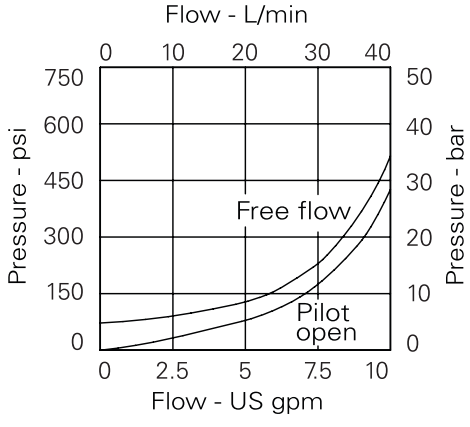
| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces electroless nickel plated. |
| Standard housing material | Steel |
| Mounting position | Line Mounted |
| Weight | 2.20 kg (4.84 lbs) |
| Seal kit | SK816 (Nitrile) SK816V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




2:5:1 and 5:1 version




10:1 version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEESH35 - Dual overcenter valve

Pilot assisted relief with brake shuffle
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEESH35 – F 3W – 35 S 3 – 377**

1 2 3 4 5 6 7

## 1 Basic code

**1CEESH35** - Cartridge and Body

## 2 Adjustment

**F** - Screw adjustment

**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port size

| Code | Port size | Housing number - sub assembly |
|---|---|---|
| | | **Steel single** |
| 3W | 3/4" BSP Valve & Cyl Port 1/4" BSP Brake Port | BXP15939-3W-S-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - (2.5:1 and 5:1) 100-350 bar. Std setting 210 bar (10:1) 120-350 bar.

Std setting made at 4.8 L/min

## 5 Seal material

**S** - Nitrile (For use with most industrial hydraulic oils)

**SV** - Viton (For high temperature and most special fluid applications)

## 6 Pilot ratio

**2** - 2.5:1

**5** - 5:1 (Standard)

**10** - 10:1

## 7 Body material

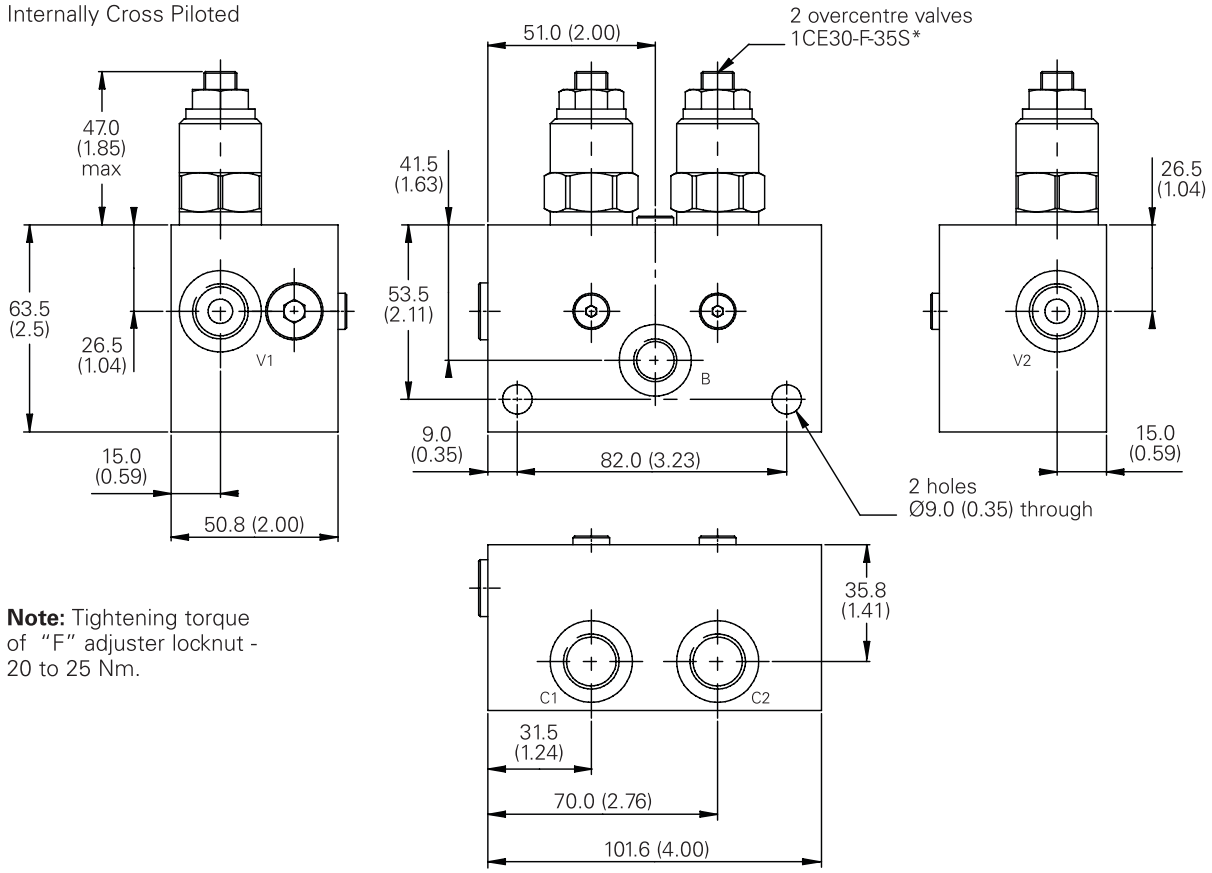
**377** - Steel

F

## Dimensions

mm (inch)

**Complete valve**
3/8" Ports
Basic Code
1CEECSH35
Internally Cross Piloted

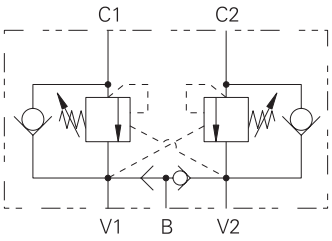



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEESH95 - Dual overcenter valve

Pilot assisted relief with brake shuffle
90 L/min (23 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

These valves have the excellent load control and safety features of the dual overcenter valve with the addition of a port for a brake release line. Smooth, safe performance.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

8.1 Best suited for applications where the load remains relatively constant.

Other ratios are available upon request.

## Description

Overcenter Valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

These dual overcenter valves also contain a brake release shuttle valve which ensures that pressure is applied to a brake release circuit regardless of whether pressure is applied to ports V1 or V2. These multifunction valves are normally used for the static and dynamic control of systems using motors or semi-rotary actuators.

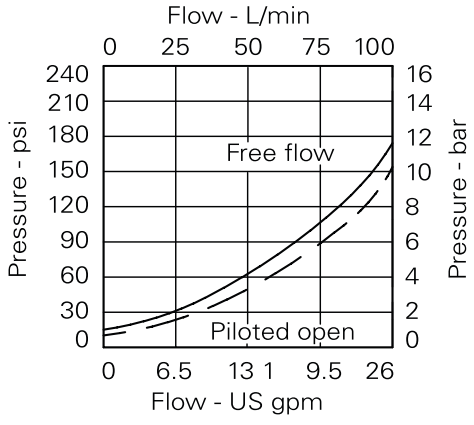
## Performance data

**Ratings and specifications**

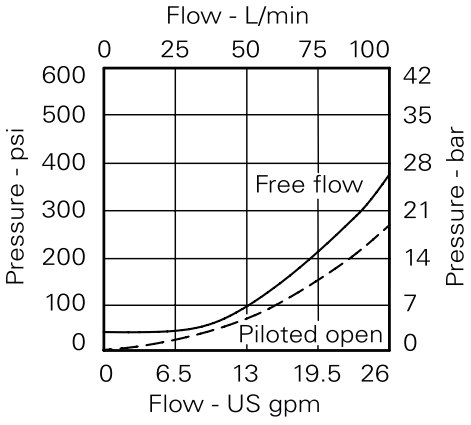
| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief pressure | 350 bar (5000 psi) **(35)**, 225 bar (3260 psi) **(20)** |
| Max load induced pressure | 270 bar (4000 psi), 160 bar (2300 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces electroless nickel plated. |
| Standard housing material | Steel |
| Mounting position | Line Mounted |
| Weight | 2.20 kg (4.84 lbs) |
| Seal kit | SK817 (Nitrile) SK817V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30°C to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




**4:1 version**




**8:1 version**

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEESH95 - Dual overcenter valve

Pilot assisted relief with brake shuffle
90 L/min (23 USgpm) • 270 bar (4000 psi)

**Model code**

| 1CEESH95 | – | F | 6W | – | 35 | S | 4 | 377 |
|---|---|---|---|---|---|---|---|---|
| 1 | | 2 | 3 | | 4 | 5 | 6 | 7 |

## 1 Function

**1CEESH95** - Cartridge and Body

## 2 Adjustment means

**F** - Screw adjustment

**N** - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port size

| Code | Port size | Housing number - body only |
|---|---|---|
| | | Steel |
| 6W | 3/4" BSP Valve & Cyl Port 1/4" BSP Brake Port | BXP17429-6W-S-377 |

## 4 Pressure range 4.8 L/min

**Note:** Code based on pressure in bar.

**20** -70-225 bar. Std setting 100 bar

**35** - 200-350 bar. Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.

**SV** - Viton (For high temperature and most special fluid applications

## 6 Pilot ratio

**4** - 4:1

**8** - 8:1

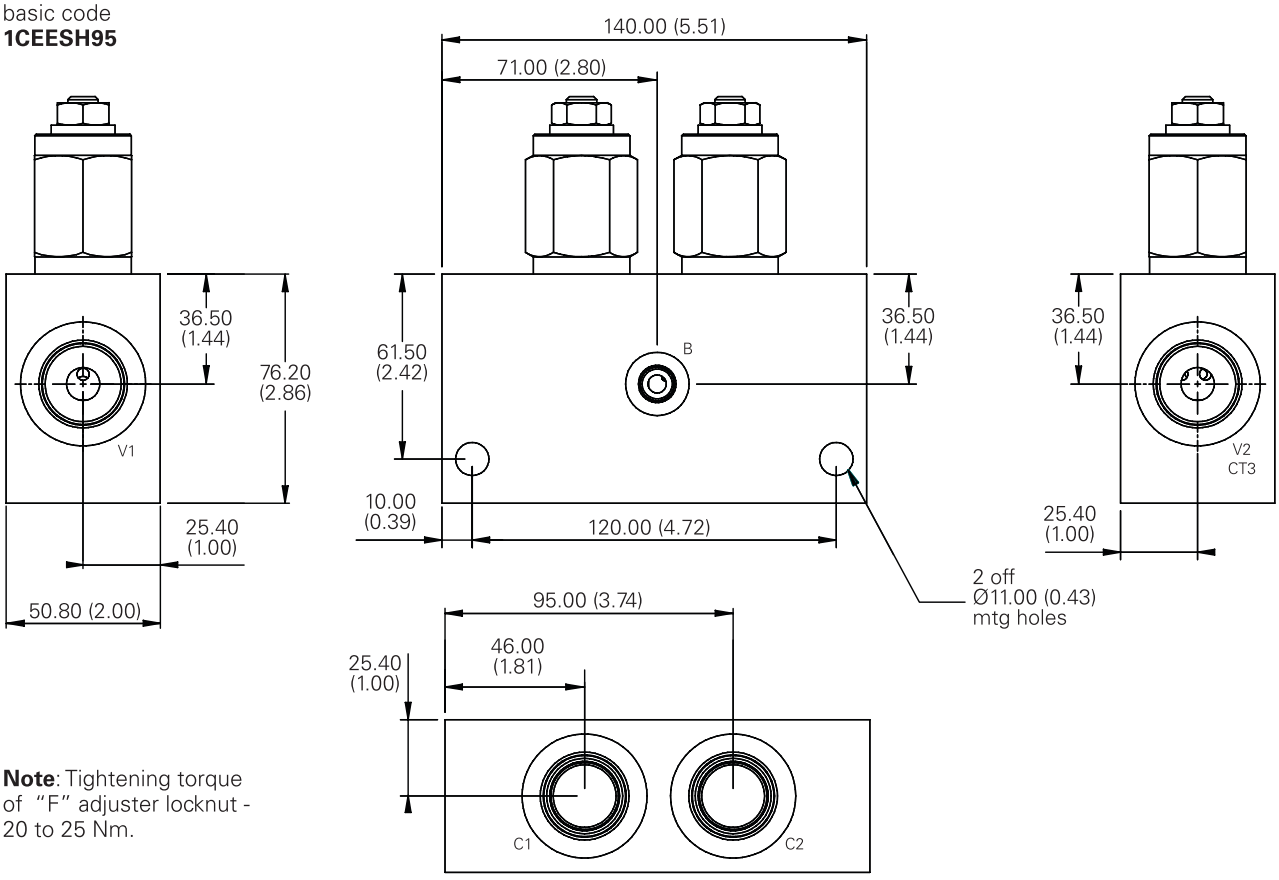
## 7 Body material

**377** - Steel

## Dimensions

mm (inch)

**Complete valve**
3/4" Ports
basic code
**1CEESH95**

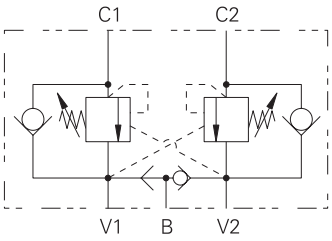



**Note**: Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEESH150 - Dual overcenter valve

Pilot assisted relief with brake shuttle
150 L/min (40 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

These valves have the excellent load control and safety features of the dual overcenter valve with the addition of a port for a brake release line. Smooth, safe performance.

## Pilot ratio

3.5:1 Best suited for applications where load varies and machine structure can induce instability.

## Description

Overcenter Valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

These dual overcenter valves also contain a brake release shuttle valve which ensures that pressure is applied to a brake release circuit regardless of whether pressure is applied to ports V1 or V2. These multifunction valves are normally used for the static and dynamic control of systems using motors or semi-rotary actuators.

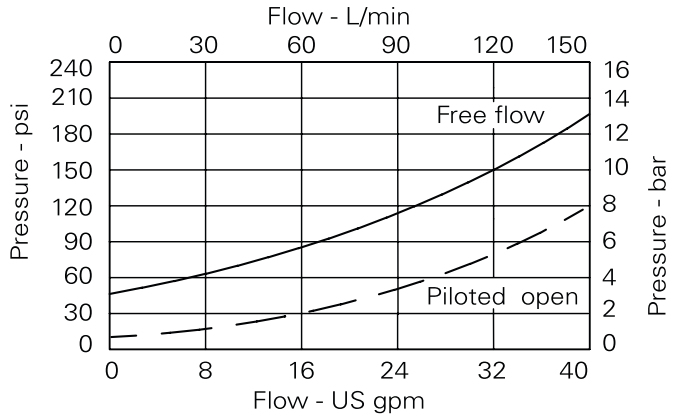
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 150 L/min (40 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated. |
| Standard housing material | Steel |
| Mounting position | Line Mounted |
| Weight | 3.50 kg (7.70 lbs) |
| Seal kit | SK818 (Nitrile)<br>SK818V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEESH150 - Dual overcenter valve

Pilot assisted relief with brake shuttle
150 L/min (40 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEESH150 – F 8W – 35 S 3 377**

1 2 3 4 5 6 7

## 1 Function

**1CEESH150** - Cartridges and Body

## 2 Adjustment means

**F** - Screw adjustment

## 3 Port size

| Code | Port size | Housing number - body only |
|---|---|---|
| | | **Steel** |
| **8W** | 1" BSP Valve & Cyl Port 1/4" BSP Pilot Port | CXP15933-8W-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 70-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seal material

**S** - Nitrile (For use with most industrial hydraulic oils.

**SV** - Viton (For high temperature and most special fluid applications

## 6 Pilot ratio

**3** - 3.5:1

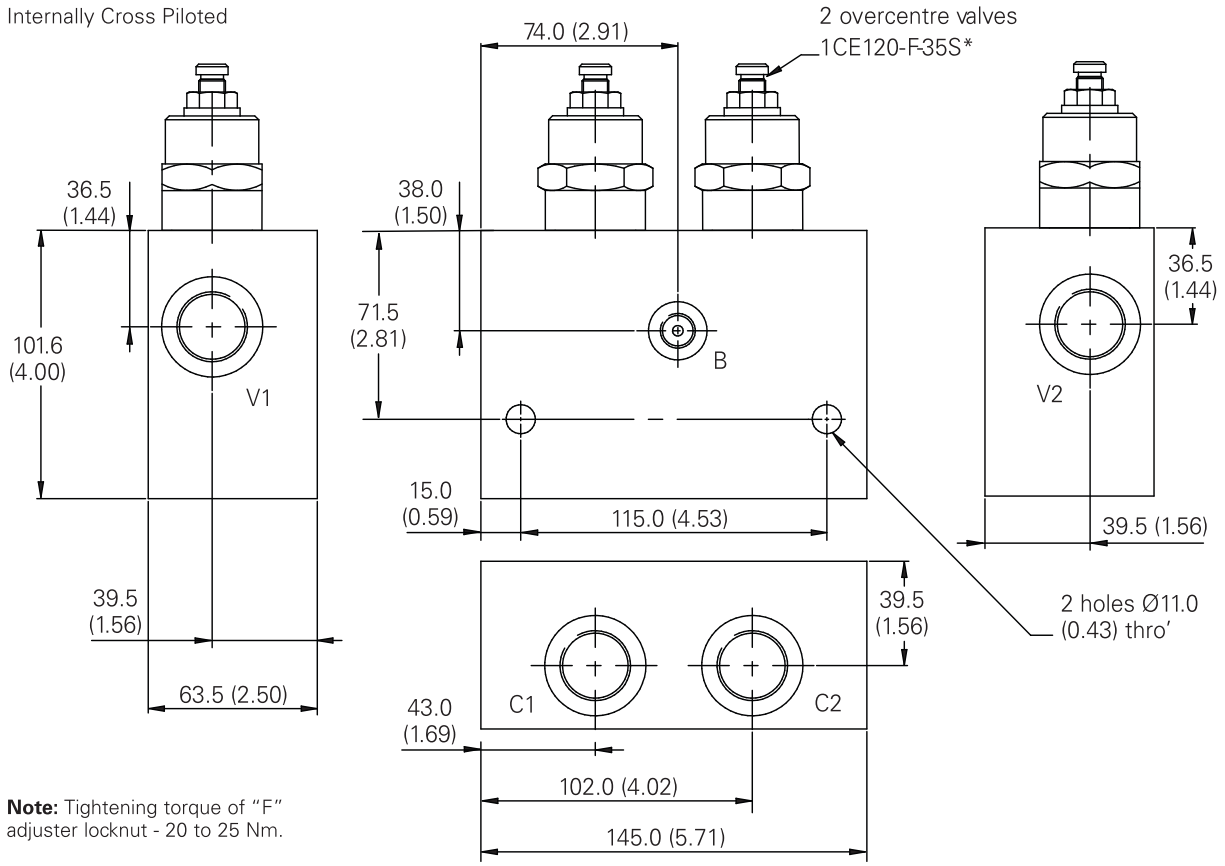
## 7 Body material

**377** - Steel

## Dimensions

mm (inch)

**Complete valve**
1" Ports
Basic Code
1CEESH150
Internally Cross Piloted

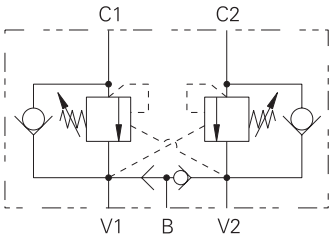



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEESH350 - Dual overcenter valve

Pilot assisted relief with brake shuttle
300 L/min (80 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

These valves have the excellent load control and safety features of the dual overcenter valve with the addition of a port for a brake release line. Smooth, safe performance.

## Pilot ratio

3:1 Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

## Description

Overcenter Valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

These dual overcenter valves also contain a brake release shuttle valve which ensures that pressure is applied to a brake release circuit regardless of whether pressure is applied to ports V1 or V2. These multifunction valves are normally used for the static and dynamic control of systems using motors or semi-rotary actuators.

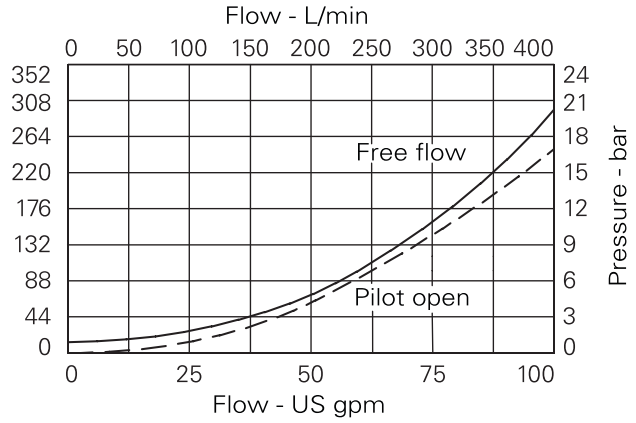
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 300 L/min (80 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces electroless nickel plated. |
| Standard housing material | Steel |
| Mounting position | Line mounted |
| Weight | 5.42 kg (11.94 lbs) |
| Seal kit | SK688 (Nitrile) SK688V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30°C to +90°C (-22° to +194°F) |
| Internal leakage | 4 milliliters/min nominal (60 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEESH350 - Dual overcenter valve

Pilot assisted relief with brake shuttle
300 L/min (80 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEESH350 – F 10W – 35 S 3 377**

1 2 3 4 5 6 7

## 1 Basic code

**1CEESH350** - Cartridges and Body

## 2 Adjustment means

**F** - Screw adjustment

## 3 Port size

| Code | Port size | Housing number - body only |
|---|---|---|
| | | **Steel** |
| **10W** | 1 1/4" BSP Valve & Cyl Port 1/4" BSP Pilot Port | CXP22297-10W-S-377 |

## 4 Pressure range @4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 70-350 bar.
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.

**SV** - Viton (For high temperature and most special fluid applications

## 6 Pilot ratio

**3** - 3:1
**8** - 8:1

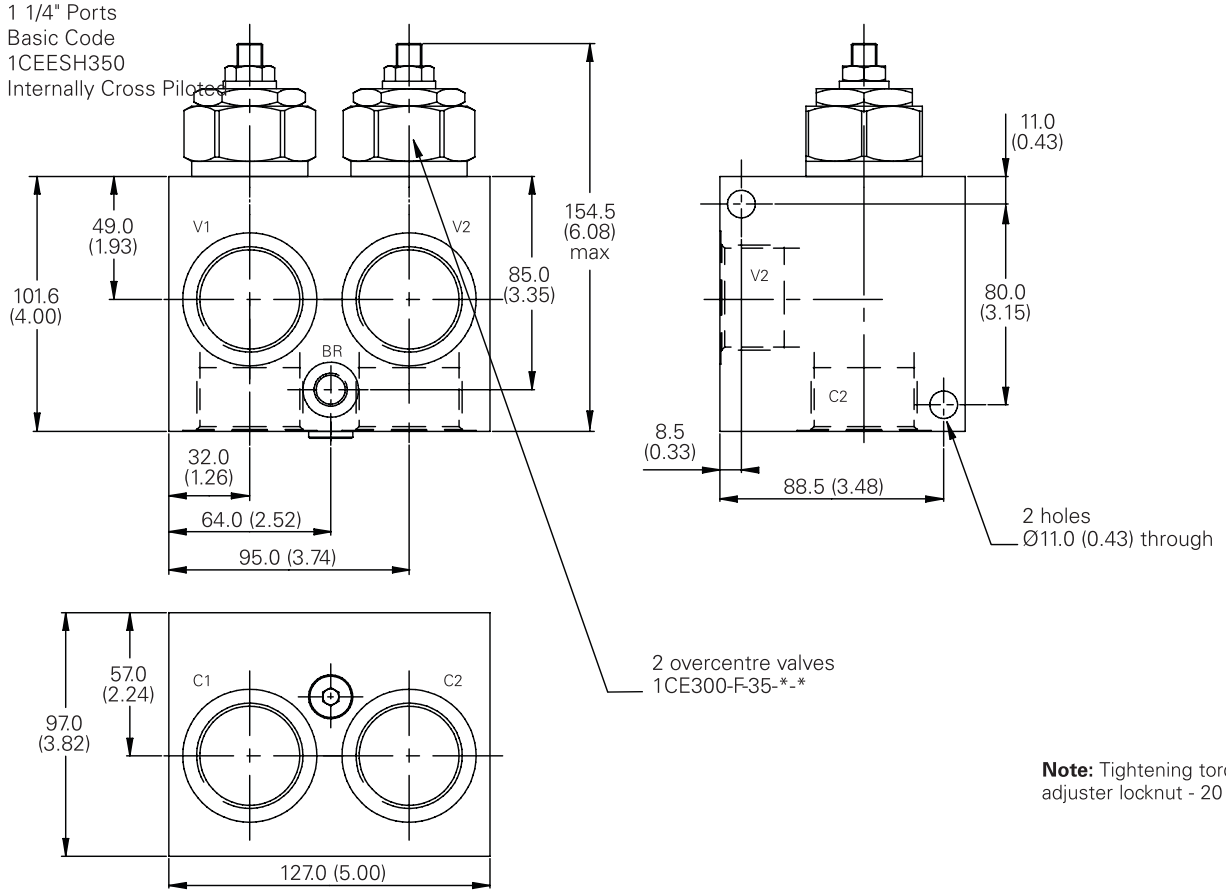
## 7 Body material

**377** - Steel

## Dimensions

mm (inch)

**Complete valve**
1 1/4" Ports
Basic Code
1CEESH350
Internally Cross Piloted

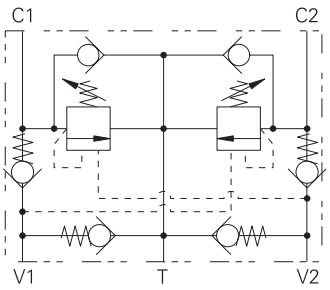



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEEC35 - Motion control and lock valve

Pilot assisted relief
30 L/min (8 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

A system of check valves allows crossline relief for dynamic applications with the optional make up facility to compensate for any change in system volume.

## Features

These valves provide complete circuit control and protection in a single valve body, reducing installation time and cost. Smooth, safe performance of dual direction actuators.

## Pilot ratio

2.5:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

5:1 (standard) Best suited for applications where the load varies and machine structure can induce instability.

10:1 Best suited for applications where the load remains relatively constant.

## Description

Motion control and lock valves give static and dynamic control by regulating the flow into and out of hydraulic actuators. When installed close to an actuator, the valve can stop runaway in the event of hose burst. The valves also give dual thermal and overload relief protection.

A low pressure tank or charge line may be connected to the T port to provide a make-up flow to either actuator port.

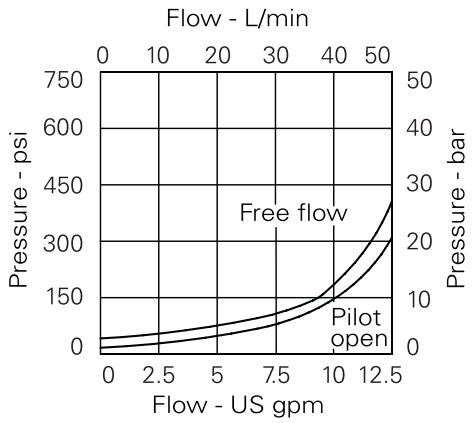
## Performance data

**Ratings and specifications**

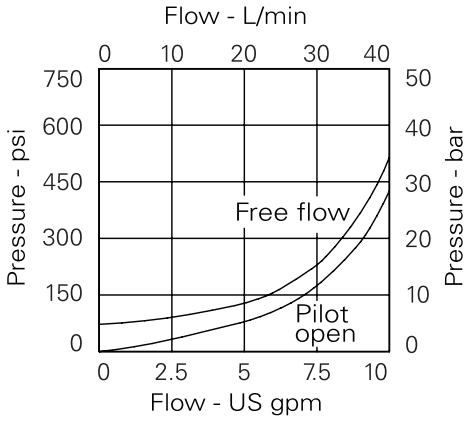
| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief pressure | 350 bar (5000 psi) **(35)**, 225 bar (3260 psi) **(20)** |
| Max load induced pressure | 270 bar (4000 psi) **(35)**, 160 bar (2300 psi) **(20)** |
| Cartridge material | Working parts hardened and ground steel. External surfaces electroless nickel plated. |
| Standard housing material | Steel |
| Mounting position | Line mounted |
| Weight | 2.03 kg (4.50 lbs) |
| Seal kit | SK815 (Nitrile) SK815V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




2:5:1 and 5:1 version




10:1 version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEEC35 - Motion control and lock valve

Pilot assisted relief
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEEC35 – F 3W – 35 S 5 377**

1 2 3 4 5 6 7

## 1 Basic code

**1CEEC35** - Cartridge and Body

## 2 Adjustment means

**F** - Screw adjustment
**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port size - bodied valves only

| Code | Port size | Housing number |
|---|---|---|
| | | **Steel** |
| **3W** | **3/8"** BSP | BXP16247-3W-S-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

| | | | | |
|---|---|---|---|---|
| **20** | - | (2.5:1 and 5:1) | 70-210 bar | Std setting 100 bar |
| | | (10:1) | 100-210 bar | Std setting 100 bar |
| **35** | - | (2.5:1 and 5:1) | 100-350 bar | Std setting 210 bar |
| | | (10:1) | 120-350 bar | Std setting 210 bar |

Std setting made a 4.8 L/min made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.
**SV** - Viton (For high temperature and most special fluid applications

## 6 Pilot ratio

**2** - 2.5:1
**5** - 5:1
**10** - 10:1

Other ratios available upon request

## 7 Body material

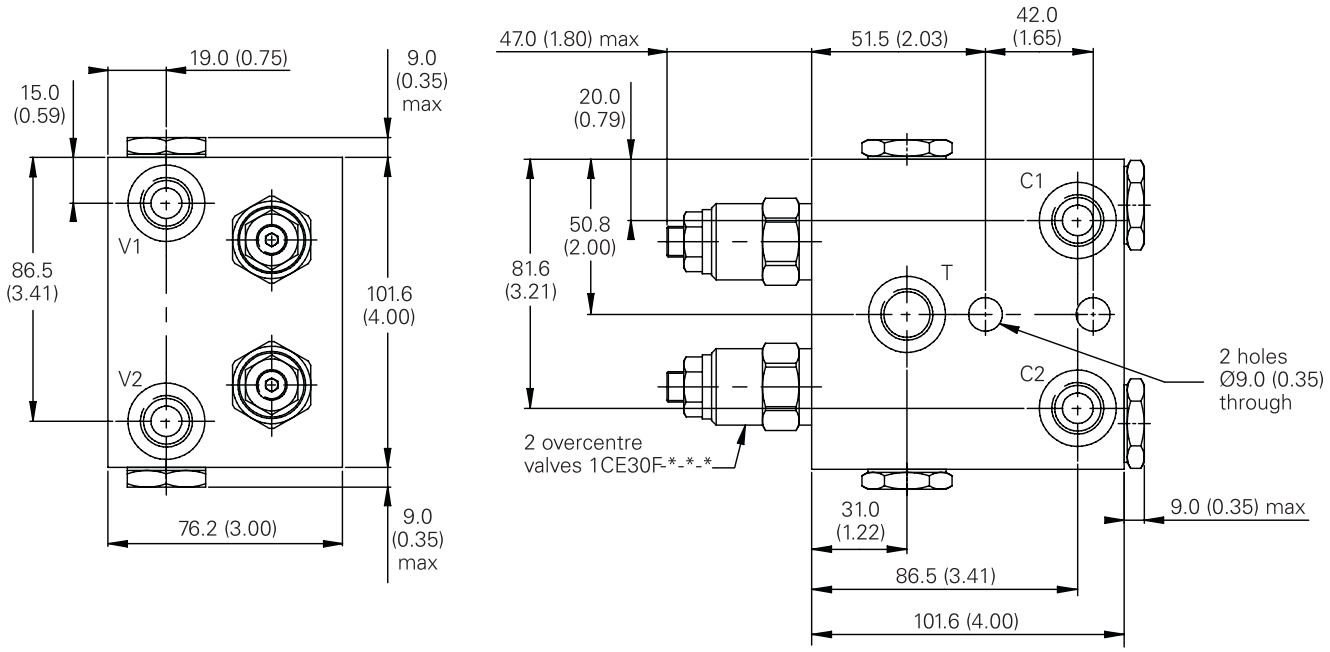
**377** - Steel

F

## Dimensions

mm (inch)

**Complete valve**
3/8" Ports Ports
Basic Code
**1CEEC35**



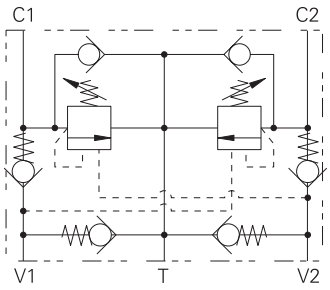

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEEC95 - Motion control & lock valve

Pilot assisted relief

95 L/min (25 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follow

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

A system of check valves allows crossline relief for dynamic applications with the optional make up facility to compensate for any change in system volume.

## Features

These valves provide complete circuit control and protection in a single valve body, reducing installation time and cost. Smooth, safe performance of dual direction actuators.

## Pilot ratio

4:1 Best suited for applications where the load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

## Description

Motion control and lock valves give static and dynamic control by regulating the flow into and out of hydraulic actuators. When installed close to an actuator, the valve can stop runaway in the event of hose burst. The valves also give dual thermal and overload relief protection.

A low pressure tank or charge line may be connected to the T port to provide a make-up flow to either actuator port.

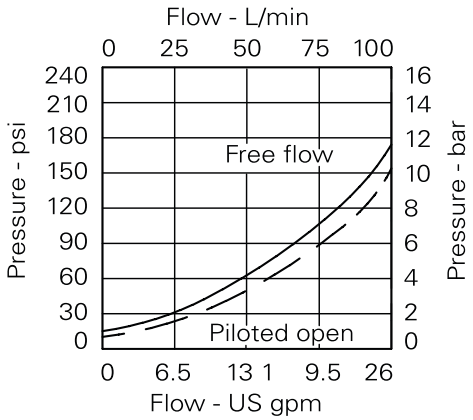
## Performance data

**Ratings and specifications**

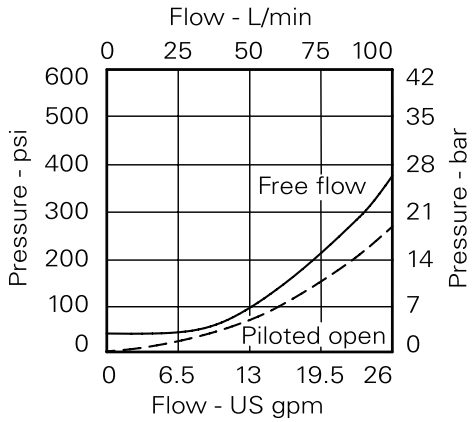
| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 1CEEC95 95 L/min (25 USgpm) |
| Max relief pressure | 350 bar (5000 psi) **(35)**, 225 bar (3260 psi) **(20)** |
| Max load induced pressure | 270 bar (4000 psi) **(35)**, 160 bar (2300 psi) **(20)** |
| Cartridge material | Working parts hardened and ground steel. External surfaces electroless nickel plated. |
| Standard housing material | Steel |
| Mounting position | Line mounted |
| Weight | 3.70 kg (8.20 lbs) |
| Seal kit | SK814 (Nitrile)<br>SK814V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 milliliters/min nominal (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop




**4:1 version**




**8:1 version**

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEEC95 - Motion control & lock valve

Pilot assisted relief

95 L/min (25 USgpm) • 270 bar (4000 psi)

**Model code**

| 1CEEC95 | – | F | 3W | – | 35 | S | 5 | 377 |
|---|---|---|---|---|---|---|---|---|
| 1 | | 2 | 3 | | 4 | 5 | 6 | 7 |

## 1 Basic code

**1CEEC95** - Cartridge and Body

## 2 Adjustment means

**F** - Screw adjustment
**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port size

| Code | Port size | Housing number- body only |
|---|---|---|
| | | **Steel** |
| **6W** | **3/4"** BSP | BXP16248-6W-S-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - (4:1 and 8:1)
200-350 bar
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.
**SV** - Viton (For high temperature and most special fluid applications made at 4.8 L/min

## 6 Pilot ratio

**4** - 4:1
**8** - 8:1

Other ratios available upon request

## 7 Body material

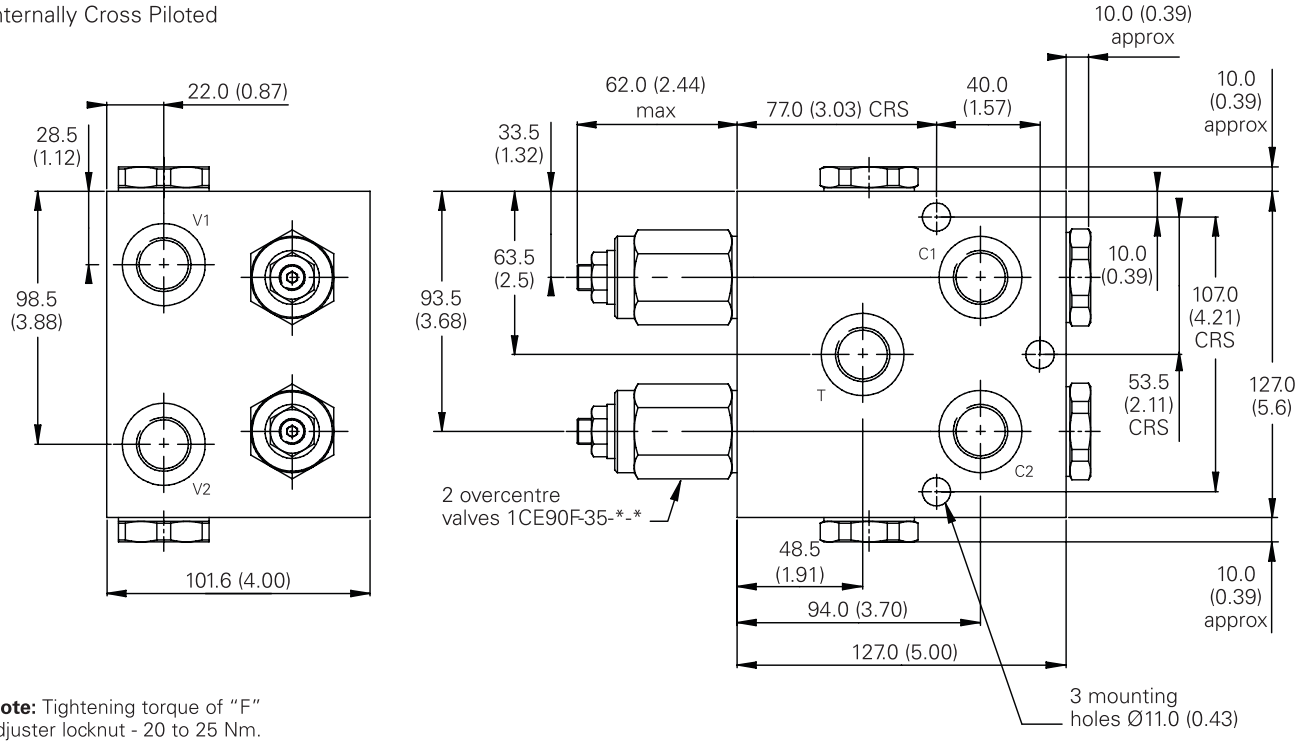
**377** - Steel

F

## Dimensions

mm (inch)

**Complete valve**
3/4" Ports
Basic Code
1CEEC95
Internally Cross Piloted

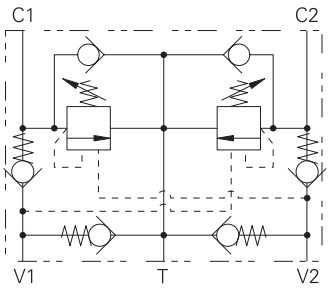



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEEC150 - Motion control & lock valve

Pilot assisted relief
150 L/min (40 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

A system of check valves allows crossline relief for dynamic applications with the optional make up facility to compensate for any change in system volume.

## Features

These valves provide complete circuit control and protection in a single valve body, reducing installation time and cost. Smooth, safe performance of dual direction actuators.

## Pilot ratio

3.5:1 Best suited for applications where the load varies and machine structure can induce instability.

## Description

Motion control and lock valves give static and dynamic control by regulating the flow into and out of hydraulic actuators. When installed close to an actuator, the valve can stop runaway in the event of hose burst. The valves also give dual thermal and overload relief protection.

A low pressure tank or charge line may be connected to the T port to provide a make-up flow to either actuator port.

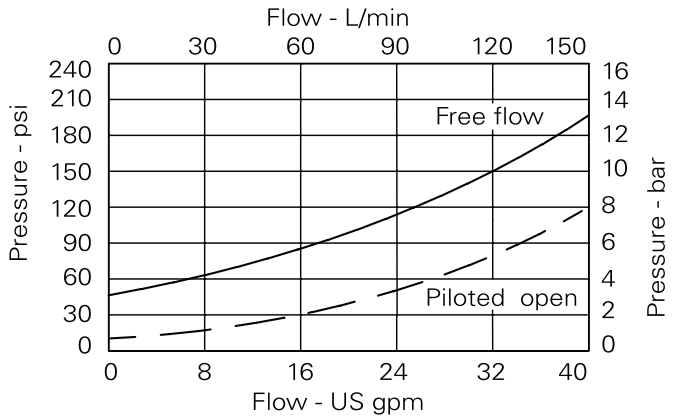
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 150 L/min (40 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel. External surfaces zinc plated. |
| Standard housing materials | Steel |
| Mounting position | Line mounted |
| Weight | 3.7 kg (8.2 lbs) |
| Seal kit | SK813 (Nitrile)<br>SK813V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 ml/min (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

**Pressure drop**




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEEC150 - Motion control & lock valve

Pilot assisted relief

150 L/min (40 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEEC150 – F 8W – 35 S 3 377**

1 2 3 4 5 6 7

## 1 Basic code

**1CEEC150** - Cartridges and body

## 2 Adjustment means

**F** - Screw adjustment

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port size

| Code | Port size | Housing number- body only |
|---|---|---|
| | | Steel |
| **8W** | 1" BSP Valve & Cyl Port. 1/4" BSP Brake Port | BXP15687-8W-S-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 70-35 bar
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seal material

**S** - Nitrile (For use with most industrial hydraulic oils.

**SV** - Viton (For high temperature and most special fluid applications made at 4.8 L/min

## 6 Pilot ratio

**3** - 3.5:1

## 7 Body material

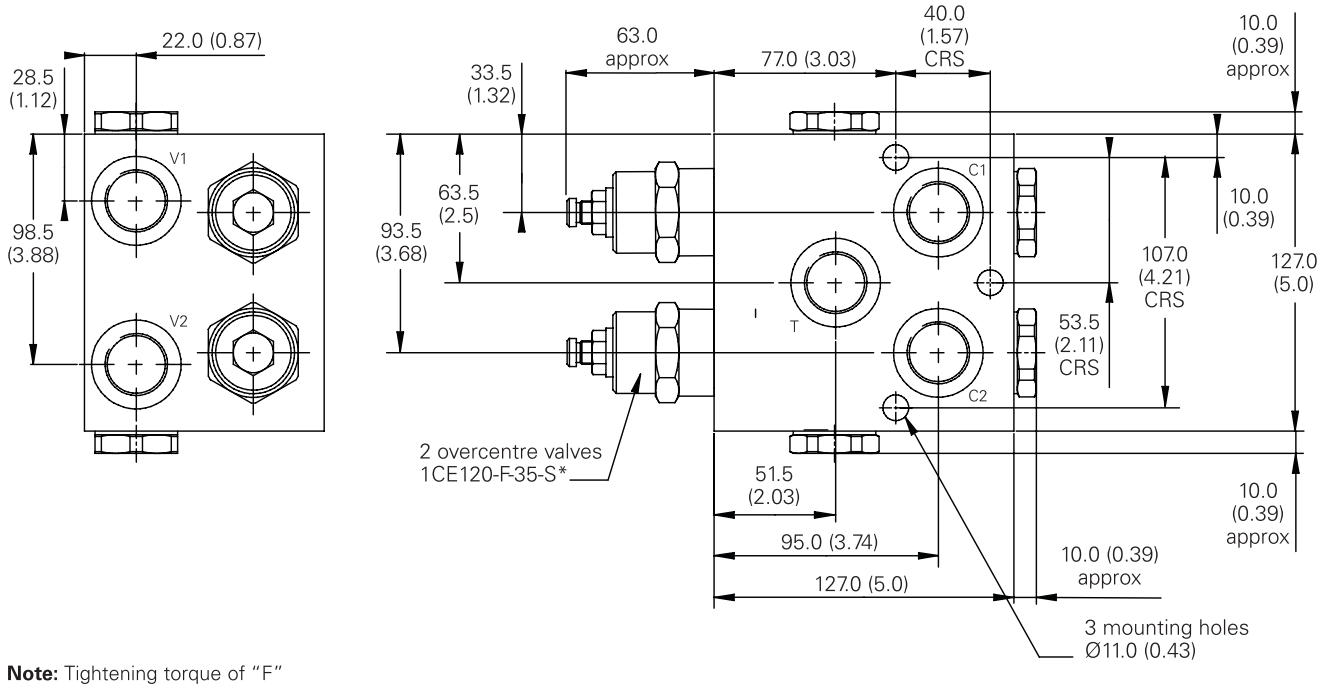
**377** - Steel

F

## Dimensions

mm (inch)

**Complete valve**
1" Ports
Basic Code
1CEEC150

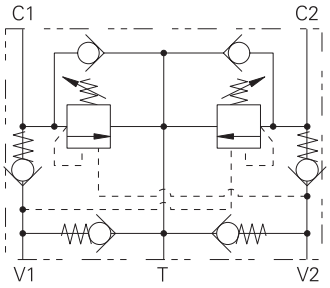



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEEC350 - Motion control & lock valve

Pilot assisted relief
300 L/min (80 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

A system of check valves allows crossline relief for dynamic applications with the optional make up facility to compensate for any change in system volume.

## Features

These valves provide complete circuit control and protection in a single valve body, reducing installation time and cost. Smooth, safe performance of dual direction actuators.

## Pilot ratio

3:1 Best suited for applications where the load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

## Description

Motion control and lock valves give static and dynamic control by regulating the flow into and out of hydraulic actuators. When installed close to an actuator, the valve can stop runaway in the event of hose burst. The valves also give dual thermal and overload relief protection.

A low pressure tank or charge line may be connected to the T port to provide a make-up flow to either actuator port.

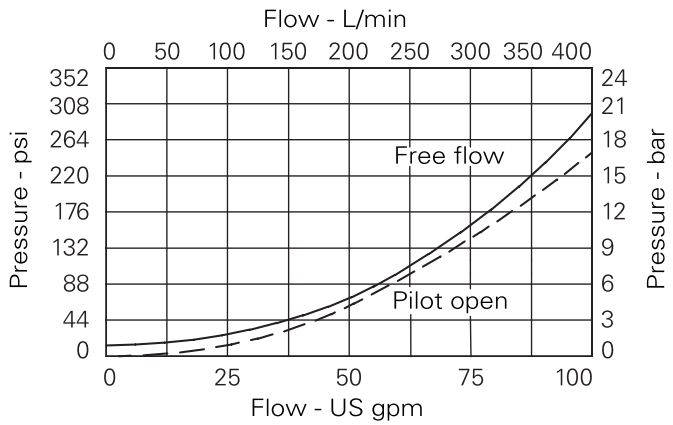
## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 300 L/min (80 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces zinc plated. |
| Standard housing materials | Steel |
| Mounting position | Line mounted |
| Weight | 8.2 kg (18.0 lbs) |
| Seal kit | SK635 (Nitrile)<br>SK635V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 4 ml/min (60 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEEC350 - Motion control & lock valve

Pilot assisted relief

300 L/min (80 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEEC350 – F 10W – 35 S 3 377**

1 2 3 4 5 6 7

## 1 Basic code

**1CEEC350** - Cartridges and body

## 2 Adjustment means

**F** - Screw adjustment

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port sizes - bodied valves only

| Code | Port size | Housing number |
|---|---|---|
| | | **Steel Single** |
| **10W** | 1 1/4" BSP valve & cyl port. 1/4" BSP brake port | DXP16844-10W-S-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.

**35** - 70-35 bar
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.

**SV** - Viton (For high temperature and most special fluid applications made at 4.8 L/min

## 6 Pilot ratio

**3** - 3:1
**8** - 8:1

## 7 Housing material

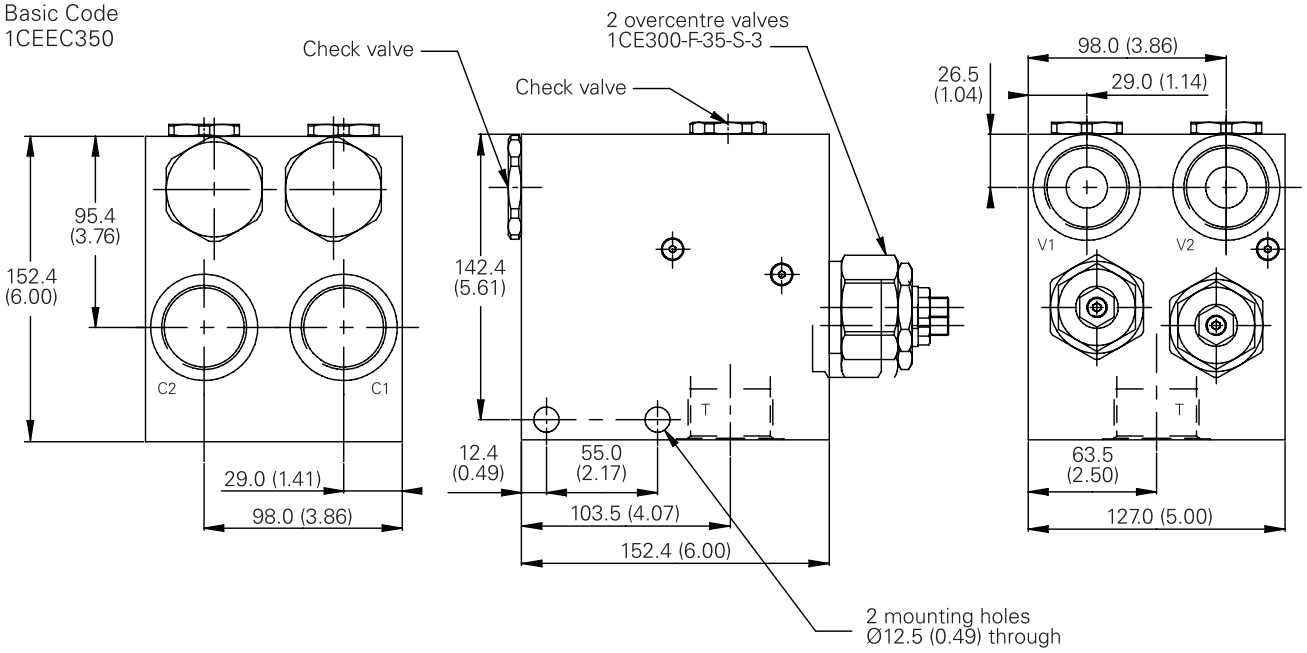
**377** - Steel

F

## Dimensions

mm (inch)

**Complete valve**
1 1/4" Ports
Basic Code
1CEEC350

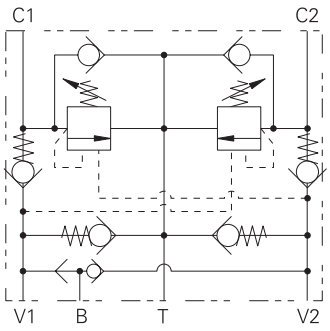



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEECSH35 - Motion control & lock valve

Pilot assisted relief with brake shuttle
30 L/min (8 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

A system of check valves allows crossline relief for dynamic applications with the optional make up facility to compensate for any change in system volume.

## Feature

This valve provides complete circuit control and protection as with the standard motion control valve but has the addition of a brake release shuttle and brake port contained in a single body.

## Pilot ratio

2.5:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.

5:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

10:1 Best suited for applications where the load remains relatively constant.

## Description

Motion control and lock valves give static and dynamic control by regulating the flow into and out of hydraulic actuators. When installed close to an actuator, the valve can stop runaway in the event of hose burst. The valves also give dual thermal and overload relief protection.

A low pressure tank or charge line may be connected to the T port to provide a make-up flow to either actuator port.

The shuttle valve provides a signal from the high pressure side of the actuator to release sprung applied brakes.

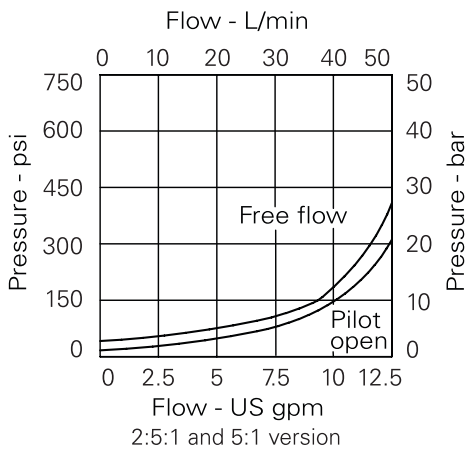
## Performance data

**Ratings and specifications**

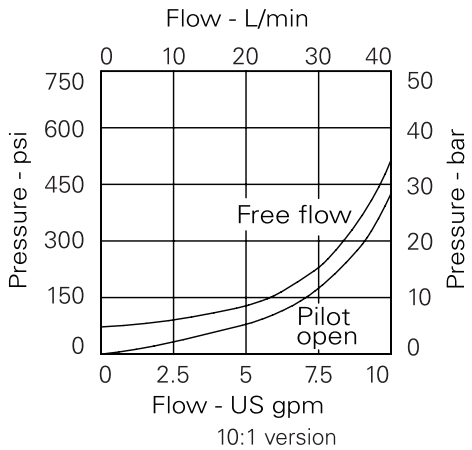
| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated. |
| Standard housing materials | Steel |
| Mounting position | Line mounted |
| Weight | 2.03 kg (4.5 lbs) |
| Seal kit | SK815 (Nitrile)<br>SK815V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 ml/min (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

## Pressure drop



2:5:1 and 5:1 version



10:1 version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

F

# 1CEECSH35 - Motion control & lock valve

Pilot assisted relief with brake shuttle
30 L/min (8 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEECSH35 – F 3W – 35 S 5 377**

1 2 3 4 5 6 7

## 1 Function

**1CEECSH35** - Cartridges and body

## 2 Adjustment means

**F** - Screw adjustment
**N** - Fixed - State pressure setting required

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port sizes - bodied valves only

| Code | Port size | Housing number - sub assembly |
|---|---|---|
| | | Steel |
| **3W** | 3/8" BSP Valve & Cyl Port. 1/4" BSP Brake Port | CXP15947-3W-S-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.
**35** -(2.5:1 and 5:1) 100-350 bar Std setting 210 bar
(10:1) 120-350 bar Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.
**SV** - Viton (For high temperature and most special fluid applications made at 4.8 L/min

## 6 Pilot ratios

**2** - 2.5:1
**5** - 5:1 (Standard)
**10** - 10:1

## 7 Body material

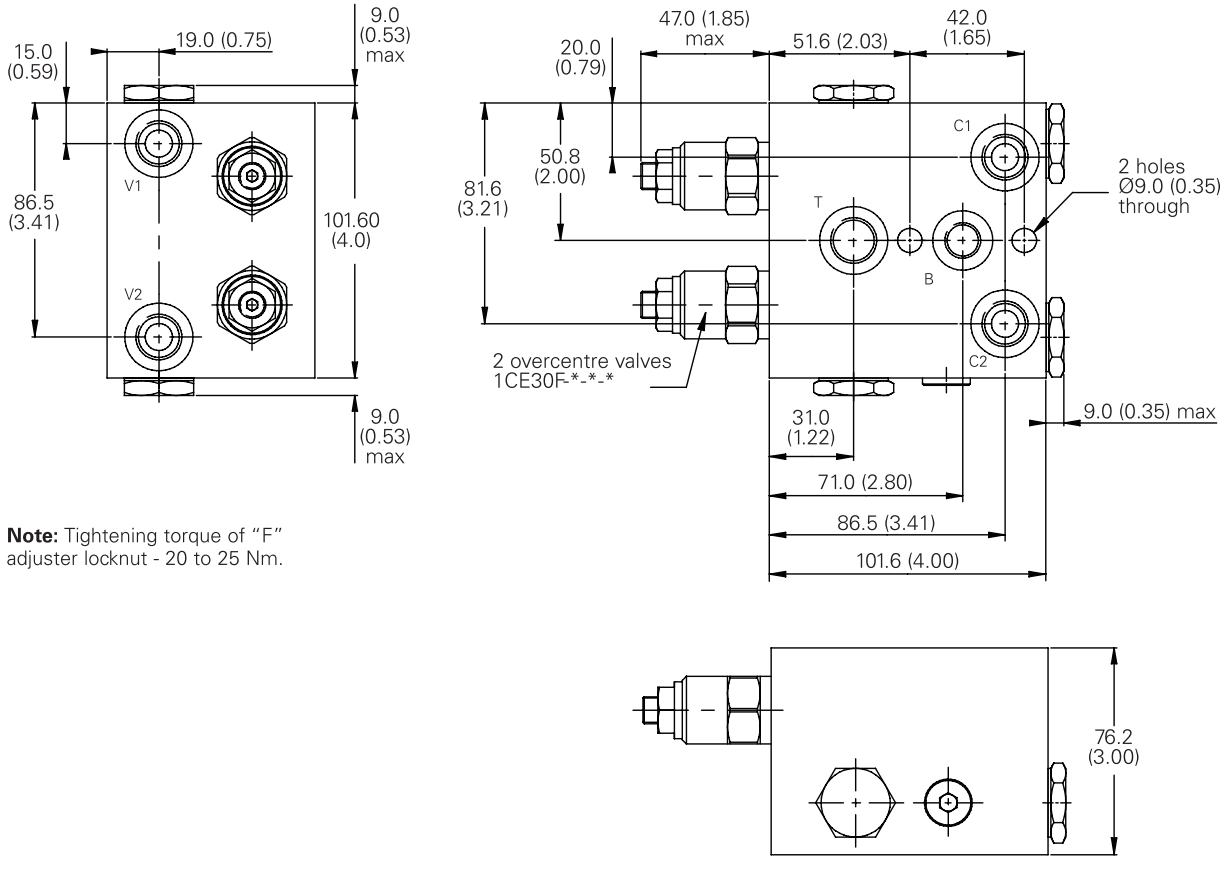
**377** - Steel

F

## Dimensions

mm (inch)

**Complete valve**
3/8" Ports
Basic Code
1CEECSH35
Internally Cross Piloted

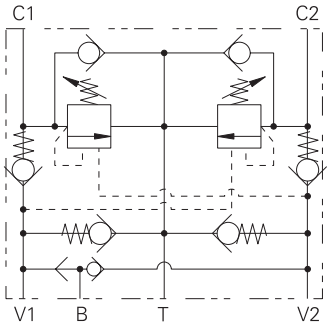



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEECSH95 - Motion control & lock valve

Pilot assisted relief with brake shuttle
95 L/min (25 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

Pilot Pressure =

$$\frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

A system of check valves allows crossline relief for dynamic applications with the optional make up facility to compensate for any change in system volume.

## Features

This valve provides complete circuit control and protection as with the standard motion control valve but has the addition of a brake release shuttle and brake port contained in a single body.

## Pilot ratio

4:1 Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

## Description

Motion control and lock valves give static and dynamic control by regulating the flow into and out of hydraulic actuators. When installed close to an actuator, the valve can stop runaway in the event of hose burst. The valves also give dual thermal and overload relief protection.

A low pressure tank or charge line may be connected to the T port to provide a make-up flow to either actuator port.

The shuttle valve provides a signal from the high pressure side of the actuator to release sprung applied brakes.

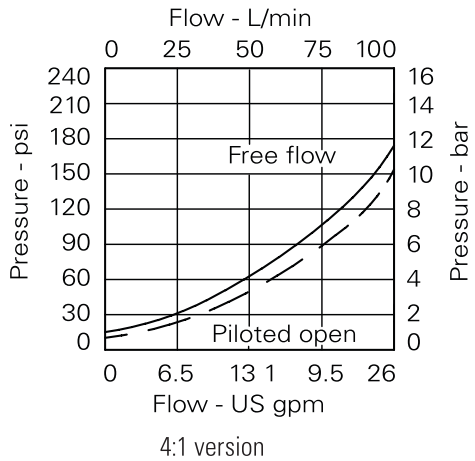
## Performance data

**Ratings and specifications**

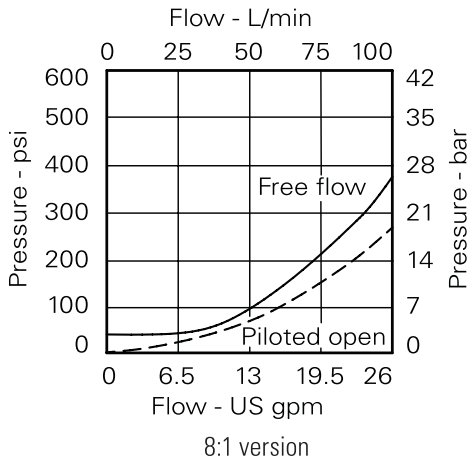
| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 95 L/min (25 USgpm) |
| Max relief pressure | 350 bar (5000 psi) **(35)**, 225 bar (3260 psi) **(20)** |
| Max load induced pressure | 270 bar (4000 psi) **(35)**,160 bar (2300 psi) **(20)** |
| Cartridge material | Working parts hardened and ground steel. External surfaces electroless nickel plated. |
| Standard housing materials | Steel |
| Mounting position | Line mounted |
| Weight | 3.70 kg (8.20 lbs) |
| Seal kit | SK814 (Nitrile)<br>SK814V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to 90°C( -22° to +194°F) |
| Internal leakage | 0.3 ml/min (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

**Pressure drop**




4:1 version




8:1 version

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEECSH95 - Motion control & lock valve

Pilot assisted relief with brake shuttle
95 L/min (25 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEECSH95 – F 6W – 35 S 4 377**

1 2 3 4 5 6 7

## 1 Basic code

**1CEECSH95** - Cartridges and body

## 2 Adjustment means

**F** - Screw adjustment
**N** - Fixed - state pressure setting required.

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

## 3 Port size

| Code | Port size | Housing number - body only |
|---|---|---|
| | | Steel |
| **6W** | 3/4" BSP Valve & Cyl Port. 1/4" BSP Brake Port | BXP15936-6W-S-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.
**20** - 70-225 bar
Std setting 100 bar.
**35** - 200-350 bar
Std setting 210 bar.

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.
**SV** - Viton (For high temperature and most special fluid applications made at 4.8 L/min

## 6 Pilot ratio

**4** - 4:1 (Standard)
**8** - 8:1

## 7 Body material

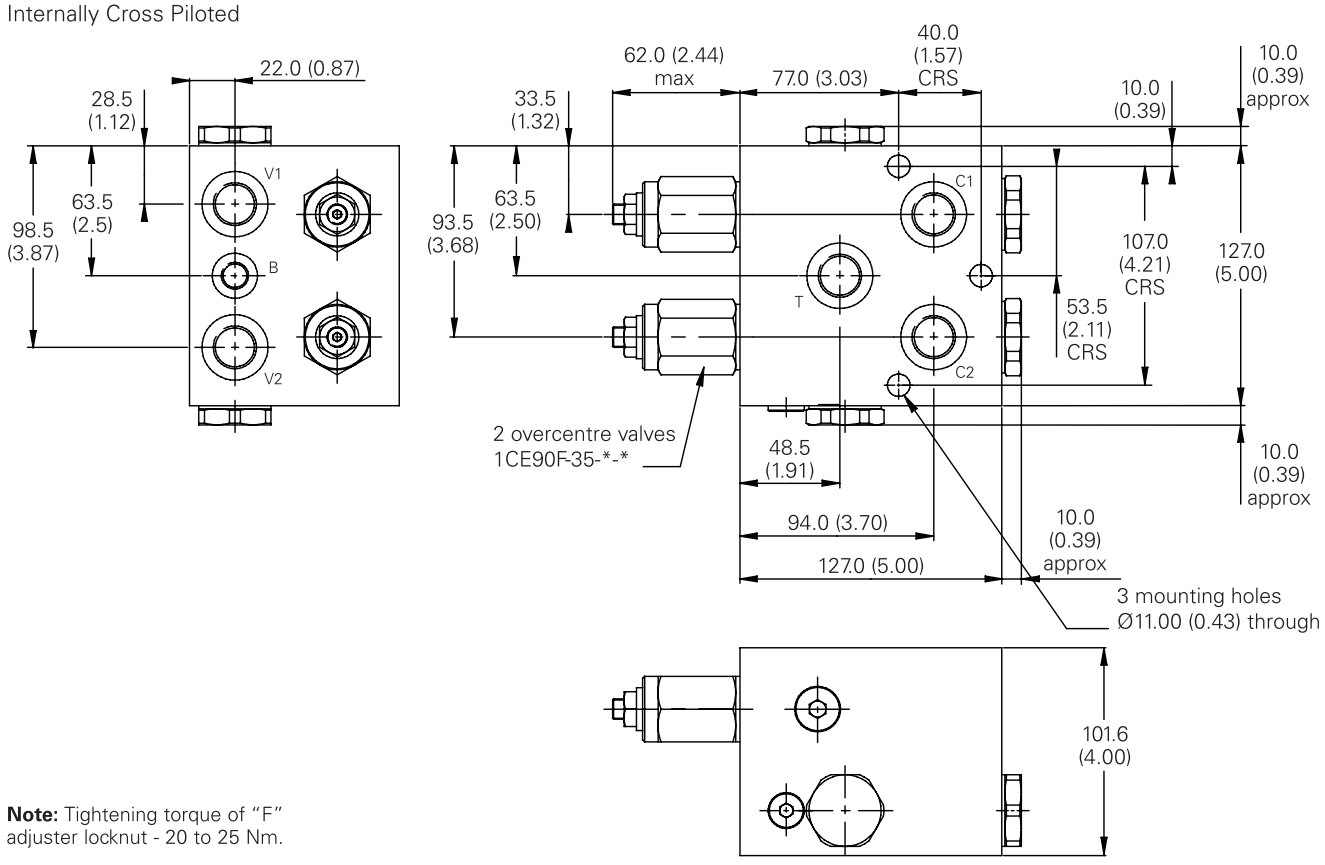
**377** - Steel

F

## Dimensions

mm (inch)

**Complete valve**
3/4" Ports
Basic Code
1CEECSH95
Internally Cross Piloted

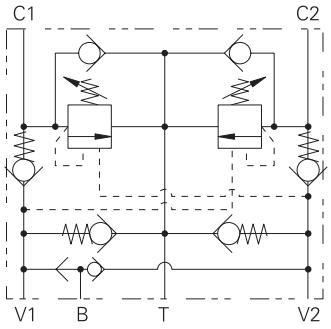



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEECSH150 - Motion control & lock valve

Pilot assisted relief with brake shuttle
150 L/min (40 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

A system of check valves allows crossline relief for dynamic applications with the optional make up facility to compensate for any change in system volume.

## Features

This valve provides complete circuit control and protection as with the standard motion control valve but has the addition of a brake release shuttle and brake port contained in a single body.

## Pilot ratio

3.5:1 Best suited for applications where load varies and machine structure can induce instability.

## Description

Motion control and lock valves give static and dynamic control by regulating the flow into and out of hydraulic actuators. When installed close to an actuator, the valve can stop runaway in the event of hose burst. The valves also give dual thermal and overload relief protection.

A low pressure tank or charge line may be connected to the T port to provide a make-up flow to either actuator port.

The shuttle valve provides a signal from the high pressure side of the actuator to release sprung applied brakes.

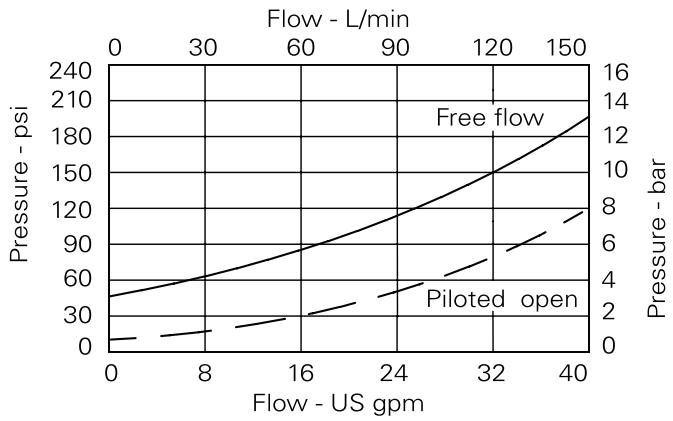
## Performance data

**Ratings and specifications**

| *Performance data is typical with fluid at 32 cST (150 SUS)* | |
|---|---|
| Rated flow | 150 L/min (40 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel<br>External surfaces electroless nickel plated |
| Standard housing materials | Steel |
| Mounting position | Line mounted |
| Weight | 3.7 kg (8.2 lbs) |
| Seal kit | SK813 (Nitrile)<br>SK813V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.3 ml/min (5 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

### Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEECSH150 - Motion control & lock valve

Pilot assisted relief with brake shuttle
150 L/min (40 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEECSH150 – F 8W – 35 S 3 377**

1 2 3 4 5 6 7

## 1 Basic code

**1CEECSH150** - Cartridges and body

## 2 Adjustment means

**F** - Screw adjustment

## 3 Port size

| Code | Port size | Housing number - body only |
|---|---|---|
| | | **Steel** |
| **8W** | 1" BSP valve & cyl port. 1/4" BSP brake port | BXP15930-8W-S-377 |

## 4 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.
**35** - 70-35 bar
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.
**SV** - Viton (For high temperature and most special fluid applications made at 4.8 L/min

## 6 Pilot ratio

**3** - 3.5:1

## 7 Body material

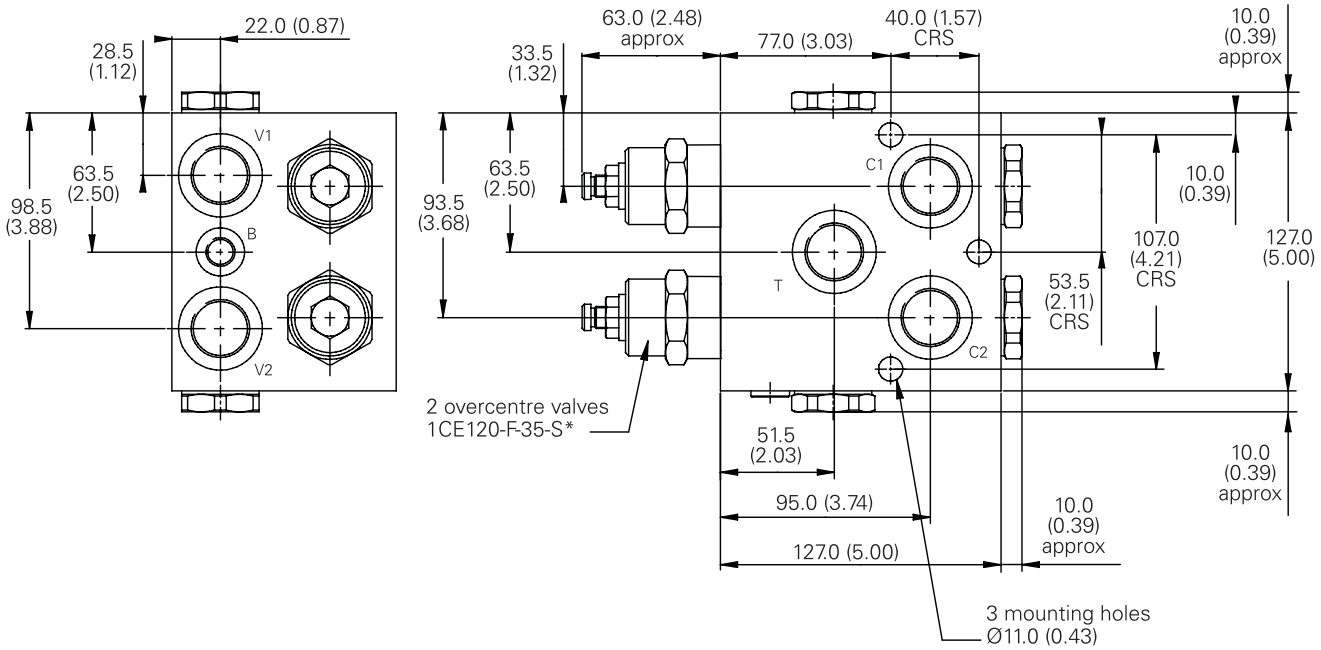
**377** - Steel

F

## Dimensions

mm (inch)

**Complete valve**
1 Port
Basic Code
1CEECSH150
Internally Cross Piloted

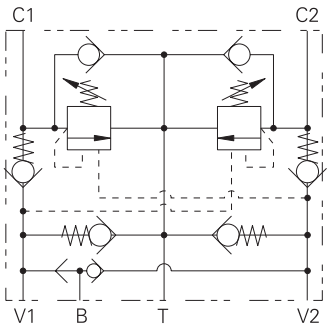



**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEECSH350 - Motion control & lock valve

Pilot assisted relief with brake shuttle
350 L/min (80 USgpm) • 270 bar (4000 psi)




## Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as ollows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

A system of check valves allows crossline relief for dynamic applications with the optional make up facility to compensate for any change in system volume.

## Features

This valve provides complete circuit control and protection as with the standard motion control valve but has the addition of a brake release shuttle and brake port contained in a single body.

## Pilot ratio

3:1 (standard) Best suited for applications where load varies and machine structure can induce instability.

8:1 Best suited for applications where the load remains relatively constant.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 350 L/min (80 USgpm) |
| Max relief pressure | 350 bar (5000 psi) |
| Max load induced pressure | 270 bar (4000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated. |
| Standard housing materials | Steel |
| Mounting position | Line mounted |
| Weight | 8.2 kg (18.0 lbs) |
| Seal kit | SK635 (Nitrile)<br>SK635V (Viton®) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 4 ml/min (60 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

Viton is a registered trademark of E.I. DuPont.

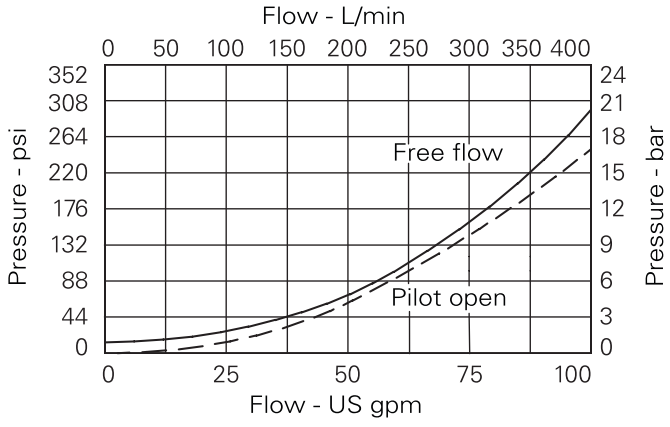
## Description

Motion control and lock valves give static and dynamic control by regulating the flow into and out of hydraulic actuators. When installed close to an actuator, the valve can stop runaway in the event of hose burst. The valves also give dual thermal and overload relief protection.

A low pressure tank or charge line may be connected to the T port to provide a make-up flow to either actuator port.

The shuttle valve provides a signal from the high pressure side of the actuator to release sprung applied brakes.

## Pressure drop




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEECSH350 - Motion control & lock valve

Pilot assisted relief with brake shuttle
350 L/min (80 USgpm) • 270 bar (4000 psi)

**Model code**

**1CEECSH350 – F 10W – 35 S 3 377**

1 2 3 4 5 6 7

## 1 Basic code

**1CEECSH350** - Cartridges and body

## 2 Adjustment means

**F** - Screw adjustment

## 3 Port size

| Code | Port size | Housing number - body only |
|---|---|---|
| | | Steel |
| **10W** | 1 1/4" BSP valve & cyl port. 1/4" BSP brake port | DXP22047-10W-S-377 |

## 4 Pressure range

**Note:** Code based on pressure in bar.
**35** - 70-350 bar
Std setting 210 bar

Std setting made at 4.8 L/min

## 5 Seals

**S** - Nitrile (For use with most industrial hydraulic oils.
**SV** - Viton (For high temperature and most special fluid applications made at 4.8 L/min

## 6 Pilot ratio

**3** - 3:1 Standard
**8** - 8:1

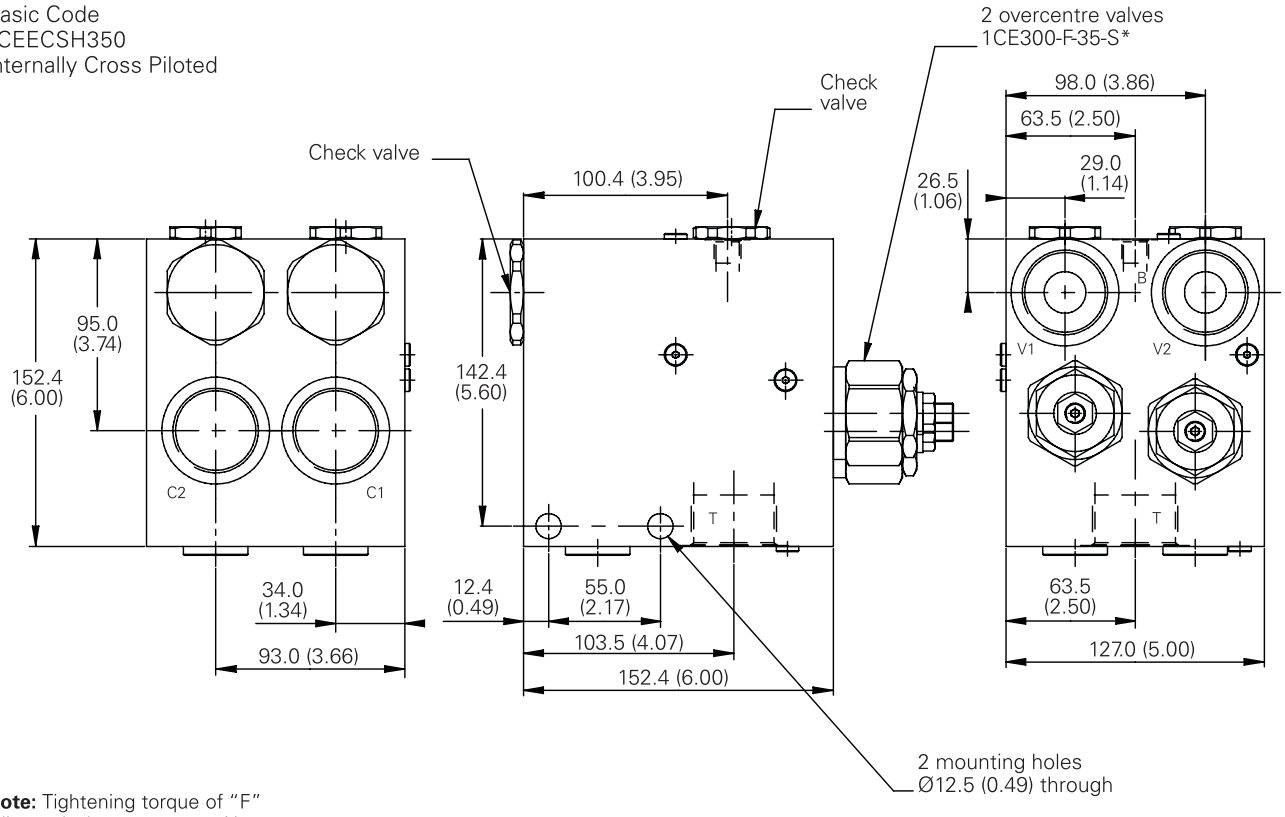
## 7 Body material

**377** - Steel

## Dimensions

mm (inch)

**Complete valve**
1 1/4" Ports
Basic Code
1CEECSH350
Internally Cross Piloted




**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL - BoomLoc valves

Hose burst protection (REF: ISO8643)

The valves function is to prevent uncontrolled lowering of the boom in the event of hose rupture.

These valves comply with International Standard ISO8643 for hydraulic excavators and backhoe loaders incorporating servo pilot systems. The valves' function is to prevent uncontrolled towering of the boom in the event of hose rupture. Closure of the valve is activated by bringing the main control valve lever to the neutral position.
By separating the relief and pilot function into two individual cartridges, the pilot cartridge has no relieving function, hence any load on the valve does not affect its opening characteristics. Consequently, the valve will always open at the same pilot pressure/joystick position, regardless of load. This feature enables the valve to be tuned to open in harmony with the machine's own main control valve, giving better control.

The pilot cartridge is generally set to dwell 1 to 2 bar behind the main control valve, therefore the Integrated Hydraulics valve takes control in the event of hose failure.

When fitted to the arm/dipper cylinder, this dwell behind the main control valve prevents acceleration when 'arm down' is selected.

Fig. 1 and 2 show typical circuits utilizing these components.

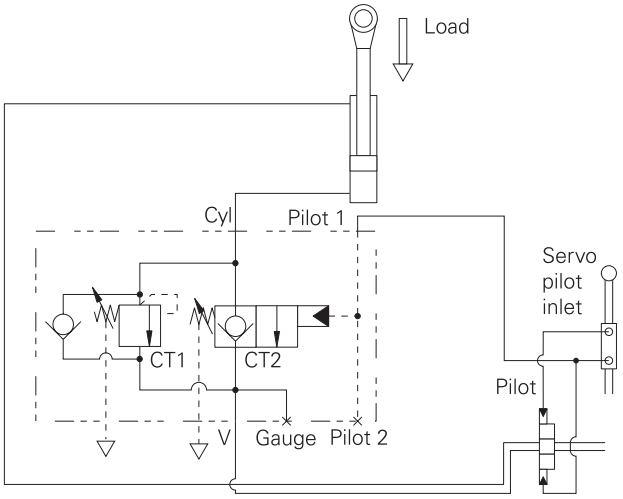
Line mountings or SAE flange mountings are available for direct fitment to the actuator. Where line mounted models are used it is essential that steel pipes are used between the valve and the actuator.

All components are manufactured in steel and are electroplated for corrosion protection.

## Typical circuit

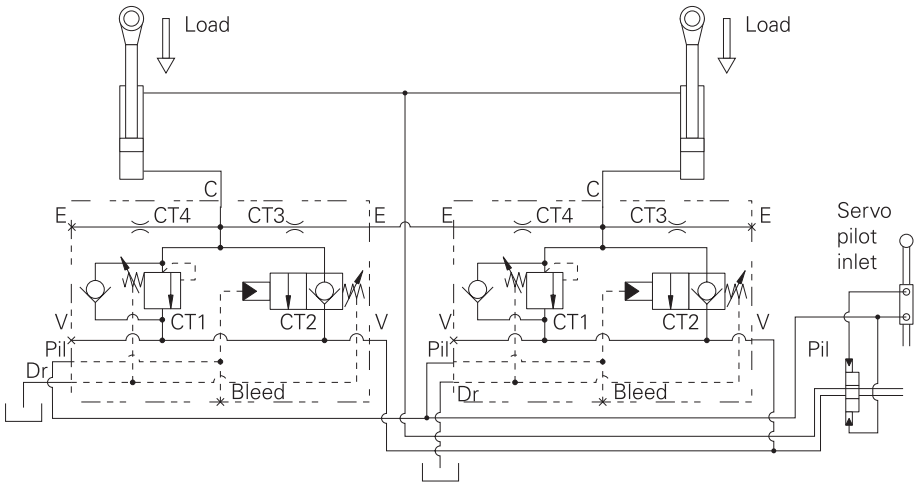
### Compact machinery

(see page F-640 to F-650)
For flows up to 30 and 40 L/min
**Fig. 1**




### Heavy machinery

(see page F-600 to F-630)
For flows up to 250, 350 and 550 L/min
**Fig. 2**



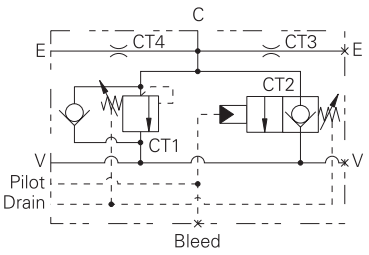

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CEBL256 - BoomLoc valve

Hose burst protection, flange mounted with independent pilot control (Ref. ISO 8643)
250 L/min (66 USgpm) • 350 bar (5000 psi)




## Operation

By connecting the hose rupture valve pilot in parallel with the directional spool valve pilot, and adjusting the opening characteristics of the hose rupture valve to suit that of the spool valve "BoomLoc" may be set so as not to interfere with the normal operation of the machine.

Fine adjustment of the pilot pressure permits the optimum setting to be made in differing operating systems.

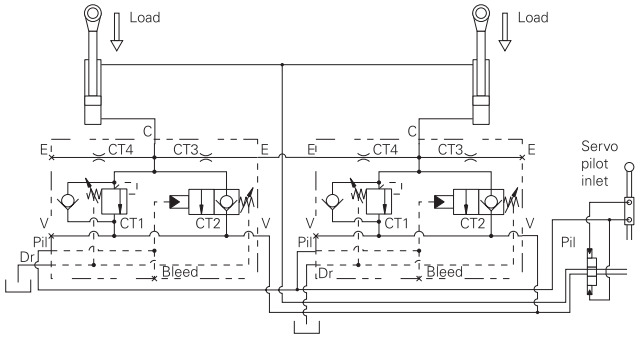
Both the pilot and the relief sections are unaffected by back pressure, enabling the service line relief's to operate normally. In the event of hose failure, the control will be passed from the main spool to the "BoomLoc" valve, maintaining control of the cylinder.

Regardless of the load the pilot pressure requirement remains constant as the valve is unaffected by load induced pressure, the poppet being fully balanced with zero differential area.

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Typical circuit




F

## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 250 L/min (66 USgpm) |
| Max setting | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn mild steel bar.<br>Zinc plated and passivated. |
| Mounting position | Flange mounted |
| Weight | 7.5 kg (16.5 lbs) |
| Seal kit | SK1162P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.6 ml/min (10 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL256 - BoomLoc valve

Hose burst protection, flange mounted with independent pilot control (Ref. ISO 8643)
250 L/min (66 USgpm) • 350 bar (5000 psi)

**Model code**

**1CEBL256 – F 3/4 6 – 35 P**

1 2 3 4 5 6

### 1 Basic code
**1CEBL256** - Cartridges and body

### 2 Adjustment means
**F** - Screw adjustment

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

### 3 Port size
**3/4** - 3/4" SAE flange cylinder port slotted for 3000 & 6000)
3/4" SAE Flange valve port (thread G1/2)
1/8" BSP bleed port
1/4" BSP all other ports

### 4 SAE port type
**6** - SAE 6000 (Valve port)

### 5 Pressure range @ 4.8 L/min
**Note:** Code based on pressure in bar.
**35** - 70-350 bar.
Std setting 350 bar

Std setting made at 4.8 L/min

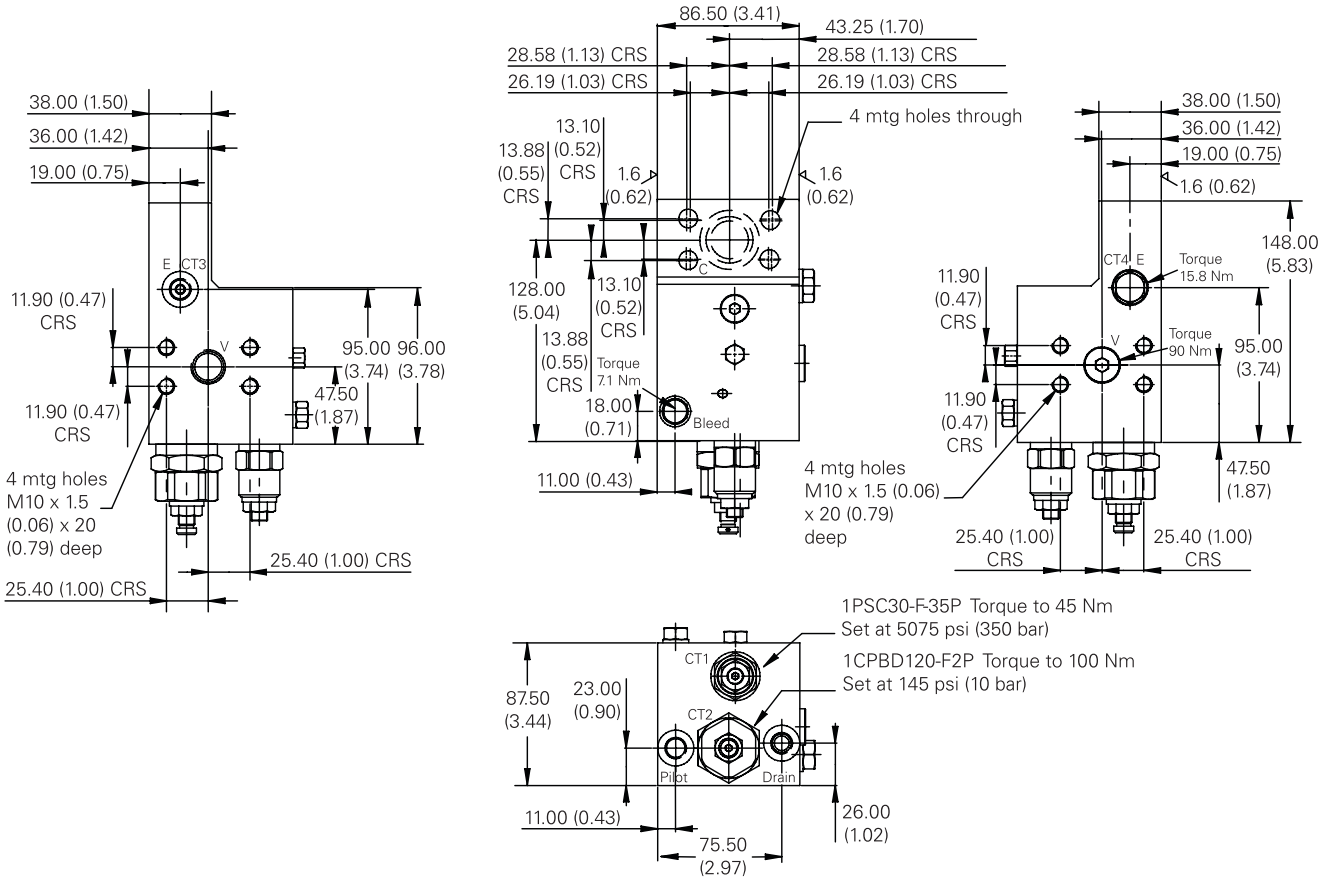
### 6 Seals
**P** -Contains polyurethane and standard seal.

## Dimensions
mm (inch)

**Flange mounted**
Basic Code
**1CEBL256**

**Note:** Cylinder port bolt holes are slotted for fitment to both SAE 3000 & SAE 6000 mounting faces.

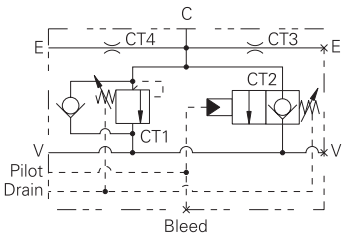
**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.



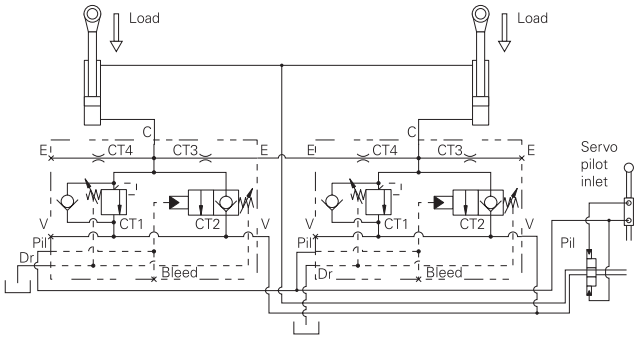

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL356 - BoomLoc valve

Hose burst protection, flange mounted with independent pilot control (Ref. ISO 8643)
350 L/min (92 USgpm) • 350 bar (5000 psi)




## Typical circuit




## Operation

By connecting the hose rupture valve pilot in parallel with the directional spool valve pilot, and adjusting the opening characteristics of the hose rupture valve to suit that of the spool valve "BoomLoc" may be set so as not to interfere with the normal operation of the machine.

Fine adjustment of the pilot pressure permits the optimum setting to be made in differing operating systems.

Both the pilot and the relief sections are unaffected by backpressure, enabling the service line relief's to operate normally. In the event of hose failure, the control will be passed from the main spool to the "BoomLoc" valve, maintaining control of the cylinder.

Regardless of the load the pilot pressure requirement remains constant as the valve is unaffected by load induced pressure, the poppet being fully balanced with zero differential area.

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 350 L/min (92 USgpm) |
| Max setting | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn M.S. bar zinc plated and passivated |
| Mounting position | Flange mounted |
| Weight | 7.5 kg (16.5 lbs) |
| Seal kit | SK1161P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to 90°C  (-22° to +194°F) |
| Internal leakage | 0.6 ml/min (10 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL356 - BoomLoc valve

Hose burst protection, flange mounted with independent pilot control (Ref. ISO 8643)
350 L/min (92 USgpm) • 350 bar (5000 psi)

**Model code**

**1CEBL356 – F 1 6 – 35 P**

1 2 3 4 5 6

### 1 Basic code

**1CEBL356** - Cartridges and body

### 2 Adjustment means

**F** - Screw adjustment

For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

### 3 Port size

**1** - 1" SAE Flange cylinder port (slotted for 3000 & 6000)
1" SAE Flange valve port (thread G3/4)
1/8" BSP bleed port
1/4" BSP all other ports

### 4 SAE port type

**6** - SAE 6000 (valve port)

### 5 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.
**35** - 70-350 bar.
Std setting 350 bar

Std setting made at 4.8 L/min

### 6 Seals

**P** -Contains polyurethane and standard seal.

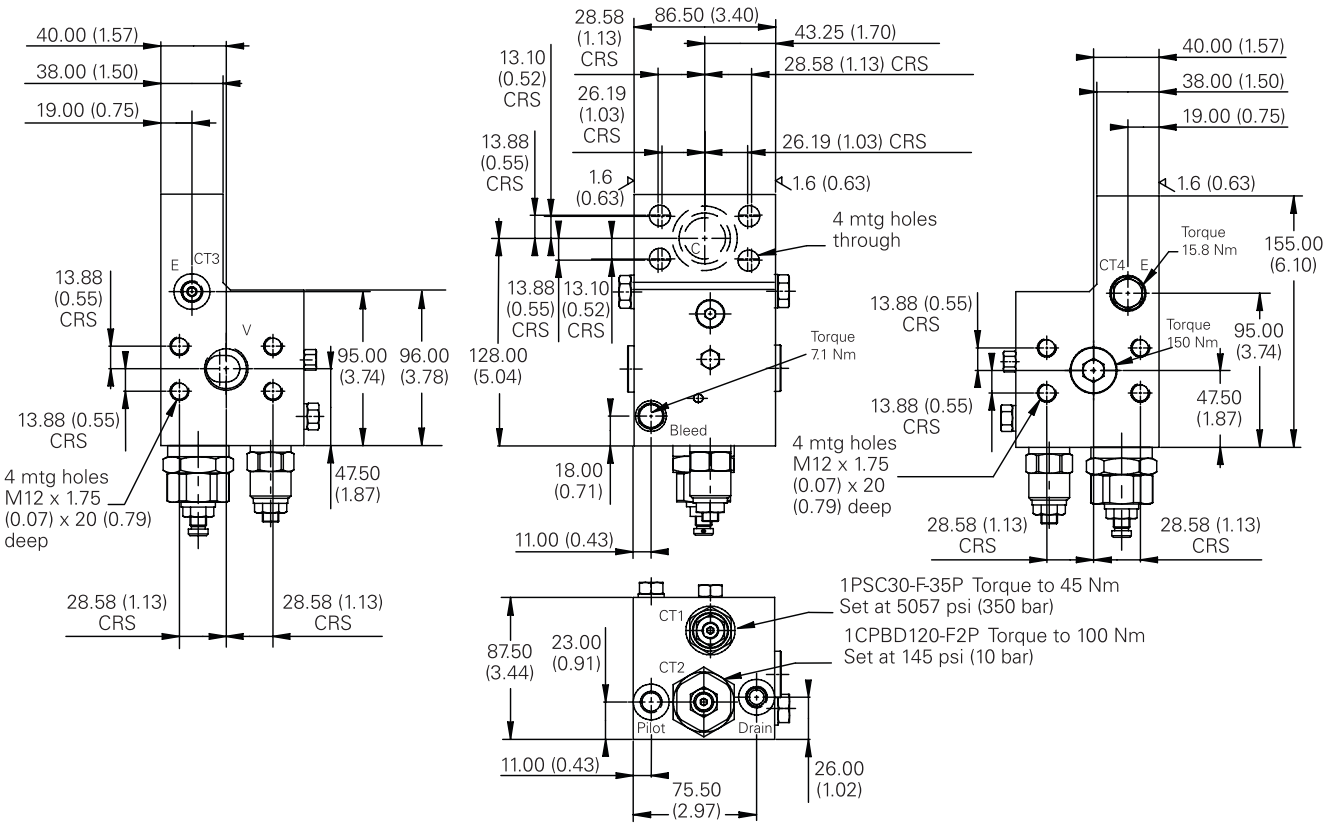
## Dimensions

mm (inch)

**Complete valve**
Flange Mounted
Basic Code
1CEBL356

**Note:** Cylinder port bolt holes are slotted for fitment to both SAE 3000 & SAE 6000 mounting faces.

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.



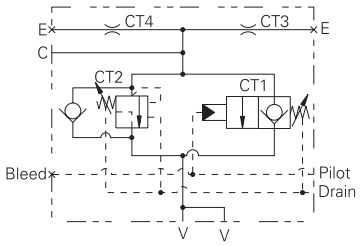

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



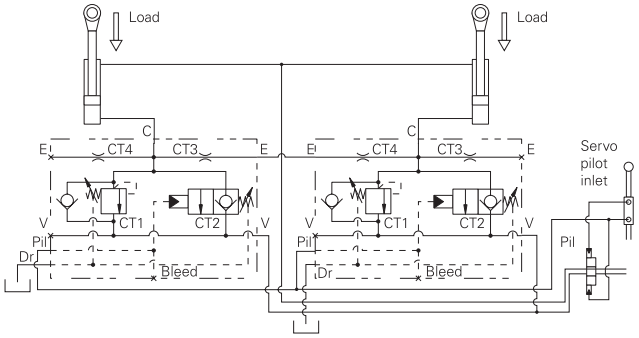
F

# 1CEBL556 - BoomLoc valve

Hose burst protection, flange mounted with independent pilot control (Ref. ISO 8643)
550 L/min (145 USgpm) • 400 bar (5800 psi)




## Typical circuit




## Operation

By connecting the hose rupture valve pilot in parallel with the directional spool valve pilot, and adjusting the opening characteristics of the hose rupture valve to suit that of the spool valve "BoomLoc" may be set so as not to interfere with the normal operation of the machine. Fine adjustment of the pilot pressure permits the optimum setting to be made in differing operating systems.

Both the pilot and the relief sections are unaffected by backpressure, enabling the service line relief's to operate normally. In the event of hose failure, the control will be passed from the main spool to the "BoomLoc" valve, maintaining control of the cylinder.

Regardless of the load the pilot pressure requirement remains constant as the valve is unaffected by load induced pressure, the poppet being fully balanced with zero differential area.

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 550 L/min (145 USgpm) |
| Max setting | 400 bar (5800 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn M.S. bar zinc plated and passivated |
| Mounting position | Flange mounted |
| Weight | 21 kg (46.2 lbs) |
| Seal kit | SK1163P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 4.3 ml/min (70 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL556 - BoomLoc valve

Hose burst protection, flange mounted with independent pilot control (Ref. ISO 8643)
550 L/min (145 USgpm) • 400 bar (5800 psi)

**Model code**

**1CEBL556 – F 5/4 6 – 40 P**

1 2 3 4 5 6

### 1 Basic code

**ICEBL556** - Cartridges and body

### 2 Adjustment means

**F** - Screw adjustment

For fixed versions add setting in 10 bar increments to end of part number. Subject to a +/-10% tolerance.

### 3 Port size

**5/4** - 1 1/4" SAE Flange cylinder port
1 1/4" SAE Flange valve port
1/4" BSP all other ports

### 4 SAE port type

**6** - SAE 6000

### 5 Pressure range @ 4.8 L/min

**Note:** Code based on pressure in bar.
**40** - 70-400 bar.
Std setting 350 bar

Std setting made at 4.8 L/min

### 6 Seals

**P** -Contains polyurethane and standard seal.

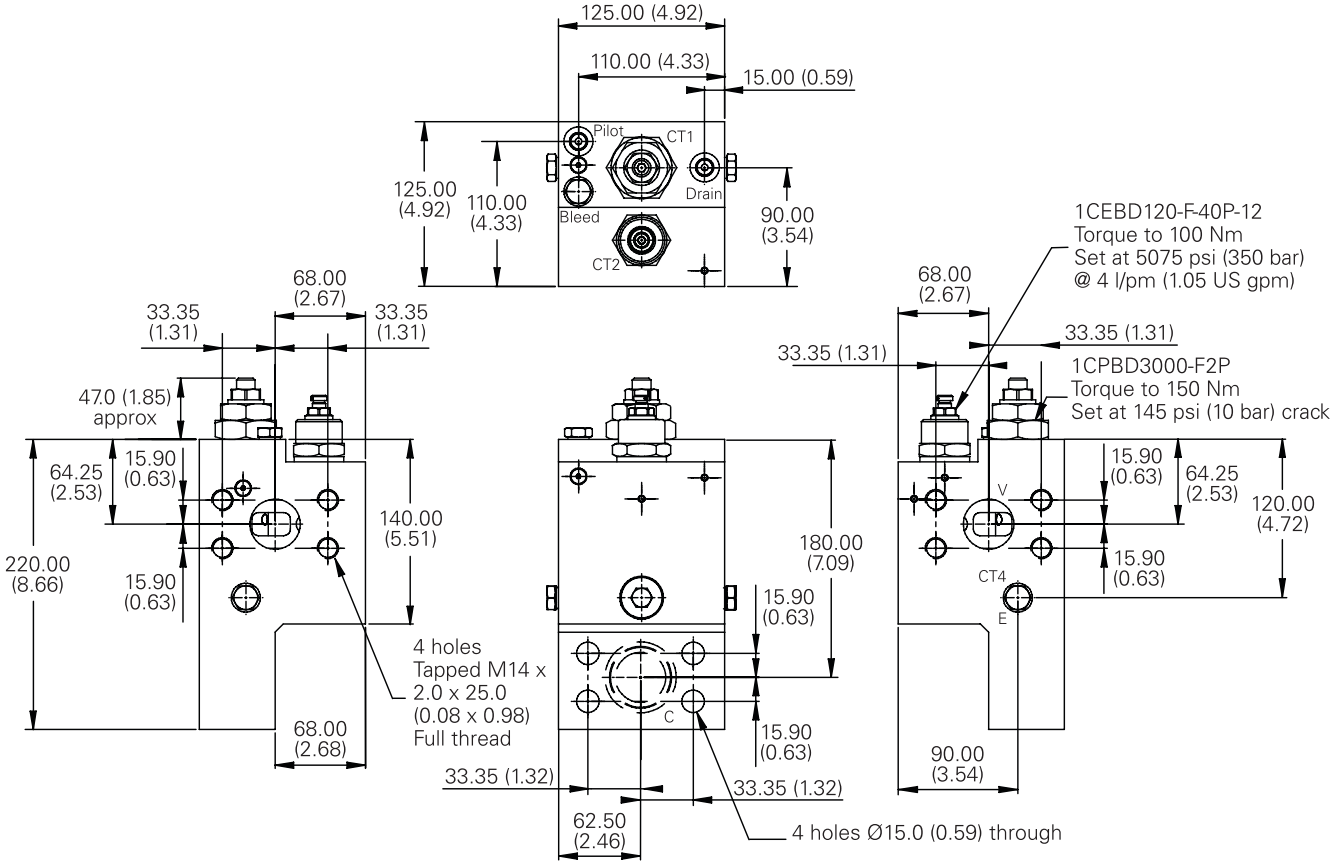
## Dimensions

mm (inch)

**Complete valve**
Flange Mounted
Basic Code
1CEBL356

**Note:** Cylinder port bolt holes are slotted for fitment to both SAE 3000 & SAE 6000 mounting faces.

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.



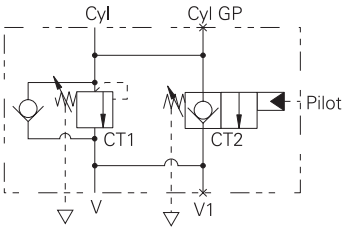

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CEBL31 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
30 L/min (8 USgpm) • 350 bar (5000 psi)




## Operation

By connecting the hose rupture valve pilot in parallel with the directional spool valve pilot, and adjusting the opening characteristics of the hose rupture valve to suit that of the spool valve "BoomLoc" may be set so as not to interfere with the normal operation of the machine. Fine adjustment of the pilot pressure permits the optimum setting to be made in differing operating systems.

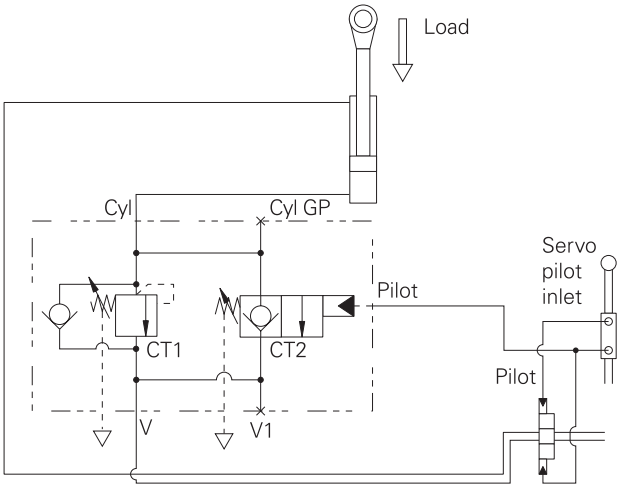
Both the pilot and the relief sections are unaffected by backpressure, enabling the service line relief's to operate normally. In the event of hose failure, the control will be passed from the main spool to the "BoomLoc" valve, maintaining control of the cylinder.

Regardless of the load the pilot pressure requirement remains constant as the valve is unaffected by load induced pressure, the poppet being fully balanced with zero differential area.

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Typical circuit




## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C  Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max setting | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn M.S. bar zinc plated and passivated |
| Mounting position | Line mounted |
| Weight | 2 kg (4.4 lbs) |
| Seal kit | SK1164P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to 90°C (-22° to +194°F) |
| Internal leakage | 0.6 ml/min (10 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL31 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
30 L/min (8 USgpm) • 350 bar (5000 psi)

## Model code

**1CEBL31 – F 3W – 35 P**

1 2 3 4 5

### 1 Basic code
**1CEBL31** - Cartridges and body

### 2 Adjustment means
**F** - Screw adjustment

For fixed versions add setting in 10 bar increments to end of part number. Subject to a +/-10% tolerance.

### 3 Port size
**3W** - 3/8" BSP cylinder port
3/8" BSP valve port
1/4" BSP all other ports

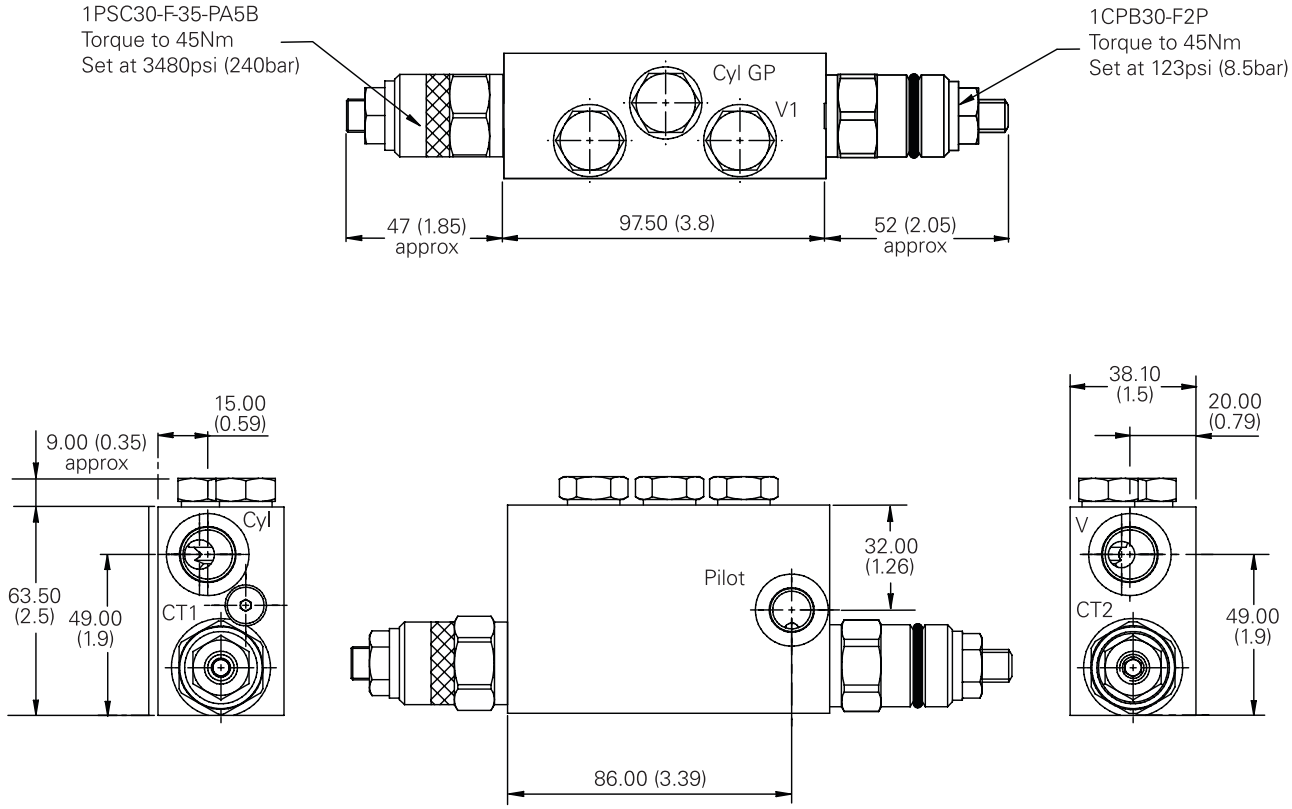
### 4 Pressure range @ 4.8 L/min
**Note:** Code based on pressure in bar.
**35** - 70-350 bar.
Std setting 240 bar

### 5 Seals
P -Contains polyurethane and standard seal.

## Dimensions
mm (inch)

**Complete valve**
Line Mounted (Ref ISO 8643)
Basic Code
1CEBL31

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.



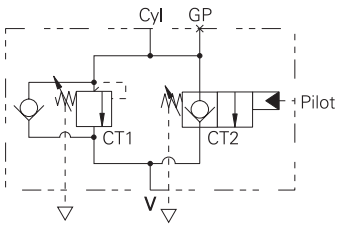

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CEBL31 - BoomLoc valve

Hose burst protection, flange mounted with independent pilot control (Ref. ISO 8643)
30 L/min (8 USgpm) • 350 bar (5000 psi)




## Operation

By connecting the hose rupture valve pilot in parallel with the directional spool valve pilot, and adjusting the opening characteristics of the hose rupture valve to suit that of the spool valve "BoomLoc" may be set so as not to interfere with the normal operation of the machine. Fine adjustment of the pilot pressure permits the optimum setting to be made in differing operating systems.

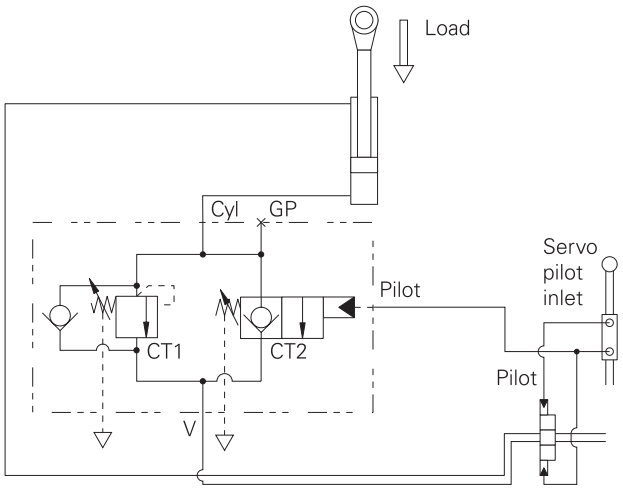
Both the pilot and the relief sections are unaffected by backpressure, enabling the service line relief's to operate normally. In the event of hose failure, the control will be passed from the main spool to the "BoomLoc" valve, maintaining control of the cylinder.

Regardless of the load the pilot pressure requirement remains constant as the valve is unaffected by load induced pressure, the poppet being fully balanced with zero differential area.

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Typical circuits




## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max setting | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn M.S. bar zinc plated and passivated |
| Mounting position | Flange mounted |
| Weight | 2 kg (4.4 lbs) |
| Seal kit | SK1165P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.6 ml/min (10 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL31 - BoomLoc valve

Hose burst protection, flange mounted with independent pilot control (Ref. ISO 8643)
30 L/min (8 USgpm) • 350 bar (5000 psi)

**Model code**

**1CEBL31 – F 1/2 – 6 – 35 P**

1 2 3 4 5 6

**1 Basic code**
**1CEBL31** - Cartridges and body

**2 Adjustment means**
**F** - Screw adjustment
For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

**3 Port size**
**1/2** - 1/2" SAE flange
3/8" BSP valve port
1/4" BSP all other ports

**4 SAE port type**
**6** - SAE 6000

**5 Pressure range @ 4.8 L/min**
**Note:** Code based on pressure in bar.
**35** - 70-350 bar.
Std setting 240 bar
Std setting made at 4.8 L/min

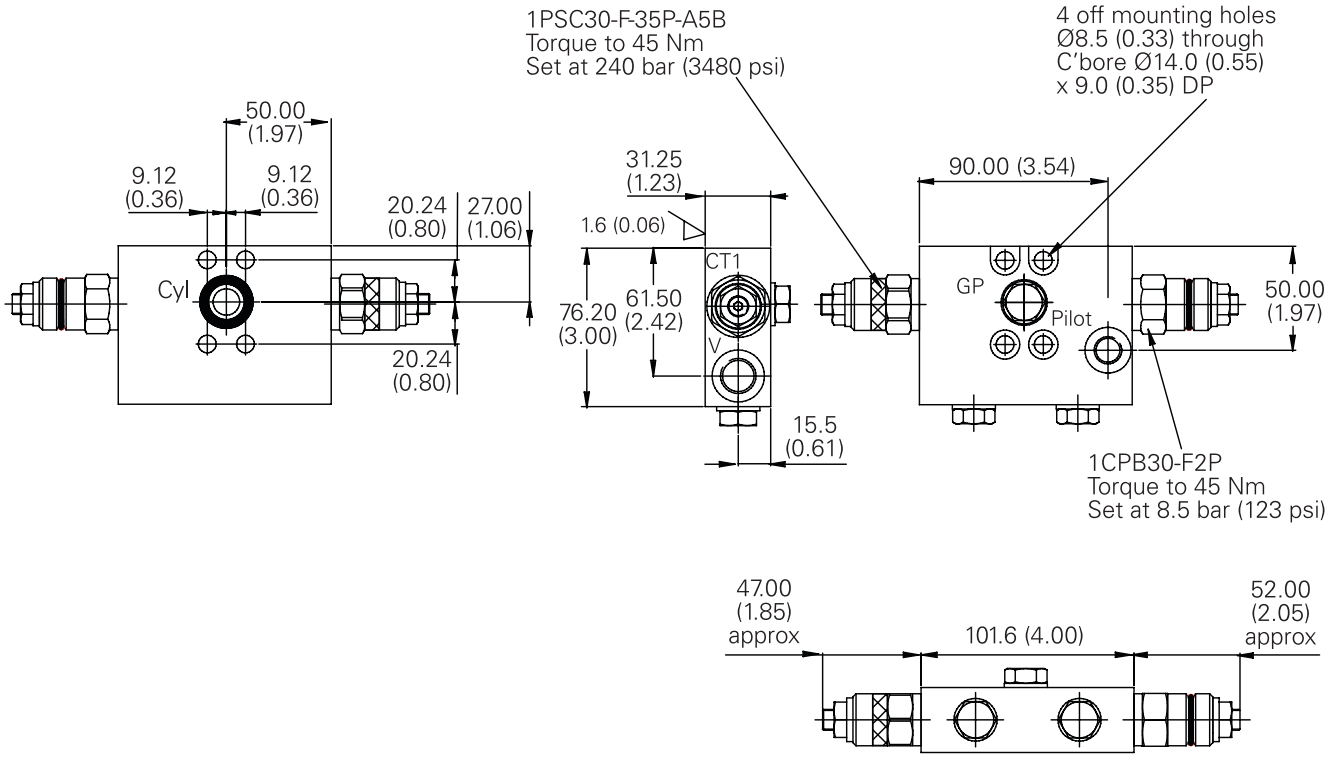
**6 Seals**
**P** -Contains polyurethane and standard seal.

## Dimensions

mm (inch)

**Complete valve**
Flange Mounted
Basic Code
1CEBL31

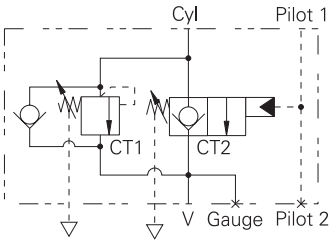
**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL31 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
30 L/min (8 USgpm) • 350 bar (5000 psi)




## Operation

By connecting the hose rupture valve pilot in parallel with the directional spool valve pilot, and adjusting the opening characteristics of the hose rupture valve to suit that of the spool valve "BoomLoc" may be set so as not to interfere with the normal operation of the machine. Fine adjustment of the pilot pressure permits the optimum setting to be made in differing operating systems.

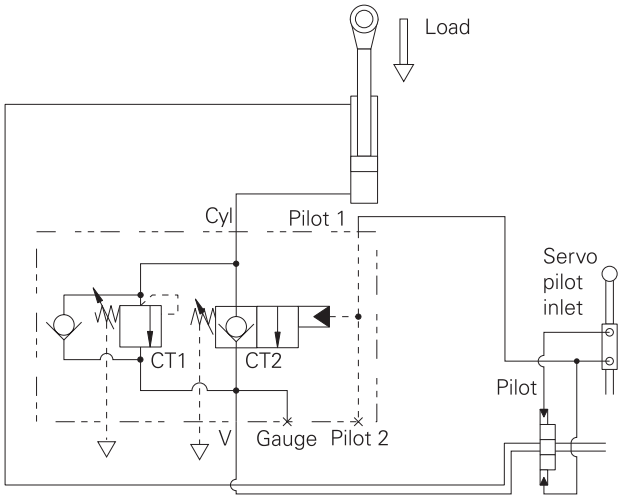
Both the pilot and the relief sections are unaffected by backpressure, enabling the service line relief's to operate normally. In the event of hose failure, the control will be passed from the main spool to the "BoomLoc" valve, maintaining control of the cylinder.

Regardless of the load the pilot pressure requirement remains constant as the valve is unaffected by load induced pressure, the poppet being fully balanced with zero differential area.

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Typical circuit




## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 30 L/min (8 USgpm) |
| Max setting | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn M.S. bar zinc plated and passivated |
| Mounting position | Line mounted |
| Weight | 2 kg (4.4 lbs) |
| Seal kit | SK1164P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to 90°C (-22° to +194°F) |
| Internal leakage | 0.6 ml/min (10 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL31 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
30 L/min (8 USgpm) • 350 bar (5000 psi)

**Model code**

**1CEBL31 – F 4W – 35 P**

1 2 3 4 5

**1 Basic code**
**1CEBL31** - Cartridges and body

**2 Adjustment means**
**F** - Screw adjustment
For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

**3 Port size**
**4W** - 1/2" BSP cylinder port
1/2" BSP valve port
1/4" BSP all other ports

**4 Pressure range @ 4.8 L/min**
**Note:** Code based on pressure in bar.
**35** - 70-350 bar.
Std setting 280 bar
Std setting made at 4.8 L/min

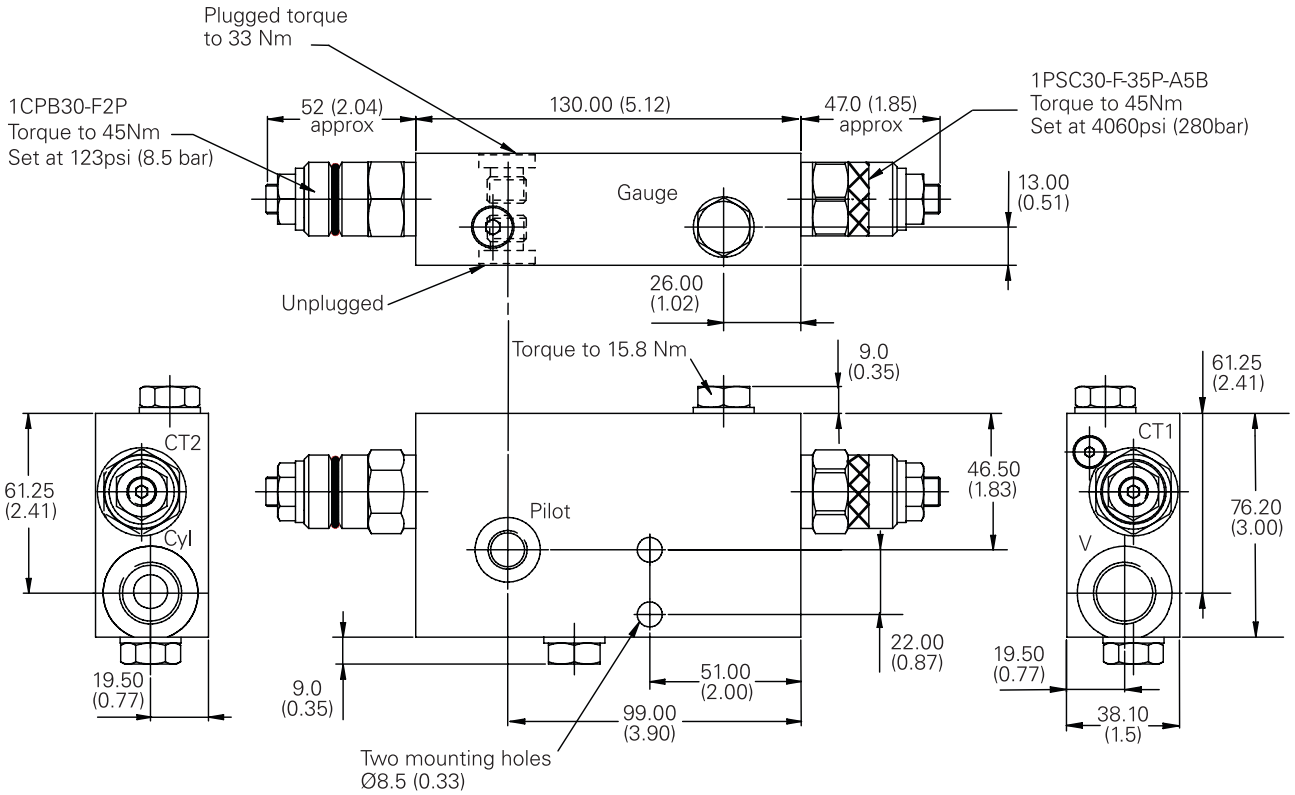
**5 Seals**
**P** -Contains polyurethane and standard seal.

## Dimensions

mm (inch)

**Complete valve**
Line Mounted
Basic Code
1CEBL31

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.



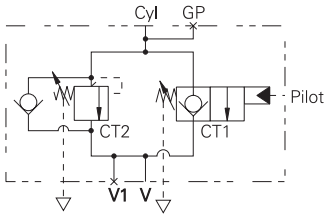

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*



F

# 1CEBL91 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
90 L/min (24 USgpm) • 350 bar (5000 psi)




## Operation

By connecting the hose rupture valve pilot in parallel with the directional spool valve pilot, and adjusting the opening characteristics of the hose rupture valve to suit that of the spool valve "BoomLoc" may be set so as not to interfere with the normal operation of the machine. Fine adjustment of the pilot pressure permits the optimum setting to be made in differing operating systems.

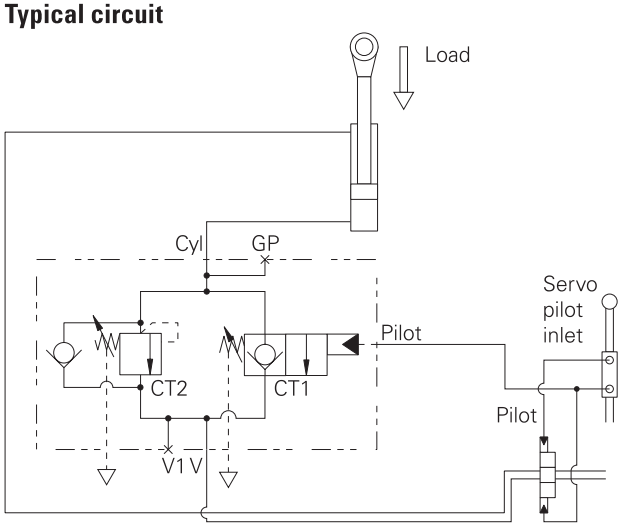
Both the pilot and the relief sections are unaffected by backpressure, enabling the service line relief's to operate normally. In the event of hose failure, the control will be passed from the main spool to the "BoomLoc" valve, maintaining control of the cylinder.

Regardless of the load the pilot pressure requirement remains constant as the valve is unaffected by load induced pressure, the poppet being fully balanced with zero differential area.

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Typical circuit




## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 90 L/min (24 USgpm) |
| Max setting | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn M.S. bar zinc plated and passivated |
| Mounting position | Line mounted |
| Weight | 3.5 kg (7.7 lbs) |
| Seal kit | SK1166P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to 90°C (-22° to +194°F) |
| Internal leakage | 0.6 ml/min (10 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL91 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
90 L/min (24 USgpm) • 350 bar (5000 psi)

**Model code**

**1CEBL91 – F 4W – 35 P**

1 2 3 4 5

**1 Basic code**

**1CEBL91** - Cartridges and body

**2 Adjustment means**

**F -** Screw adjustment
For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

**3 Port size**

**4W** - 1/2" BSP cylinder port
1/2" BSP valve port "V"
1/4" BSP "V1" & all other ports

**4 Pressure range @ 4.8 L/min**

**Note:** Code based on pressure in bar.
**35** - 70-350 bar.
Std setting 280 bar

Std setting made at 4.8 L/min

**5 Seals**

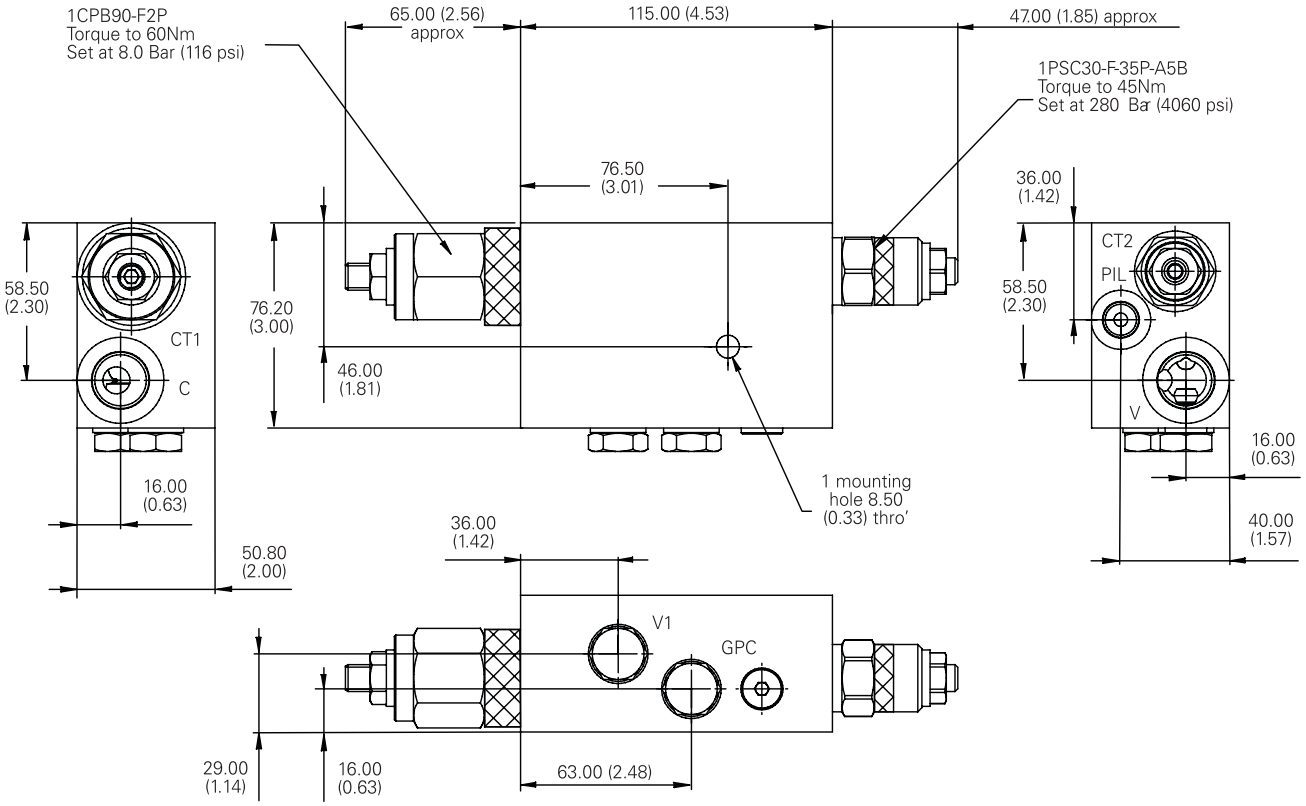
**P** -Contains polyurethane and standard seal.

## Dimensions

mm (inch)

**Complete valve**
Line Mounted
Basic Code
1CEBL91

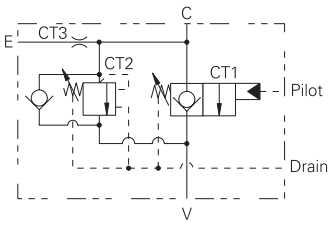
**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL151 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
150 L/min (40 USgpm) • 350 bar (5000 psi)




## Operation

By connecting the hose rupture valve pilot in parallel with the directional spool valve pilot, and adjusting the opening characteristics of the hose rupture valve to suit that of the spool valve "BoomLoc" may be set so as not to interfere with the normal operation of the machine. Fine adjustment of the pilot pressure permits the optimum setting to be made in differing operating systems.

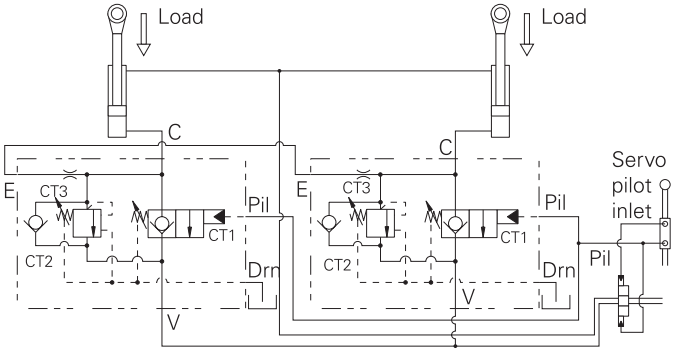
Both the pilot and the relief sections are unaffected by backpressure, enabling the service line relief's to operate normally. In the event of hose failure, the control will be passed from the main spool to the "BoomLoc" valve, maintaining control of the cylinder.

Regardless of the load the pilot pressure requirement remains constant as the valve is unaffected by load induced pressure, the poppet being fully balanced with zero differential area.

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Typical circuit




## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 150 L/min (40 USgpm) |
| Max setting | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn M.S. bar zinc plated and passivated |
| Mounting position | Line mounted |
| Weight | 3 kg (6.6 lbs) |
| Seal kit | SK947P (Polyurethane/Nitrile) |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 0.6 ml/min (10 dpm) |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL151 - BoomLoc Valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
150 L/min (40 USgpm) • 350 bar (5000 psi)

**Model code**

**1CEBL151 – F 4W – 35 P**

1 2 3 4 5

**1 Basic code**

**1CEBL151-** Cartridges and body

**2 Adjustment means**

**F -** Screw adjustment
For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

**3 Port size**

**4W -** 1/2" BSP cylinder port
1/2" BSP valve port
G1/8" all other ports

**4 Pressure range @ 4.8 L/min**

**Note:** Code based on pressure in bar.
**35** - 70-350 bar.
Std setting 260 bar
Std setting made at 4.8 L/min

**5 Seals**

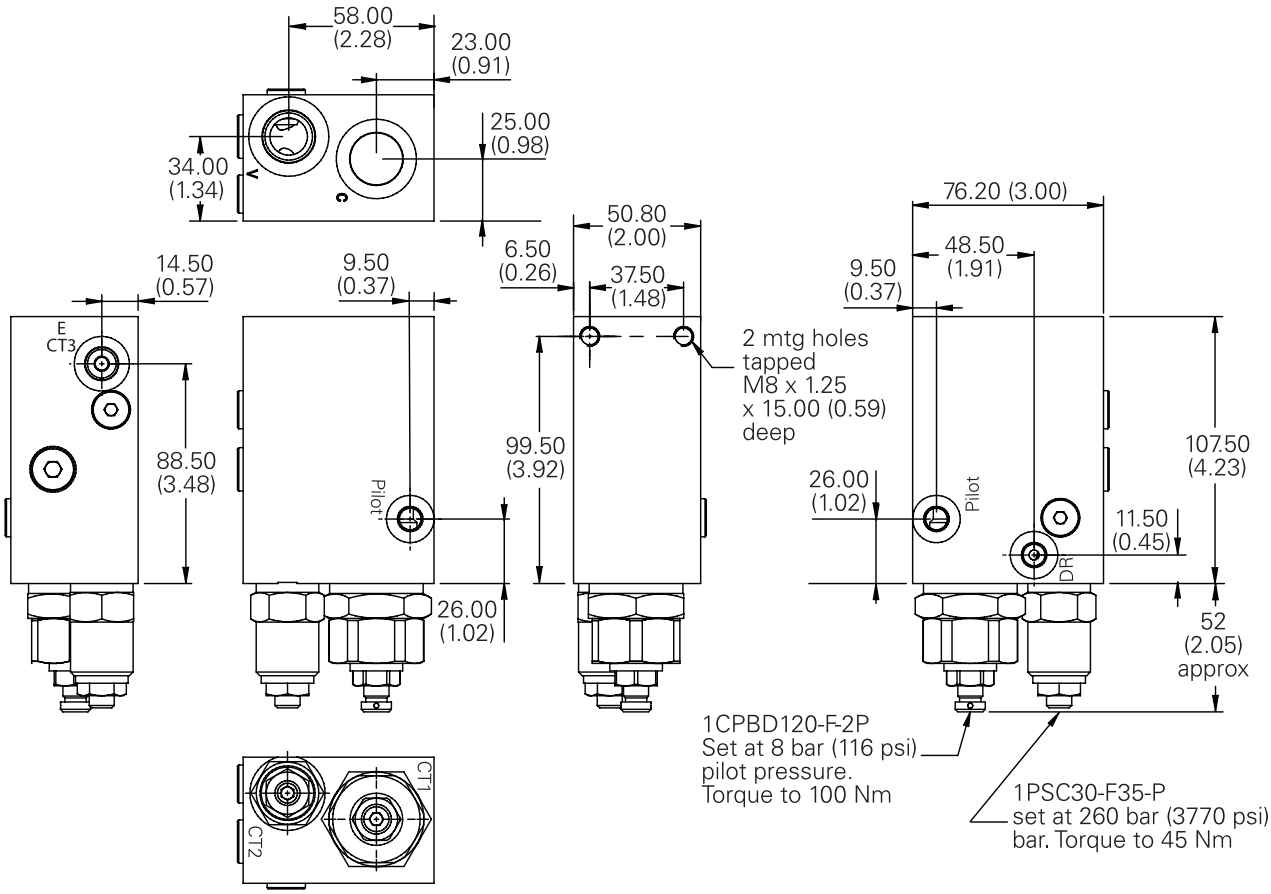
**P** -Contains polyurethane and standard seal.

## Dimensions

mm (inch)

**Complete valve**
Line Mounted
Basic Code
1CEBL151

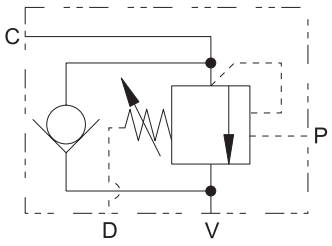
**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL153 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
150 L/min (40 USgpm) • 350 bar (5000 psi)




## Operation

By connecting the pilot line in parallel with the spool valve pilot, the high pilot ratio allows the valve to open just prior to the spool valve, ensuring that the valve does not interfere with the normal operation of the machine. Both the pilot and the relief sections are unaffected by back pressure, enabling the service line reliefs to operate normally, without interfering with the spool valve control as it meters the return flow. In the event of hose failure, the control will be passed from the main spool to the overcenter valve, maintaining control of the cylinder.

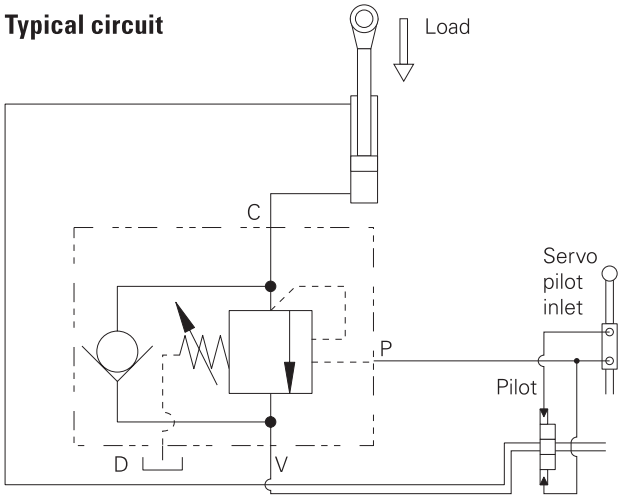
The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{\text{(Relief Setting) - (Load Pressure)}}{\text{Pilot Ratio}}$$

## Features

This is a compact design with good dirt tolerance. Hardened poppets and seats provide excellent load holding characteristics with all the advantages of the cartridge insert.

## Typical circuit




## Description

These overcenter valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.

They were designed to give relief, load holding and hose failure protection to systems where a pilot system controls the directional valves.

## Performance data

**Ratings and specifications**

| *Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)* | |
|---|---|
| Rated flow | 150 L/min (40 USgpm) |
| Max setting | 350 bar (5000 psi) |
| Cartridge material | Working parts hardened and ground steel.<br>External surfaces electroless nickel plated and passivated. |
| Standard housing materials | Bright drawn M.S. bar zinc plated and passivated |
| Mounting position | Mount directly to cylinder using steel pipe |
| Weight | 1.5 kg (3.3 lbs) |
| Seal kit | SK924P |
| Filtration | BS5540/4 Class 18/13 (25 micron nominal) |
| Temperature range | -30° to +90°C (-22° to +194°F) |
| Internal leakage | 1.5 ml/min |
| Nominal viscosity range | 5 to 500 cSt |

*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

# 1CEBL153 - BoomLoc valve

Hose burst protection, line mounted with independent pilot control (Ref. ISO 8643)
150 L/min (40 USgpm) • 350 bar (5000 psi)

## Model code

**1CEBL153 – F 4W – 35 P**

1 2 3 4 5

### 1 Basic code
**1CEBL153-** Cartridges and body

### 2 Adjustment means
**F** - Screw adjustment
For fixed versions add setting in 10 bar increments to end of part number. Subject to a ±10% tolerance.

### 3 Port size
**4W** - 1/2" BSP cylinder port
1/2" BSP valve port
1/4" BSP pilot port/drain port

### 4 Pressure range @ 4.8 L/min
**Note:** Code based on pressure in bar.
**35** - 70-350 bar.
Std setting 350 bar

Std setting made at 4.8 L/min

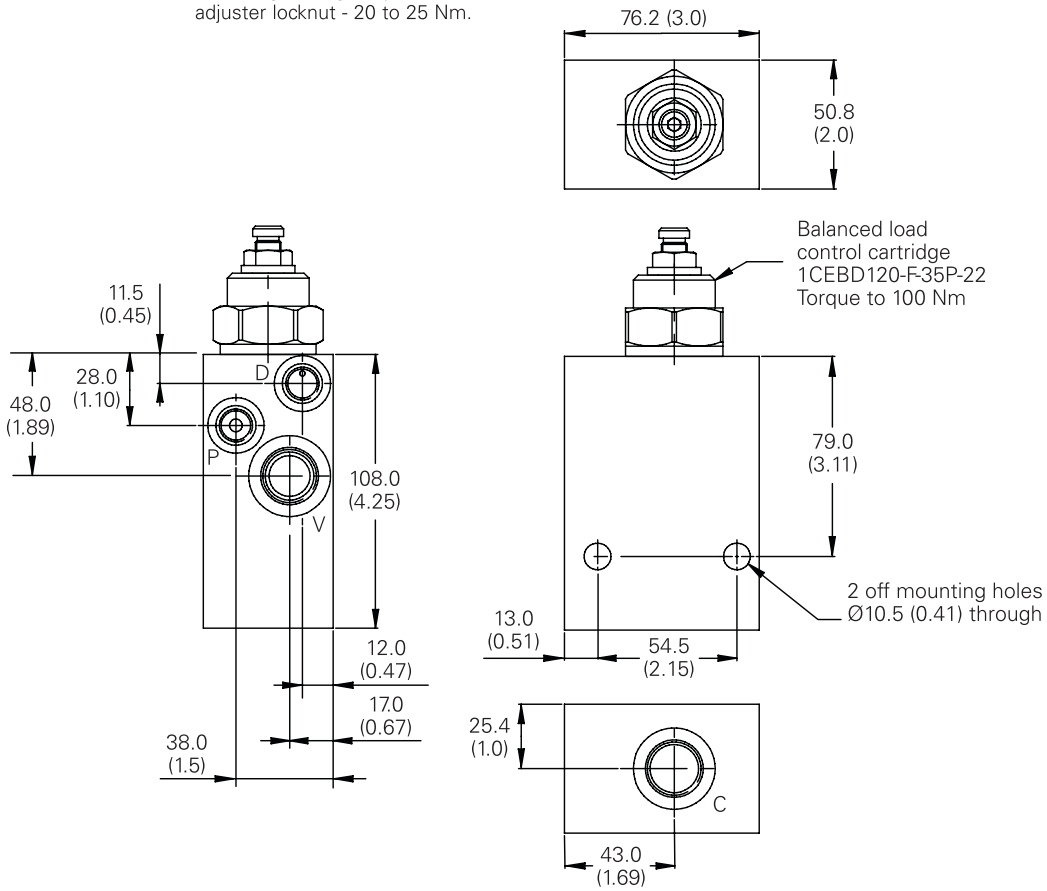
### 5 Seals
**P** -Contains polyurethane and standard seal.

## Dimensions

mm (inch)

**Complete valve**
Line Mounted
Basic Code
1CEBL153

**Note:** Tightening torque of "F" adjuster locknut - 20 to 25 Nm.




*Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.*

For enquiries please contact our
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