

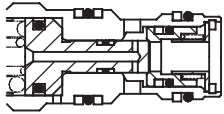
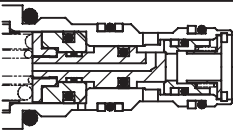
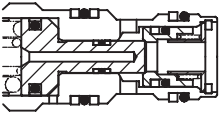
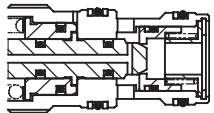
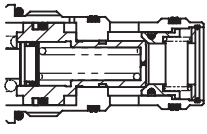
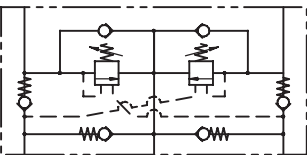
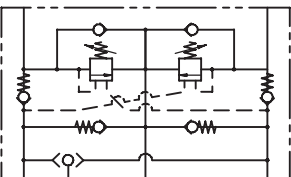


SECTION 6 - MOTION CONTROL VALVES

CONTENTS

This section contains a most extensive range of overcentre 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.

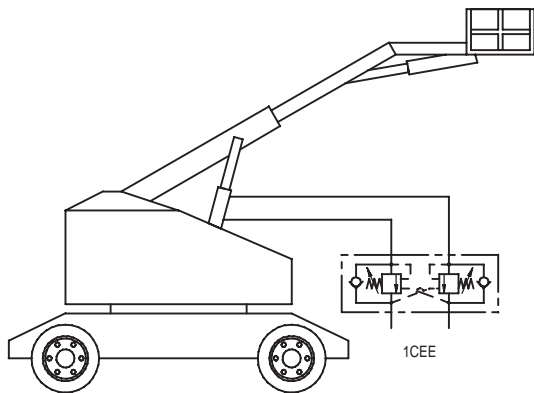
SELECTION

SECTION	SERIES	APPLICATION	RANGE	PAGE
	1CE/1CEE Overcentre cartridge pilot assisted relief with check	To control moving loads and prevent load runaway, giving load holding and hose failure safety	350 bar (5000 psi) 300 litres/min (80 US GPM)	6-111 6-151 6-181 6-205 6-241
	1CER Overcentre 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 centre DCV with service line reliefs	350 bar (5000 psi) 300 litres/min (80 US GPM)	6-121 6-161 6-211
	1CEB/1CEBD Overcentre 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	350 bar (5000 psi) 300 litres/min (80 US GPM)	6-131 6-171 6-173 6-191 6-193 6-251 6-255
	1CEL Overcentre 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	380 bar (5510 psi) 140 litres/min (37 US GPM)	6-135 6-175 6-225
	1CPB/1CPBD 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	400 bar (5800 psi) 300 litres/min (80 US GPM)	6-137 6-139 6-177 6-197 6-265
	1CEEC Line mounted overcentre 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	350 bar (5000 psi) 300 litres/min (80 US GPM)	6-301 6-311
	1CEESH/1CEESH As 1CEEC series with brake shuttle. Piece parts in body style	As 1CEEC series but with added brake shuttle for removal of spring applied park brakes	350 bar (5000 psi) 300 litres/min (80 US GPM)	6-271 6-281 6-321 6-341



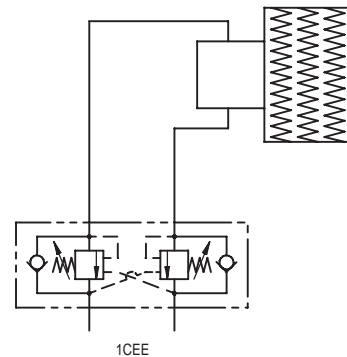
SECTION	SERIES	APPLICATION	RANGE	PAGE
	1CEBL In-line or cylinder mounted BoomLoc valves incorporating 1CPB(D) cartridge and additional relief cartridge element.	These overcentre valves are suitable for use on the boom and dipper cylinders of an excavator to help the manufacturer or user comply with standard ISO8643.	400 bar (5800 psi) 550 litres/min (145 US GPM)	6-400 to 6-491

TYPICAL CIRCUIT EXAMPLES



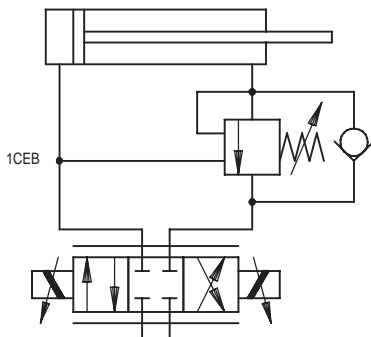
MANLIFT

Load holding and load safety provided by dual overcentre valves protecting the operator from hose failure and giving him a smooth ride.



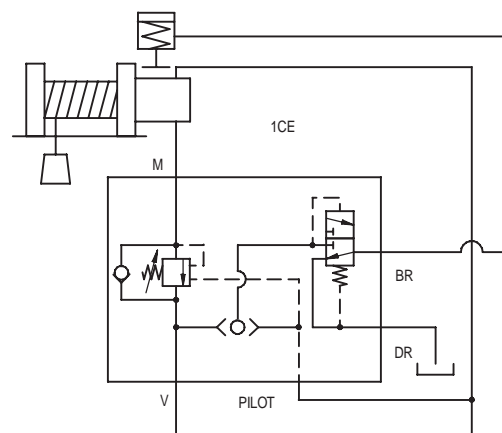
WHEEL MOTOR

Dual overcentres preventing load runaway in transmission systems forward and reverse.



PROPORTIONAL CONTROL

Balanced valves are required where back pressures vary as above in proportional valve circuits where flow is metered in and out of the directional control valve.



WINCH

Smooth lowering and soft stop for winches using overcentre combined with brake shuttles for spring applied brakes.

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.

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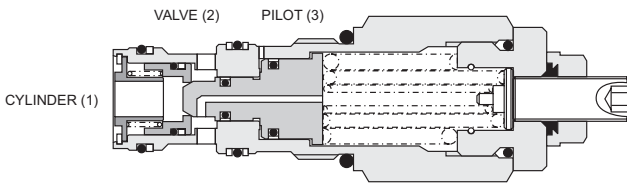
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 Website: www.integratedhydraulics.com



OVERCENTRE VALVES

Figure 1. ICE Standard Overcentre Valve



There are now many types of overcentre or motion control valves available to the designer of hydraulically operated machines, each one has its own place and specific benefits to the user. The function of these valves can be divided into three basic groups.

1. Load Holding; where the overcentre valve prevents the movement of a load when the directional valve is in the neutral position. Permitting the use of open centre directional valves and negating leakage past the spool of closed centre directional valves.
2. Load Control; where the overcentre valve prevents the actuator running ahead of the pump due to the load induced energy thereby eliminating cavitation in the actuator and loss of control.
3. Load Safety. In the case of hose failure an overcentre valve mounted onto or into an actuator will prevent uncontrolled movement of the load. When a boom is used as a crane then hose failure protection is vital as the loss of load control could cause damage to people or property.

Each of these functions is applicable to linear or rotary motion.

The standard overcentre valve (fig 1) can be described as a pilot assisted relief valve with an integral free flow check. The difference between this design of valve and a pilot check is that the check valve will open fully as soon as the pilot pressure is sufficient to open the valve because the only resistance to opening is the pressure locked in to the cylinder port. With an overcentre valve the pilot pressure has to overcome the force of the spring which is reduced by load pressure. This ensures a gradual opening and a metering of the flow as it passes the poppet. Integrated Hydraulics overcentre valves consist of a poppet that seals flow from an actuator, a check element, which permits free flow to the actuator and a pilot section that opens the poppet allowing flow from the actuator at a controlled rate. There are two basic designs, each with several variants. The direct acting design, whereby the pressure in the actuator acts on the full area of the nose of the poppet, is ideal for flows up to 200 L/min whereas the differential area design, whereby the pressure acts on an annular area, is suitable for flows up to 300 L/min. Being of poppet type both designs exhibit excellent

leakage characteristics with maximum leakage of up to 0.5 ml/min for valves up to 200 L/min capacity and up to 4ml/min for valves with 300 L/min capacity.

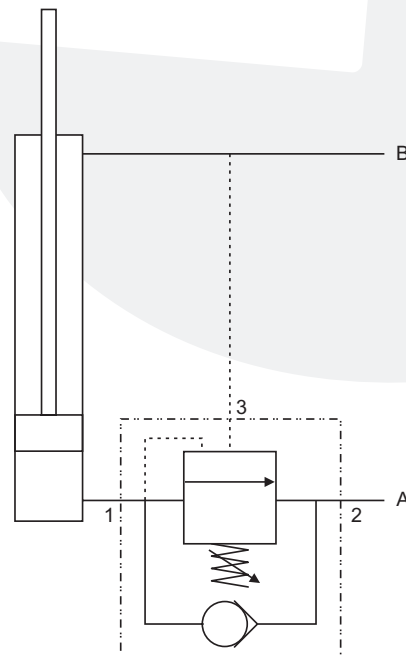
The cartridge has three ports, a cylinder port (1), a valve port (2) and a pilot port (3). If pressure, above the setting of the valve is applied to the cylinder port it will open as a relief. When applied to the valve port pressure will open a low pressure check allowing free flow into the cylinder port. Pressure applied to the pilot port acts over a larger area on the poppet than the area referenced to the cylinder port, so the valve will open at a low pressure.

For most applications the relief setting should be approximately 1.3 times higher than the maximum load induced pressure. This ensures that with the maximum load on the actuator the valve will remain closed until pilot pressure is applied. The pilot pressure required to open the valve will depend on the pilot ratio that is the ratio between the relief area and the pilot area. The pilot pressure can be calculated:

$$\text{Pilot pressure} = \frac{\text{Valve Setting} - \text{Load Pressure}}{\text{Pilot Ratio}}$$

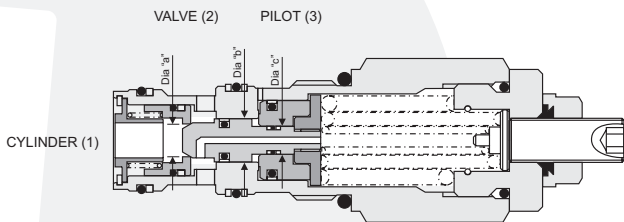
A typical application would entail mounting the overcentre valve in or on the end cap of a cylinder (fig 2). The cylinder port of the valve being connected to the full bore area of the cylinder, the valve port to the directional control line A and the pilot connected to the annulus inlet, line B and so to the directional control line B. As soon as the pressure rises in the inlet port of the annulus (line B) to retract the rod to a point where it reaches the required pilot pressure the actuator will

Figure 2. Overcentre valve mounted in end cap of cylinder



begin moving at the flow at which the pressure setting was made. If the load causes the flow to increase then the inlet will be starved of oil and the pressure will begin to drop at this port. The reducing pressure will be sensed at the pilot allowing the spring to begin to close the valve preventing load run-away. In this way the valve will continually meter, controlling the load throughout its movement. When the pressure needed to move the load is higher than the pilot pressure needed to fully open the valve the only restriction produced is the pressure drop due to flow in the fully open condition.

Figure 3. 1CER part balanced overcentre



With the standard overcentre the spring chamber is vented through the poppet to the valve port which creates a problem if there are varying or high back pressures.

Pressure in the valve port increases the effective setting of the valve by a factor equivalent to the pilot ratio plus one. This means that if there is a standing back pressure of 50 bar with a pilot ratio of 5:1 the effective relief setting would be increased by 300 bar. This creates problems if the application demands a closed centre directional valve and the utilisation of service line reliefs. The relief valves will operate to limit inlet pressure but will not act if there is an external load which needs to be limited. The overcentre will not allow oil past the seat due to the back pressure created by the service line relief valves. To overcome this problem the part balanced 1CER series was created (figure 3).

The 1CER series overcentre valve performs in the same way as the standard valve under most conditions. But the relief section of the valve is not affected by back pressure.

The poppet is designed to balance back pressure over two areas on the poppet. The first is an annular area between the seat (dia a) and the centre seal (dia b) on the poppet which acts to open the valve and the second at the spring end of the spool (dia c) acting to close the valve. These areas are the same, the poppet is therefore balanced and so pressure in the valve line will not affect the relief performance of the valve. It must be noted that the pilot pressure required to open the valve is still affected on a one to one ratio by any back pressure.

The advantage of this design is the ability to use the valve on closed centre directional valve systems allowing service line relief valves to operate as normal. Most other valves of this

type on the market have an atmospheric vent which limits their use in corrosive atmospheres and are prone to leakage.

The 1CER valve does have some draw backs in certain applications. Because the pilot pressure is affected by back pressure the valve can not be used in regenerative circuits on the annular port of the cylinder. Also if used with a meter out proportional system the constantly varying back pressures can cause both the part balanced and the standard valve to go unstable. For this is the reason the fully balanced version, 1CEB series (fig 4) is available. In this case the spring chamber is vented to atmosphere or to a separate drain port.

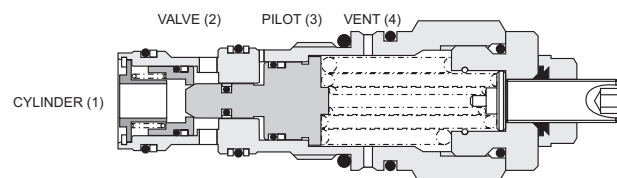
Any back pressure therefore does not affect the setting of the valve or the amount of pilot pressure needed.

For the standard, Part Balanced and Balanced valves there are various pilot ratios available to the system designer, which is best for his circuit? A general rule is that high pilot ratios are suitable for constant, stable loads and low pilot ratios for unstable and varying loads. The pilot ratio does not necessarily affect the working pressure by much given that the normal working pressure of a system is often much higher than the pilot pressure required to fully open the valve. If this is the case then the piloted open pressure drop will determine the systems efficiency.

Graph 1 shows the pressure drop curves of two valves with different pilot ratios. The higher pilot ratio valve is more restrictive than the low pilot ratio valve. This shows that above a certain pressure the lower pilot ratio valve is more efficient than the higher pilot ratio valve. It is important that the total performance is taken into account before specifying an overcentre valve.

The two stage overcentre valve, 1CEL (Fig 5) has been developed to overcome a problem which has been a continual nuisance to designers of machines incorporating long

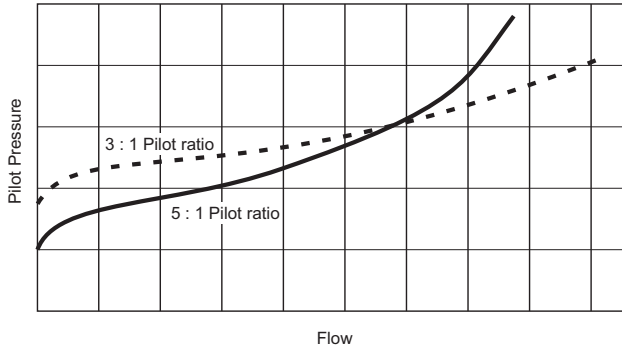
Figure 4. 1CEB fully balanced overcentre valve



unstable booms. Instability problems affect many machines, most noticeably those with high capacity cylinders particularly in conjunction with slender booms that are subject varying frictional forces. The best example is the Telescopic Handler that usually has a long cylinder to extend or retract its boom. At the end of its stroke the pressure of the oil within a cylinder rises to the setting of the main relief valve for that part of the system and by its nature, the motion control valve re-seat locks in that pressure (irrespective of any load induced



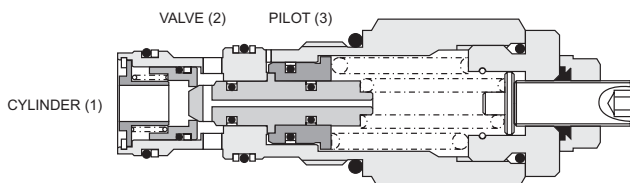
Graph 1. The effect of pilot ratio on flow



pressure). When the operator lowers the load, this stored energy gives the valve the message that a heavy load is on the cylinder; therefore it takes less pilot pressure to open. As a result, the valve opens very quickly and allows the stored energy to dissipate causing a momentary runaway condition, this causes a rapid acceleration of the load that is then checked by the motion control valve and brought under control. The consequence of this is an initial instability as a boom is retracted; the number of jerks will depend on the stiffness of the system at the time of lowering. This instability can sometimes continue through the whole of the cylinder's stroke, its magnitude, in extreme cases, can cause severe operator insecurity or even the loss of a load.

The 1CEL valve uses two springs to control the poppet, only the outer spring being effected by the pilot piston, leaving the inner to generate a counterbalance pressure. The two-stage valve has overcome many instability problems by preventing the total decay of the stored energy in the cylinder and stopping the valve over reacting. It allows the pressure to fall to the counterbalance setting, which can be adjusted dependant upon the severity of the application. This back pressure can also help to stiffen the boom during its movement further through its stroke, for example when wear pads on the box sections of a telescopic boom create changing frictional forces. This works well but with some systems, the backpressure created by this valve causes problems due to the reduction in available force. On certain machines, when for instance a crowd cylinder is bottomed, the oil from a slave cylinder has to be forced across a relief valve; the boom cylinder creates an induced pressure by virtue of its downward force. It is possible that an unloaded boom will not lower due to the counterbalance pressure. Also

Figure 5. 1CEL counterbalanced overcentre valve



in the fully piloted open position the valve still generates a backpressure heating the oil and creating inefficiency.

To overcome these problems another variant is available in which the counterbalance pressure is reduced as the pilot pressure increases. This design has a second pilot ratio, which acts to reduce the backpressure applied by the centre spring. Indeed the valve can be piloted fully open, eliminating the counterbalance pressure altogether so improving the efficiency of the system. With a primary pilot ratio of 4:1 and a secondary ratio of 0.5:1 the initial unloading of the stored pressure happens at a low pilot pressure followed by a more gentle reduction as the pilot pressure increases. The overall setting of the valve is a combination of the outer and the inner spring forces divided by the seat area.

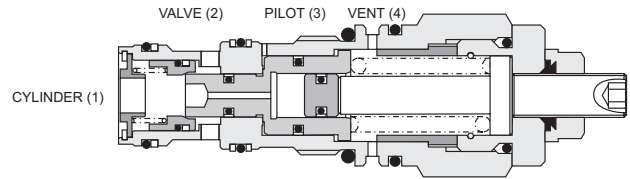
The practical application of either of these valves involves the establishing a range of acceptable settings. For example, the requirement is for the valve to be set at 200 bar (3000psi) with a counterbalance pressure between 35 and 70 bar (500-1000psi) - there are two springs within the valve, the outer one is fixed and the inner adjustable. For this application the outer spring would be set to give 165 bar (2400psi) and the inner adjustable between 35 and 70 bar (500-1000psi). This would give the valve an adjustable range of 165-235 bar (2400-3400psi). Given a pilot ratio of 6:1 or 4:1 depending on the type this extra pressure setting would have little effect on the pilot pressure needed to open the valve during normal operation.

Graph 2 shows a typical recorded instability picking up machine frequencies and getting worse and Graph 3 shows the counterbalanced overcentre valves preventing the problem getting worse, dampening out the initial instability and the counterbalance pressure falling as the pilot pressure increases.

The zero differential range of load control valves 1CPB (fig 6) have been designed with 'BoomLoc' hose rupture valve applications in mind. Typically the valve is piloted open from the hydraulic remote control operating the main directional spool valve. By setting the overcentre to open just after the main valve it will control the flow rate at low speed but as the overcentre opens more rapidly than the directional valve the directional valve will control the flow rate at higher speeds. It is a pilot operated metered poppet valve. The poppet seals against a tapered seat, as the pilot pressure increases the poppet will move off the seat. Flow is dependant upon the axial movement of the poppet which in turn is dependant upon the force exerted by pilot pressure balanced by that exerted by the spring. The poppet is hydraulically balanced so this valve is unaffected by valve line AND cylinder pressure but it will not provide any relief function. If over pressure, shock or thermal relief are required a second relief element is required.

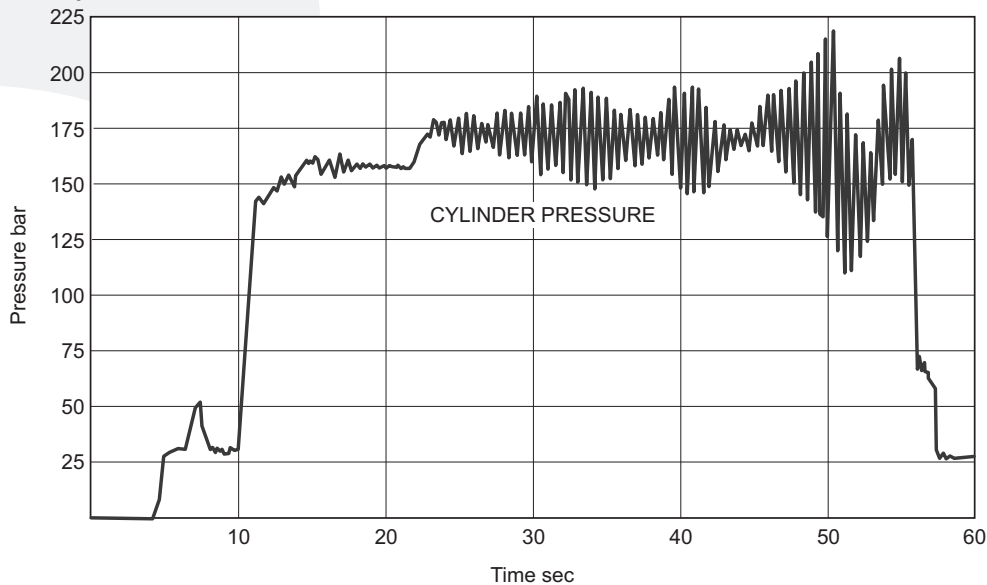
The successful application of motion control valves, particularly in areas that are demanding involves the anticipation and resolution of numerous factors only some of which can be discussed in this article. Motion control valves are adjustable, are available in several pressure ranges with many pilot ratio options. Most of the valves fit in a common cavity (the exception being the fully balanced, 1CEB and zero differential, 1CPB versions when required with an external rather than an atmospheric vent) and are available in sizes from 30 to 300 L/min. The flexibility of cartridge valve technology can therefore be easily applied to bring stability. The standard range of valves described here can be used to

Figure 6. 1CPB(D) zero differential overcentre valve

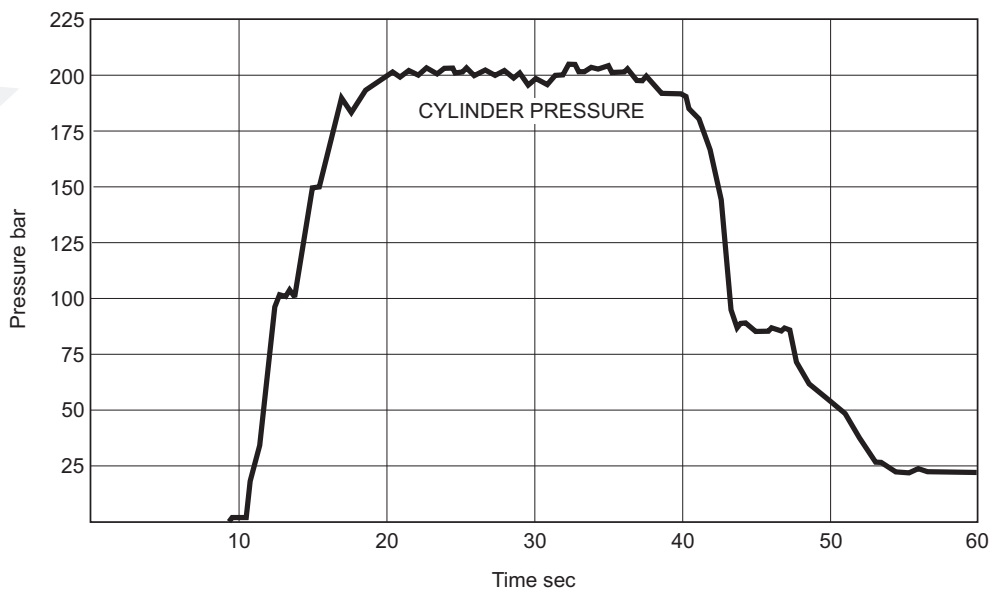


solve the vast majority of motion control problems and we are constantly developing new valves that will further improve stability and load control.

Graph 2. Unstable system



Graph 3. Stable system using counterbalance valve

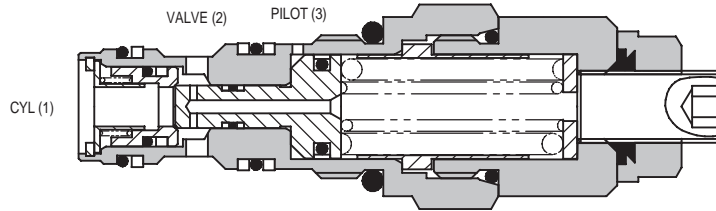
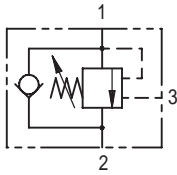




1CE SERIES OVERCENTRE VALVE

PILOT ASSISTED RELIEF WITH CHECK

1CE30



6

APPLICATION

Overcentre 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 overcentre 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.

The overcentre 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 overcentre valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcentre valves are used for controlling loads in both directions for motor applications or for cylinders going over centre.

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 optimisation 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:

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

FEATURES

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Directly interchangeable with 30 litres/min pilot check valve. See catalogue page 7-151.

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

PILOT RATIOS

- 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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	30 litres/min (8 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A6610 (See Section 17)
Torque Cartridge into Cavity	45 Nm (33 lbs ft)
Weight	1CE30 0.15 kg (0.33 lbs) 1CE35 0.41 kg (0.90 lbs) 1CEE34 0.90 kg (1.98 lbs)
Seal Kit Number	SK395 (Nitrile) SK395V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

Integrated Hydraulics Ltd

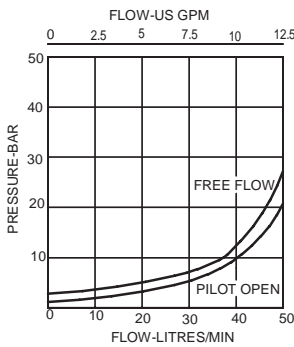
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Integrated Hydraulics Inc

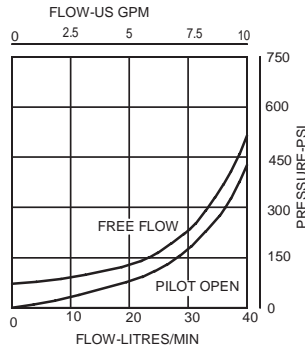
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Website: www.integratedhydraulics.com

PRESSURE DROP

2.5:1 & 5:1 version

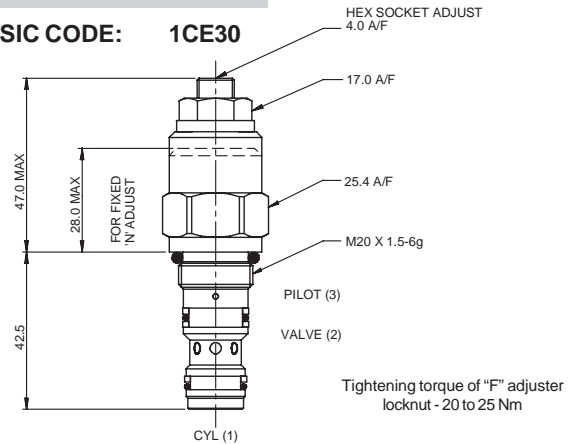


10:1 version



CARTRIDGE ONLY

BASIC CODE: 1CE30



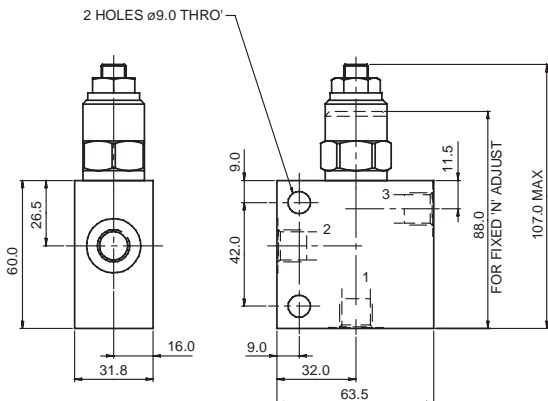
SINGLE VALVE

3/8" 1/2" PORTS

BASIC CODE: 1CE35

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/8" B6743	3/8" B10536	3/8" B12823	1/2" B11811
	1/2" B7884		



Where measurements are critical request certified drawings

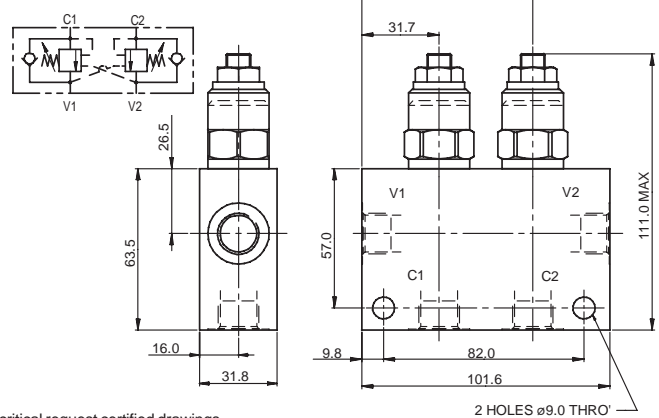
DUAL VALVE

3/8" 1/2" PORTS

BASIC CODE: 1CEE34 (INTERNALLY CROSSED PILOTED)

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/8" B6836	3/8" B10805	3/8" B13803	1/2" B11812
	1/2" B30237		



ORDERING CODE EXAMPLE

1CE F 3W 35 S 5**

Basic Code

- 1CE30 = Cartridge Only
- 1CE35 = Cartridge and Body
- 1CEE34 = Cartridges and Dual Body

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.

Port Sizes - Bodied Valves Only

- 3W = 3/8" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
- 6T = 3/8" SAE Valve & Cyl Port. 1/4" SAE Pilot Port
- 8T = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pressure Range @ 4.8 l/min

- 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 at 4.8 litres/min

Other pressure ranges available on request

We reserve the right to change specifications without notice

Pilot Ratio

- 2 = 2.5:1
- 5 = 5:1 (Standard)
- 10 = 10:1

Seals

- S = Nitrile (For use with most industrial hydraulic oils)
- SV = Viton (For high temperature and most special fluid applications)

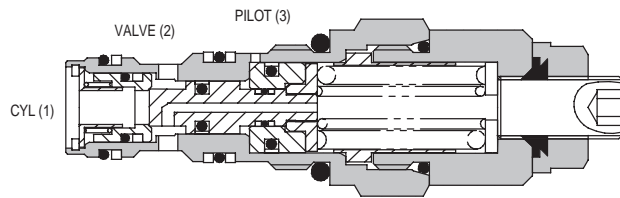
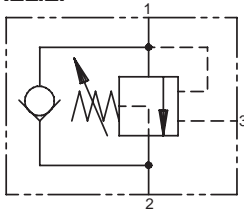


1CER SERIES OVERCENTRE VALVE

PART BALANCED - PILOT ASSISTED

1CER30

POPPET RELIEF



6

APPLICATION

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

PILOT RATIOS

- 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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

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 optimisation 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:

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

FEATURES

Cartridge is economical and fits simple cavity. Allows quick, easy field service - reduces down time. Directly interchangeable with 30 litres/min pilot check valve. See catalogue page 7-151.

Rated Flow	30 litres/min (8 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A6610 (See Section 17)
Torque Cartridge into Cavity	45 Nm (33 lbs ft)
Weight	1CER30 0.15 kg (0.33 lbs) 1CER35 0.41 kg (0.90 lbs) 1CEER34 0.90 kg (1.98 lbs)
Seal Kit Number	SK395 (Nitrile) SK395V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

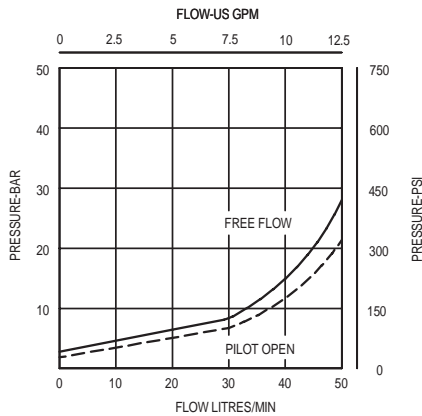
Integrated Hydraulics Ltd

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Integrated Hydraulics Inc

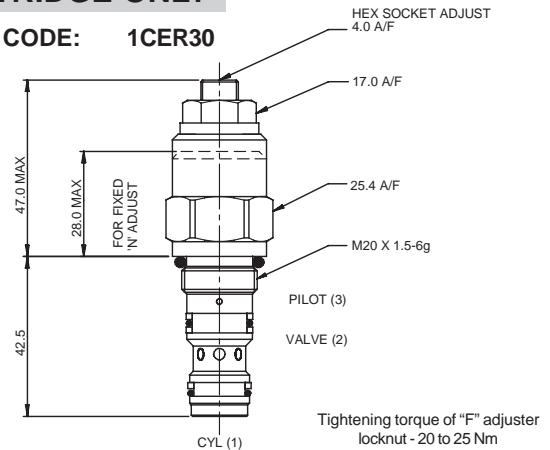
7047 Spinach Drive, Mentor, Ohio 44060, USA
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Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CER30



SINGLE VALVE

3/8" 1/2" PORTS

BASIC CODE: 1CER35

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/8" B6743	3/8" B10536	3/8" B12823	1/2" B11811
	1/2" B7884		

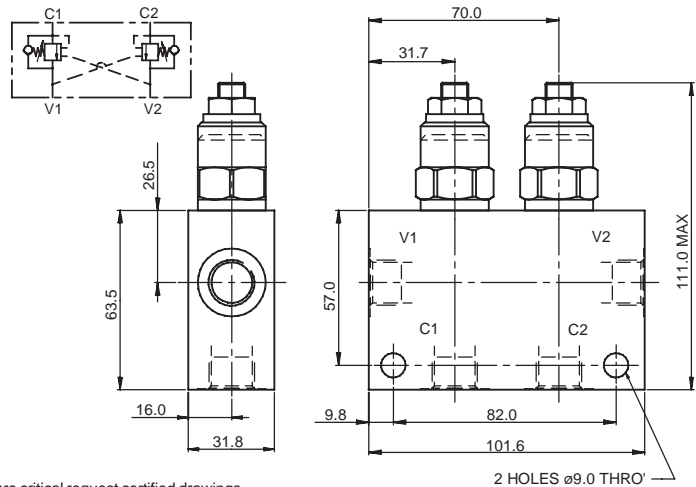
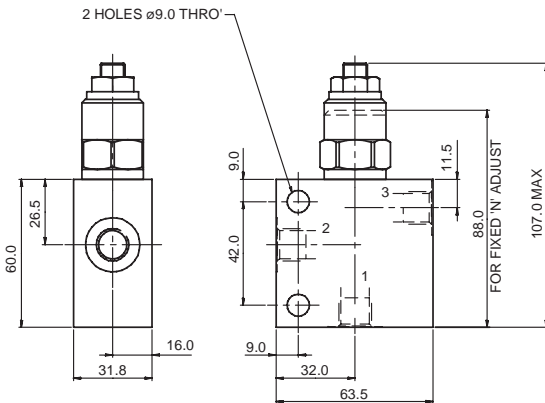
DUAL VALVE

3/8" 1/2" PORTS

**BASIC CODE: 1CEER34
(INTERNALLY CROSS PILOTED)**

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/8" B6836	3/8" B10805	3/8" B13803	1/2" B11812
	1/2" B30237		



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE* F 3W 35 S 4**

Basic Code

- 1CER30** = Cartridge Only
- 1CER35** = Cartridge and Body
- 1CEER34** = Cartridges and Dual Body

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.

Port Sizes - Bodied Valves Only

- 3W** = 3/8" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
- 6T** = 3/8" SAE Valve & Cyl Port. 1/4" SAE Pilot Port
- 8T** = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pilot Ratio

- 2** = 2.5:1
- 4** = 4:1

Seals

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

Pressure Range @ 4.8 l/min

- 35** = 100-350 bar. Std setting 210 bar
- Std setting made at 4.8 litres/min

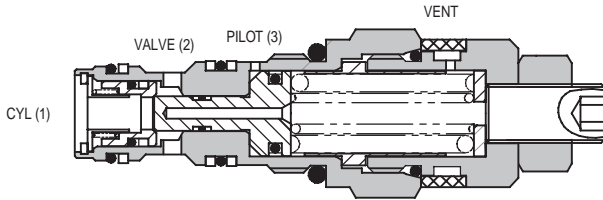
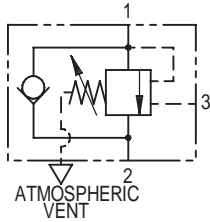


1CEB SERIES OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CEB30

POPPET RELIEF



6

APPLICATION

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

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

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 optimisation 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:

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

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. See page 7-151.

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

PILOT RATIO

5:1

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	30 litres/min (8 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A6610 (See Section 17)
Torque Cartridge into Cavity	45 Nm (33 lbs ft)
Weight	1CEB30 0.14 kg (0.30 lbs) 1CEB35 0.40 kg (0.88 lbs) 1CEEB34 0.88 kg (1.94 lbs)
Seal Kit Number	SK395 (Nitrile) SK395V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

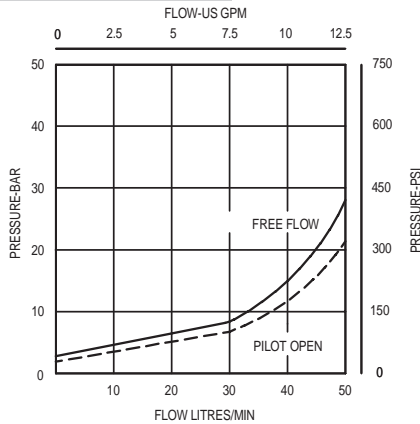
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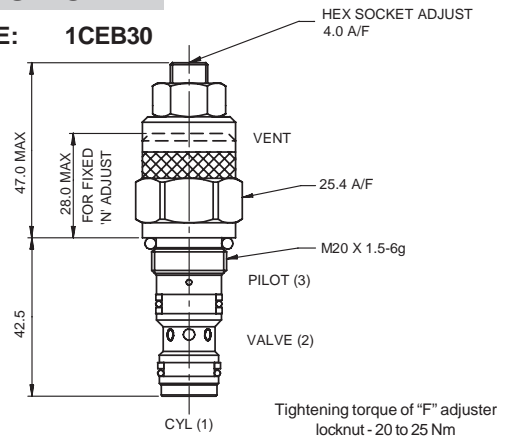
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Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEB30



SINGLE VALVE

3/8" 1/2" PORTS

BASIC CODE: 1CEB35

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/8" B6743	3/8" B10536	3/8" B12823	1/2" B11811
	1/2" B7884		

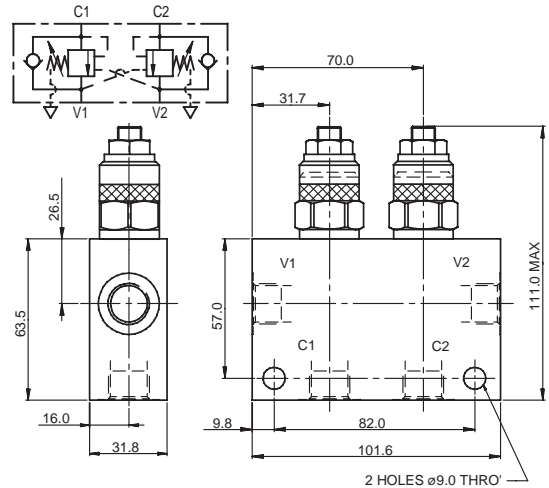
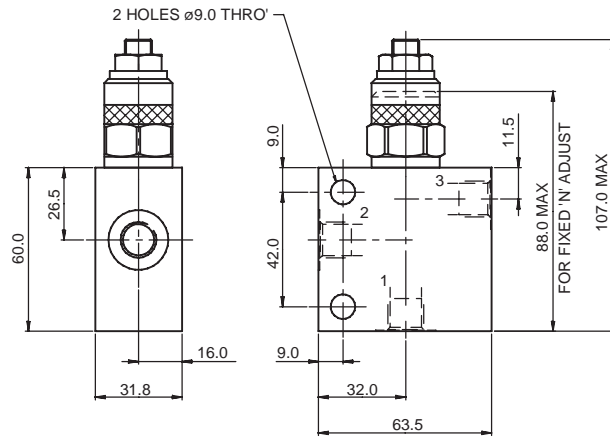
DUAL VALVE

3/8" 1/2" PORTS

BASIC CODE: 1CEEB34
(INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/8" B6836	3/8" B10805	3/8" B13803	1/2" B11812
	1/2" B30237		



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE* F 3W 35 S 5**

Basic Code

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

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.

Port Sizes - Bodied Valves Only

- 3W = 3/8" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
- 6T = 3/8" SAE Valve & Cyl Port. 1/4" SAE Pilot Port
- 8T = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pilot Ratio

- 2 = 2.5:1
- 5 = 5:1

Seals

- S = Nitrile (For use with most industrial hydraulic oils)
- SV = Viton (For high temperature and most special fluid applications)

Pressure Range @ 4.8 l/min

- 35 = 100-350 bar. Std setting 210 bar
- Std setting made at 4.8 litres/min

We reserve the right to change specifications without notice

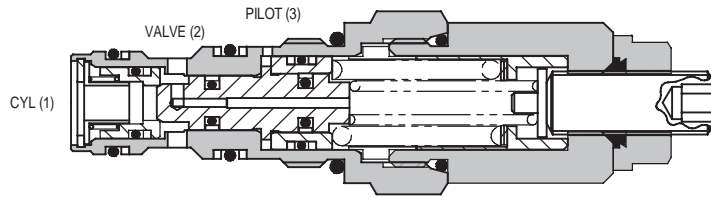
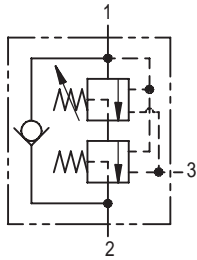


1CEL OVERCENTRE VALVE

PILOT ASSISTED RELIEF WITH CHECK AND COUNTERBALANCE

1CEL30

POPPET RELIEF



6

APPLICATION

The 1CEL30 overcentre valve performs all duties of a regular overcentre 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.

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.

PILOT RATIOS

Primary 4.3:1
Secondary 0.4:1

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	30 litres/min (8 US GPM)
Max Setting	380 bar (5510 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A6610
Torque Cartridge into Cavity	45 Nm (33 lbs ft)
Weight	0.15 kg (0.33 lbs)
Seal Kit Number	SK395 (Nitrile) SK395V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

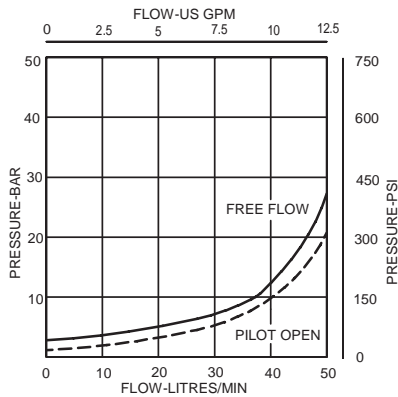
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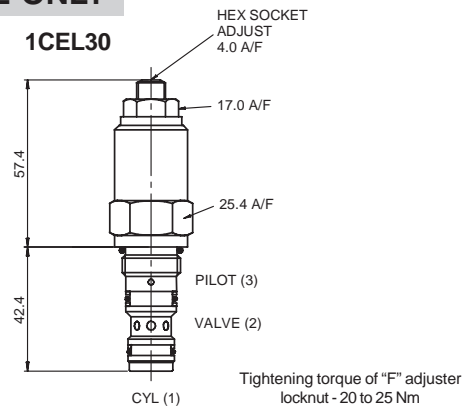
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Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEL30



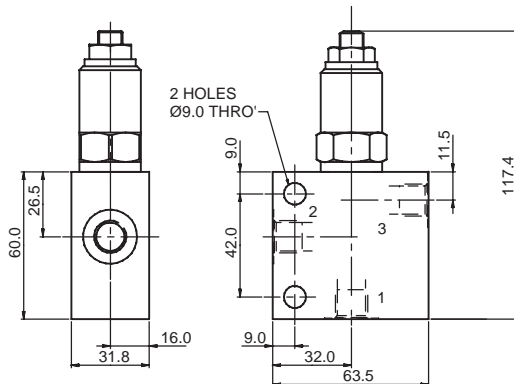
SINGLE VALVE

3/8" 1/2" PORTS

BASIC CODE: 1CEL35

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/8" B6743	3/8" B10536	3/8" B12823	1/2" B11811
	1/2" B7884		



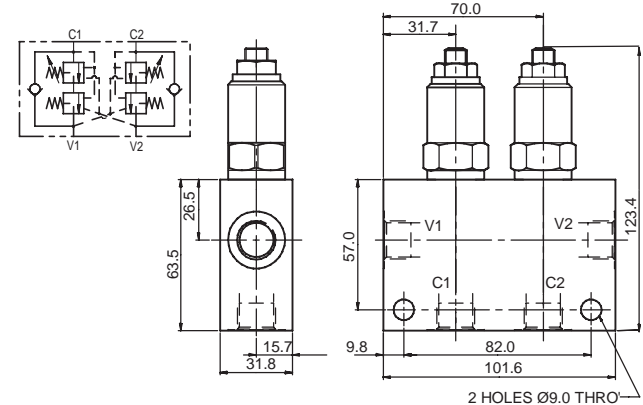
DUAL VALVE

3/8" 1/2" PORTS

BASIC CODE: 1CEEL34
(INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/8" B6836	3/8" B10805	3/8" B13803	1/2" B11812
	1/2" B30237		



6

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 Integrated Hydraulics for more information.

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEL***

F

3W

30

S

230

50

Basic Code

1CEL30 = Cartridge Only
1CEL35 = Cartridge and Body
1CEEL34 = Cartridges and Dual

Adjustment Means

F = Screw Adjustment

Port sizes - Bodied Valves Only

3W = 3/8" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
6T = 3/8" SAE Valve & Cyl Port. 1/4" SAE Pilot Port
8T = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Counterbalance setting bar
(10 bar increments).

High pressure setting bar
(10 bar increments).

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

Pressure Range, bar @ 4.8 l/min
20 = 170-300. Std setting 220 (170/50)
30 = 240-370. Std setting 280 (230/50)
40 = 270-380. Std setting 350 (300/50)
Std setting made at 4.8 litres/min

We reserve the right to change specifications without notice

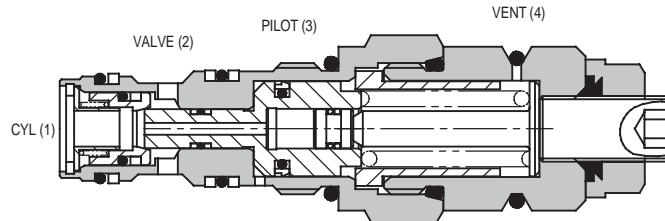
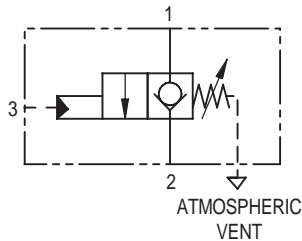


1CPB SERIES ZERO DIFFERENTIAL

OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CPB30



6

APPLICATION

Zero differential overcentre 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.

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.
Fits standard 30 litre overcentre cavity.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	30 litres/min (8 US GPM)
Max Working Pressure	350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A6610 (See section 17)
Torque Cartridge into Cavity	45 Nm (33 lbs ft)
Weight	1CPB30 0.15 kg (0.33 lbs) 1CPB35 0.41 kg (0.90 lbs)
Seal Kit Number	SK1151 (Nitrile) SK1151V (Viton) SK1151P (Polyurethane/Nitrile)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min max (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

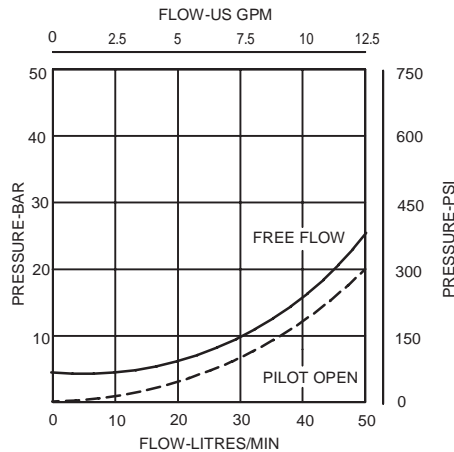
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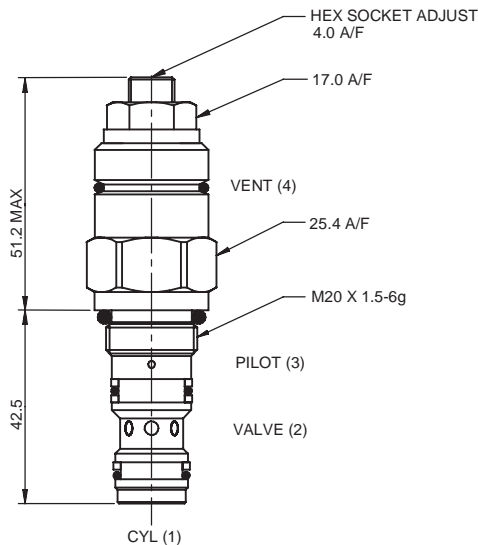
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Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CPB30



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

SINGLE VALVE

3/8" 1/2" PORTS

BASIC CODE: 1CPB35

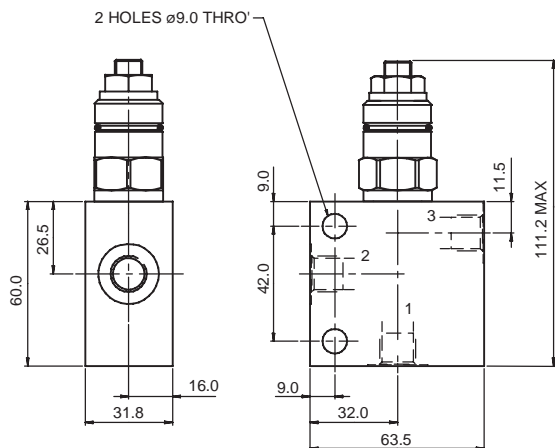
Body ONLY part numbers

BSP, aluminium
3/8" B6743

SAE, aluminium
3/8" B10536
1/2" B7884

BSP, steel
3/8" B12823

SAE, steel
1/2" B11811



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CPB* F 3W 2 P**

Basic Code

1CPB30 = Cartridge Only
1CPB35 = Cartridge and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

3W = 3/8" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
6T = 3/8" SAE Valve & Cyl Port. 1/4" SAE Pilot Port
8T = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

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)

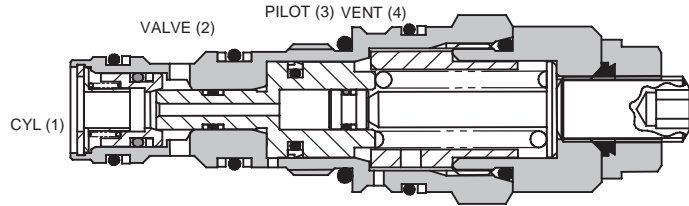
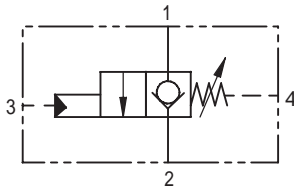
Pilot Adjustment Range

2 = 5 - 20 bar. Std setting 10 bar
Std setting made at 4.8 litres/min

We reserve the right to change specifications without notice



1CPBD30



6

APPLICATION

Zero differential overcentre 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.

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	30 litres/min (8 US GPM)
Max Working Pressure	350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Mounting Position	Unrestricted
Cavity Number	AXP 20530
Torque Cartridge into Cavity	45 Nm (33 lbs ft)
Weight	1CPBD30 0.15 kg (0.33 lbs)
Seal Kit Number	SK1159 (Nitrile) SK1159V (Viton) SK1159P (Polyurethane)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min max (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

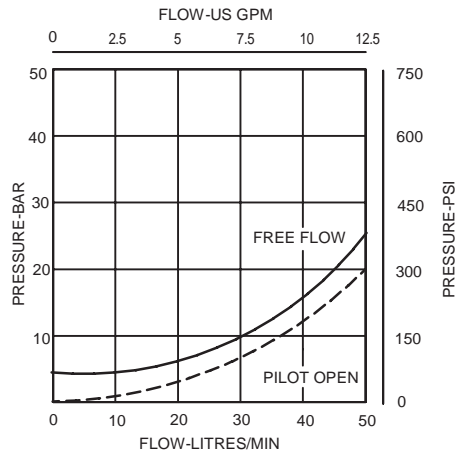
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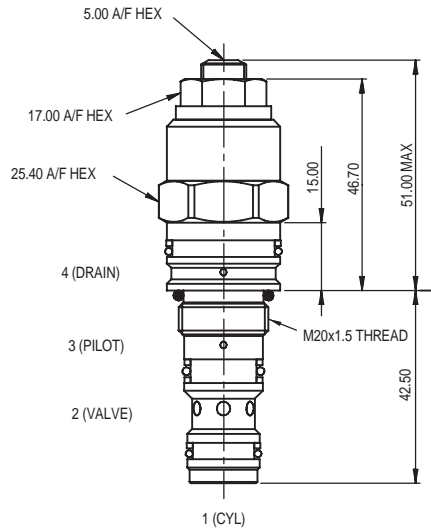
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Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CPBD30



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CPBD F 2 P**

Basic Code
1CPBD30 = Cartridge Only

Adjustment Means
F = Screw Adjustment

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)

Pilot Adjustment Range

2 = 5 - 20 bar. Std setting 10 bar
Std setting made at 4.8 litres/min

We reserve the right to change specifications without notice



1CE SERIES OVERCENTRE VALVE

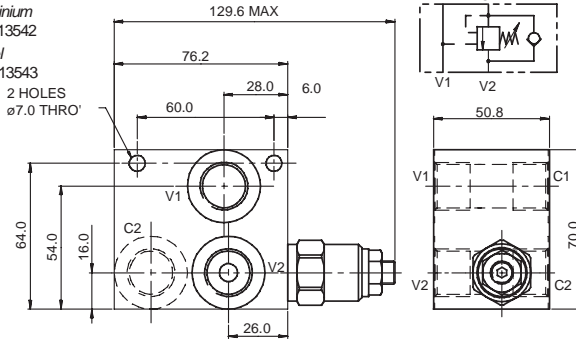
ALTERNATIVE BODY ARRANGEMENTS for 30 Litres/min Valves

COMPLETE VALVE 3/8" PORTS

BASIC CODE: 1CE36/1CEB36/1CER36/1CEL36 THROUGH PORTED

Body ONLY part numbers

BSP, aluminium
3/8" B13542
BSP, steel
3/8" B13543

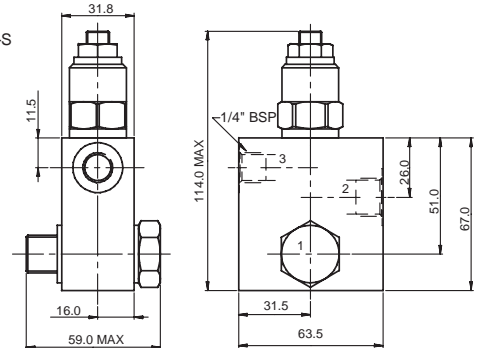


COMPLETE VALVE 3/8" PORTS

BASIC CODE: 1CBE35/1CBEB35/1CBER35/1CBEL35 BANJO MOUNTED

Sub-assembly part numbers

BSP, aluminium
3/8" AXP13617-3W-S



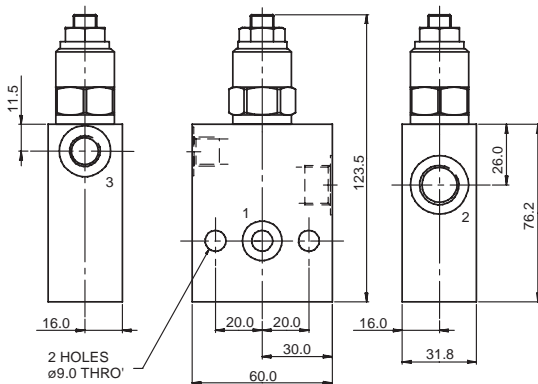
6

COMPLETE VALVE 3/8" PORTS

BASIC CODE: 1CEG35/1CEBG35/1CERG35/1CELG35 GASKET MOUNTED

Sub-assembly part numbers

BSP, aluminium
3/8" BXP13621-3W-S



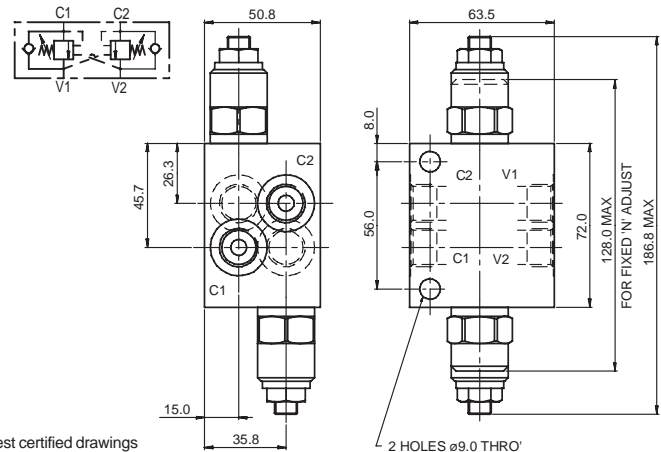
Where measurements are critical request certified drawings

COMPLETE VALVE 3/8" PORTS

BASIC CODE: 1CEE35/1CEEB35/1CEER35/1CEEL35 DUAL OVERCENTRE (INTERNALLY CROSSED PILOTED)

Sub-assembly part numbers

BSP, aluminium 3/8" BXP24147-3W-S SAE, aluminium 3/8" BXP24147-6T-S BSP, steel 3/8" BXP24147-3W-S-377



ORDERING CODE EXAMPLE

1C** F 3W 35 S 5 230 50**

Basic Code

1CE36/1CEB36/ = Cartridge & Body Thro' Ported
1CER36/1CEL36
1CBE35/1CBEB35/ = Cartridge & Body Banjo
1CBER35/1CBEL35
1CEG35/1CEBG35/ = Cartridge & Body Gasket
1CERG35/1CELG35
1CEE35/1CEEB35/ = Cartridges & Dual Body
1CEER35/1CEEL35

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.

Port Sizes

3W = 3/8" BSP 6T = 3/8" SAE

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

Counterbalance setting
(1CEL30 based options only)
bar in 10 bar increments.

High pressure setting
(1CEL30 based options only)
bar in 10 bar increments.

Pilot Ratio

(omit for 1CEL30 based options)
2 = 2.5:1 4 = 4:1
5 = 5:1 10 = 10:1
(See cartridge details)

Seals

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

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

We reserve the right to change specifications without notice

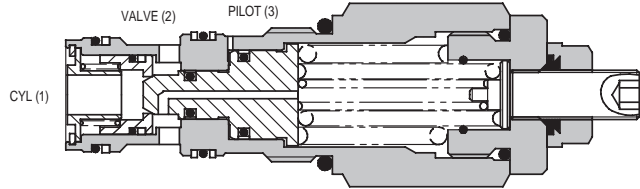
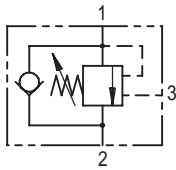




1CE SERIES OVERCENTRE VALVE

PILOT ASSISTED RELIEF WITH CHECK

1CE90



6

APPLICATION

Overcentre 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 overcentre 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.

The overcentre 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 overcentre valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcentre valves are used for controlling loads in both directions for motor applications or for cylinders going over centre.

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 optimisation 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:

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

FEATURES

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

PILOT RATIOS

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.

Other ratios available upon request.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	90 litres/min (23 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A12336 (See Section 17)
Torque Cartridge into Cavity	60 Nm (44 lbs ft)
Weight	1CE90 0.29 kg (0.63 lbs) 1CE95 1.35 kg (2.97 lbs) 1CEE95 2.10 kg (4.62 lbs)
Seal Kit Number	SK633 (Nitrile) SK633V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

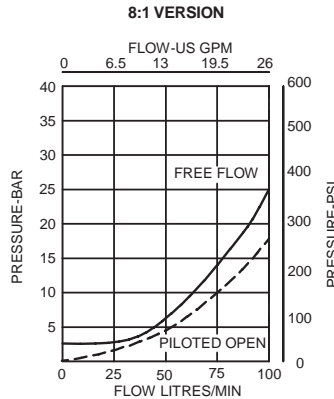
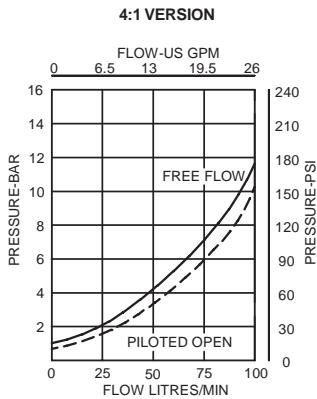
Integrated Hydraulics Ltd

Collins Road, Heathcote Ind. Est., Warwick, CV34 6TF, UK.
Tel: +44 (0) 1926 881171 Fax: +44 (0) 1926 315729
Website: www.integratedhydraulics.com

Integrated Hydraulics Inc

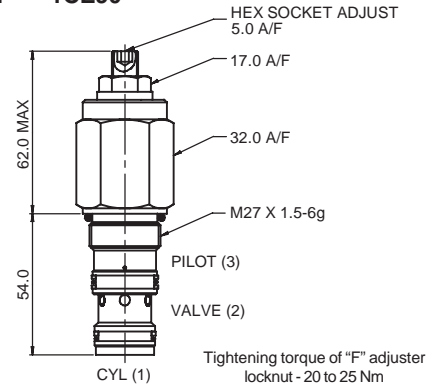
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CE90



SINGLE VALVE

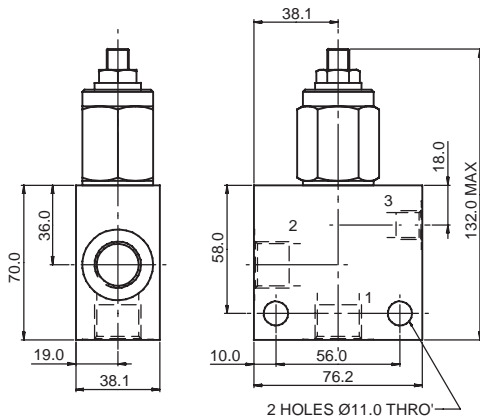
BASIC CODE: 1CE95

Body ONLY part numbers

BSP, aluminium 1/2" B13625
SAE, aluminium 1/2" B10806

1/2" PORTS

BSP, steel 1/2" B13626
SAE, steel 1/2" B10922



DUAL VALVE

BASIC CODE: 1CEE95

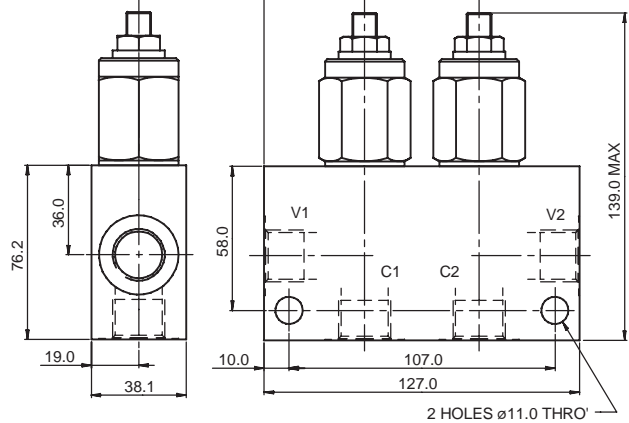
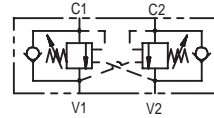
Body ONLY part numbers

BSP, aluminium 1/2" C13627
SAE, aluminium 1/2" C10807

1/2" PORTS

(INTERNALLY CROSS PILOTED)

BSP, steel 1/2" C13628
SAE, steel 1/2" C11561



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE****

F

4W

35

S

4

Basic Code

1CE90 = Cartridge Only
1CE95 = Cartridge and Body
1CEE95 = Cartridges and Dual Body

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.

Port Sizes - Bodied Valves Only

4W = 1/2" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
8T = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pilot Ratio

4 = 4:1
8 = 8:1
Other ratios available upon request

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

Pressure Range @ 4.8 l/min

20 = 70-225 bar. Std setting 100 bar
35 = 200-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

We reserve the right to change specifications without notice

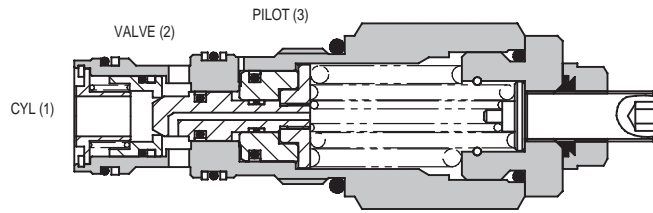
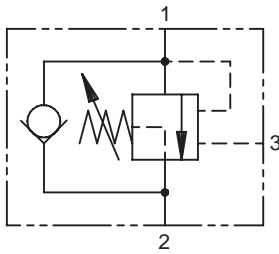


1CER SERIES OVERCENTRE VALVE

PART BALANCED - PILOT ASSISTED

1CER90

POPPET RELIEF



6

APPLICATION

The 1CER series overcentre valve performs all duties of a regular overcentre but is able to relieve and stay open irrespective of downstream pressure. This enables the valve to operate when used with a closed centre 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 optimisation 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:

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

FEATURES

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

PILOT RATIOS

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

Other ratios available upon request.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	90 litres/min (23 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A12336 (See Section 17)
Torque Cartridge into Cavity	60 Nm (44 lbs ft)
Weight	1CER90 0.29 kg (0.63 lbs) 1CER95 1.35 kg (2.97 lbs) 1CEER95 2.10 kg (4.62 lbs)
Seal Kit Number	SK633 (Nitrile) SK633V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

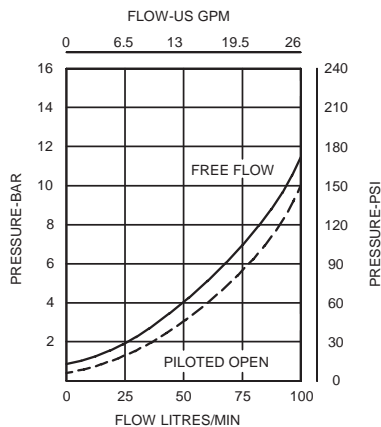
Integrated Hydraulics Ltd

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Tel: +44 (0) 1926 881171 Fax: +44 (0) 1926 315729
Website: www.integratedhydraulics.com

Integrated Hydraulics Inc

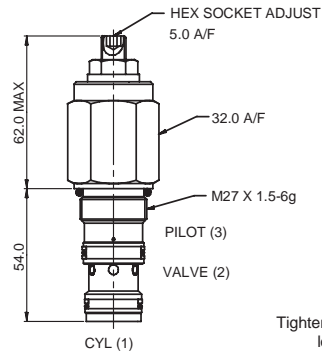
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CER90



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

SINGLE VALVE

1/2" PORTS

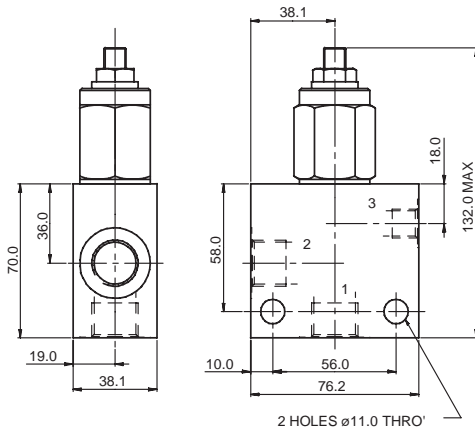
BASIC CODE: 1CER95

Body ONLY part numbers

BSP, aluminium 1/2" B13625 SAE, aluminium 1/2" B10806

BSP, steel 1/2" B13626

SAE, steel 1/2" B10922



DUAL VALVE

1/2" PORTS

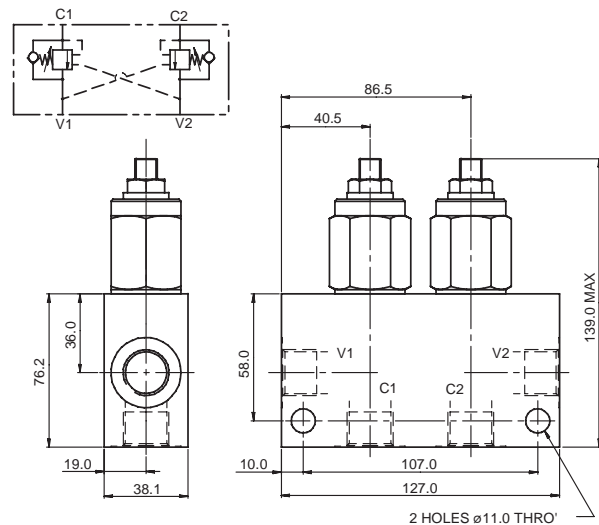
BASIC CODE: 1CEER95 (INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium 1/2" C13627 SAE, aluminium 1/2" C10807

BSP, steel 1/2" C13628

SAE, steel 1/2" C11561



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE** F 4W 35 S 4**

Basic Code

1CER90 = Cartridge Only
1CER95 = Cartridge and Body
1CEER95 = Cartridges and Body

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.

Port Sizes - Bodied Valves Only

4W = 1/2" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
8T = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pilot Ratio

4 = 4:1
Other ratios available upon request

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

Pressure Range @ 4.8 l/min

20 = 70-225 bar. Std setting 100 bar
35 = 200-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

We reserve the right to change specifications without notice

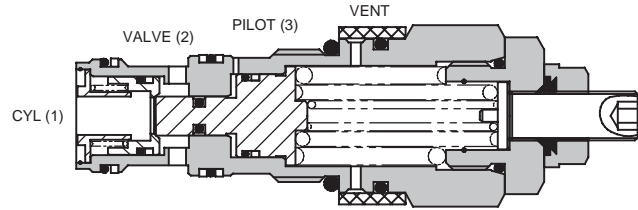
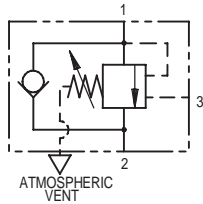


1CEB SERIES OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CEB90

POPPET RELIEF



6

APPLICATION

Overcentre 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 overcentre 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 overcentre valve should be mounted either into, onto or as close to the actuator as possible, using a machined cavity into the actuator or a suitable machined body, either gasket or line mounted.

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

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 optimisation 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:

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

FEATURES

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

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

PILOT RATIOS

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

Other ratios available upon request.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	90 litres/min (23 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A12336 (See Section 17)
Torque Cartridge into Cavity	60 Nm (44 lbs ft)
Weight	1CEB90 0.29 kg (0.63 lbs) 1CEB95 1.35 kg (2.97 lbs) 1CEEB95 2.10 kg (4.62 lbs)
Seal Kit Number	SK634 (Nitrile) SK634V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

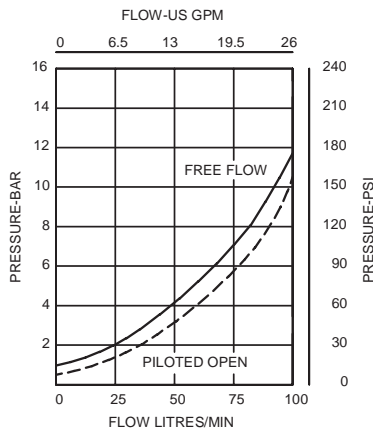
Integrated Hydraulics Ltd

Collins Road, Heathcote Ind. Est., Warwick, CV34 6TF, UK.
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Website: www.integratedhydraulics.com

Integrated Hydraulics Inc

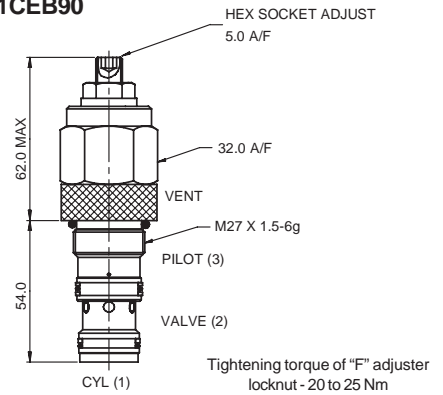
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEB90



SINGLE VALVE

1/2" PORTS

BASIC CODE: 1CEB95

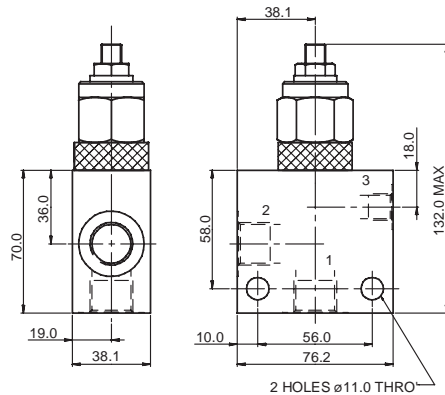
Body ONLY part numbers

BSP, aluminium
1/2" B13625

SAE, aluminium
1/2" B10806

BSP, steel
1/2" B13626

SAE, steel
1/2" B10922



DUAL VALVE

1/2" PORTS

BASIC CODE: 1CEEB95

(INTERNALLY CROSS PILOTED)

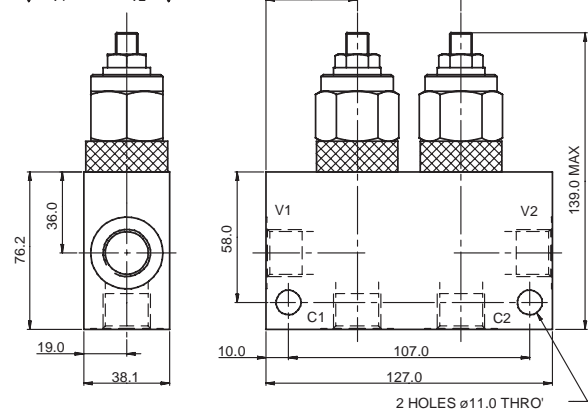
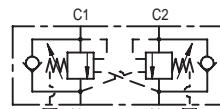
Body ONLY part numbers

BSP, aluminium
1/2" C13627

SAE, aluminium
1/2" C10807

BSP, steel
1/2" C13628

SAE, steel
1/2" C11561



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE****

F

4W

35

S

4

Basic Code

1CEB90 = Cartridge Only

1CEB95 = Cartridge and Body

1CEEB95 = Cartridges and Dual Body

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.

Port Sizes - Bodied Valves Only

4W = 1/2" BSP Valve & Cyl Port. 1/4" BSP Pilot Port

8T = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pilot Ratio

4 - 4:1

Other ratios available upon request

Seals

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

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

Pressure Range @ 4.8 l/min

20 = 70-225 bar. Std setting 100 bar

35 = 200-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

We reserve the right to change specifications without notice

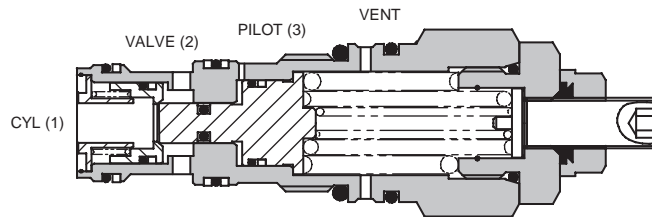
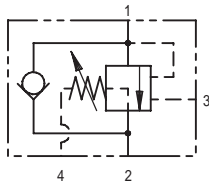


1CEBD SERIES OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CEBD90

POPPET RELIEF



6

APPLICATION

Overcentre 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 overcentre 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 overcentre valve should be mounted either into, onto or as close to the actuator as possible, using a machined cavity into the actuator or a suitable machined body, either gasket or line mounted.

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

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 optimisation 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:

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

FEATURES

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

PILOT RATIOS

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

Other ratios available upon request.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	90 litres/min (23 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A12196 (See Section 17)
Torque Cartridge into Cavity	60 Nm (44 lbs ft)
Weight	1CEBD90 0.29 kg (0.63 lbs)
Seal Kit Number	SK634 (Nitrile) SK634V (Viton) SK634P (Polyurethane/Nitrile)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

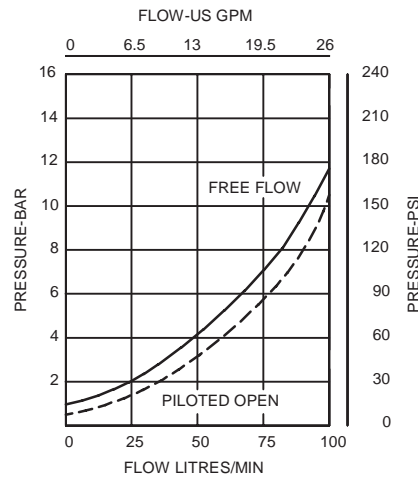
Integrated Hydraulics Ltd

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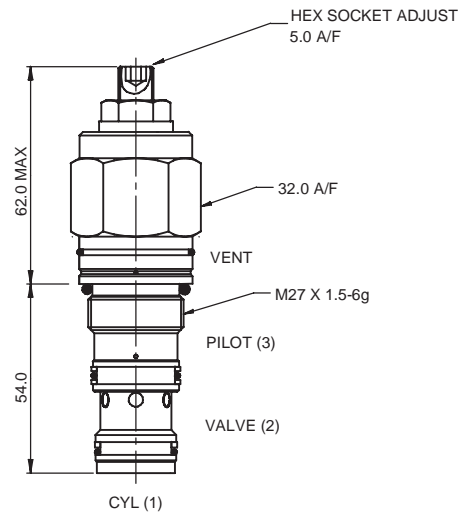
PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEBD90

6



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEBD90 F 35 P 4

Basic Code
1CEBD90

Adjustment Means
F = Screw Adjustment

Pressure Range @ 4.8 l/min
20 = 70-225 bar. Std setting 100 bar
35 = 200-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

Pilot Ratio
4 - 4:1
Other ratios available upon request

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)

We reserve the right to change specifications without notice

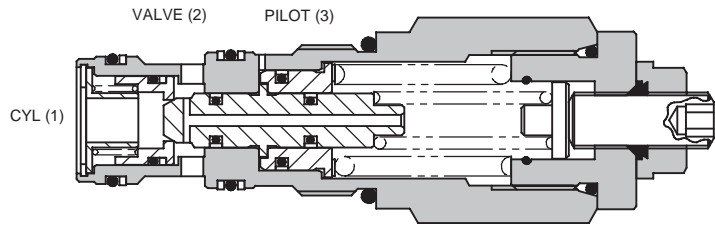
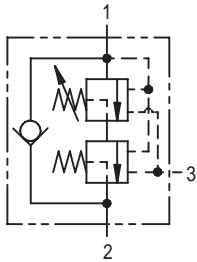


1CEL SERIES OVERCENTRE VALVE

PILOT ASSISTED RELIEF WITH CHECK AND COUNTERBALANCE

1CEL90

POPPET RELIEF



6

APPLICATION

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

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 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.

PILOT RATIOS

Primary 5.6:1
Secondary 0.7:1

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	90 litres/min (23 US GPM)
Max Setting	380 bar (5510 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A12336 (See Section 17)
Torque Cartridge into Cavity	60 Nm (44 lbs ft)
Weight	1CEL90 0.29 kg (0.63 lbs) 1CEL95 1.35 kg (2.97 lbs) 1CEEL95 2.10 kg (4.62 lbs)
Seal Kit Number	SK633 (Nitrile) SK633V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

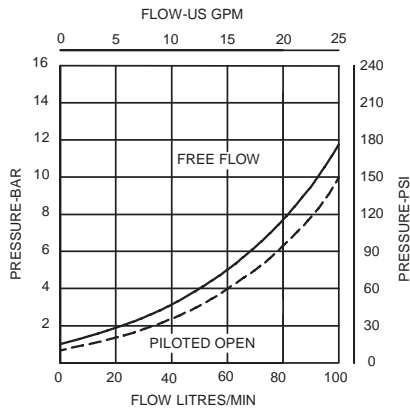
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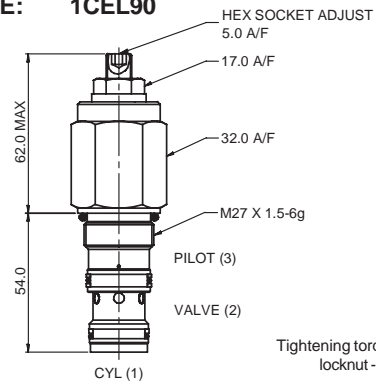
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PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEL90



SINGLE VALVE

1/2" PORTS

BASIC CODE: 1CEL95

Body ONLY part numbers

BSP, aluminium 1/2" B13625 SAE, aluminium 1/2" B10806

BSP, steel 1/2" B13626

SAE, steel 1/2" B10922

DUAL VALVE

1/2" PORTS

BASIC CODE: 1CEEL95

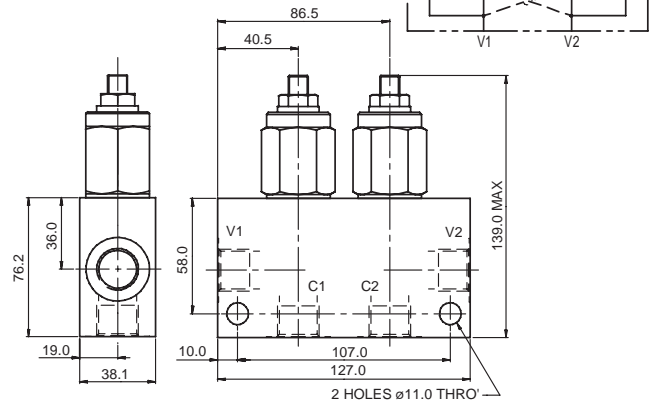
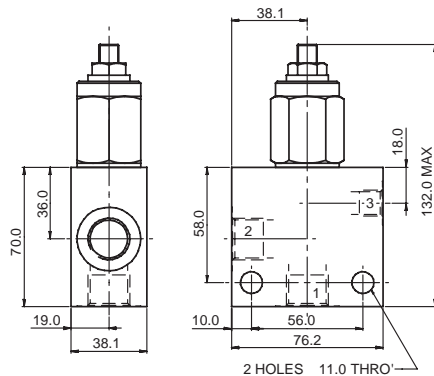
(INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium 1/2" C13627 SAE, aluminium 1/2" C10807

BSP, steel 1/2" C13628

SAE, steel 1/2" C11561



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 Integrated Hydraulics for more information.

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE** F 4W 30 S 220 60**

Basic Code

1CEL90 = Cartridge Only
1CEL95 = Cartridge and Body
1CEEL95 = Cartridges and Dual Body

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.

Port Sizes - Bodied Valves Only

4W = 1/2" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
8T = 1/2" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Counterbalance setting bar
(10 bar increments).

High pressure setting bar
(10 bar increments).

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

Pressure Range, bar @ 4.8 l/min
20 = 170-350. Std 220 (160/60)
30 = 210-380. Std 280 (220/60)
Std setting made at 4.8 litres/min



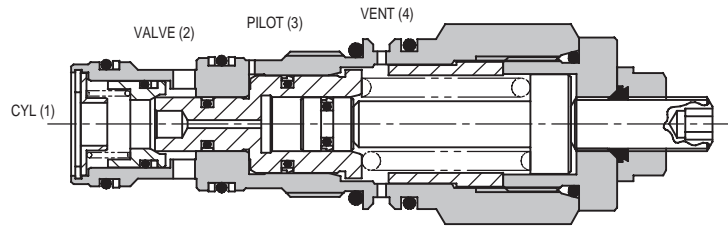
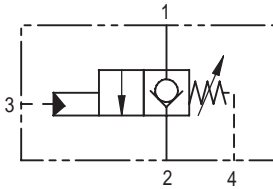
1CPBD SERIES ZERO DIFFERENTIAL

OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CPBD90

POPPET RELIEF



6

APPLICATION

Zero differential overcentre 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.

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	90 litres/min (23 US GPM)
Max 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 17)
Torque Cartridge into Cavity	60 Nm (44 lbs ft)
Weight	1CPBD90 0.29 kg (0.63 lbs)
Seal Kit Number	SK634 (Nitrile) SK634V (Viton) SK634P (Polyurethane/Nitrile)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

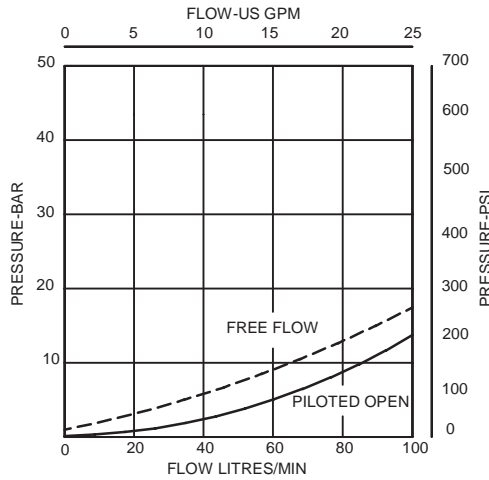
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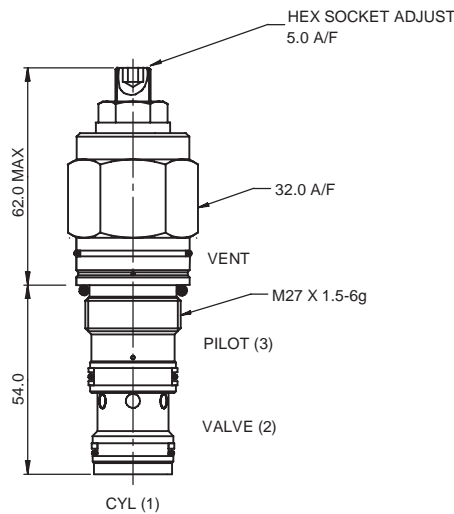
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Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CPBD90



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CPBD F 2 P**

Basic Code
1CPBD90 = Cartridge Only

Adjustment Means
F = Screw Adjustment

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)

Pilot Adjustment Range
2 = 5 - 20 bar. Std setting 10 bar
 Std setting made at 4.8 litres/min

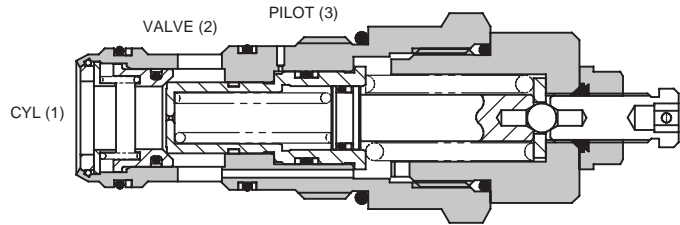
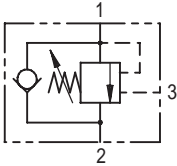
We reserve the right to change specifications without notice



1CE SERIES OVERCENTRE VALVE

PILOT ASSISTED RELIEF WITH CHECK

1CE120



6

APPLICATION

Overcentre 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 overcentre 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.

The overcentre 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 overcentre valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcentre valves are used for controlling loads in both directions for motor applications or for cylinders going over centre.

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 optimisation 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:

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

FEATURES

Allows quick, easy field service - reduces down time. Smooth, sure performance.

PILOT RATIOS

- 3.5:1 (Standard) Best suited for applications where load varies and machine structure can induce instability.
- 8:1 Best suited for applications where load remains relatively constant.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	120 litres/min (32 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A877 (See Section 17)
Torque Cartridge into Cavity	100 Nm (74 lbs ft)
Weight	1CE120 0.59 kg (1.30 lbs) 1CE150 1.46 kg (3.20 lbs) 1CEE150 2.58 kg (5.70 lbs)
Seal Kit Number	SK417 (Nitrile) SK417V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

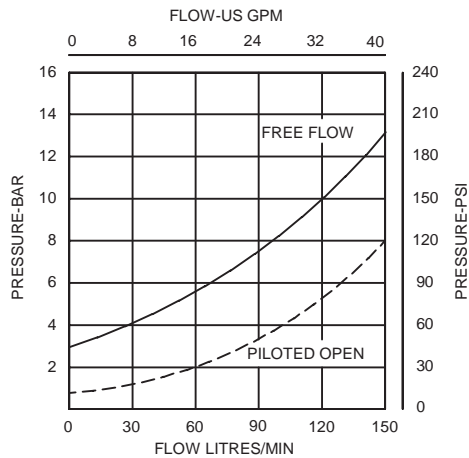
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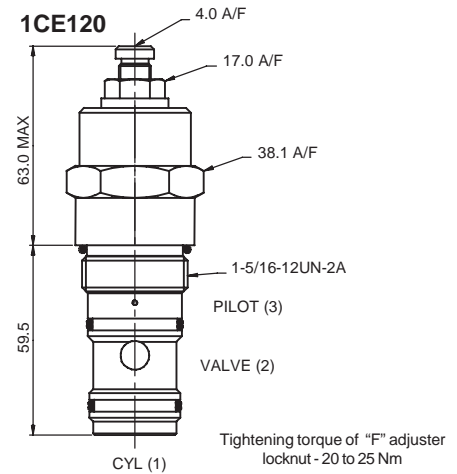
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Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CE120



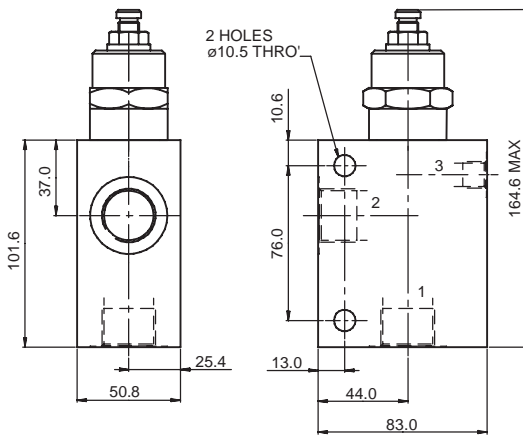
SINGLE VALVE

3/4" 1" PORTS

BASIC CODE: 1CE150

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/4" B6898	3/4" B8200	3/4" B5544	1" B11814
	1" B10708		



DUAL VALVE

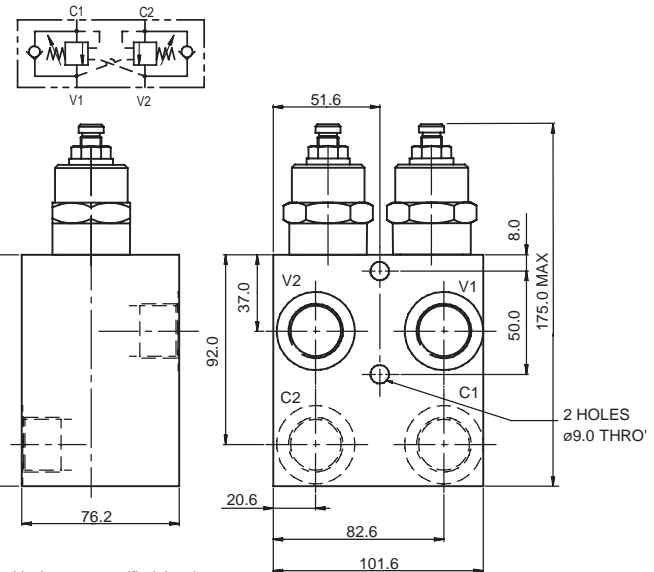
3/4" PORTS

BASIC CODE: 1CEE150

(INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium	SAE, aluminium	BSP, steel	SAE, steel
3/4" C2543	3/4" C10629	3/4" C1200	3/4" C16434



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE** F 6W 35 S 3**

Basic Code

1CE120 = Cartridge Only
1CE150 = Cartridge and Body
1CEE150 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

6W = 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
12T = 3/4" SAE Valve & Cyl Port. 1/4" SAE Pilot Port
16T = 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

Pilot Ratio

3 = 3.5:1
8 = 8:1

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

We reserve the right to change specifications without notice

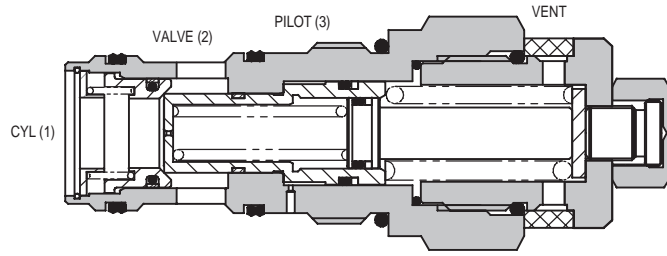
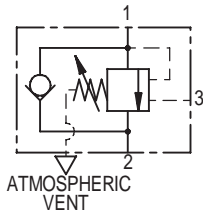


1CEB SERIES OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CEB120

POPPET RELIEF



6

APPLICATION

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

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

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 optimisation 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:

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

FEATURES

Cartridge is economical and fits simple 'dual purpose' cavity. Allows quick, easy field service - reduces down time. Overcentre is interchangeable with 120 litres/min pilot check cartridge. See page 7-171.

PILOT RATIOS

3:1 (Standard)

Best suited for applications where load varies and machine structure can induce instability

8:1

Best suited for applications where load remains relatively constant.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	120 litres/min (32 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A877 (See Section 17)
Torque Cartridge into Cavity	100 Nm (74 lbs ft)
Weight	1CEB120 0.59 kg (1.30 lbs) 1CEB150 1.46 kg (3.20 lbs) 1CEEB150 2.58 kg (5.70 lbs)
Seal Kit Number	SK417 (Nitrile) SK417V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

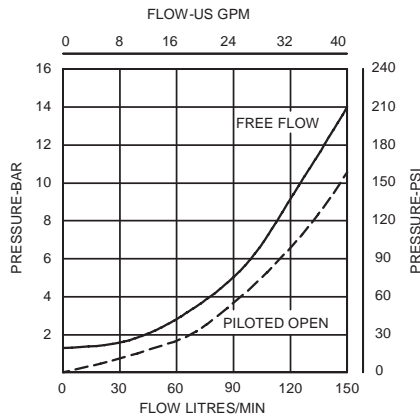
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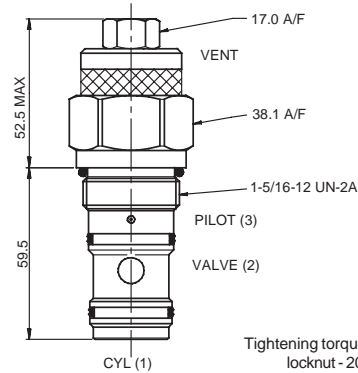
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PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEB120



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

SINGLE VALVE

3/4" 1" PORTS

BASIC CODE: 1CEB150

Body ONLY part numbers

BSP, aluminium 3/4" B6898
SAE, aluminium 3/4" B8200
1" B10708

BSP, steel 3/4" B5544

SAE, steel 1" B11814

DUAL VALVE

3/4" PORTS

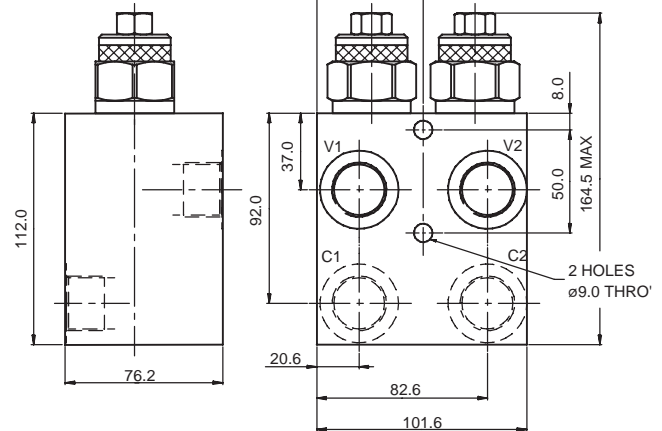
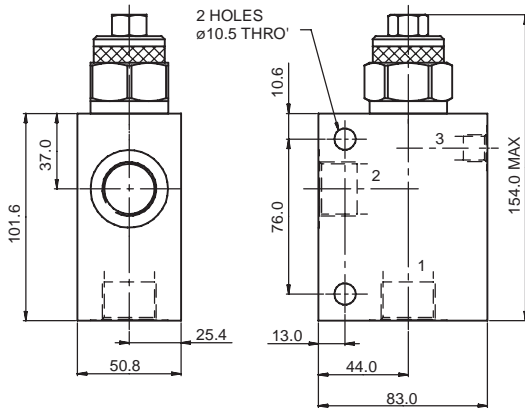
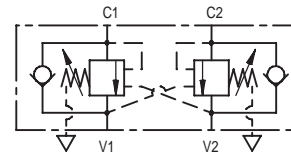
BASIC CODE: 1CEEB150 (INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium 3/4" C2543
SAE, aluminium 3/4" C10629

BSP, steel 3/4" C1200

SAE, steel 3/4" C16434



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE** P 6W 35 S 3**

Basic Code

1CEB120 = Cartridge Only
1CEB150 = Cartridge and Body
1CEEB150 = Cartridges and Dual Body

Adjustment Means

P = Leakproof Screw Adjustment

Port Sizes - Bodied Valves Only

6W = 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
12T = 3/4" SAE Valve & Cyl Port. 1/4" SAE Pilot Port
16T = 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

Pilot Ratio

3 = 3:1 (Standard)
8 = 8:1

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)

We reserve the right to change specifications without notice

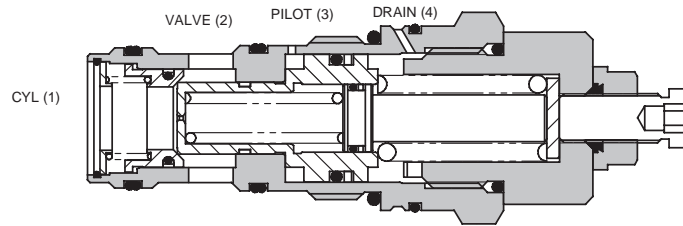
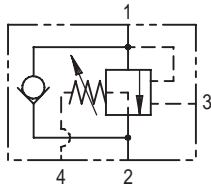


1CEBD SERIES OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CEBD120

POPPET RELIEF



6

APPLICATION

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

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

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 optimisation 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:

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

FEATURES

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

PILOT RATIOS

- 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.
- 12:1
- 22:1 Specifically designed for Boom Lock applications.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	180 litres/min (47 US GPM)
Max Setting	BMax Load Induced Pressure: 270 bar (4000 psi) Relief Setting 400 bar (5800 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces electroless nickel plated
Mounting Position	Unrestricted
Cavity Number	A6726
Torque Cartridge into Cavity	100 Nm (74 lbs ft)
Weight	0.59 kg (1.30 lbs)
Seal Kit Number	SK830 (Nitrile) SK830V (Viton) SK830P (Polyurethane/Nitrile)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min max (5 dpm)
Nominal Viscosity Range	5 to 500 cSt
Bar per turn	65 bar

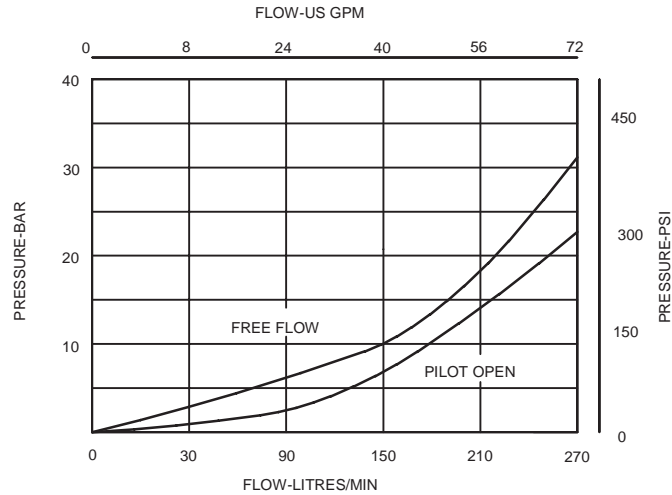
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Website: www.integratedhydraulics.com

Integrated Hydraulics Inc

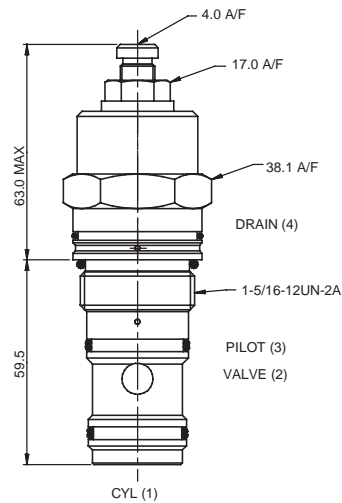
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEBD120



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEBD120 F 35 P 8

Basic Code
1CEBD120 = Cartridge Only

Adjustment Means
F = Screw Adjustment

Pressure Range @ 4.8 l/min
35 = (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 litres/min

Pilot Ratio
3 = 3:1
8 = 8:1
12 = 12:1
22 = 22:1

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)

We reserve the right to change specifications without notice

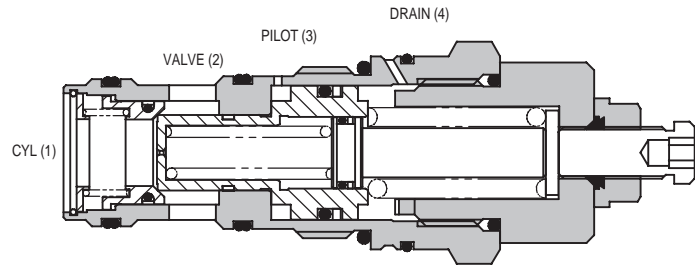
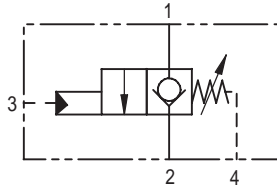


1CPBD SERIES ZERO DIFFERENTIAL

OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CPBD120



6

APPLICATION

Zero differential overcentre 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.

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	180 litres/min (47 US GPM)
Max Working Pressure	400 bar (5800 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Mounting Position	Unrestricted
Cavity Number	A6726 (See section 17)
Torque Cartridge into Cavity	100 Nm (74 lbs ft)
Weight	0.59 kg (1.30 lbs)
Seal Kit Number	SK830 (Nitrile) SK830V (Viton) SK830P (Polyurethane/Nitrile)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min max (5 dpm)
Nominal Viscosity Range	5 to 500 cSt
Bar per turn	5 bar

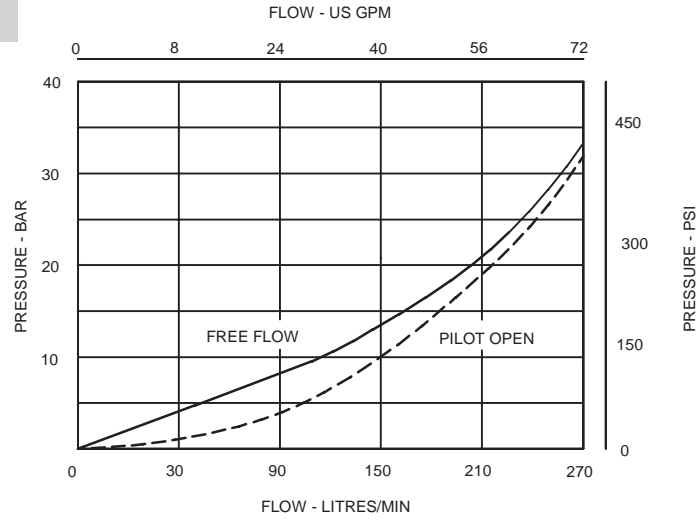
Integrated Hydraulics Ltd

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Tel: +44 (0) 1926 881171 Fax: +44 (0) 1926 315729
Website: www.integratedhydraulics.com

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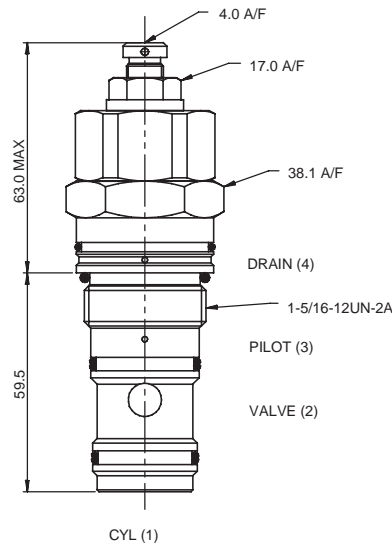
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CPBD120



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CPBD120 F 2 P

Basic Code
1CPBD120 = Cartridge Only

Adjustment Means
F = Screw Adjustment

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)

Pilot Adjust Range
2 = 5-20 bar. Std setting 10 bar
 Std setting made at 4.8 litres/min

We reserve the right to change specifications without notice



1CE SERIES OVERCENTRE VALVE

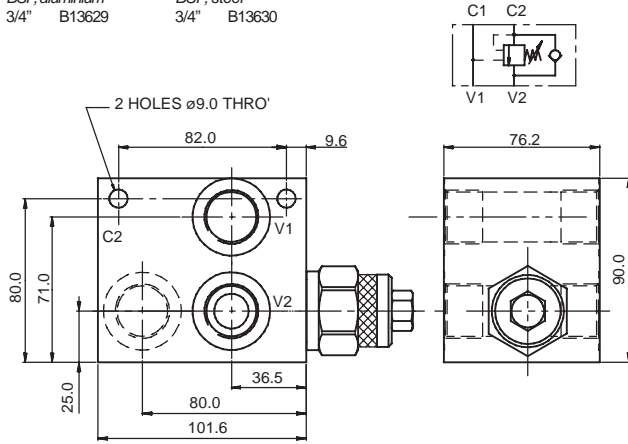
ALTERNATIVE BODY ARRANGEMENTS for 100 Litres/min Valves

COMPLETE VALVE 3/4" PORTS

BASIC CODE: 1CE156/1CEB156
THROUGHPORTED

Body ONLY part numbers

BSP, aluminium BSP, steel
3/4" B13629 3/4" B13630

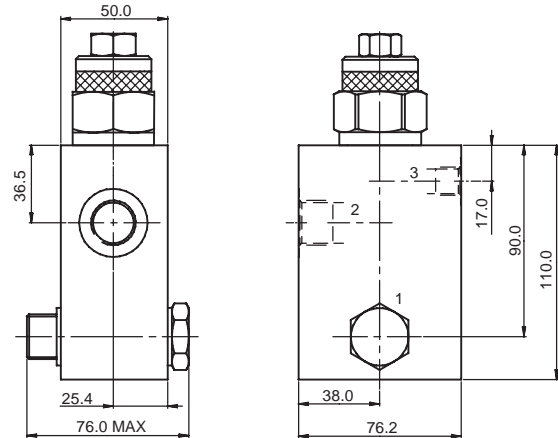


COMPLETE VALVE 3/4" PORTS

BASIC CODE: 1CBE150/1CBEB150
BANJO MOUNTED

Sub-assembly part numbers

BSP, aluminium
3/4" AXP13565-6W-S



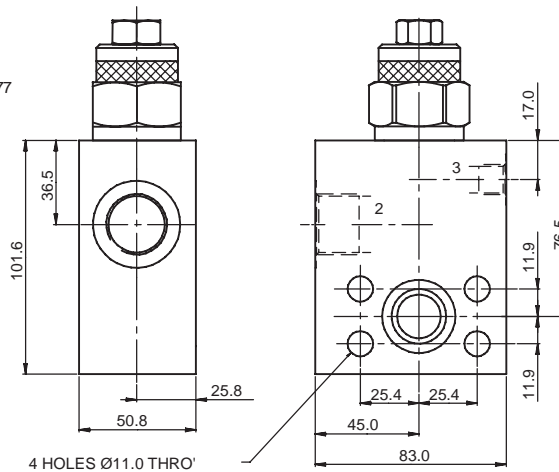
6

COMPLETE VALVE 3/4" SAE 6000 PSI FLANGE PORTS

BASIC CODE: 1CEG150/1CEBG150
GASKET MOUNTED

Sub-assembly part numbers

BSP, aluminium BSP, steel
3/4" BXP13634-6W-S 3/4" BXP13634-6W-S-377



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1C**** **F** **6W** **35** **S** **3**

Basic Code

1CE156/1CEB156 = Cartridge & Body Through Ported.
1CBE150/1CBEB150 = Cartridge & Body Banjo Mounted.
1CEG150/1CEBG150 = Cartridge & Body Gasket Mounted

Adjustment Means

P = Leakproof Screw Adjust (1CEB156/1CBEB150/1CEBG150)
F = Screw Adjust (1CE156/1CBE150/1CEG150)

Port Sizes - Bodied Valves Only

6W = 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

Pilot Ratio

3 = 3.5:1 - 1CE156/1CBE150/
1CEG150
3 = 3:1 - 1CEB156/1CBEB150/
1CEBG150 (Standard)
8 = 8:1 - 1CEB156/1CBEB150/
1CEBG150

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)

We reserve the right to change specifications without notice

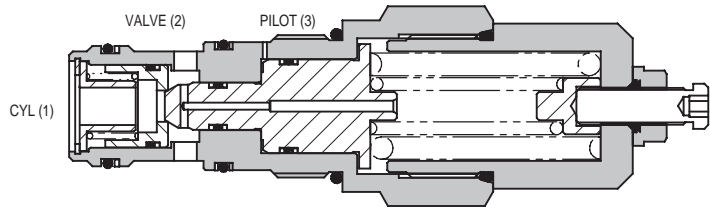
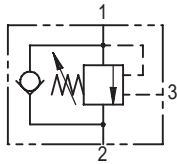




1CE SERIES OVERCENTRE VALVE

PILOT ASSISTED RELIEF WITH CHECK

1CE140



6

APPLICATION

Overcentre 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 overcentre 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.

The overcentre 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 overcentre valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcentre valves are used for controlling loads in both directions for motor applications or for cylinders going over centre.

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 optimisation 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:

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

FEATURES

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

PILOT RATIOS

- 4:1 Best suited where the load varies and machine structure can induce instability.
 - 6:1 Best suited for applications where the load remains relatively constant.
- Other ratios available upon request.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	140 litres/min (37 US GPM)
Max Setting	Max Load Induced Pressure: 340 bar (4930 psi) Relief Setting: 420 bar (6090 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (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) 1CE145 (aluminium) 2.2 kg (4.5 lbs) 1CE145 (steel) 4.0 kg (8.8 lbs) 1CEE145 (aluminium) 2.9 kg (6.4 lbs) 1CEE145 (steel) 6.0 kg (13.2 lbs)
Seal Kit Number	SK1108 (Nitrile) SK1108V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

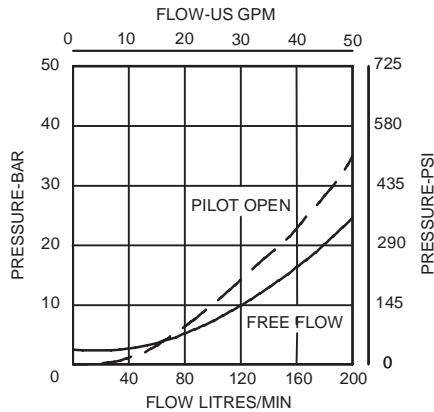
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Website: www.integratedhydraulics.com

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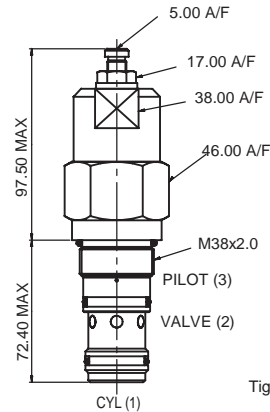
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Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CE140



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

SINGLE VALVE

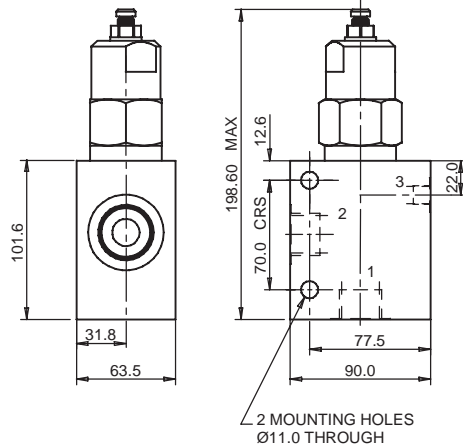
3/4" 1" PORTS

BASIC CODE: 1CE145

Body ONLY part numbers

BSP, aluminium	SAE, aluminium
3/4" B20105	1" B11946
1" B20107	

BSP, steel	SAE, steel
3/4" B20106	1" B11947
1" B20108	



DUAL VALVE

1" PORTS

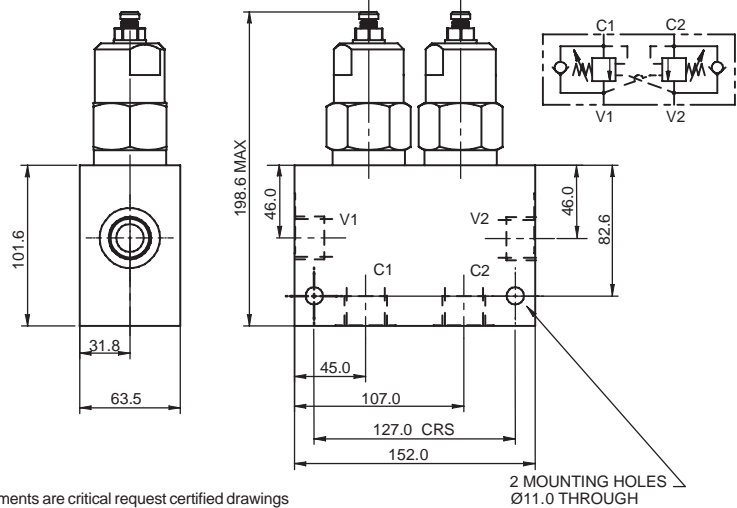
BASIC CODE: 1CEE145

Body ONLY part numbers

BSP, aluminium	SAE, aluminium
1" C20285	1" C30105

(INTERNALLY CROSS PILOTED)

BSP, steel	SAE, steel
1" C20287	1" C30106



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE** F 6W 40 S 4**

Basic Code

1CE140 = Cartridge Only
1CE145 = Cartridge and Body
1CEE145 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

6W = 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
8W = 1" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
16T = 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pilot Ratio

4 = 4:1
6 = 6:1
Other ratios available upon request

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

Pressure Range @ 4.8 l/min

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 litres/min

We reserve the right to change specifications without notice

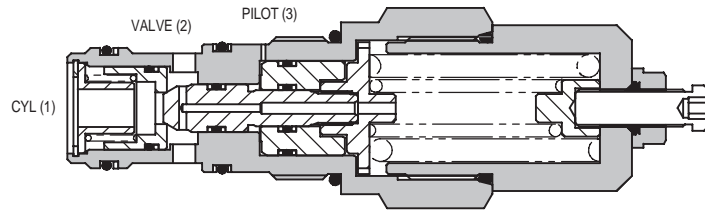
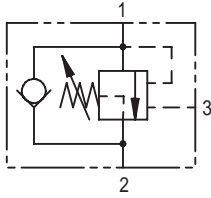


1CER SERIES OVERCENTRE VALVE

PART BALANCED - PILOT ASSISTED

1CER140

POPPET RELIEF



6

APPLICATION

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

PILOT RATIOS

- 4:1 Best suited where the load varies and machine structure can induce instability.
 - 6:1 Best suited for applications where the load remains relatively constant.
- Other ratios available upon request.

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 optimisation 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:

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

FEATURES

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

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	140 litres/min (37 US GPM)
Max Setting	Max Load Induced Pressure: 340 bar (4930 psi) Relief Setting: 420 bar (6090 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (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	1CER140 1.2 kg (2.6 lbs) 1CER145 (aluminium) 2.2 kg (4.8 lbs) 1CER145 (steel) 4.0 kg (8.8 lbs) 1CEER145 (aluminium) 2.9 kg (6.4 lbs) 1CEER145 (steel) 6.0 kg (13.2 lbs)
Seal Kit Number	SK1108 (nitrile) SK1108V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

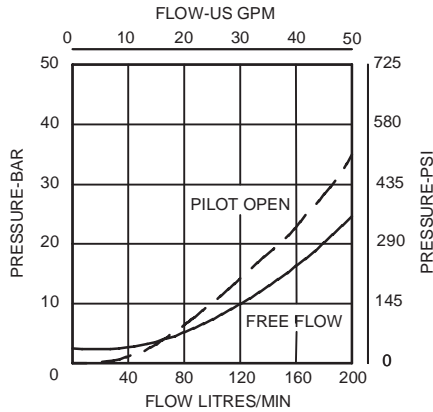
Integrated Hydraulics Ltd

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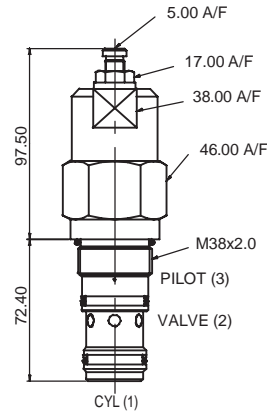
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Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CER140



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

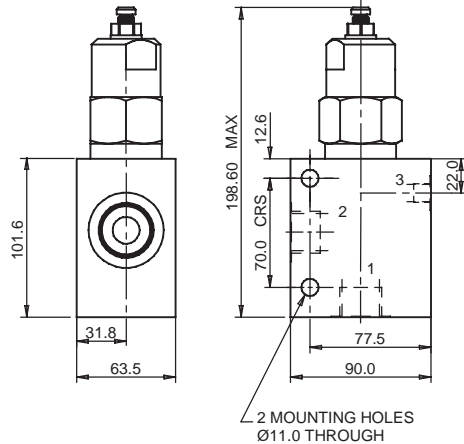
SINGLE VALVE

3/4" 1" PORTS

BASIC CODE: 1CER145

Body ONLY part numbers

BSP, aluminium		SAE, aluminium		BSP, steel		SAE, steel	
3/4"	B20105	3/4"	B11952	3/4"	B20106	3/4"	B11953
1"	B20107	1"	B11946	1"	B20108	1"	B11947



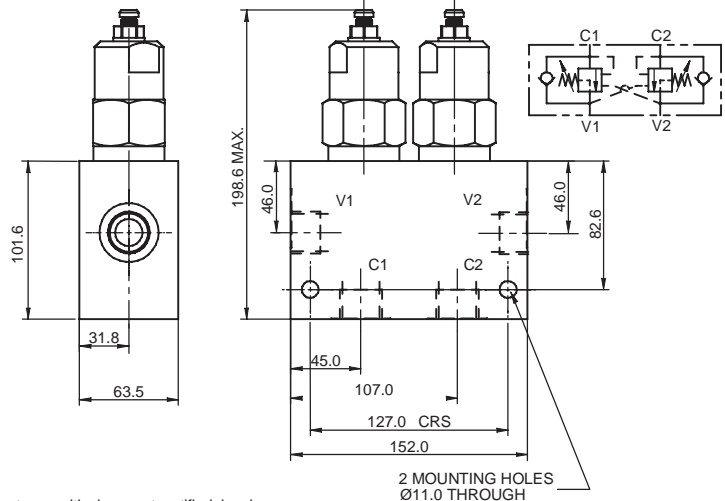
DUAL VALVE

1" PORTS

BASIC CODE: 1CEER145 (INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium		SAE, aluminium		BSP, steel		SAE, steel	
1"	C20285	1"	C30105	1"	C20287	1"	C30106



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CER* F 6W 40 S 4**

Basic Code

1CER140 = Cartridge Only
1CER145 = Cartridge and Body
1CEER145 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

6W = 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
8W = 1" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
16T = 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pilot Ratio

4 = 4:1
6 = 6:1
Other ratios available upon request

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

Pressure Range @ 4.8 l/min

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 litres/min

We reserve the right to change specifications without notice

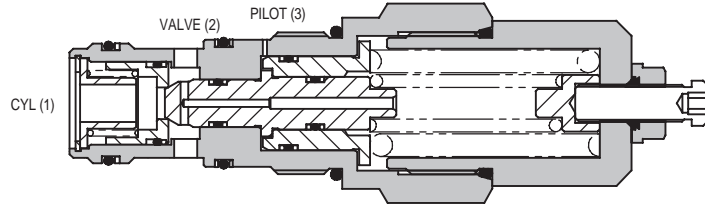
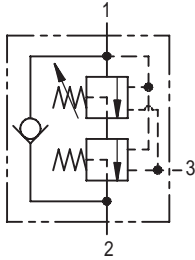


1CEL SERIES OVERCENTRE VALVE

PILOT ASSISTED RELIEF WITH CHECK AND COUNTERBALANCE

1CEL140

POPPET RELIEF



6

APPLICATION

The 1CEL overcentre valve performs all duties of a regular overcentre but maintains a counterbalance pressure to provide dampening to 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.

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.

PILOT RATIOS

Primary 6.1:1
Secondary 0.5:1

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	140 litres/min (37 US GPM)										
Max Setting	380 bar (5510 psi)										
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated										
Body Material	Standard aluminium (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	<table> <tr> <td>1CEL140</td> <td>1.2 kg (2.6 lbs)</td> </tr> <tr> <td>1CEL145 (aluminium)</td> <td>2.2 kg (4.8 lbs)</td> </tr> <tr> <td>1CEL145 (steel)</td> <td>4.0 kg (8.8 lbs)</td> </tr> <tr> <td>1CEEL145 (aluminium)</td> <td>2.9 kg (6.4 lbs)</td> </tr> <tr> <td>1CEEL145 (steel)</td> <td>6.0 kg (13.2 lbs)</td> </tr> </table>	1CEL140	1.2 kg (2.6 lbs)	1CEL145 (aluminium)	2.2 kg (4.8 lbs)	1CEL145 (steel)	4.0 kg (8.8 lbs)	1CEEL145 (aluminium)	2.9 kg (6.4 lbs)	1CEEL145 (steel)	6.0 kg (13.2 lbs)
1CEL140	1.2 kg (2.6 lbs)										
1CEL145 (aluminium)	2.2 kg (4.8 lbs)										
1CEL145 (steel)	4.0 kg (8.8 lbs)										
1CEEL145 (aluminium)	2.9 kg (6.4 lbs)										
1CEEL145 (steel)	6.0 kg (13.2 lbs)										
Seal Kit Number	SK1108 (Nitrile) SK1108V (Viton)										
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)										
Operating Temp	-20°C to +90°C										
Leakage	0.3 millilitres/min nominal (5 dpm)										
Nominal Viscosity Range	5 to 500 cSt										

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

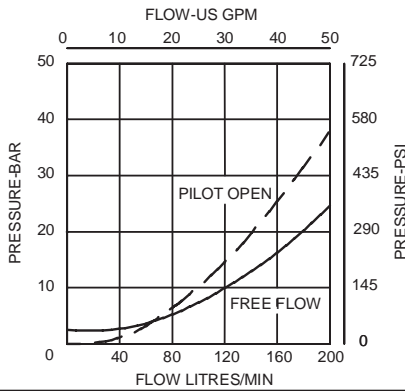
Integrated Hydraulics Ltd

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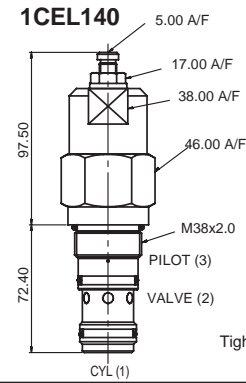
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEL140



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

SINGLE VALVE

3/4" 1" PORTS

BASIC CODE: 1CEL145

Body ONLY part numbers

BSP, aluminium		SAE, aluminium		BSP, steel		SAE, steel	
3/4"	B20105	1"	B11946	3/4"	B20106	1"	B11947
1"	B20107			1"	B20108		

DUAL VALVE

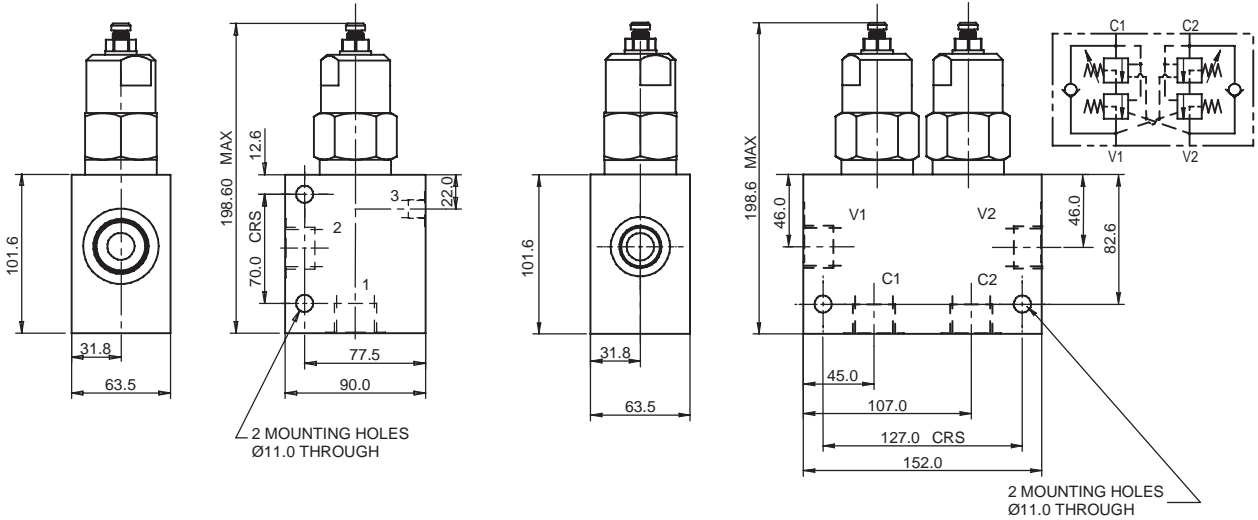
1" PORTS

BASIC CODE: 1CEEL145

(INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium		SAE, aluminium		BSP, steel		SAE, steel	
1"	C20285	1"	C30105	1"	C20287	1"	C30106



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 Integrated Hydraulics for more information.

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEL * F 6W 30 S 220 60**

Basic Code

1CEL140 = Cartridge Only
 1CEL145 = Cartridge and Body
 1CEEL145 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

6W = 3/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
 8W = 1" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
 16T = 1" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Counterbalance setting bar
 (10 bar increments).

High pressure setting bar
 (10 bar increments).

Seals

S = Nitrile (For use with most industrial hydraulic oils)
 SV = Viton (For high temperature and most special fluid applications)

Pressure Range, bar @ 4.8 l/min

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

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

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

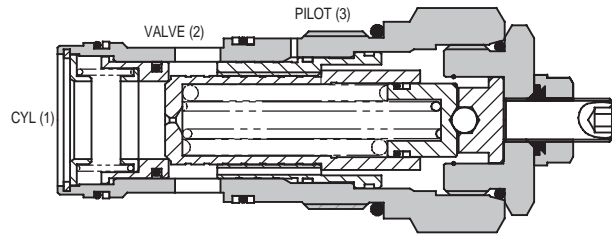
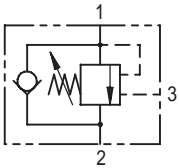
We reserve the right to change specifications without notice



1CE SERIES OVERCENTRE VALVE

PILOT ASSISTED RELIEF WITH CHECK

1CE300



6

APPLICATION

Overcentre 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 overcentre 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.

The overcentre 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 overcentre valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcentre valves are used for controlling loads in both directions for motor applications or for cylinders going over centre.

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 optimisation 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:

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

FEATURES

Allows quick, easy field service - reduces down time.
Smooth, sure performance.

PILOT RATIOS

- 3:1 (Standard) Best suited for applications where load varies and machine structure can induce instability.
- 8:1 Best suited for applications where load remains relatively constant.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	300 litres/min (80 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A6935 (See Section 17)
Torque Cartridge into Cavity	150 Nm (110 lbs ft)
Weight	1CE300 0.91 kg (2.00 lbs) 1CE350 2.71 kg (5.96 lbs) 1CEE350 5.42 kg (11.92 lbs)
Seal Kit Number	SK437 (Nitrile) SK437V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	4 millilitres/min nominal (60 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

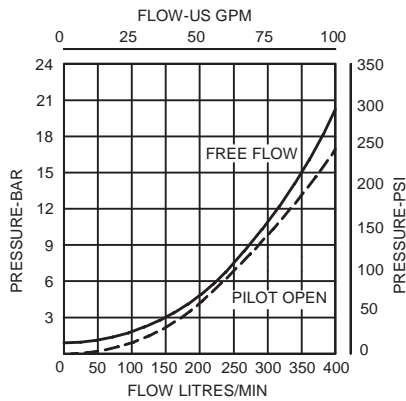
Integrated Hydraulics Ltd

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Website: www.integratedhydraulics.com

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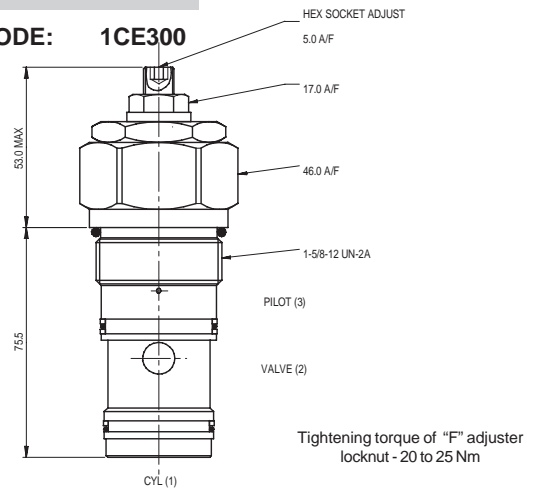
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CE300



SINGLE VALVE

1 1/4" PORTS

BASIC CODE: 1CE350

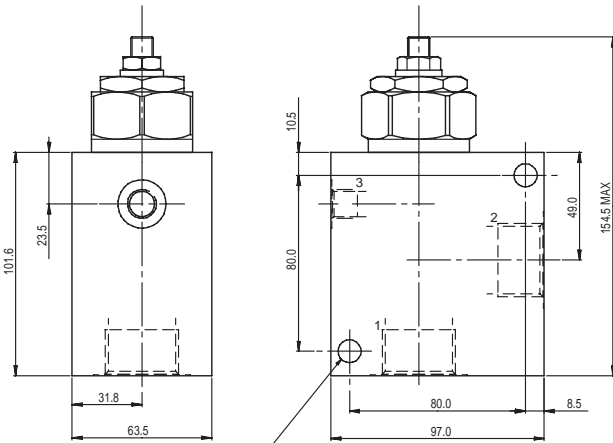
Body ONLY part numbers

BSP, aluminium
1 1/4" B6814

SAE, aluminium
1 1/4" B10630

BSP, steel
1 1/4" B8610

SAE, steel
1 1/4" B11474



2 HOLES Ø 10.5 THRO

Where measurements are critical request certified drawings

DUAL VALVE

1 1/4" PORTS

BASIC CODE: 1CEE350

Body ONLY part numbers

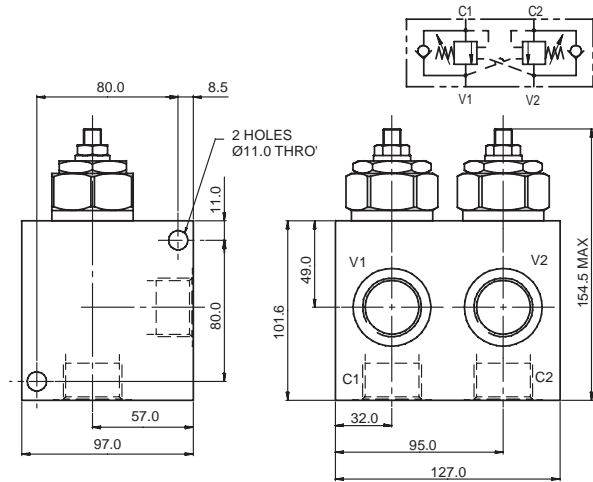
BSP, aluminium
1 1/4" C8704

SAE, aluminium
1 1/4" C10811

BSP, steel
1 1/4" C8705

SAE, steel
1 1/4" C11564

(INTERNALLY CROSS PILOTED)



ORDERING CODE EXAMPLE

1CE** F 10W 35 S 3**

Basic Code

1CE300 = Cartridge Only
1CE350 = Cartridge and Body
1CEE350 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

10W = 1 1/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
20T = 1 1/4" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

Pilot Ratio

3 = 3:1 (Standard)
8 = 8:1

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

We reserve the right to change specifications without notice

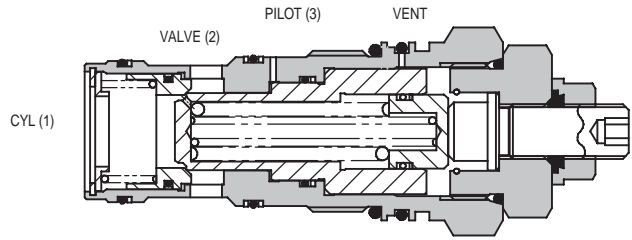
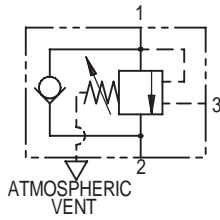


1CEB SERIES OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CEB300

POPPET RELIEF



6

APPLICATION

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

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

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 optimisation 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:

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

FEATURES

Allows quick, easy field service - reduces down time.
Smooth, sure performance.

PILOT RATIOS

- 3:1 (Standard) Best suited for applications where load varies and machine structure can induce instability.
- 8:1 Best suited for applications where load remains relatively constant.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	300 litres/min (80 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium (up to 210 bar*) Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A6935 (See Section 17)
Torque Cartridge into Cavity	150 Nm (110 lbs ft)
Weight	1CEB300 0.91 kg (2.00 lbs) 1CEB350 2.71 kg (5.96 lbs) 1CEEB350 5.42 kg (11.92 lbs)
Seal Kit Number	SK686 (Nitrile) SK686V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	4 millilitres/min max (60 dpm)
Nominal Viscosity Range	5 to 500 cSt

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

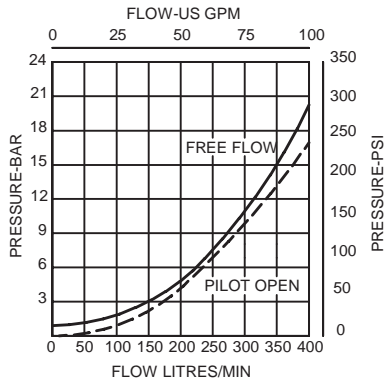
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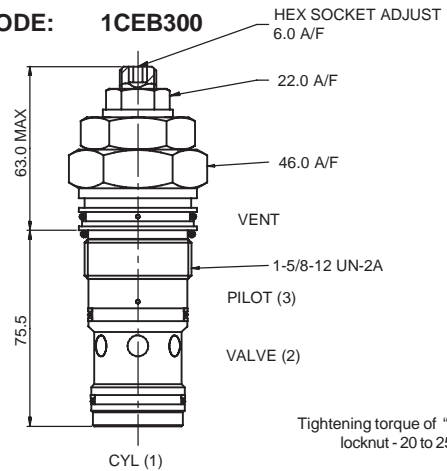
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Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEB300



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

SINGLE VALVE

1 1/4" PORTS

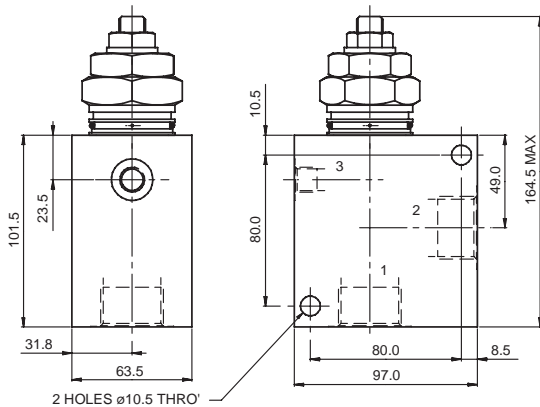
BASIC CODE: 1CEB350

Body ONLY part numbers

BSP, aluminium 1 1/4" B6814 SAE, aluminium 1 1/4" B10630

BSP, steel 1 1/4" B8610

SAE, steel 1 1/4" B11474



DUAL VALVE

1 1/4" PORTS

BASIC CODE: 1CEEB350

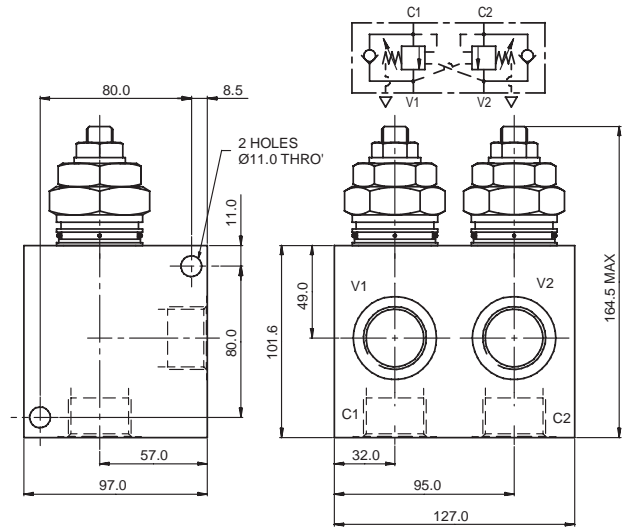
(INTERNALLY CROSS PILOTED)

Body ONLY part numbers

BSP, aluminium 1 1/4" C8704 SAE, aluminium 1 1/4" C10811

BSP, steel 1 1/4" C8705

SAE, steel 1 1/4" C11564



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE** F 10W 35 S 3**

Basic Code

- 1CEB300 = Cartridge Only
- 1CEB350 = Cartridge and Body
- 1CEEB350 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

- 10W = 1 1/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port
- 20T = 1 1/4" SAE Valve & Cyl Port. 1/4" SAE Pilot Port

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

Pilot Ratio

- 3 = 3:1 (Standard)
- 8 = 8:1

Seals

- S = Nitrile (For use with most industrial hydraulic oils)
- SV = Viton (For high temperature and most special fluid applications)

We reserve the right to change specifications without notice

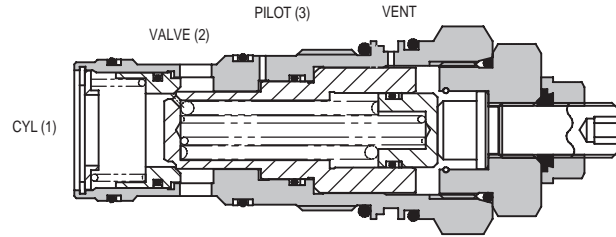
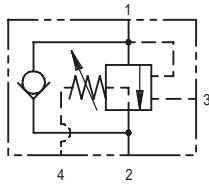


1CEBD SERIES OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CEBD300

POPPET RELIEF



6

APPLICATION

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

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

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 optimisation 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:

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

FEATURES

Allows quick, easy field service - reduces down time.
Smooth, sure performance.

PILOT RATIOS

3:1 (Standard)

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

8:1

Best suited for applications where load remains relatively constant.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	300 litres/min (80 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Standard aluminium Add suffix '377' for steel option
Mounting Position	Unrestricted
Cavity Number	A13098 (See Section 17)
Torque Cartridge into Cavity	150 Nm (110 lbs ft)
Weight	1CEBD300 0.91 kg (2.00 lbs)
Seal Kit Number	SK686 (Nitrile) SK686V (Viton) SK686P (Polyurethane/Nitrile)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	4 millilitres/min max (60 dpm)
Nominal Viscosity Range	5 to 500 cSt

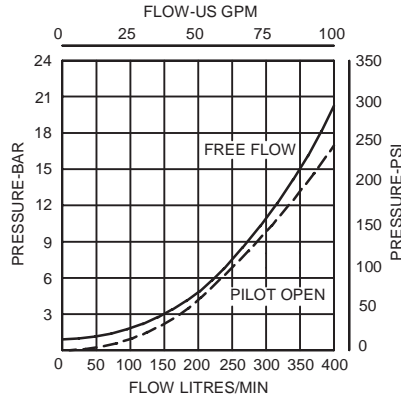
Integrated Hydraulics Ltd

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Integrated Hydraulics Inc

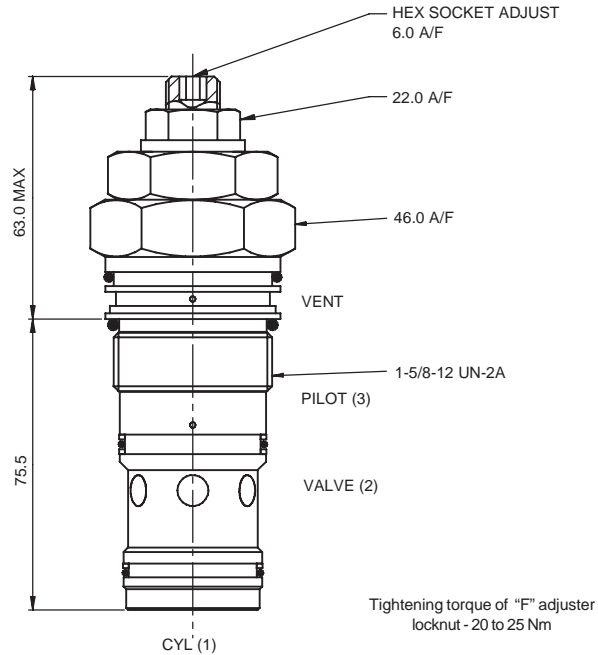
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CEBD300



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEBD300 F 35 P 8

Basic Code
1CEBD300 = Cartridge Only

Adjustment Means
F = Screw Adjustment

Pressure Range @ 4.8 l/min
35 = 70-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

Pilot Ratio
3 = 3:1 (Standard)
8 = 8:1

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)

We reserve the right to change specifications without notice

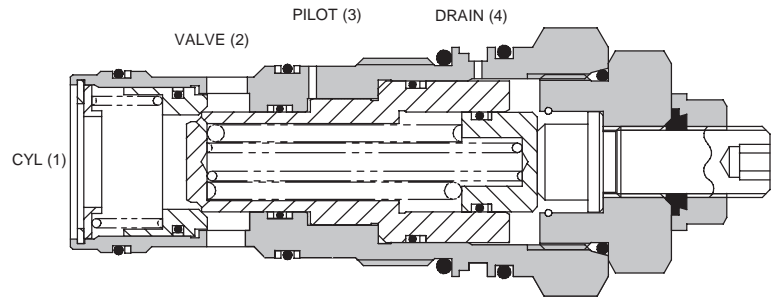
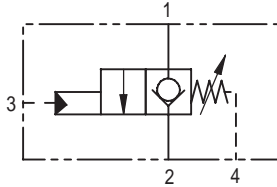


1CPBD SERIES ZERO DIFFERENTIAL

OVERCENTRE VALVE

FULLY BALANCED - PILOT ASSISTED

1CPBD300



6

APPLICATION

Zero differential overcentre 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.

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	300 litres/min (80 US GPM)
Max Working Pressure	400 bar (5800 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Mounting Position	Unrestricted
Cavity Number	A13098 (See section 17)
Torque Cartridge into Cavity	150 Nm (110 lbs ft)
Weight	0.91 kg (2.0 lbs)
Seal Kit Number	SK971 (Nitrile) SK971V (Viton) SK971P (Polyurethane/Nitrile)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	4.0 millilitres/min max (60 dpm)
Nominal Viscosity Range	5 to 500 cSt
Bar per turn	5 bar

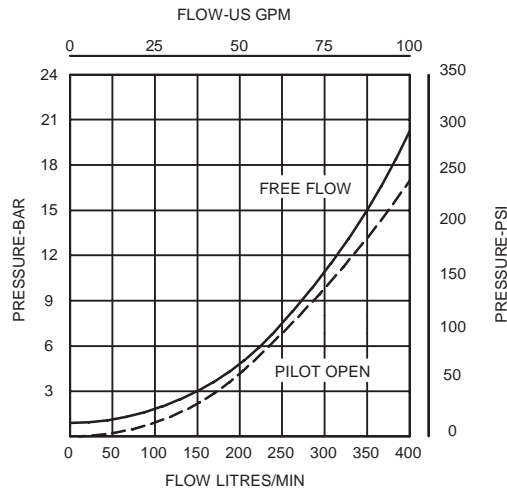
Integrated Hydraulics Ltd

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Website: www.integratedhydraulics.com

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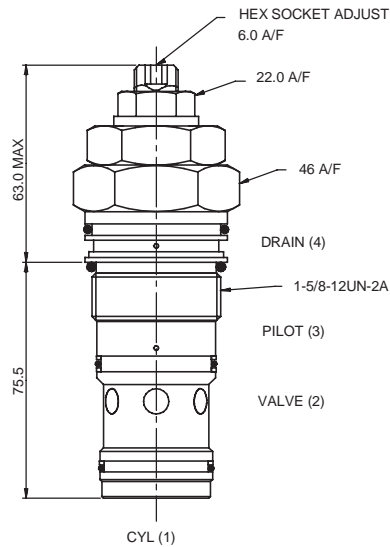
7047 Spinach Drive, Mentor, Ohio 44060, USA
Tel: (440) 974 3171 Fax: (440) 974 3170
Website: www.integratedhydraulics.com

PRESSURE DROP



CARTRIDGE ONLY

BASIC CODE: 1CPBD300



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CPBD300	F	2	P
<p>Basic Code 1CPBD300 = Cartridge Only</p>	<p>Adjustment Means F = Screw Adjustment</p>	<p>Pilot Adjust Range 2 = 5-20 bar. Std setting 10 bar Std setting made at 4.8 litres/min</p>	<p>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)</p>

We reserve the right to change specifications without notice



1CE SERIES OVERCENTRE VALVE

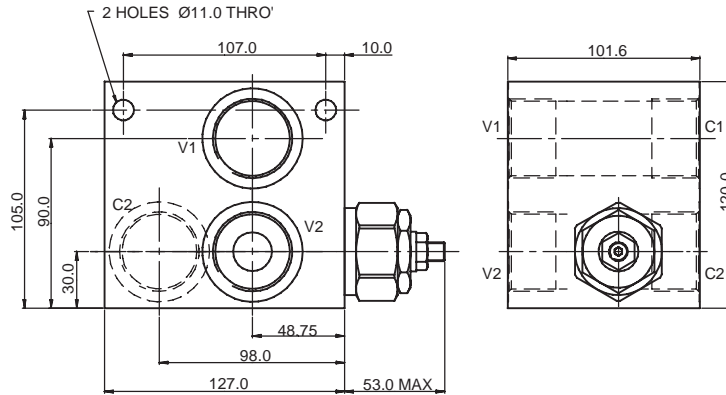
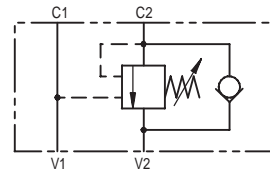
ALTERNATIVE BODY ARRANGEMENTS for 300 Litres/min Valves

COMPLETE VALVE

1 1/4" PORTS

BASIC CODE: 1CE356
THROUGH PORTED

Body ONLY part numbers
BSP, aluminium 1 1/4" C13637 *BSP, steel* 1 1/4" C13638



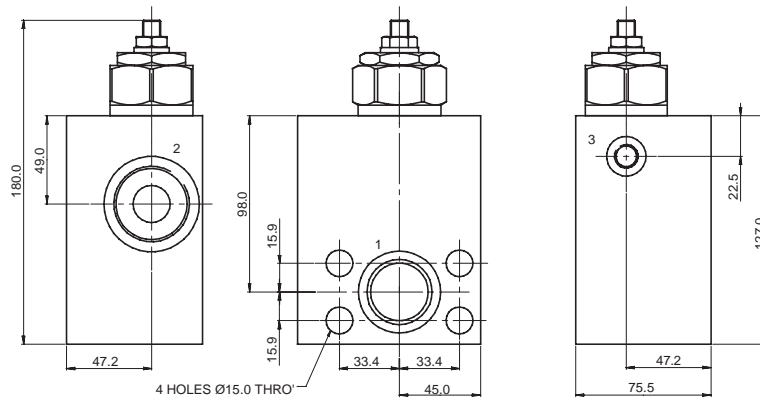
6

COMPLETE VALVE

1 1/4" PORTS

BASIC CODE: 1CEG350
GASKET MOUNTED

Sub-assembly part numbers
BSP, aluminium 1 1/4" CXP20647-10W-S *BSP, steel* 1 1/4" CXP20647-10W-S-377



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CE** F 10W 35 S 3**

Basic Code

1CE356 = Cartridge and Body Through Ported
 1CEG350 = Cartridge and Body Gasket Mounted

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

10W = 1 1/4" BSP Valve & Cyl Port. 1/4" BSP Pilot Port

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar
 Std setting made at 4.8 litres/min

Pilot Ratio

3 = 3:1
 8 = 8:1

Seals

S = Nitrile (For use with most industrial hydraulic oils)
 SV = Viton (For high temperature and most special fluid applications)

We reserve the right to change specifications without notice

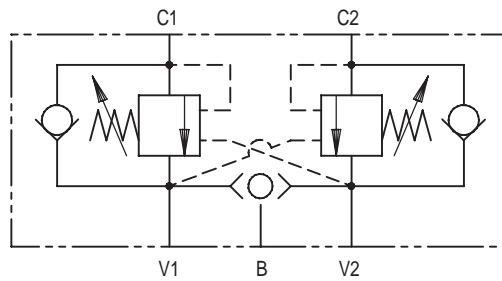




1CEESH SERIES DUAL OVERCENTRE VALVE

WITH BRAKE SHUTTLE - PILOT ASSISTED

1CEESH35



6

APPLICATION

Overcentre 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 overcentre 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 overcentre 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.

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 optimisation 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:

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

PILOT RATIOS

- 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 load remains relatively constant.

FEATURES

These valves have the excellent load control and safety features of the dual overcentre valve with the addition of a port for a brake release line. Smooth, safe performance.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	30 litres/min (8 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces electroless nickel plated
Body Material	Steel
Mounting Position	Line mounted
Weight	2.20 kg (4.84 lbs)
Seal Kit Number	SK816 (Nitrile) SK816V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

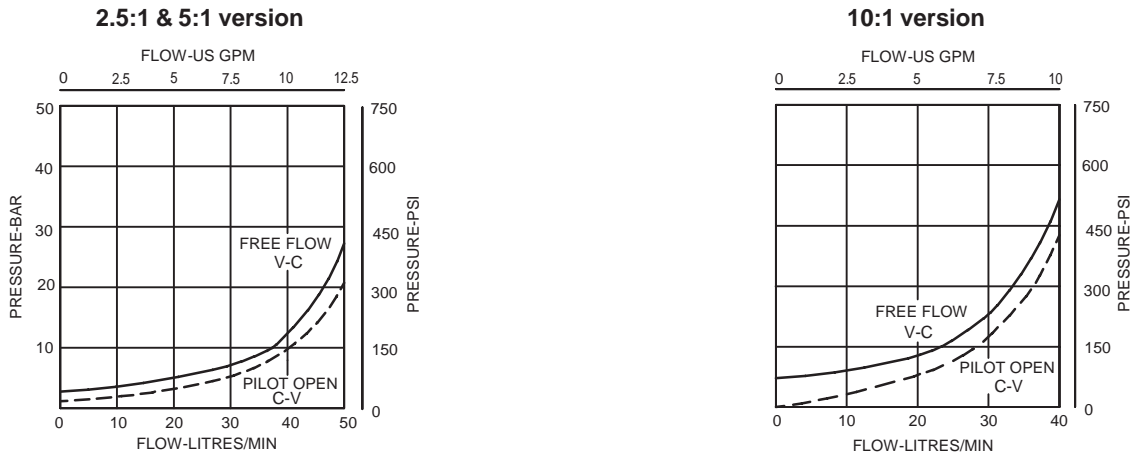
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Website: www.integratedhydraulics.com

PRESSURE DROP



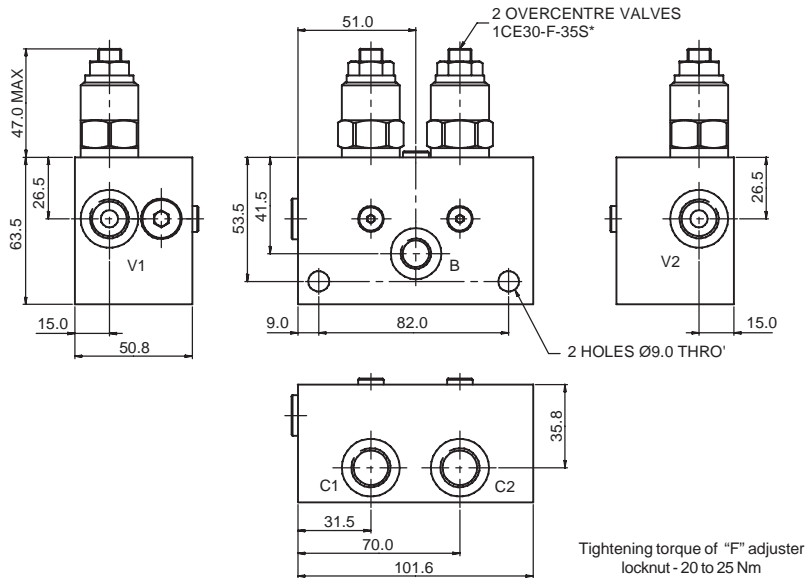
COMPLETE VALVE 3/8" PORTS

BASIC CODE: 1CEESH35 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel

3/8" BXP15939-3W-S-377



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEESH35 F 3W 35 S 5 377

Basic Code

1CEESH35 = Cartridges and Body Only

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.

Port Sizes - Bodied Valves Only

3W = 3/8" BSP Valve & Cyl Port. 1/4" BSP Brake Port

Pressure Range @ 4.8 l/min

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 litres/min

Body Material

377 = Steel

Pilot Ratio

2 = 2.5:1

5 = 5:1 (Standard)

10 = 10:1

Seals

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

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

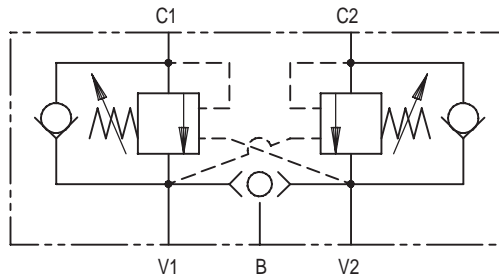
We reserve the right to change specifications without notice



1CEESH SERIES DUAL OVERCENTRE VALVE

WITH BRAKE SHUTTLE - PILOT ASSISTED

1CEESH95



6

APPLICATION

Overcentre 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 overcentre 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 overcentre 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.

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 optimisation 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:

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

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.

Other ratios available upon request.

FEATURES

These valves have the excellent load control and safety features of the dual overcentre valve with the addition of a port for a brake release line. Smooth, safe performance.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	90 litres/min (23 US GPM)
Max Setting	Max Load Induced Pressure: 160 bar (2300 psi) (20) 270 bar (4000 psi) (35) Relief Setting: 350 bar (5000 psi) (35) 225 bar (3260 psi) (20)
Cartridge Material	Working parts hardened and ground steel. External surfaces electroless nickel plated
Body Material	Steel
Mounting Position	Line mounted
Weight	3.50 kg (7.70 lbs)
Seal Kit Number	SK817 (Nitrile) SK817V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

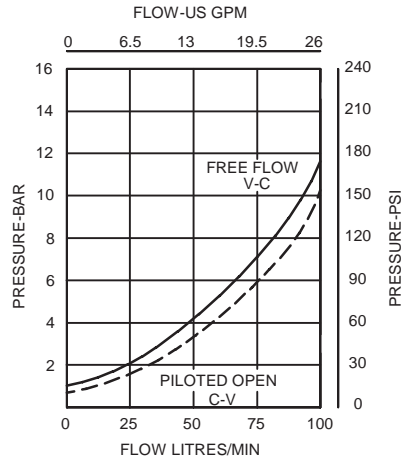
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PRESSURE DROP



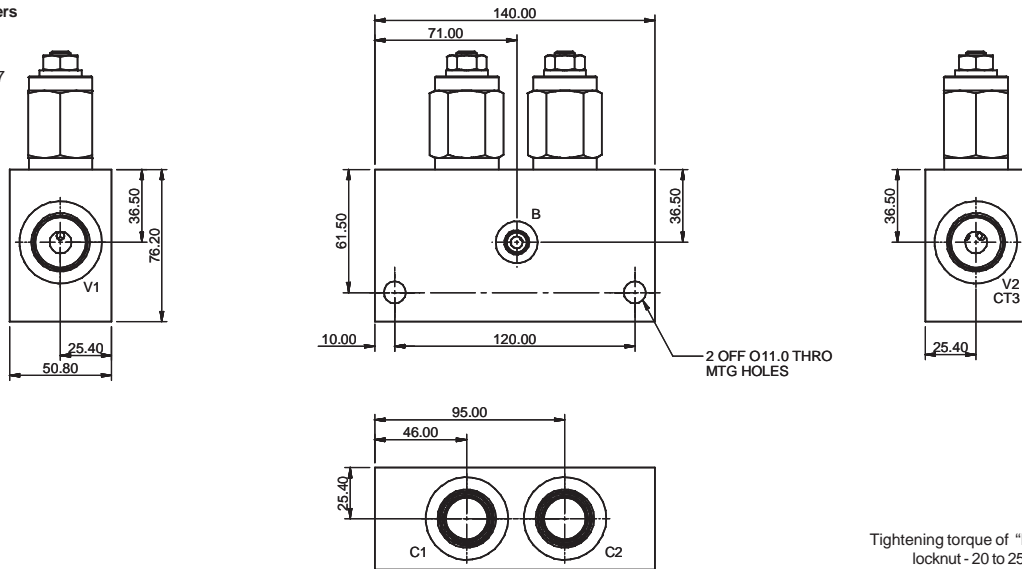
COMPLETE VALVE 3/4" PORTS

BASIC CODE: 1CEESH95 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel

3/4" BXP17429-6W-S-377



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEESH95 F 6W 35 S 4 377

Basic Code

1CEESH95 = Cartridges and Body

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.

Port Sizes - Bodied Valves Only

6W = 3/4" BSP Valve & Cyl Port. 1/4" BSP Brake Port

Pressure Range @ 4.8 l/min

20 = 70-225 bar. Std setting 100 bar

35 = 200-350 bar. Std setting 210 bar

Std setting made at 4.8 litres/min

Body Material

377 = Steel

Pilot Ratio

4 = 4:1

8 = 8:1

Seals

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

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

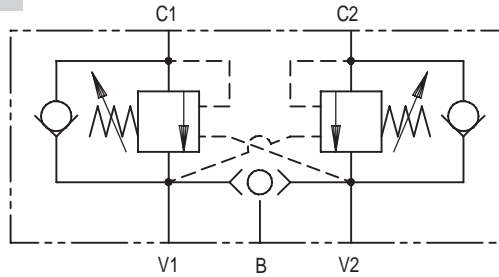
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1CEESH SERIES DUAL OVERCENTRE VALVE

WITH BRAKE SHUTTLE - PILOT ASSISTED

1CEESH150/1CEESH350



6

APPLICATION

Overcentre 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 overcentre 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 overcentre 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.

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 optimisation 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:

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

PILOT RATIOS

- 3:1 Best suited for applications where load varies
- 3.5:1 and machine structure can induce instability.
- 8:1 Best suited for applications where the load remains relatively constant.

FEATURES

These valves have the excellent load control and safety features of the dual overcentre valve with the addition of a port for a brake release line. Smooth, safe performance.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	1CEESH150: 150 l/min (40 US GPM) 1CEESH350: 300 l/min (80 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces electroless nickel plated
Body Material	Steel
Mounting Position	Line mounted
Weight	1CEESH150: 3.50 kg (7.70 lbs) 1CEESH350: 5.42 kg (11.94 lbs)
Seal Kit Number	1CEESH150: SK818 (Nitrile) SK818V (Viton) 1CEESH350: SK688 (Nitrile) SK688V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	1CEESH150: 0.3 millilitres/min nominal (5 dpm) 1CEESH350: 4 millilitres/min nominal (60 dpm)
Nominal Viscosity Range	5 to 500 cSt

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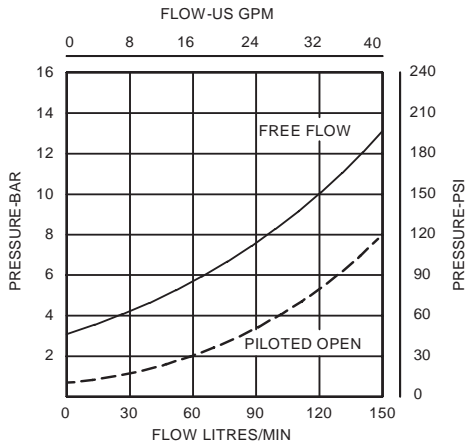
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PRESSURE DROP

1CEESH150

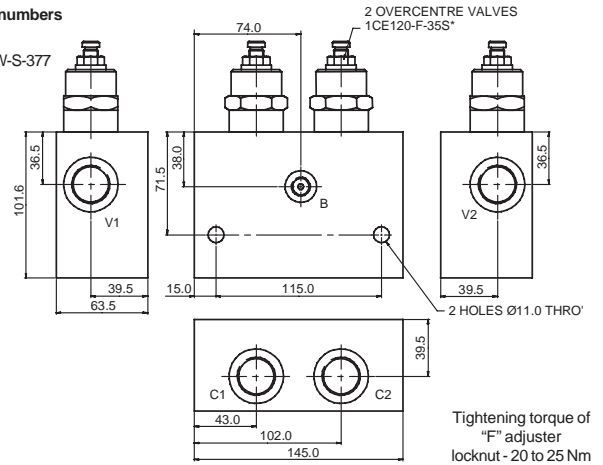


COMPLETE VALVE 1" PORTS

BASIC CODE: 1CEESH150 (INTERNALLY CROSS PILOTED)

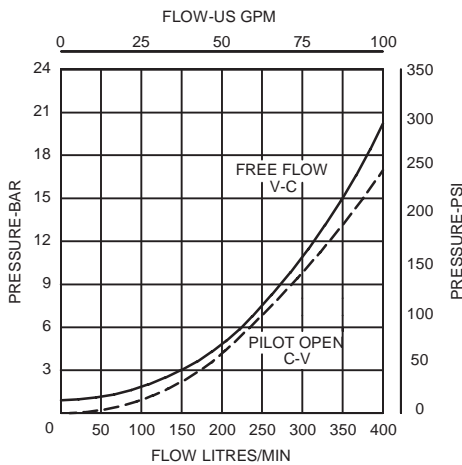
Sub-assembly part numbers

BSP, steel
1" CXP15933-8W-S-377



PRESSURE DROP

1CEESH350

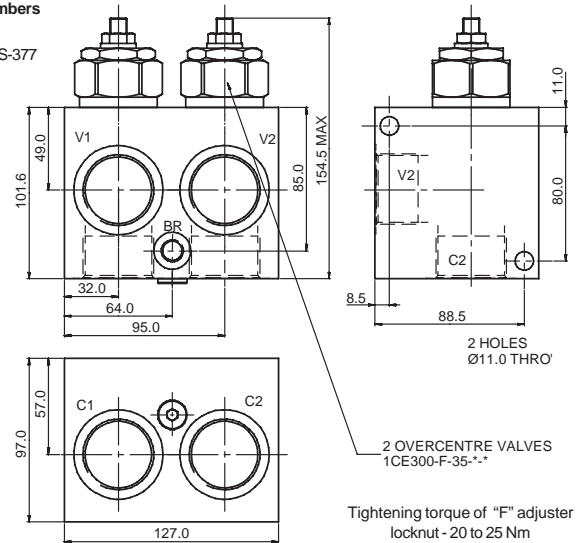


COMPLETE VALVE 1 1/4" PORTS

BASIC CODE: 1CEESH350 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel
1.1/4" CXP22297-10W-S-377



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEESH* F 10W 35 S 3 377**

Basic Code

1CEESH150 = Cartridges and Body
1CEESH350 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

8W = 1" BSP Valve & Cyl Port. 1/4" BSP Brake Port
10W = 1 1/4" BSP Valve & Cyl Port. 1/4" BSP Brake Port

Body Material

377 = Steel

Pilot Ratio

3 = 3:1 - 1CEESH350 (Standard)
3 = 3.5:1 - 1CEESH150
8 = 8:1 - 1CEESH350

Seals

S = Nitrile (For use with most industrial hydraulic oils)
SV = Viton (For high temperature and most special fluid applications)

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar
Std setting made at 4.8 litres/min

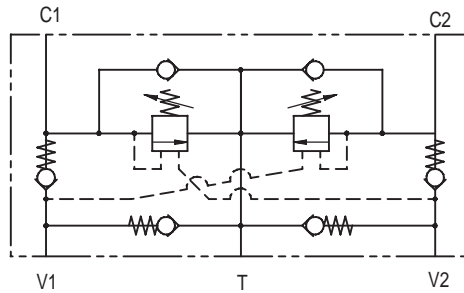
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1CEEC SERIES MOTION CONTROL & LOCK VALVE

PILOT ASSISTED

1CEEC35/1CEEC95



6

APPLICATION

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.

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 optimisation 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:

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

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.

PILOT RATIOS

- 2.5:1 (1CEEC35) Best suited for extremely unstable applications such as long booms or flexible framework.
- 5:1 (1CEEC35) Best suited for applications where load varies and machine structure can induce instability.
- 4:1 (1CEEC95)
- 10:1 (1CEEC35) Best suited for applications where the load remains relatively constant.
- 8:1 (1CEEC95)

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	1CEEC35: 30 litres/min (8 US GPM) 1CEEC95: 95 litres/min (25 US GPM)
Max Setting	Max Load Induced Pressure: 160 bar (2300 psi) (20) 270 bar (4000 psi) (35) Relief Setting: 350 bar (5000 psi) (35) 225 bar (3260 psi) (20)
Cartridge Material	Working parts hardened and ground steel. External surfaces electroless nickel plated
Body Material	Steel
Mounting Position	Line mounted
Weight	1CEEC35: 2.03 kg (4.50 lbs) 1CEEC95: 3.70 kg (8.20 lbs)
Seal Kit Number	1CEEC35: SK815 (Nitrile) SK815V (Viton) 1CEEC95: SK814 (Nitrile) SK814V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

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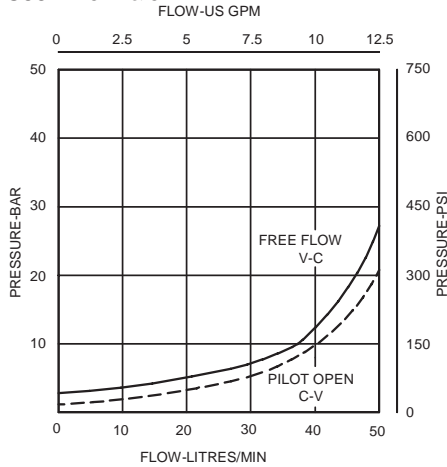
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PRESSURE DROP

1CEEC35 2: 5:1 & 5:1

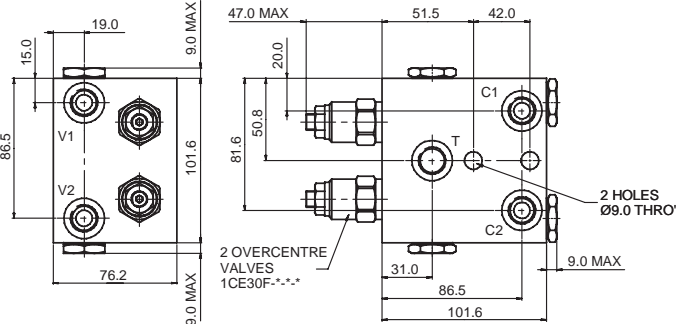


COMPLETE VALVE 3/8" PORTS

BASIC CODE: 1CEEC35 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

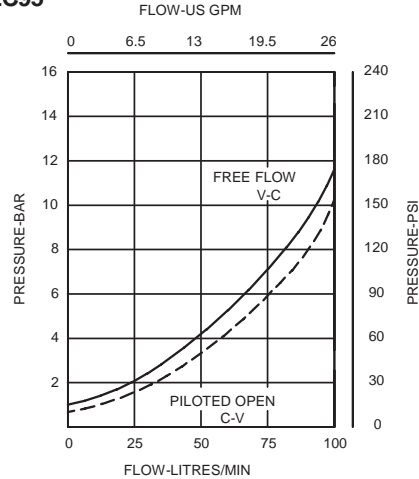
BSP, steel
3/8" BXP16247-3W-S-377



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

PRESSURE DROP

1CEEC95

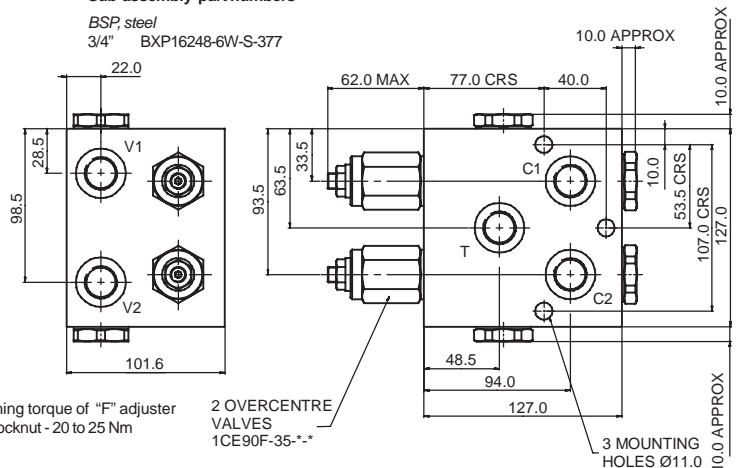


COMPLETE VALVE 3/4" PORTS

BASIC CODE: 1CEEC95 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel
3/4" BXP16248-6W-S-377



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

2 OVERCENTRE VALVES
1CE90F-35-*-*

Where measurements are critical request certified drawings

6

ORDERING CODE EXAMPLE

1CEEC F 3W 35 S 5 377**

Basic Code

1CEEC35 = Cartridge and Body

1CEEC95 = Cartridge and Body

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.

Port Sizes - Bodied Valves Only

3W = 3/8" BSP

6W = 3/4" BSP

Pressure Range @ 4.8 l/min

20 = (2.5:1 and 5:1): 70-210 bar. Std setting 100 bar. (1CEEC35)

(10:1): 100-210 bar. Std setting 100 bar. (1CEEC35)

35 = (2.5:1 and 5:1): 100-350 bar. Std setting 210 bar. (1CEEC35)

(10:1): 120-350 bar. Std setting 210 bar. (1CEEC35)

35 = (4:1 and 8:1): 200-350 bar Std setting 210 bar. (1CEEC95)

Std setting made at 4.8 litres/min

Body Material

377 = Steel

Pilot Ratio

2 = 2.5:1 (1CEEC35)

4 = 4:1 (1CEEC95)

5 = 5:1 (1CEEC35 standard)

8 = 8:1 (1CEEC95)

10 = 10:1 (1CEEC35)

Other ratios available upon request

Seals

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

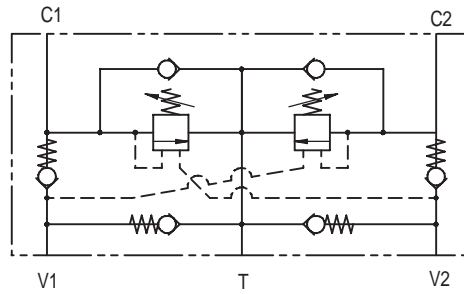
SV = Viton (For high temperature and most special fluid applications)



1CEEC SERIES MOTION CONTROL VALVE

MOTOR APPLICATIONS - PILOT ASSISTED POPPET

1CEEC150/1CEEC350



6

APPLICATION

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.

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 optimisation 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:

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

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.

PILOT RATIOS

- 3:1 Best suited applications where load varies and machine structure can induce instability
- 8:1 Best suited for applications where the load remains relatively constant.

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	1CEEC150: 150 litres/min (40 US GPM) 1CEEC350: 300 litres/min (80 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces zinc plated
Body Material	Steel
Mounting Position	Line mounted
Weight	1CEEC150: 3.7 kg (8.20 lbs) 1CEEC350: 8.2 kg (18.0 lbs)
Seal Kit Number	1CEEC150: SK813 (Nitrile) SK813V (Viton) 1CEEC350: SK635 (Nitrile) SK635V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	1CEEC150: 0.3 millilitres/min nominal (5 dpm) 1CEEC350: 4 millilitres/min nominal (60 dpm)
Nominal Viscosity Range	5 to 500 cSt

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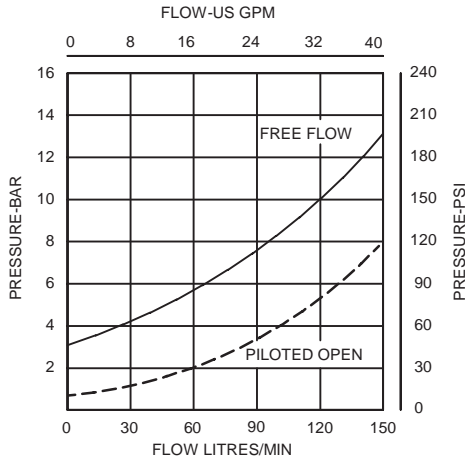
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PRESSURE DROP

1CEEC150

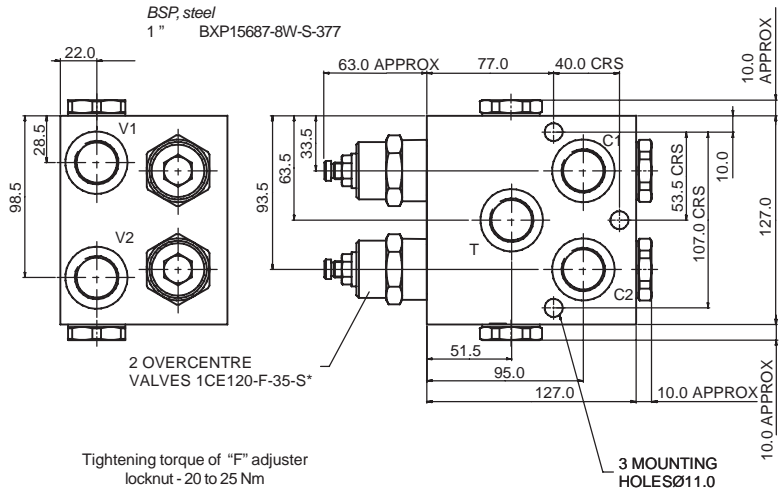


COMPLETE VALVE 1" PORTS

BASIC CODE: 1CEEC150 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

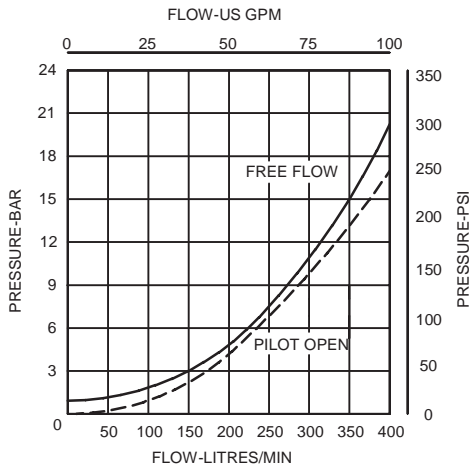
BSP, steel
1" BXP15687-8W-S-377



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

PRESSURE DROP

1CEEC350

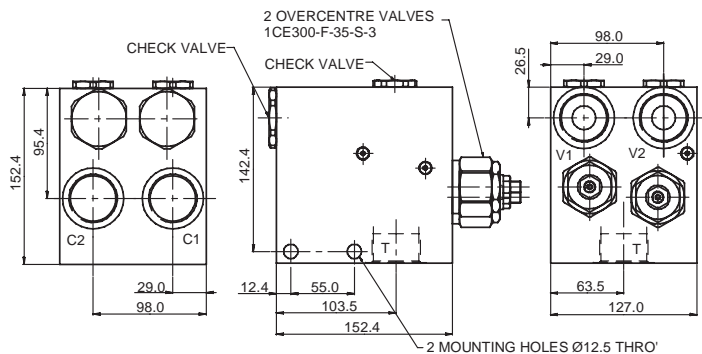


COMPLETE VALVE 1 1/4" PORTS

BASIC CODE: 1CEEC350 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel
1 1/4" DXP16844-10W-S-377



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEEC* F 10W 35 S 3 377**

Basic Code

1CEEC150 = Cartridges and Body

1CEEC350 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

8W = 1" BSP Valve & Cyl Port. 1/4" BSP Brake Port

10W = 1 1/4" BSP Valve & Cyl Port. 1/4" BSP Brake Port

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar

Std setting made at 4.8 litres/min

Body Material

377 = Steel

Pilot Ratio

3 = 3:1 - 1CEEC350 (Standard)

3 = 3.5:1 - 1CEEC150

8 = 8:1 - 1CEEC350

Seals

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

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

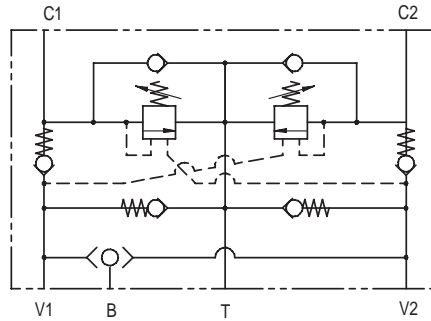
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1CEECSH SERIES MOTION CONTROL VALVE

WITH BRAKE SHUTTLE - PILOT ASSISTED

1CEECSH35



6

APPLICATION

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.

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 optimisation 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:

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

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.

PILOT RATIOS

- 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 and machine structure can induce instability.
- 10:1 Best suited for applications where the load remains relatively constant.

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	30 litres/min (8 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. Extnal surfaces electroless nickel plated
Body Material	Steel
Mounting Position	Line mounted
Weight	2.03 kg (4.50 lbs)
Seal Kit Number	SK815 (Nitrile) SK815V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

Integrated Hydraulics Ltd

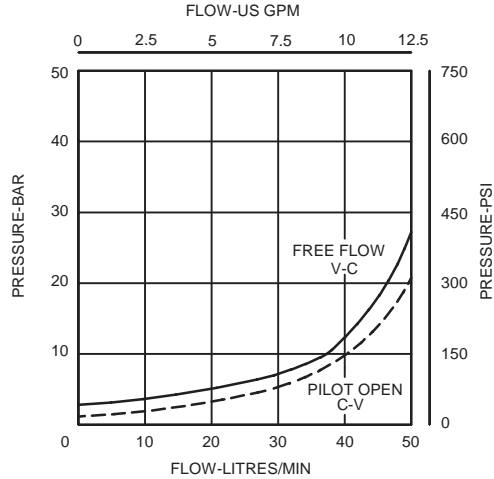
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PRESSURE DROP

2.5:1 & 5:1 versions



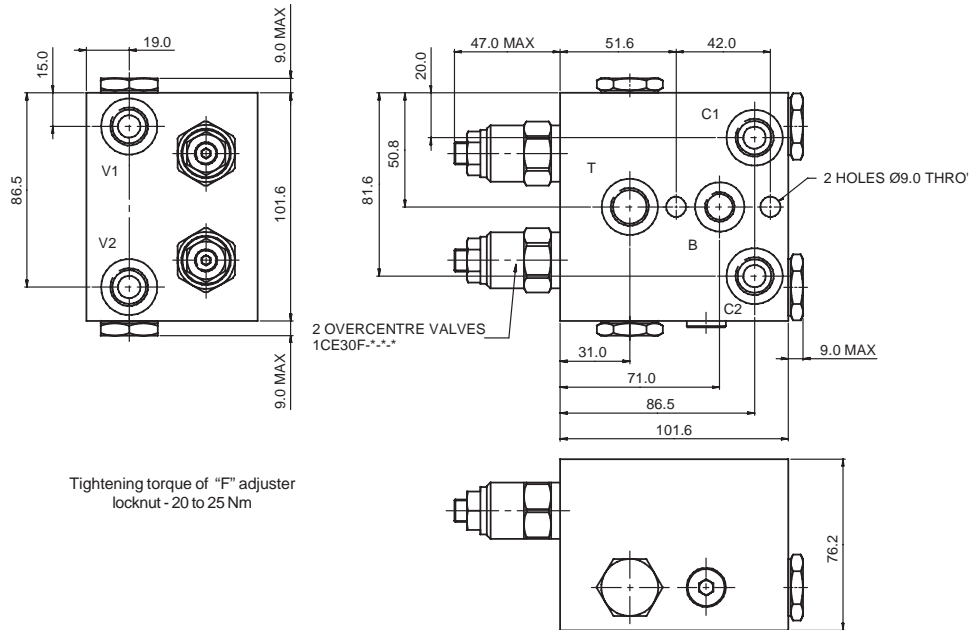
COMPLETE VALVE 3/8" PORTS

BASIC CODE: 1CEECSH35 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel

3/8" CXP15947-3W-S-377



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEECSH35 F 3W 35 S 5 377

Basic Code

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.

Port Sizes - Bodied Valves Only

3W = 3/8" BSP Valve & Cyl Port. 1/4" BSP Brake Port

Pressure Range @ 4.8 l/min

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 litres/min

Body Material

377 = Steel

Pilot Ratio

2 = 2.5:1

5 = 5:1 (standard)

10 = 10:1

Seals

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

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

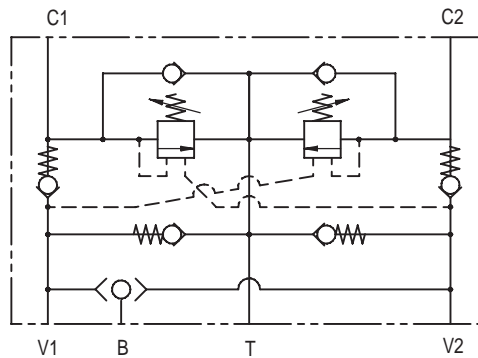
We reserve the right to change specifications without notice



1CEECSH SERIES MOTION CONTROL VALVE

WITH BRAKE SHUTTLE - PILOT ASSISTED

1CEECSH95



6

APPLICATION

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.

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 optimisation 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:

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

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.

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.
Other ratios available upon request.

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	95 litres/min (25 US GPM)
Max Setting	Max Load Induced Pressure: 160 bar (2300 psi) (20) 270 bar (4000 psi) (35) Relief Setting: 350 bar (5000 psi) (35) 225 bar (3260 psi) (20)
Cartridge Material	Working parts hardened and ground steel. External surfaces electroless nickel plated
Body Material	Steel
Mounting Position	Line mounted
Weight	3.70 kg (8.20 lbs)
Seal Kit Number	SK814 (Nitrile) SK814V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	0.3 millilitres/min nominal (5 dpm)
Nominal Viscosity Range	5 to 500 cSt

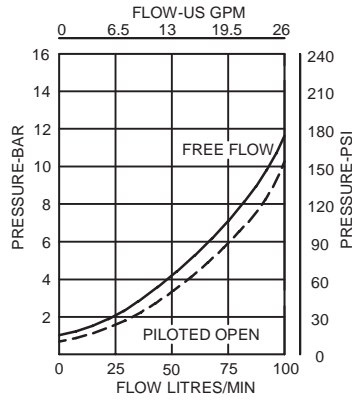
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Integrated Hydraulics Inc

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Website: www.integratedhydraulics.com

PRESSURE DROP

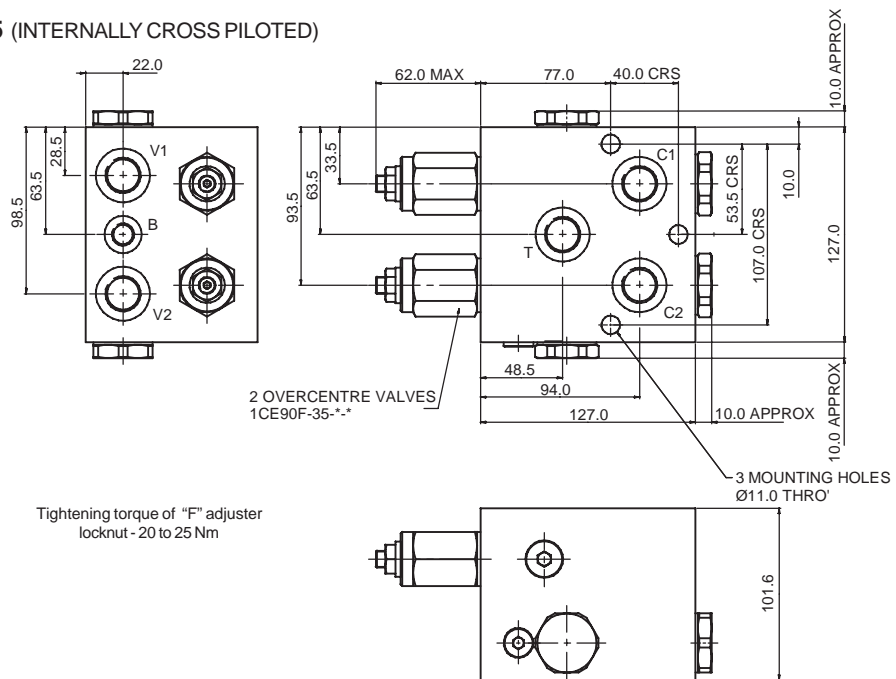


COMPLETE VALVE 3/4" PORTS

BASIC CODE: 1CEECSH95 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel
3/4" BXP15936-6W-S-377



Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEECSH95 F 6W 35 S 4 377

Basic Code
1CEECSH95

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.

Port Sizes - Bodied Valves Only

6W = 3/4" BSP Valve & Cyl Port. 1/4" BSP Brake Port

Pressure Range @ 4.8 l/min

20 = 70-225 bar. Std setting 100 bar

35 = 200-350 bar. Std setting 210 bar

Std setting made at 4.8 litres/min

Body Material

377 = Steel

Pilot Ratio

4 = 4:1 (Standard)

8 = 8:1

Seals

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

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

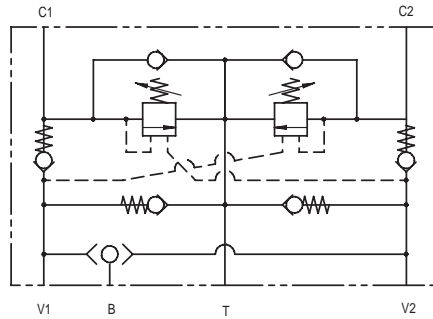
We reserve the right to change specifications without notice



1CEEC SH SERIES MOTION CONTROL VALVE

WITH BRAKE SHUTTLE - PILOT ASSISTED

1CEEC SH150 / 1CEEC SH350



6

APPLICATION

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.

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 optimisation 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.

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

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.

PILOT RATIOS

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.

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.

SPECIFICATIONS

Figures based on: Oil Temp = 40°C Viscosity = 40 cSt

Rated Flow	1CEEC SH150 150 l/min (40 US GPM) 1CEEC SH350: 350 l/min (80 US GPM)
Max Setting	Max Load Induced Pressure: 270 bar (4000 psi) Relief Setting: 350 bar (5000 psi)
Cartridge Material	Working parts hardened and ground steel. External surfaces electroless nickel plated
Body Material	Steel
Mounting Position	Line mounted
Weight	1CEEC SH150: 3.7 kg (8.2 lbs) 1CEEC SH350: 8.2 kg (18.0 lbs)
Seal Kit Number	1CEEC SH150: SK813 (Nitrile) SK813V (Viton) 1CEEC SH350: SK635 (Nitrile) SK635V (Viton)
Recommended Filtration Level	BS5540/4 Class 18/13 (25 micron nominal)
Operating Temp	-20°C to +90°C
Leakage	1CEEC SH150: 0.3 millilitres/min nominal (5 dpm) 1CEEC SH350: 4 millilitres/min nominal (60 dpm)
Nominal Viscosity Range	5 to 500 cSt

Integrated Hydraulics Ltd

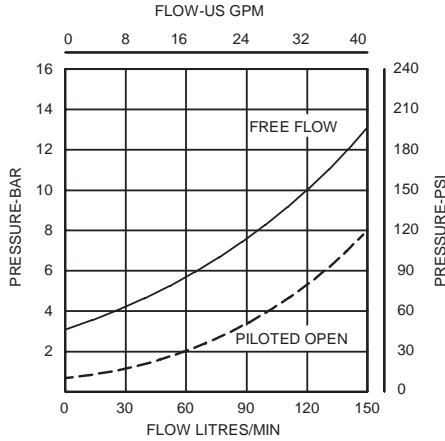
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PRESSURE DROP

1CEECSH150

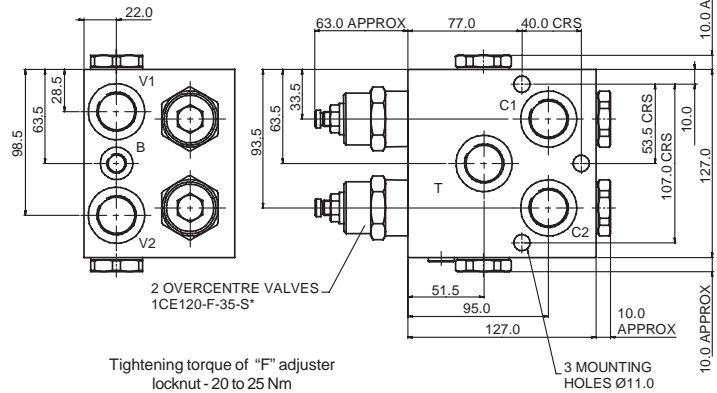


COMPLETE VALVE 1" PORTS

BASIC CODE: 1CEECSH150 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel
1" BXP15930-8W-S-377

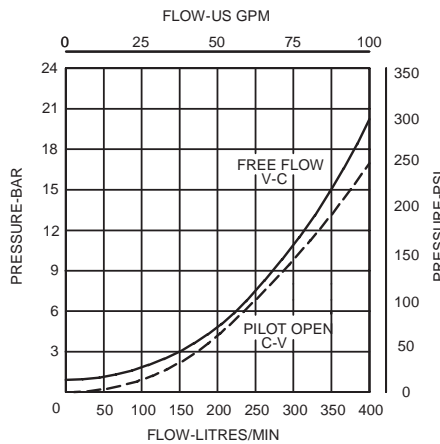


Tightening torque of "F" adjuster locknut - 20 to 25 Nm

PRESSURE DROP

Sub-assembly part numbers

BSP, steel
1 1/4" DXP22047-10W-S-377

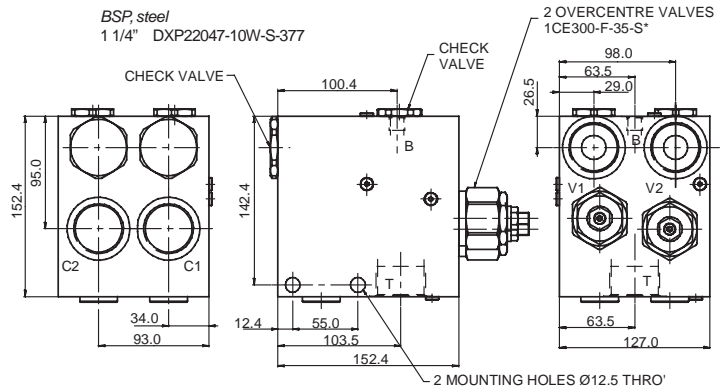


COMPLETE VALVE 1 1/4" PORTS

BASIC CODE: 1CEECSH350 (INTERNALLY CROSS PILOTED)

Sub-assembly part numbers

BSP, steel
1 1/4" DXP22047-10W-S-377



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

Where measurements are critical request certified drawings

ORDERING CODE EXAMPLE

1CEECSH* F 10W 35 S 3 377**

Basic Code

1CEECSH150 = Cartridges and Body*

1CEECSH350 = Cartridges and Body

Adjustment Means

F = Screw Adjustment

Port Sizes - Bodied Valves Only

8W = 1" BSP Valve & Cyl Port. 1/4" BSP Brake Port

10W = 1 1/4" BSP Valve & Cyl Port. 1/4" BSP Brake Port

Pressure Range @ 4.8 l/min

35 = 70-350 bar. Std setting 210 bar

Std setting made at 4.8 litres/min

Body Material

377 = Steel

Pilot Ratio

3 = 3:1 - 1CEECSH350 (Standard)

3 = 3.5:1 - 1CEECSH150

8 = 8:1 - 1CEECSH350

Seals

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

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

