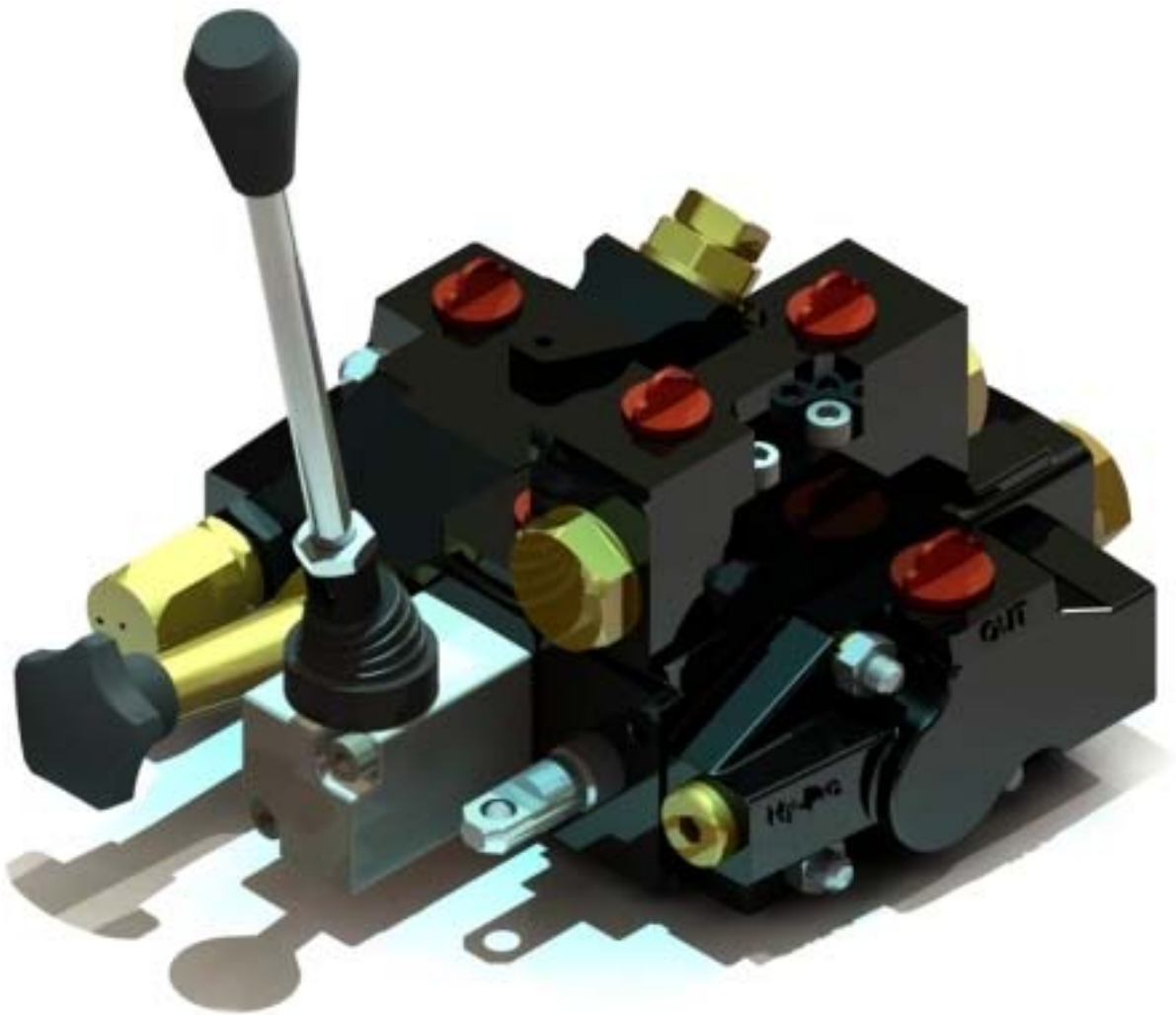


V4 40 LPM SECTIONAL SPOOL VALVE



V4 40 LPM SECTIONAL SPOOL VALVE

Description

A low profile sectional spool valve, lever, solenoid or cable operated. Suitable for open or closed centre circuits. Spool options for 2, 3 & 4 position valves, all with excellent metering characteristics and with fine metering spools also available. Direct acting or pilot operated main relief valves can be incorporated into the inlet cover. Extensive range of lever options, inter-sections, solenoid sections and ancillaries are available.

The V4-40 G3/8 sectional spool valve replaces our V1-40 range. It has been developed from the popular V5-60 taking advantage of that valve's extensive range of spools, levers, ancillary, intersection and options. It offers a 40 lpm, 250 bar rating and has cast iron end-covers and a fully enclosed lever mechanism providing excellent environmental protection. There is a solenoid operated version, the V4-40E, which can be inter-mixed with the manual sections to further increase the control options.

Application

Designed to be used in many applications requiring a compact, rugged sectional spool valve, and suitable for use in the industrial, mobile, marine and agricultural markets. Using the comprehensive range of options, a valve bank can be assembled to control a variety of hydraulic circuits.

Features

- Excellent metering characteristics.
 - Good load holding.
 - Integral load check valve.
 - Open and closed centre assemblies.
 - Direct acting or piloted adjustable relief valves.
 - Robust enclosed lever mechanism.
 - Extensive range of ancillaries and intersections.
 - 100% production testing.
 - Pilot solenoid control option (See Product Manual V4E)
- Fully Interchangeable with the V5-60 range

Compatibility with the V1-40

The V4 range contains many new features and is not interchangeable with the V1-40 which it supersedes.

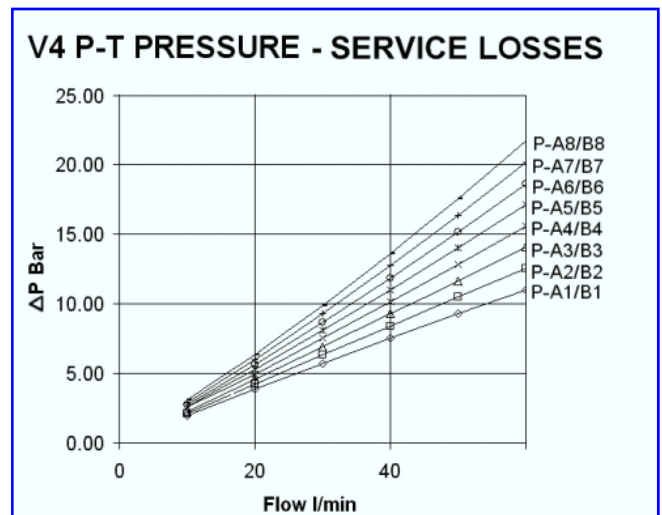
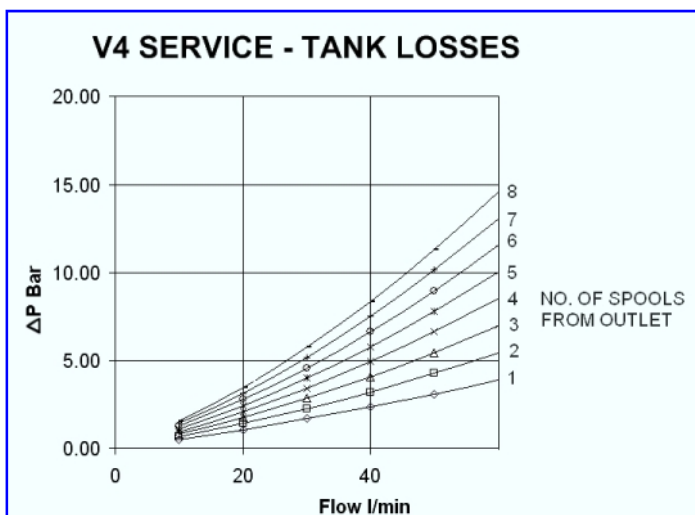
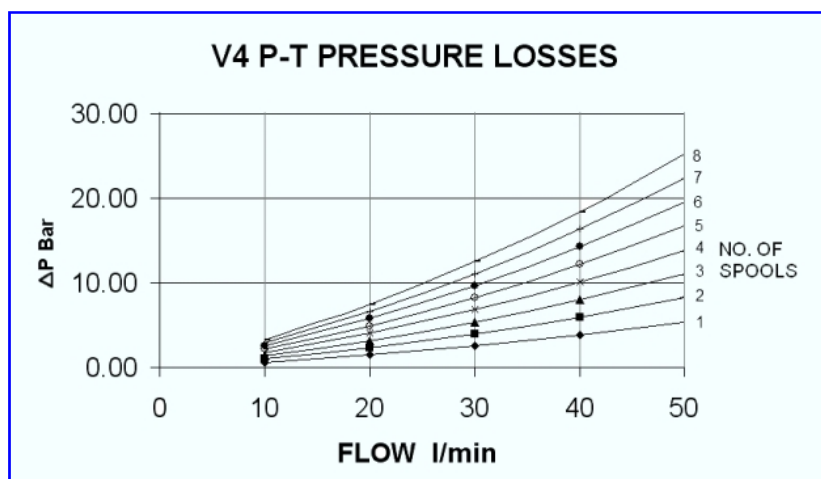
V4 TECHNICAL INFORMATION

Performance

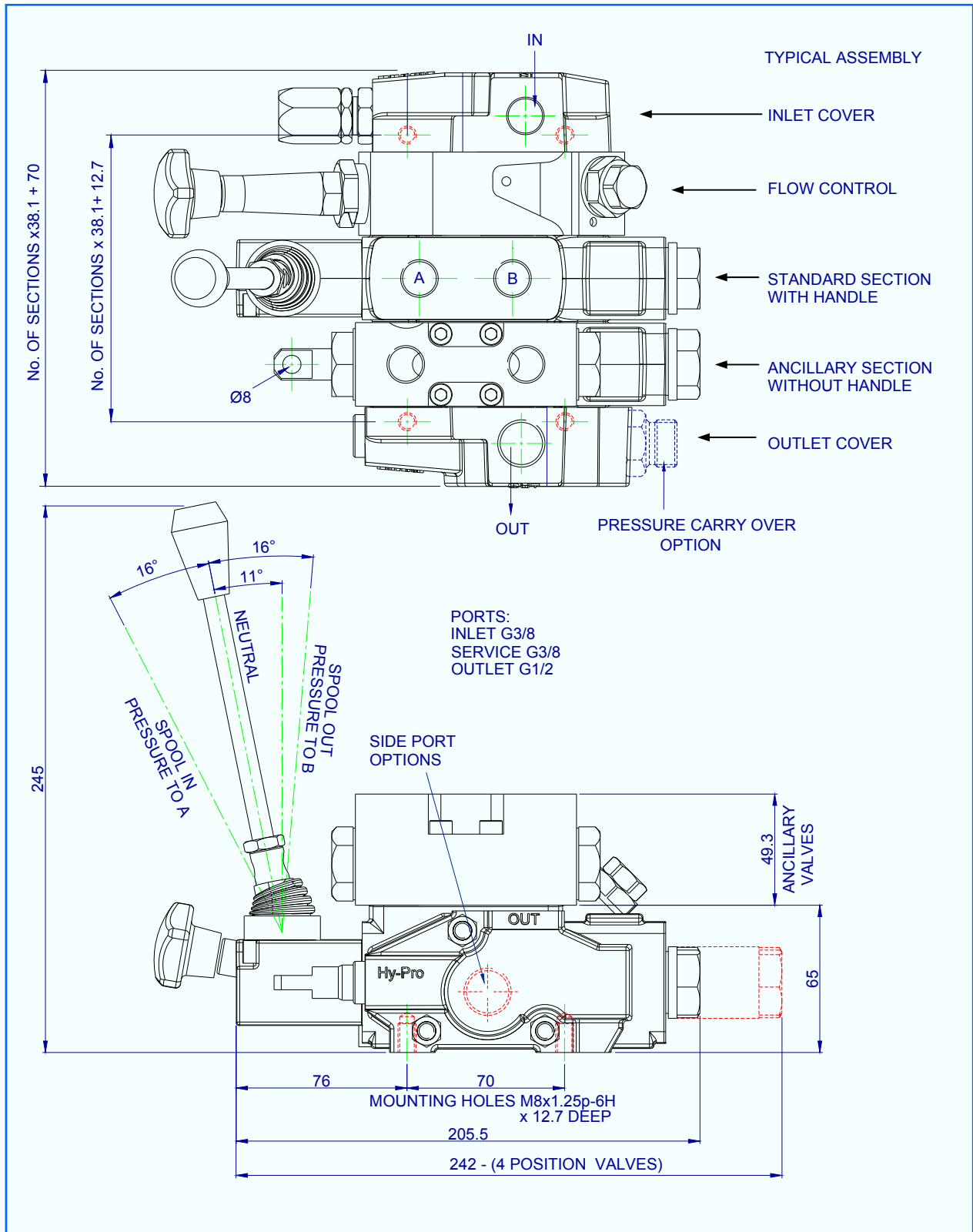
Rated flow	40 l/min
Port size	G3/8
Max. pressure service port	250 bar
Max. pressure inlet port	250 bar
Max. back pressure outlet port	25 bar
Temperature rating minimum	-20°C
Temperature rating maximum	+65°C
Spool leakage at 210 bar @ 20°C	<6cc/min
Spool leakage 4 position	<8cc/min

Recommended Oil

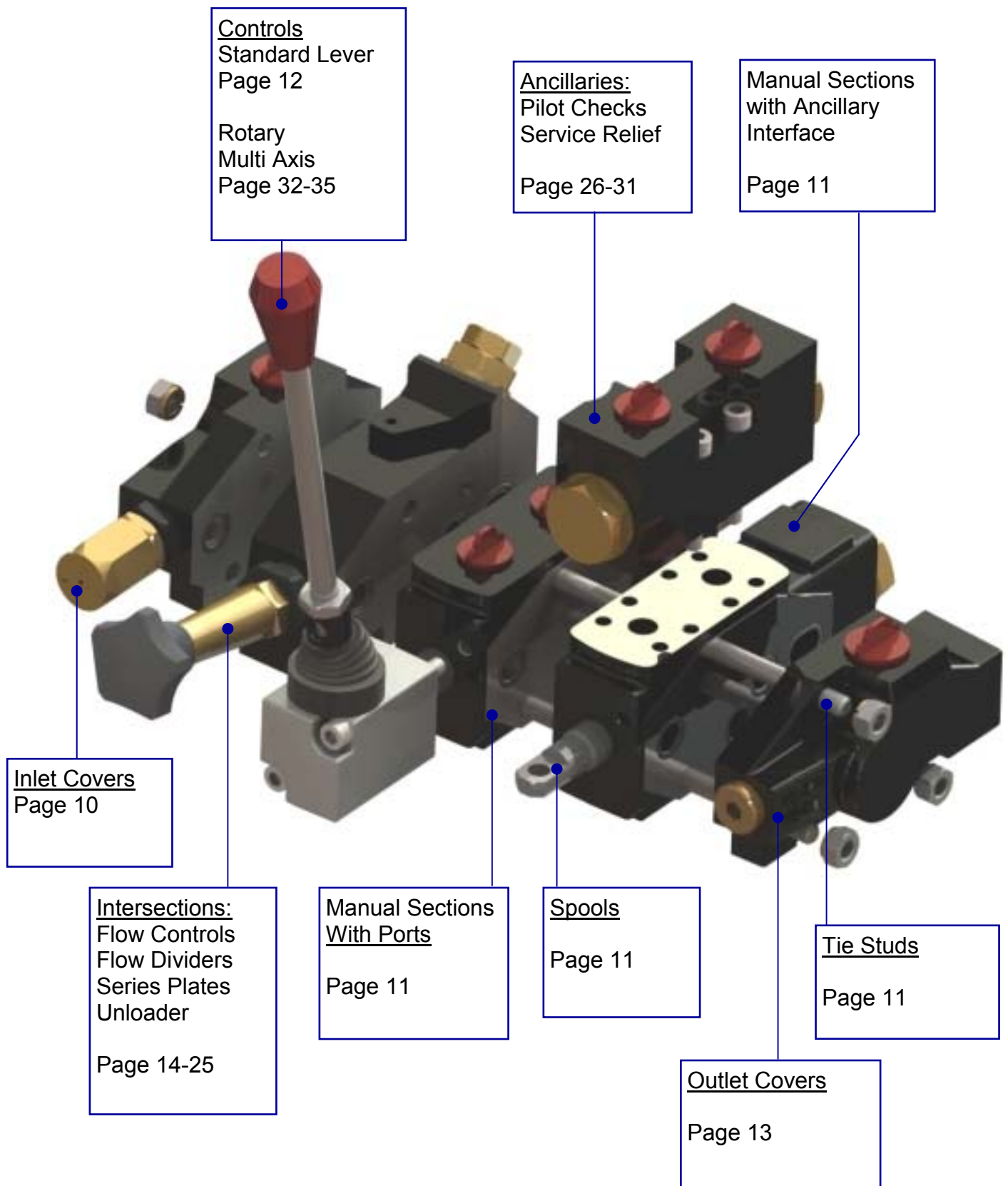
Mineral based hydraulic	ISO VG37
Filtration (minimum)	25 micron



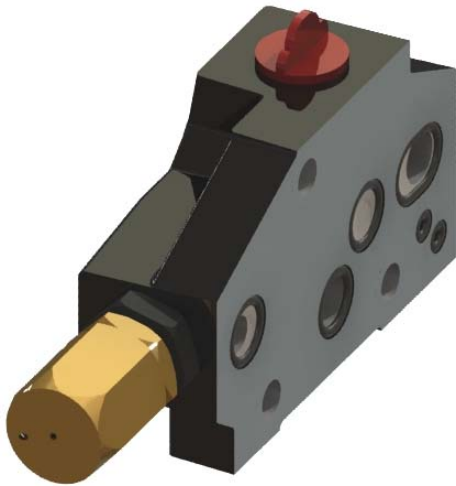
V4 INSTALLATION DETAILS



V4 SECTIONAL VALVE ANATOMY



V4 INLET COVER



SPECIFICATION

Material

Cast Iron BS1452-250

Relief Valve

Adjustable. Pilot Operated or Direct Acting. Pre-set 140bar unless stated

Ports

Top or Side entry
G3/8 standard size
Metric And SAE options available

Options

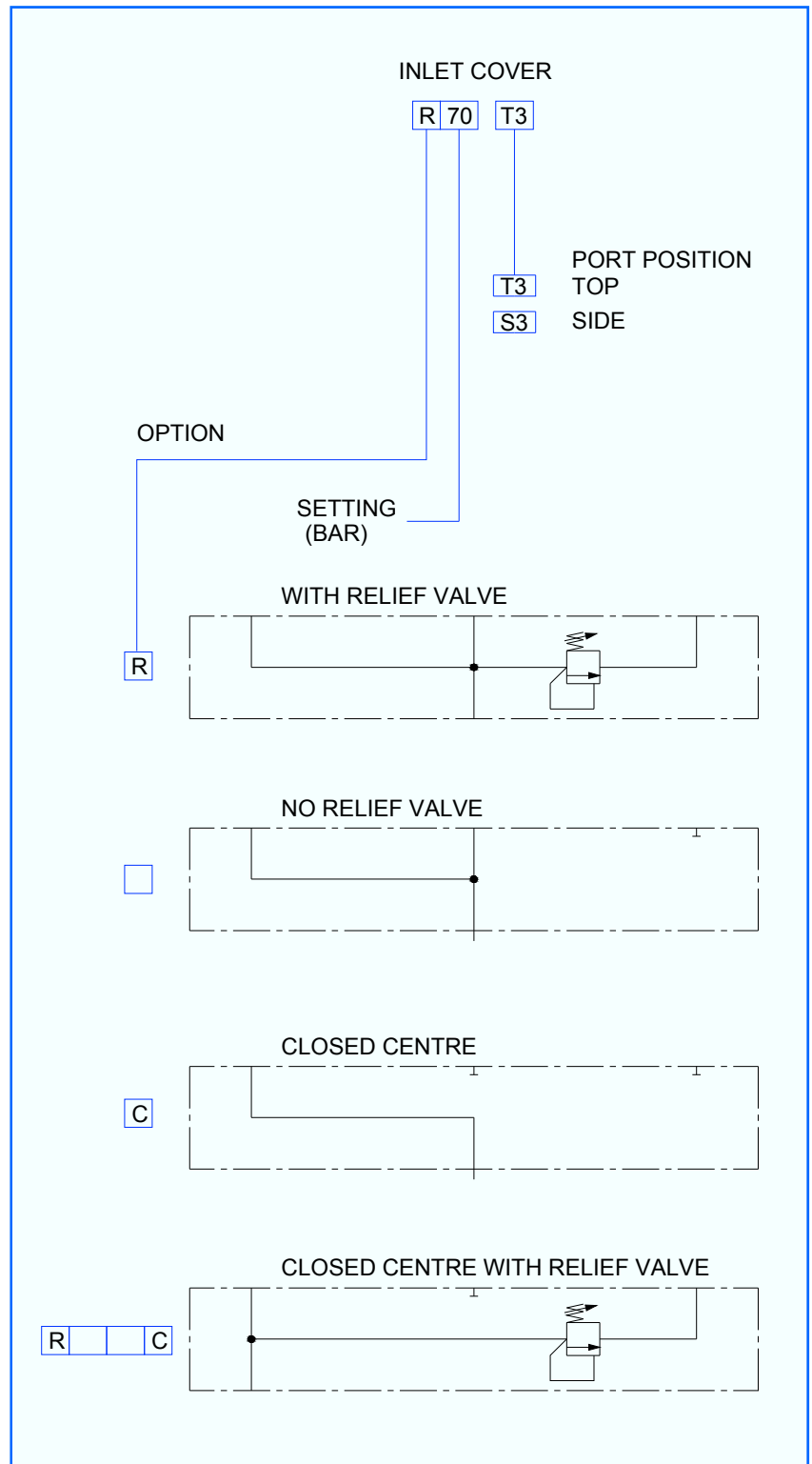
With Relief Valve (standard)
No Relief Valve
Closed Centre

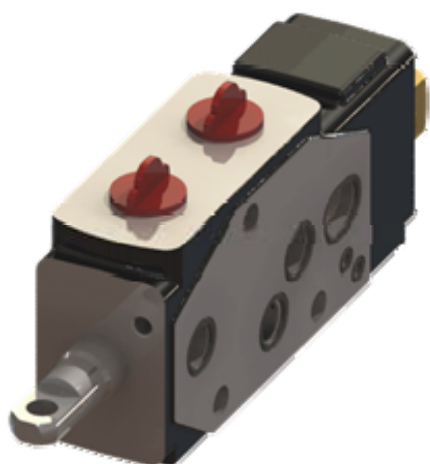
Mounting

2x M8x1.5p-6H x 12.7

Weight

0.75kg





V4 VALVE SECTION

SPECIFICATION

Body Material

Cast Iron BS1452-250

Spool

Mild steel. Case hardened and ground

Environmental protection option

Electroless nickel plated spool

Tie Studs

BS970 pt1 1991 605M36 (EN16T)

Torque 13.5Nm

Ports

G3/8 standard size
Metric And SAE
available options.

Ancillary Interface

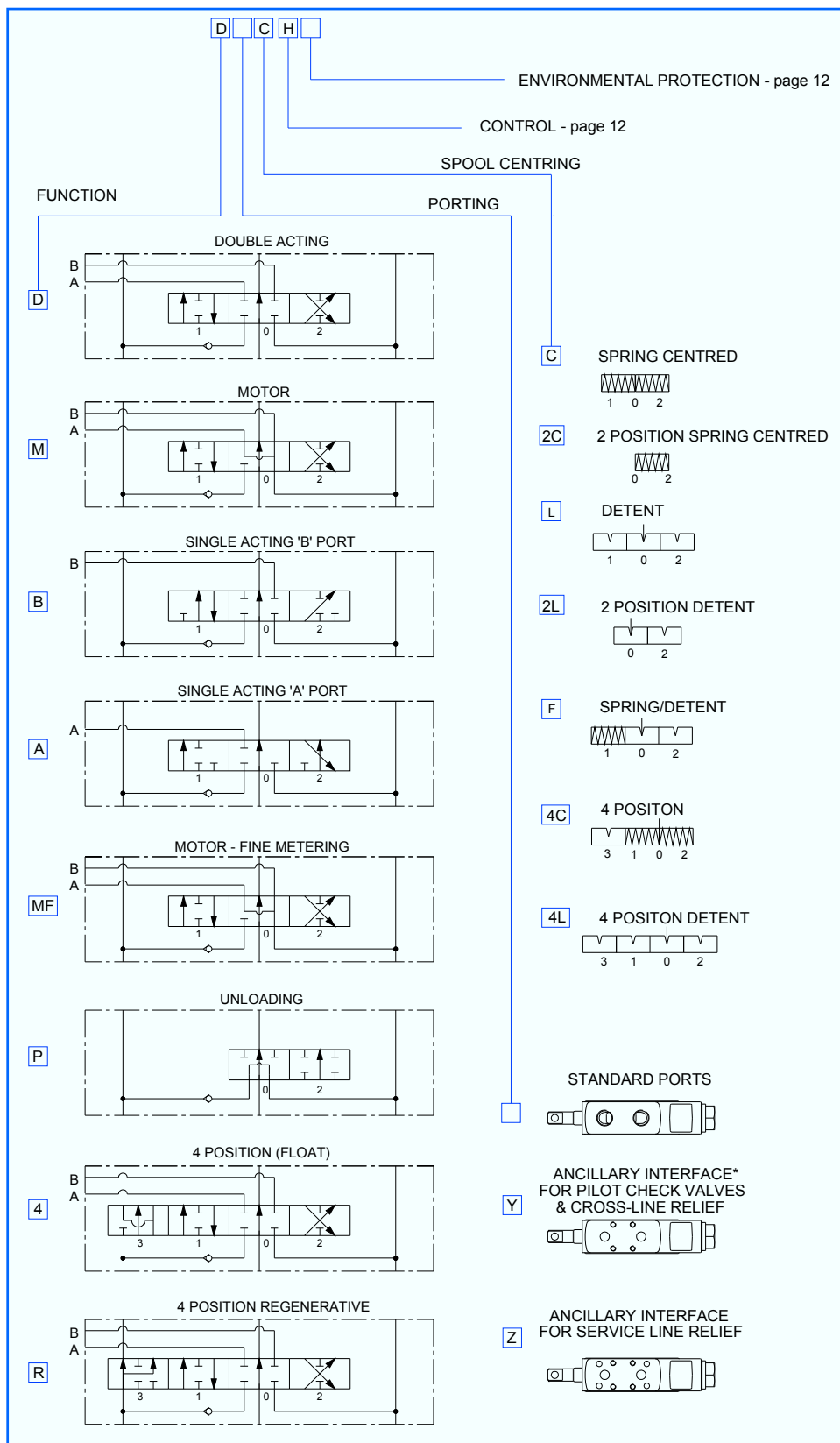
When ancillary valves are required the port face is denoted:

Y - Pilot Check valves
& Cross-line relief *

Z - Service-Line Relief

Weight

2.9kg





V4 STANDARD LEVER

SPECIFICATION

Materials

Housing: Aluminium LM24TF
 Actuator: Steel Nitro-carburised
 Pivot: Steel Hardened
 Fasteners: Deltatone

Fixing

2x M6 Cap screw (Torque - 10lbs/ft)

Knob

Black standard, Red, Blue, Green,
 Red, Yellow and Ident' type available

Options

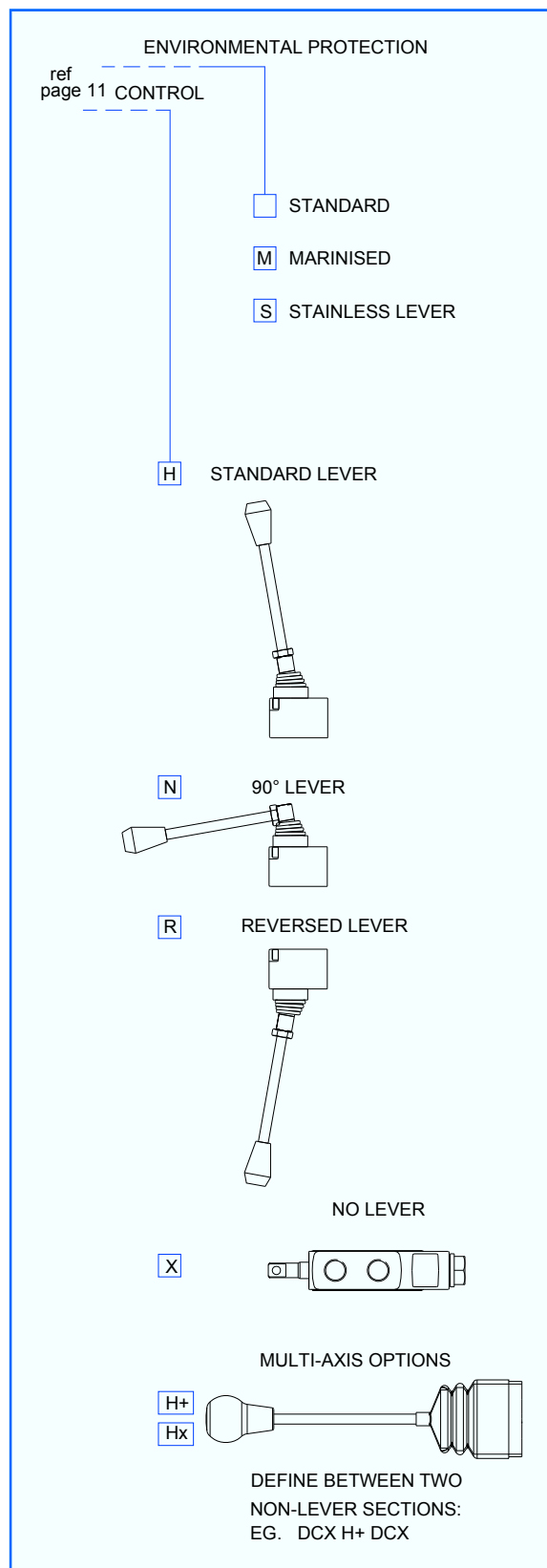
Standard or Multi-axis
 Aux cable attachment

Environmental protection option

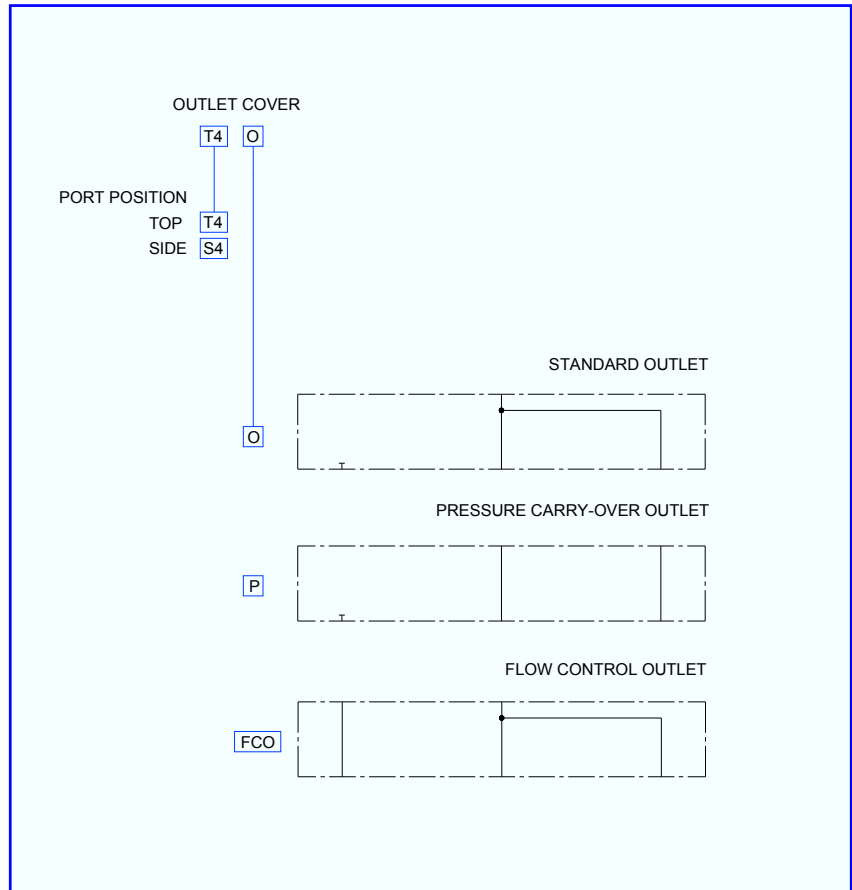
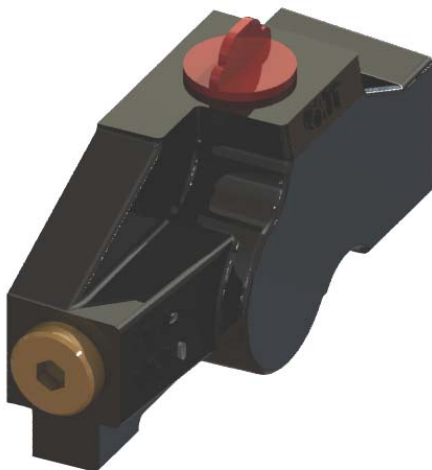
Housing: Anodised
 Lever: Stainless steel 304

Weight

0.13kg



V4 OUTLET COVERS



SPECIFICATION

Material

Cast Iron BS1452-250

Ports

Top or Side entry
G1/2 standard size
Metric And SAE options available

Mounting

2x M8x1.5p-6H x 12.7

Weight

0.8kg

Options

Standard Outlet (Tank port)
Pressure Carry-Over
(Tank port plus a Pressure port to feed further valves in the circuit)
Flow Control Type
(used to convert sectional FC to Line-mounted operation)

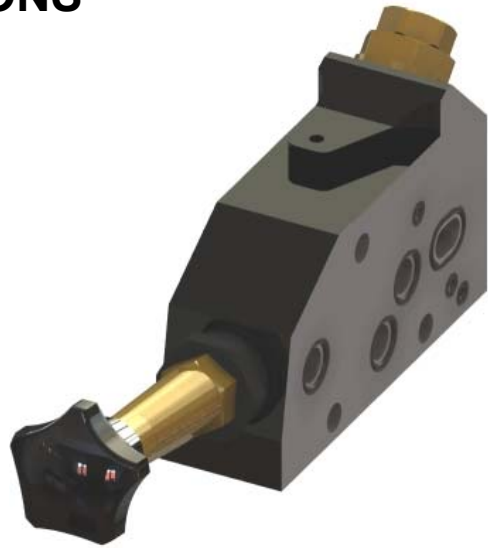
V4 INTERSECTIONS

FLOW CONTROL

A fully pressure compensated metering type flow control, which can be included in a V4 valve assembly. The regulated flow is supplied via the pressure gallery to 'down stream' sections, while 'up stream' are unaffected. A variety of controls are available to allow the flow to be pre-set or continually adjustable. A relief valve option limits the maximum pressure within the pressure gallery and a series link can be supplied to ensure full pump flow is available to the regulated sections even when up-stream sections are in use.

Description

A meter-in type flow control intersection, which regulates flow to 'down stream' sections only. Pressure compensated, it returns the excess flow to the tank gallery. This ensures consistent control and minimum heat generation. A relief valve option limits the maximum pressure in the pressure gallery, a series link will maintain pump flow to the flow controls even when up stream sections are in use.

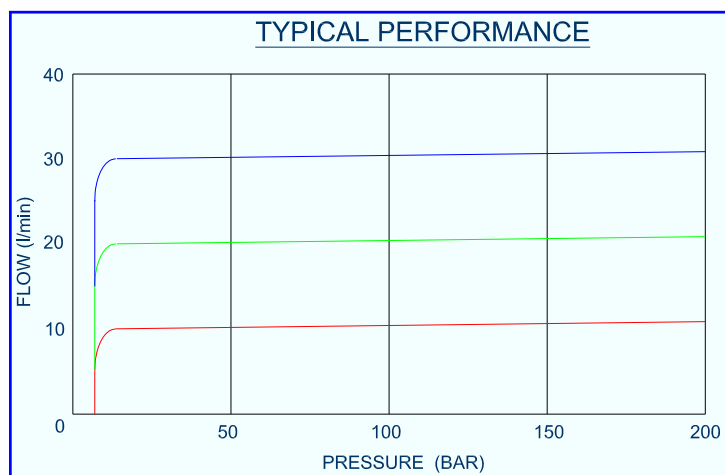


Application

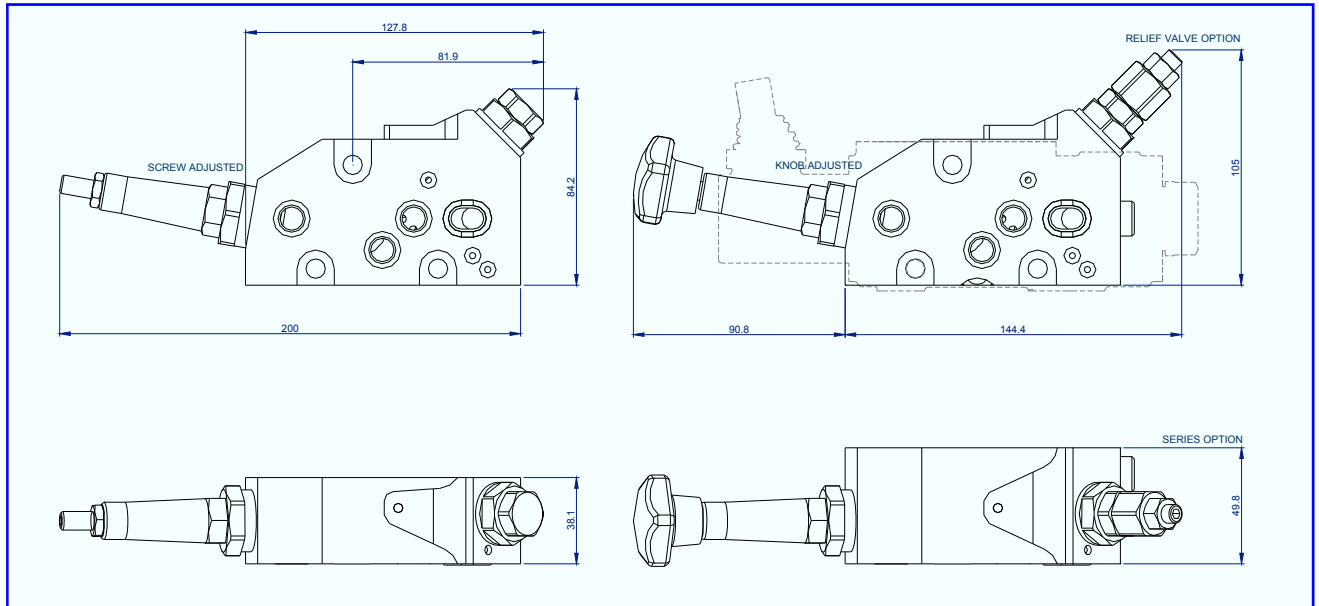
To be used in applications requiring precise speed control in addition to stop, start and reverse functions of the spool valve, such as winches and industrial conveyors. Can also be used to control the speed of cylinders.

Features

- Pressure compensated.
- Adjustable or pre-set.
- Screw, knob or cable operated.
- Solenoid two speed option.
- Range of metering characteristics.
- 1 turn option.
- Limited max flow option.
- Fixed flow option
- Adjustable relief valve option.
- Series link option.
- Hardened and ground components for long life.



V4 INTERSECTIONS



Flow Control Specification

Performance

Rated flow	40 l/min
Adjustable range	0-40 l/min
ΔP Inlet to outlet 40 l/min	0.6 bar
ΔP Inlet to service 40 l/min	4.6 bar
Maximum pressure	250 bar
Maximum back pressure	25 bar
Temperature rating minimum	-20°C
Temperature rating maximum	+60°C

Recommended Oil

Mineral based hydraulic	ISO VG37
Filtration minimum	25 micron

Materials

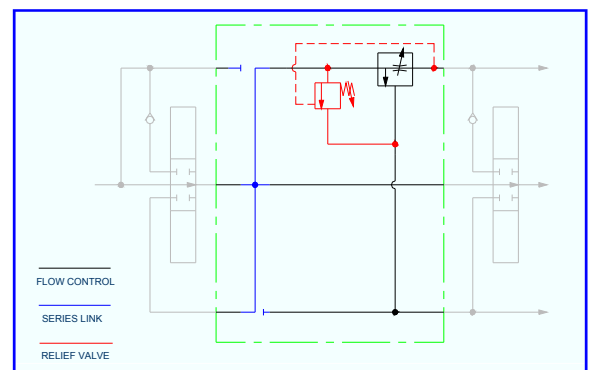
Body - Aluminium	BS 1490
Needle - Stainless Steel	EN58AM
External protection	Zinc chromate
	BS 1706 Zn3
	Nitrotech NQ3
	Nitrile/PTFE

Seals

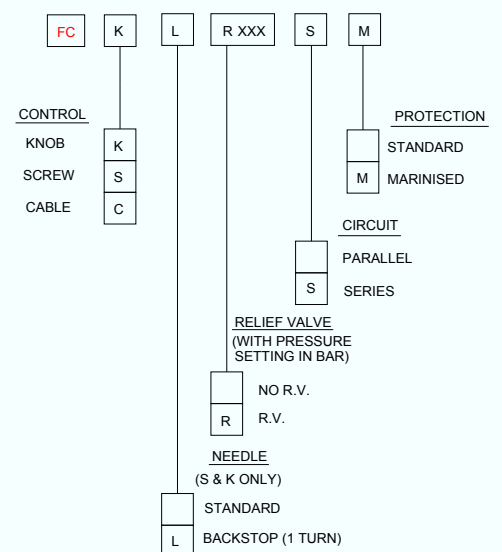
Weight

FCK

0.9 kg



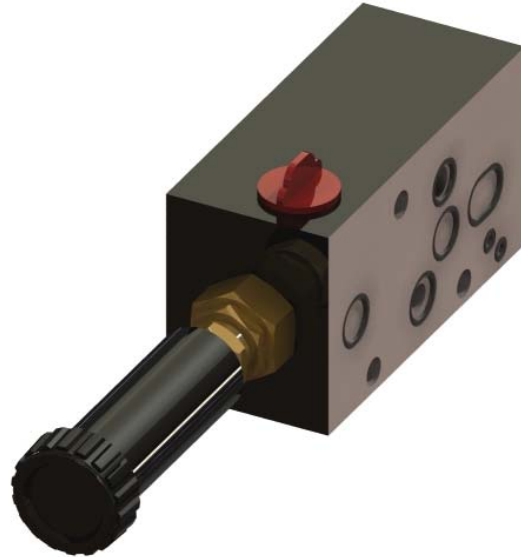
ORDER CODE



V4 INTERSECTIONS

FLOW DIVIDER

The Hy-Pro flow divider inter-section allows two hydraulic circuits to be built into one valve assembly. Flow is fed directly to the section. The adjustable priority flow is fed to the left hand sections and the remaining flow to the right hand sections, thus allowing two circuits to be run simultaneously and independently. A series link can be incorporated in the flow divider section, re-combining the flow and feeding the full flow to the right hand sections, whilst maintaining priority flow to the left hand sections. The pressure compensated flow divider can be supplied with either a graduated knob for continuous adjustment or preset with a lock nut.



Description

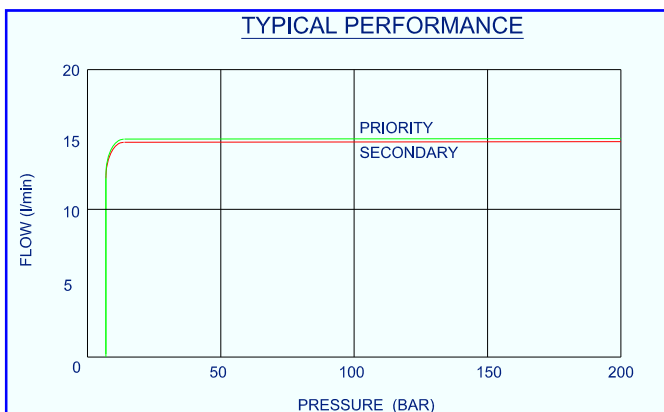
Adjustable flow divider cartridge housed in a manifold. The flow divider continuously senses the pressure drop across the priority control orifice, maintaining the selected priority flow. The adjustable priority flow is unaffected by variable pump delivery or pressure changes in either priority or secondary circuits.

Application

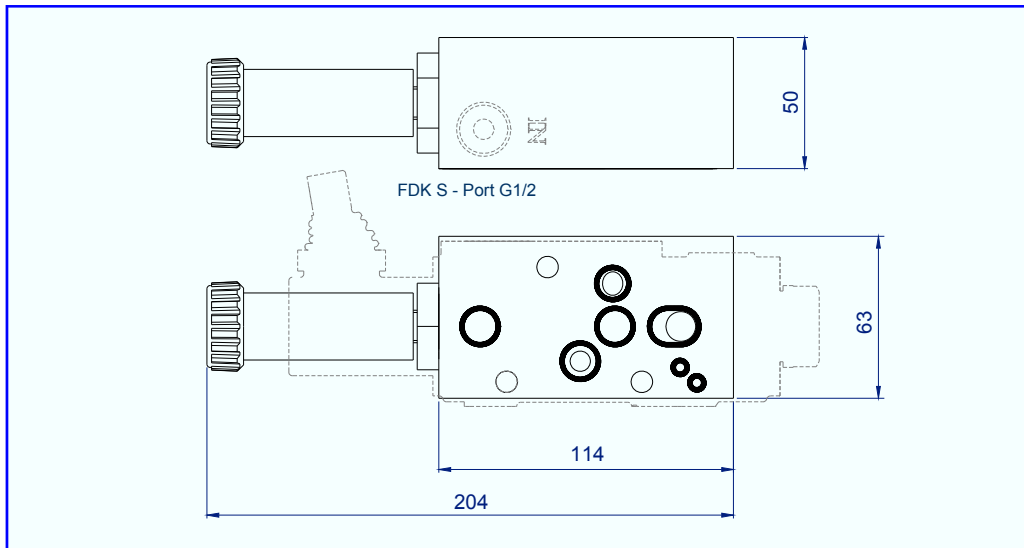
Used in applications requiring a single pump to drive an actuator and a motor, or a pair of motors simultaneously, with variable loads. Typically conveyor motors used in road surface treatment and feeder wagons for the agricultural sector.

Features

- Variable priority flow.
- Pressure compensated.
- Compact cartridge design.
- Graduated knob.
- Series link option.
- Screw and locknut option
- Hardened and ground components for long life.



V4 INTERSECTIONS



Flow Divider Specification

Performance

Rated flow	40 L/minute
Priority flow maximum	36 L/minute
Priority flow minimum	0 L/minute
ΔP inlet to service	6.9 bar
Maximum pressure	250 bar
Temperature rating minimum	-20°C
Temperature rating maximum	+65°C

Recommended Oil

Mineral based hydraulic	ISO VG37
Filtration (minimum)	25 micron

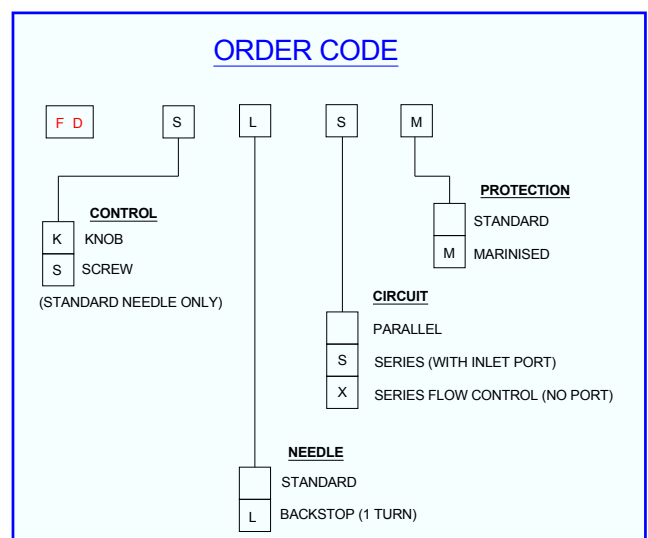
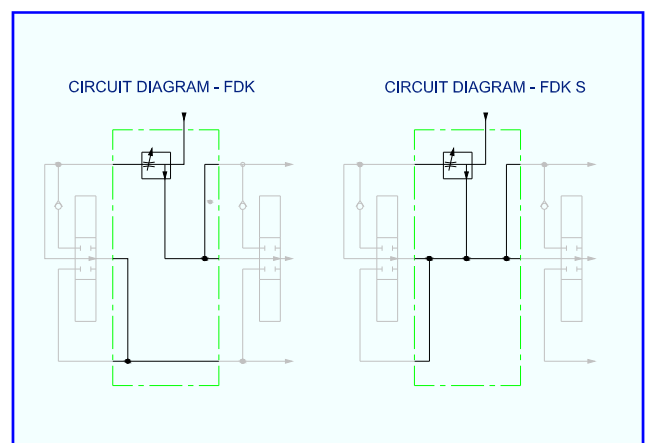
Materials

Body – aluminium	BS 1490
Needle – stainless steel	EN58AM
External protection	Zinc chromate
	BS 1706 Zn3
	Nitrotech NQ3
	Nitrile/PTFE

Seals

Weights

FDK	0.9 Kg
-----	--------



V4 INTERSECTIONS

SOLENOID UNLOADER INTERSECTION

Designed to rapidly unload the pressure gallery to tank when power to the coil is interrupted. Can be used in both manual and solenoid operated valve assemblies as an emergency stop to override the other controls of the valve bank.

This intersection complements the range of options available for the V4 and makes it one of the most versatile valves in the Hy-Pro range.

Description

The intersection houses a normally open bypass cartridge valve which rapidly unloads the pressure gallery to tank when the solenoid coil is de-energized. When the coil is energized the bypass valve closes and the pressure is restored to the valve bank. The optional manual override can restore hydraulic operation in the event of electrical failure. A further option is the incorporation of an adjustable piloted relief valve.

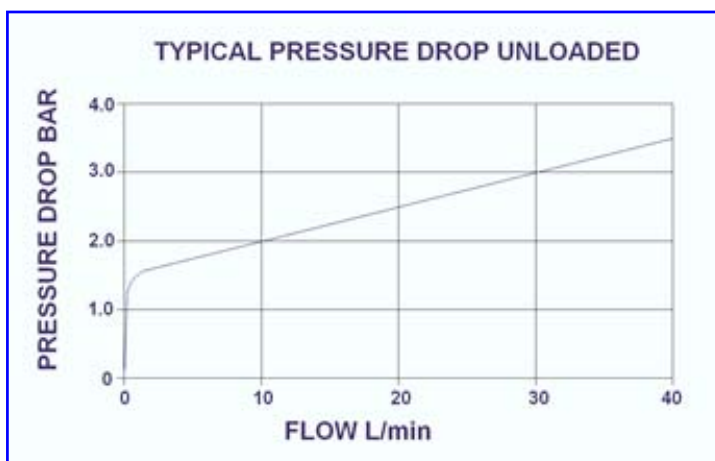


Application

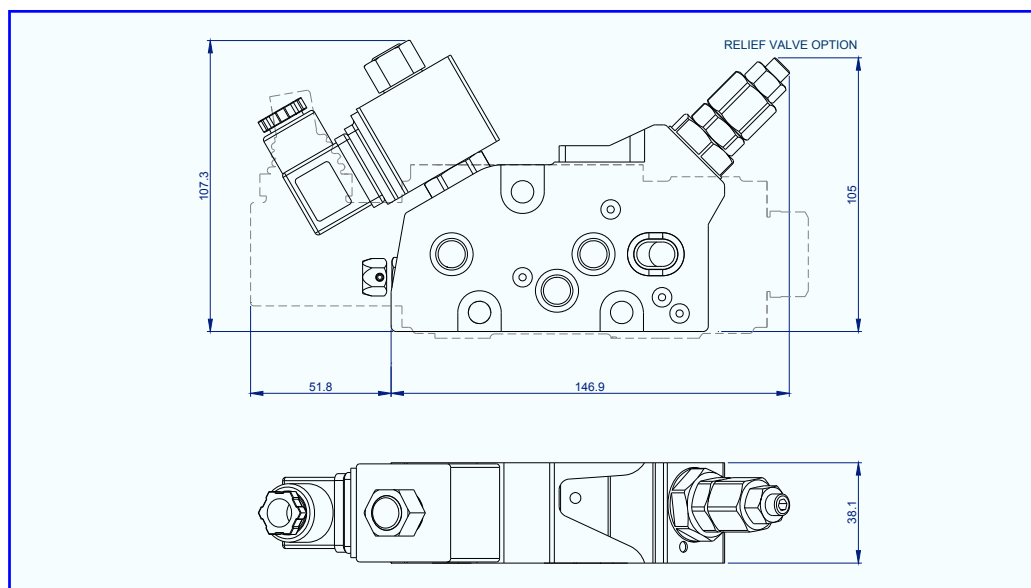
Required in recovery vehicle applications where winching controls must have a second control to stop the winch. Can also be used as an interlock system to prevent operation when the electrical circuit is broken.

Features

- 12Vdc or 24Vdc
- Optional manual override.
- Optional relief valve.
- N/O or N/C cartridge options
- Hardened and ground components for long life



V4 INTERSECTIONS



Solenoid Unloader Section Specification

Performance

Related flow	40 l/min
ΔP inlet to outlet at 40 l/min	0.6 bar
Maximum pressure	210 bar
Maximum back pressure	25 bar
Temperature rating: minimum	-20°C
Temperature rating: maximum	+65°C

Electrical

Coil voltage nominal	12V or 24V
Coil power	24W
Protection	IP65
Connection	DIN 43650
Cable Ø (not supplied)	6 - 8mm

Recommended Oil

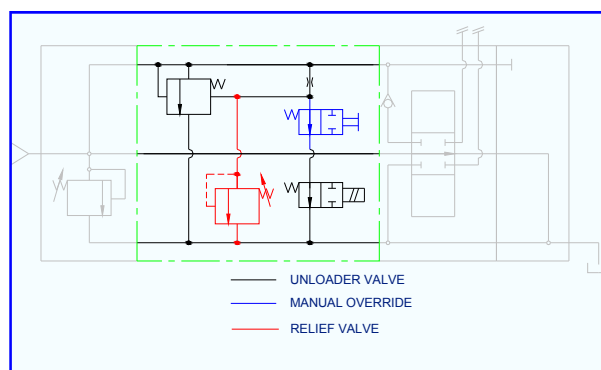
Mineral based hydraulic	ISO VG37
Filtration minimum	25 micron

Materials

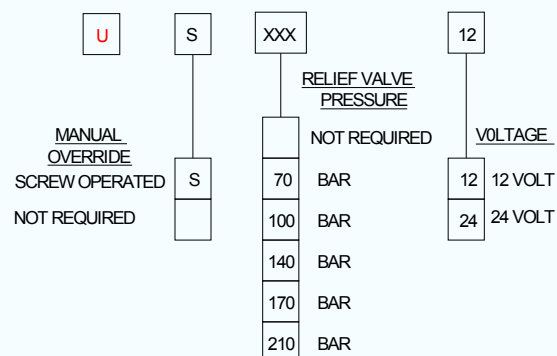
Body	Aluminium BS 1490
External protection	Zinc chromate BS 1706 Zn3
	Nitrotech NQ3
Seals	Nitrile & PTFE

Weight

1.7kg



ORDER CODE



V4 INTERSECTIONS

SERIES CONNECTOR

Hy-Pro series connectors are designed to be fitted between two valve sections, connecting in series the actuators that they control. Series connectors are often used to synchronize two hydraulic motors where the return oil from one is fed to the inlet of the second.

The series connector effects only the valve sections immediately upstream and downstream of its position in the valve bank. Other sections remain connected in parallel. When using the series connectors, consideration must be given to upstream sections. This is because the normally open tank gallery in the valve bank is pressurized when the series connected actuators are on load. If this is a problem specially designed inlet covers are available which contain a separate outlet port for the relief valve bypass flow.



Special provision has also to be made for ancillary valves when used with series-connected valve banks. In such cases, customers are advised to discuss their circuit design with Hy-Pro.

Description

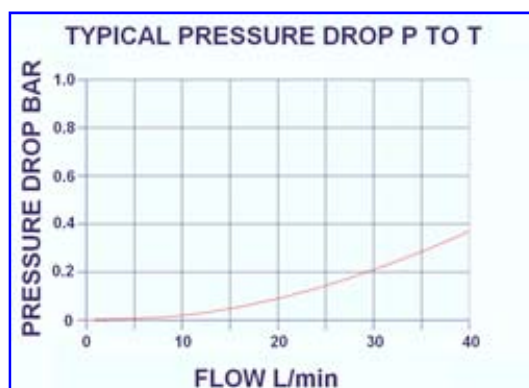
This intersection connects the up stream tank galleries to the pressure galleries of the down stream section enabling the flow to power a second service .

Application

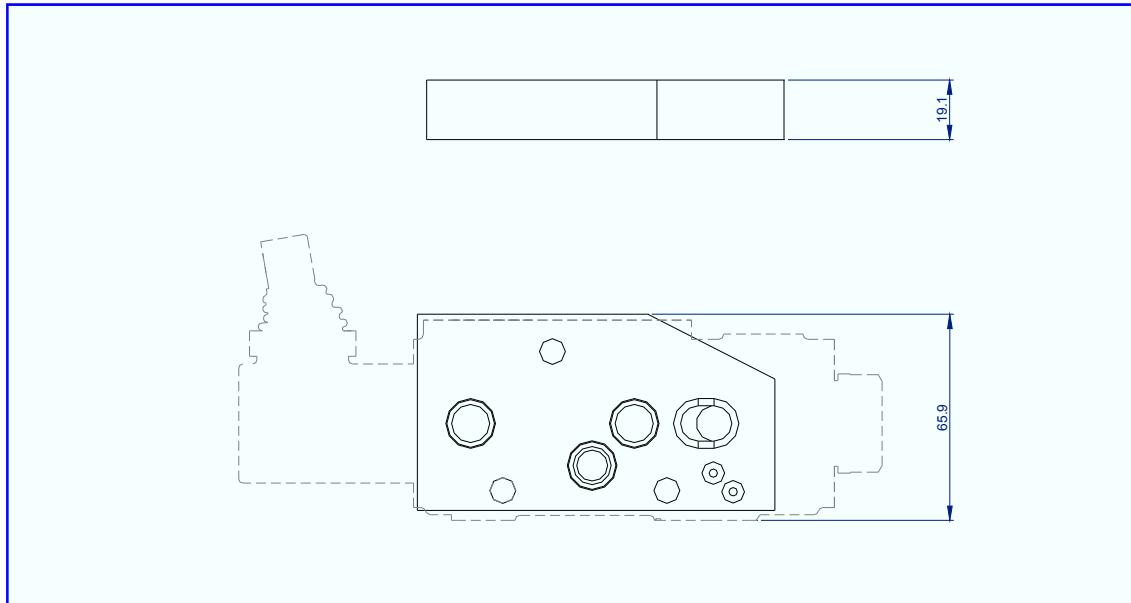
Used where two or more services are required to operate simultaneously with differing loads. Often used to synchronize two hydraulic motors.

Features

- Used with standard sections.
- Converts both manual and solenoid sections.
- Anodised option



V4 INTERSECTIONS



Series Connector Specification

Performance

Rated flow	40 l/min
Max pressure	250 bar
Δp at rated flow P to T	0.6 bar
Temperature rating minimum	-20°C
Temperature rating maximum	+65°C

Recommended Oil

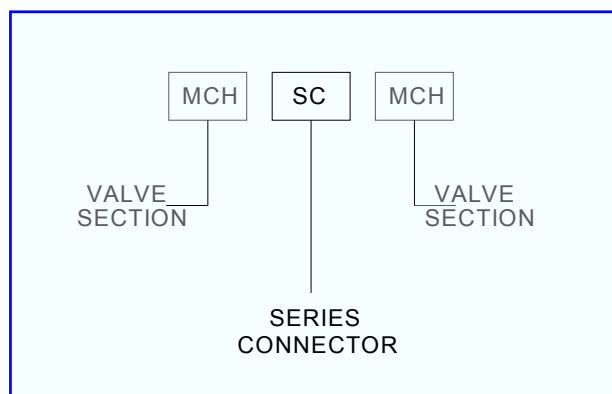
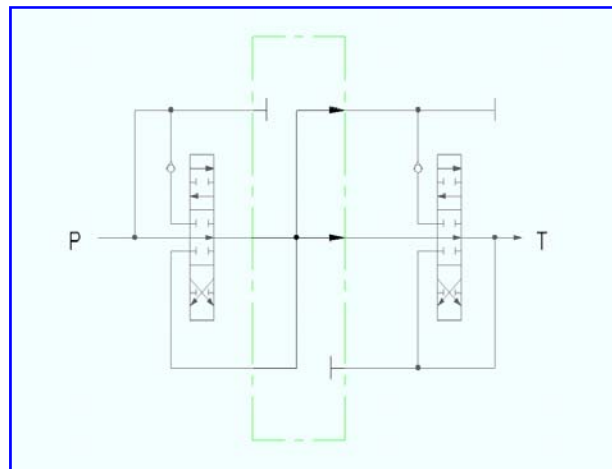
Mineral based hydraulic	ISO VG37
Filtration (minimum)	25 micron

Materials

Aluminium	BS1490
-----------	--------

Weight

0.3kg



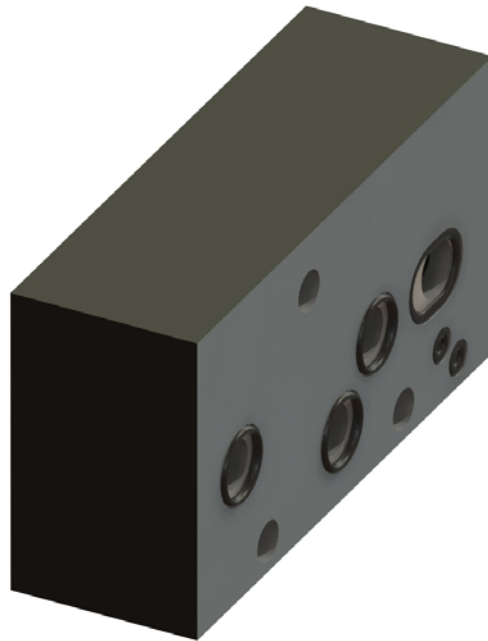
V4 INTERSECTIONS

SERIES PARALLEL CONNECTOR

The V4 series parallel connector is used to give priority to up stream sections.

The pressure gallery is isolated from down stream sections when the up stream section is selected. If the up stream section is single acting, the pressure gallery is only closed when in the raised position, i.e. the down stream sections will have a pressure feed when in the lower position.

The Hy-Pro series parallel connector can be used in manual and solenoid valve assemblies to provide an interlock or ensure a service is activated in the correct



Description

An intersection to provide series parallel connection. Flow is only passed to the down stream control sections when the upstream control section is in neutral.

Application

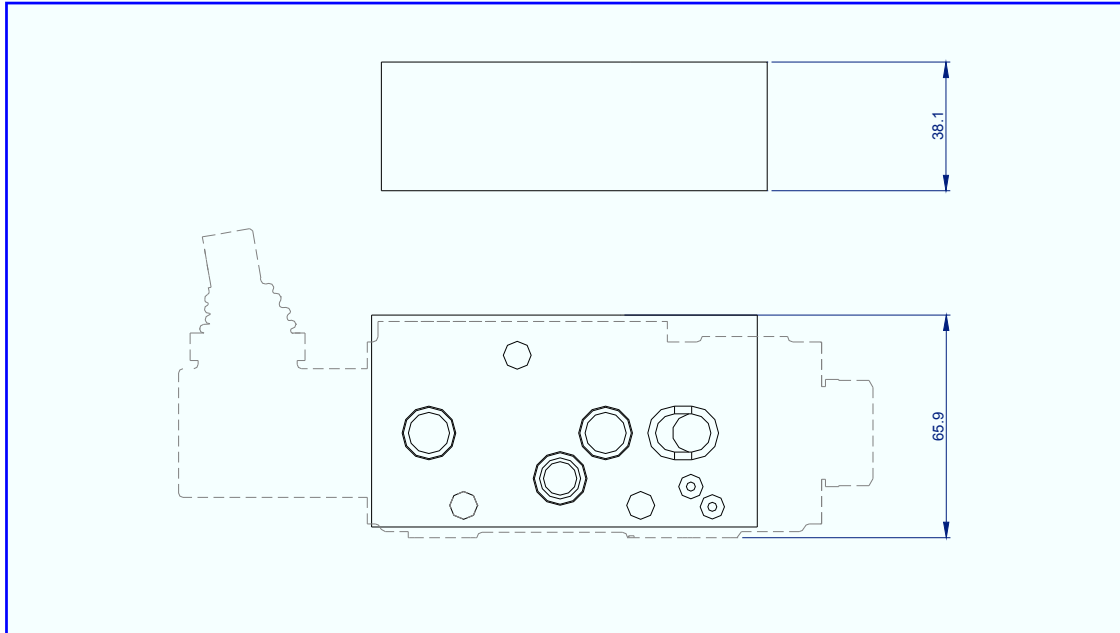
Use to give priority to control sections or provide an interlock. Can be used between each section to ensure only function can be used at a time, simplifying the operation of the machine.

Features

- Compatible with manual and solenoid valves.
- Compact.
- Anodised option



V4 INTERSECTIONS



Series Parallel Connector Specification

Performance

Rated flow	40 l/min
Maximum pressure	250 bar
Temperature rating min	-20°C
Temperature rating max	+65°C

Recommended Oil

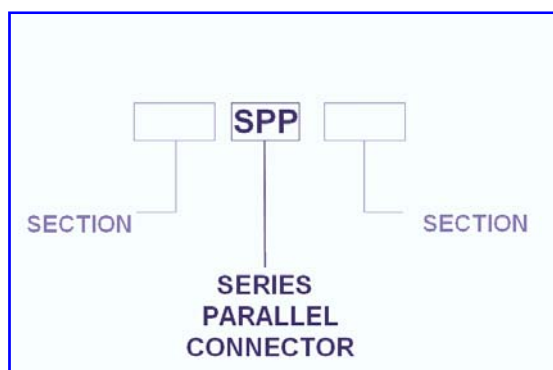
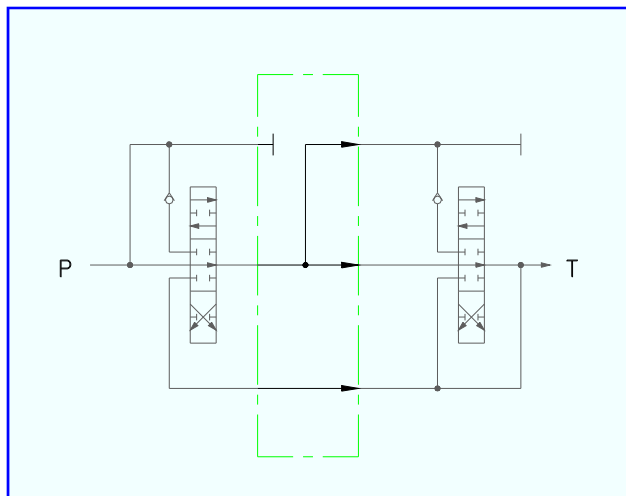
Mineral based hydraulic	ISO VG37
Filtration (minimum)	25 micron

Materials

Body Aluminium	BS 1490
Seals	Nitrile

Weight

0.53 kg



V4 INTERSECTIONS

MID-INLET SECTION

A mid inlet section is used to enable two separate control valves to be built into one assembly. The first valve is fed from the inlet cover whilst the second is fed by the mid-inlet. An adjustable relief valve is included to protect the pump supplying the sections fed by the mid-inlet. The mid inlet section combines elements of our standard inlet and outlet covers thus permitting a very compact installation with less hoses and connections than two separate valve banks.



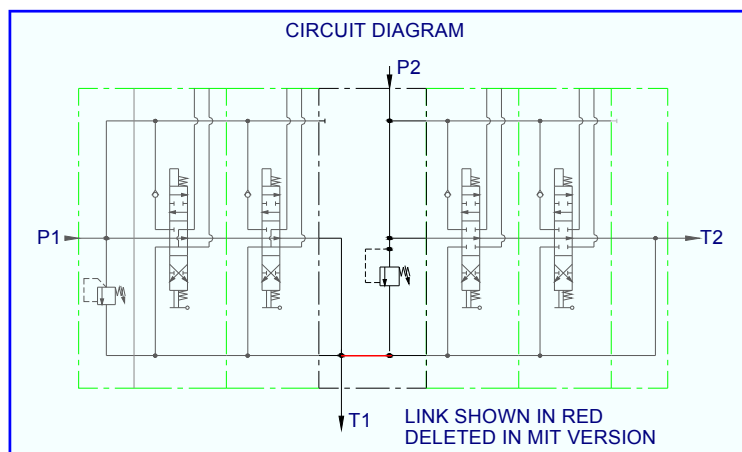
Options are available to have the outlet flow from both sides of the assembly combined into one outlet (MI) or as 2 separate outlets if the combined return flow is greater than 60 lpm (MIT). more valve assemblies into one bank, typically where space is limited. This also allows the control levers to be sited closer together.

Application

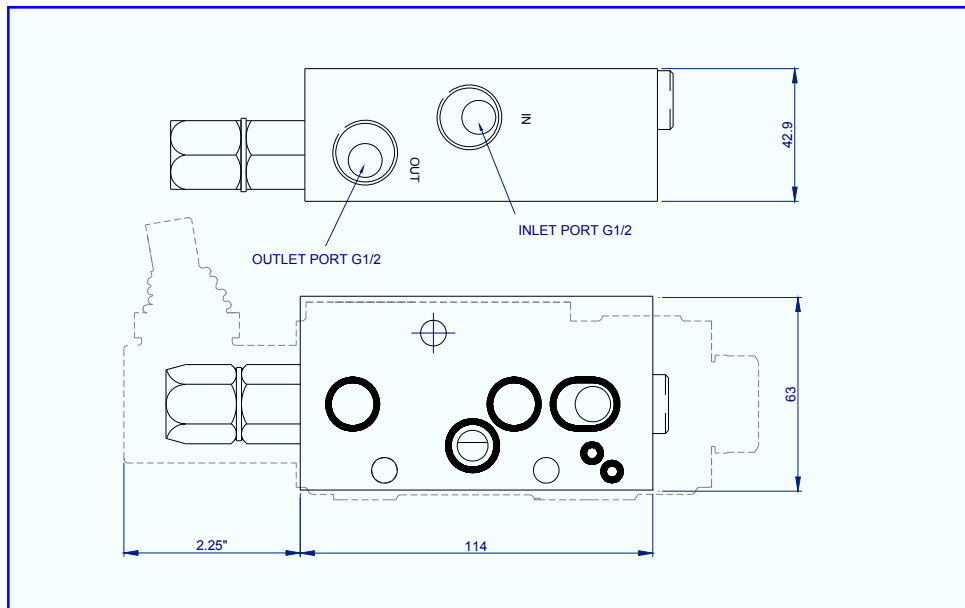
Used to combine two or more valve assemblies into one bank, typically where space is limited. This also allows the control levers to be sited closer together.

Features

- Integral adjustable relief valve.
- 2 outlet port options.
- Anodised option
- Compact section.



V4 INTERSECTIONS



Mid-Inlet Specification

Performance

Rated Flow	40 l/min
Δp at rated flow P to T	0.5 bar
Maximum pressure	250 bar
Maximum back pressure	25 bar
Temperature rating minimum	-20°C
Temperature rating maximum	+60°C
Inlet port	G 1/2
Outlet port	G 1/2

Recommended Oil

Mineral based hydraulic	ISO VG37
Filtration minimum	25 micron

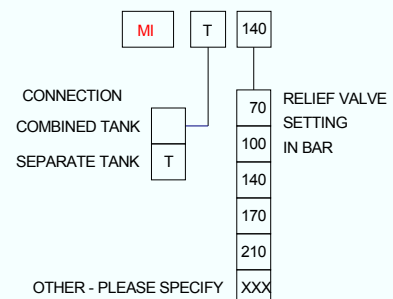
Materials

Body	Aluminium BS 1490
Relief Valve	Zinc chromate BS 1706 Zn3
	Nitrotec NQ3
Seals	Nitrile

Weight

MI RXXX	0.6 kg
---------	--------

ORDER CODE



V4 ANCILLARIES

PILOT CHECK VALVE

Pilot check valves are used to lock one or both service ports to ensure that there is zero movement of the actuator whilst its control valve is in neutral.

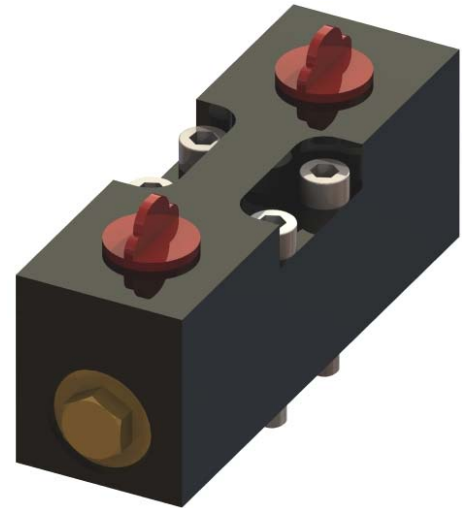
Check valves are mounted using four cap screws on the service port face of a valve section with a 'Y' type manifold interface. Where a single acting check valve is used, the control section must be fitted with an 'M' spool to ensure pilot pressure is available to unlock the check valve.

When used with cylinders, whose rod is large in relation to the diameter of the bore, it is possible for pressures to be generated in the rod end which can not be unloaded. To avoid this the ratio of the cylinder full area to the rod annular area must not be greater than 4:1, which is the pilot ratio of this check valve.

When lowering a cylinder, the pump may not maintain the pilot pressure. This can result in jerky operation caused by oscillation of the pilot piston. This can be overcome by restricting the flow out of the cylinder to maintain pilot pressure at the check valve.

Description

Designed to be mounted directly onto the service port face of the V4 'Y' section. Chrome steel ball and hardened seats provide a positive and total lock to actuators, this cannot be released unless the pump is running and the valve is selected.

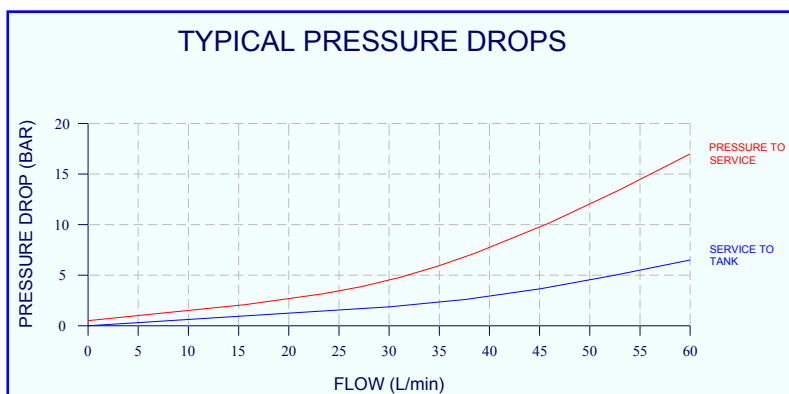


Application

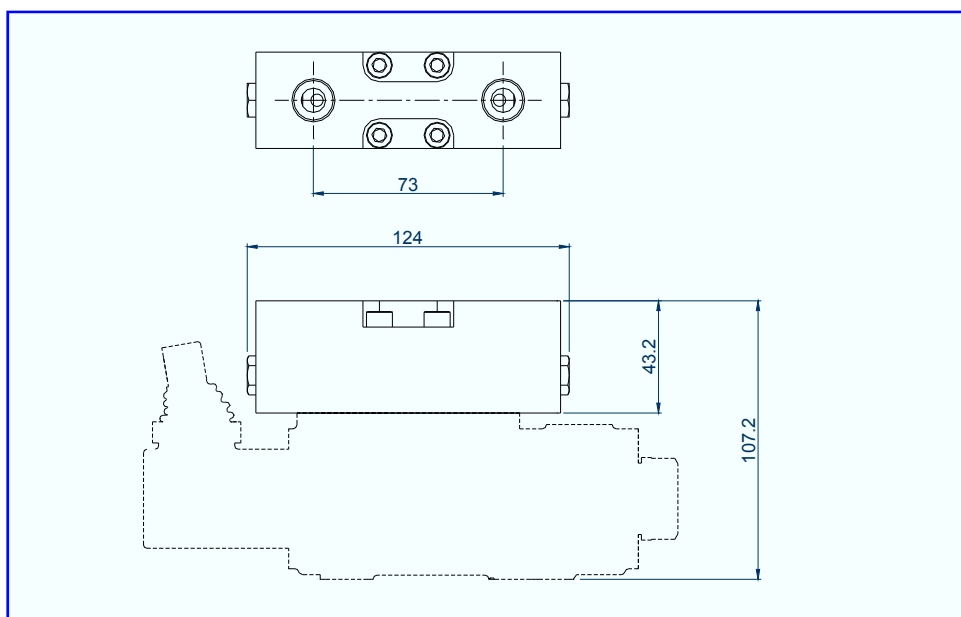
Used to positively lock cylinders and prevent involuntary movement when the pump is not running. Ideally suited to mobile applications such as back hoe and access platforms.

Features

- 4:1 pilot ratio.
- Hardened seats.
- Section mounting.
- 100% production testing.
- Suitable for manual or solenoid sections.
- Good flow characteristics.
- Low opening pressure.
- Cast iron body and hardened piston for long life.



V4 ANCILLARIES



Pilot Check valve Specification

Performance

Rated flow	40 l/min
Maximum pressure	250 bar
Opening pressure	3.0 bar
Temperature rating: minimum	-20°C
Temperature rating: maximum	+60°C
Leakage	0 cc/min
Ratio	4:1

Recommended Oil

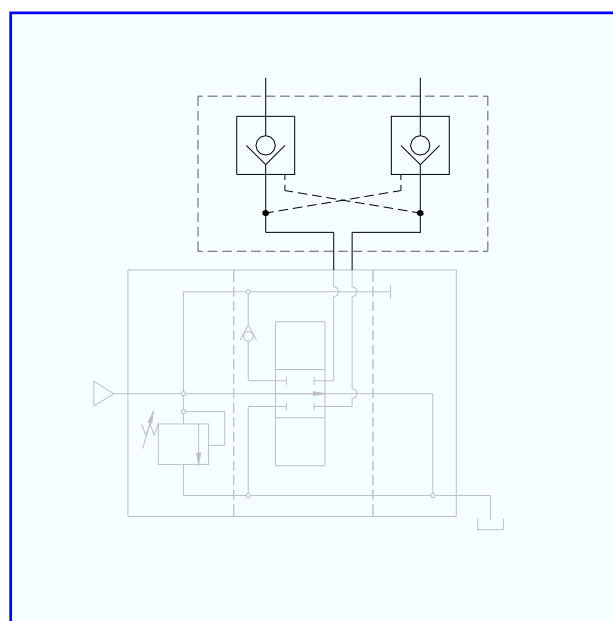
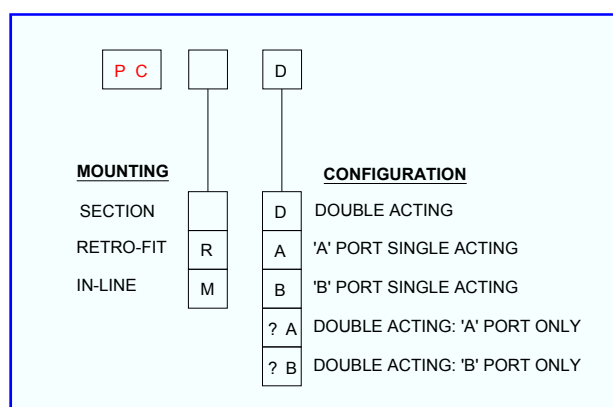
Mineral based hydraulic	ISO VG37
Filtration (minimum)	25 micron

Materials

Body - cast iron	BS 1452
External plating - zinc chromate	BS 1706 Zn3
M6 cap screw torque	8.0 Nm
Seals	PTFE/Nitrile
Mounting interface	'Y' type

Weight

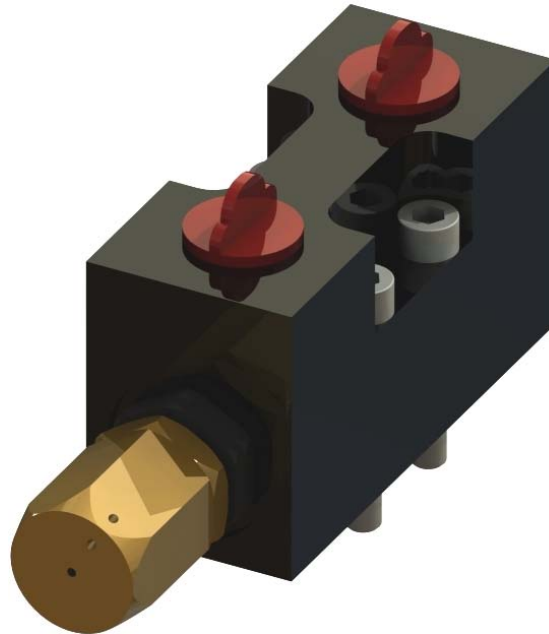
1.16kg



V4 ANCILLARIES

CROSS LINE RELIEF VALVE

The V4 cross line relief valve is designed to be fitted onto the 'Y' interface of the V4 sectional valve. The valve relieves pressure from one service line to the other using only one relief valve cartridge. This provides a cost effective means of protecting reversible motors or balanced cylinders.

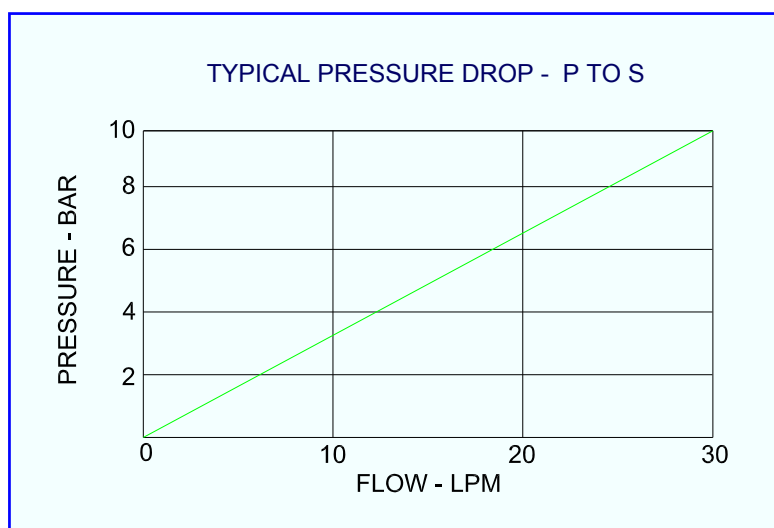


Application

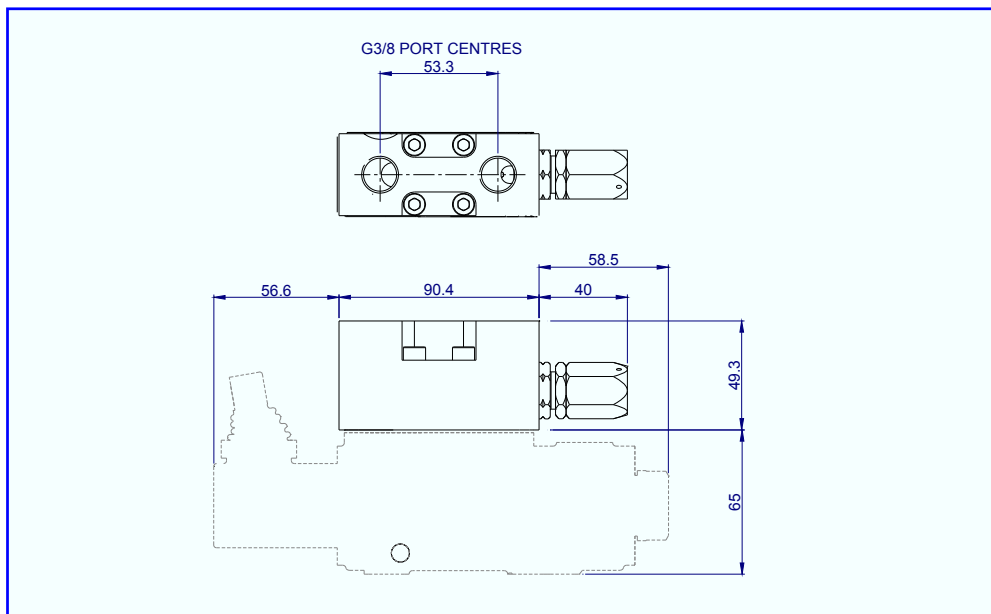
Used to protect from overpressure on a reversible motor or a balanced double acting cylinder. Typically used for a controlled slow down on hydraulic motors.

Features

- Fast responding direct acting relief.
- Adjustable relief valve.
- Hardened piston.
- Long life relief valve.
- Dirt tolerant.



V4 ANCILLARIES



Technical Data

Performance

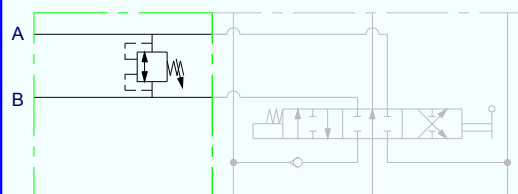
Rated flow	40 l/min
Maximum pressure	210 bar
Temperature rating: min	-20°C
Temperature rating: max	+65°C
Ports – male	G3/8
Relief re-seat	80% of setting
Recommended Oil	
Mineral based hydraulic	ISOVG37
Filtration (minimum)	25 micron

Materials

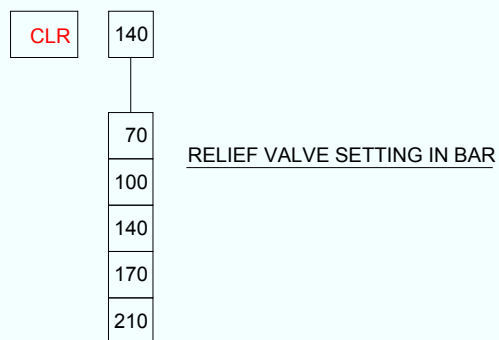
RV body – nitrile	NQ3
Piston – hardened	BC Standard 019
Cap – Zinc chromate	BS1706Zn3
Manifold – aluminium	BS1490
Seals – reciprocating	Viton
Seals - static	Nitrile

Weight	0.5Kgs
--------	--------

CIRCUIT DIAGRAM



ORDER CODE



V4 ANCILLARIES

SERVICE LINE RELIEF & ANTI- CAVITATION

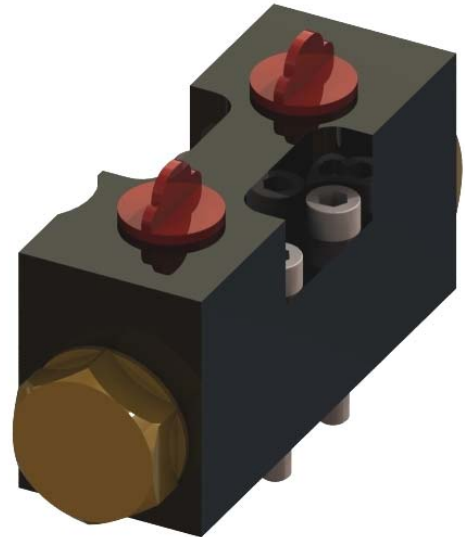
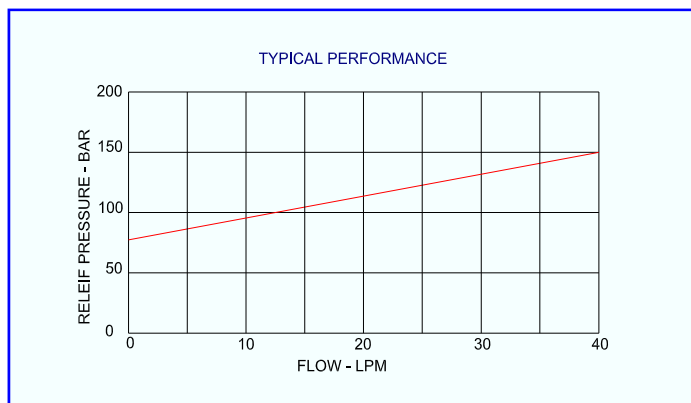
The V4 service line relief valve is used to limit the pressure in individual service lines and provide anti-cavitation protection in circuits with overrun situations to maintain oil in the actuators.

The valve is mounted onto the service port face of a "Z" type valve section using four cap screws. The body has a cavity for each service line. This will accept one of four cartridges, relief, anti-cavitation, relief and anti-cavitation or a blanking cartridge.

Relief valves are pre-set by Hy-Pro, but are fully adjustable retrospectively using the socket screw located under the cap nut. The Hy-Pro service line relief valves and anti-cavitation valves can be used on manual, cable and solenoid operated sections.

Description

The body is machined to accept one of four cartridge options for each service line. The cartridges are relief, anticavitation, relief and anticavitation and blanking cartridge. The relief valves are adjustable.



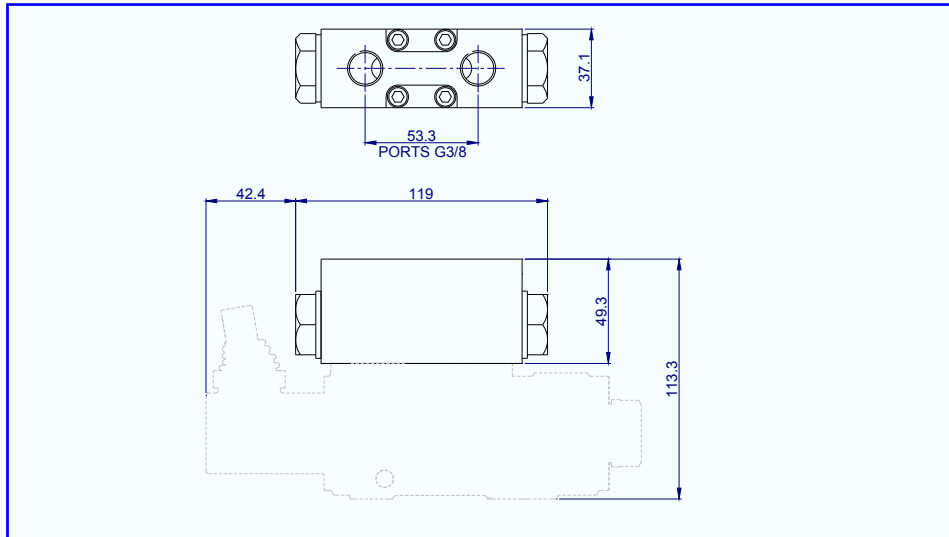
Application

Used to protect one or both service lines from being over pressurized, it is effective when the main spool is selected or in neutral. The anti-cavitation cartridge allows oil to be drawn into the service line should the demand over take the pump supply.

Features

- Fast responding, adjustable direct acting relief valve.
- Large capacity anti-cavitation
- Compact construction.
- Relief and anti-cavitation in each port option.
- Hardened relief and anti-cavitation pistons for long life.

V4 ANCILLARIES



Service Line Relief Valve Specification

Performance

Rated flow	40 l/min
Maximum pressure service	250 bar
Maximum back pressure - outlet port	25 bar
Relief valve range	20 bar to 205 bar
Anticavitation	0.5 bar
Temperature rating minimum	-20°C
Temperature rating maximum	+65°C

Recommended Oil

Mineral based hydraulic	ISO VG37
Filtration minimum	25 micron

Materials

Body - Aluminium	BS 1490
External plating - zinc chromate	BS 1706 Zn3
Seals	PTFE & Nitrile
Cap screw torque	8.0 Nm

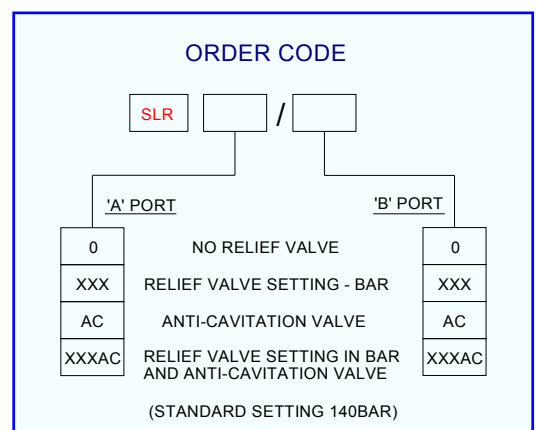
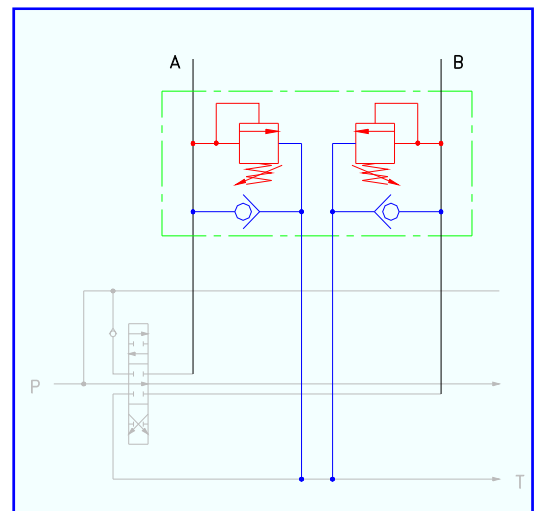
Mounting interface

Z type

Weight

SLR 140/140

0.53 kg



V4 CONTROL

ROTARY LEVER

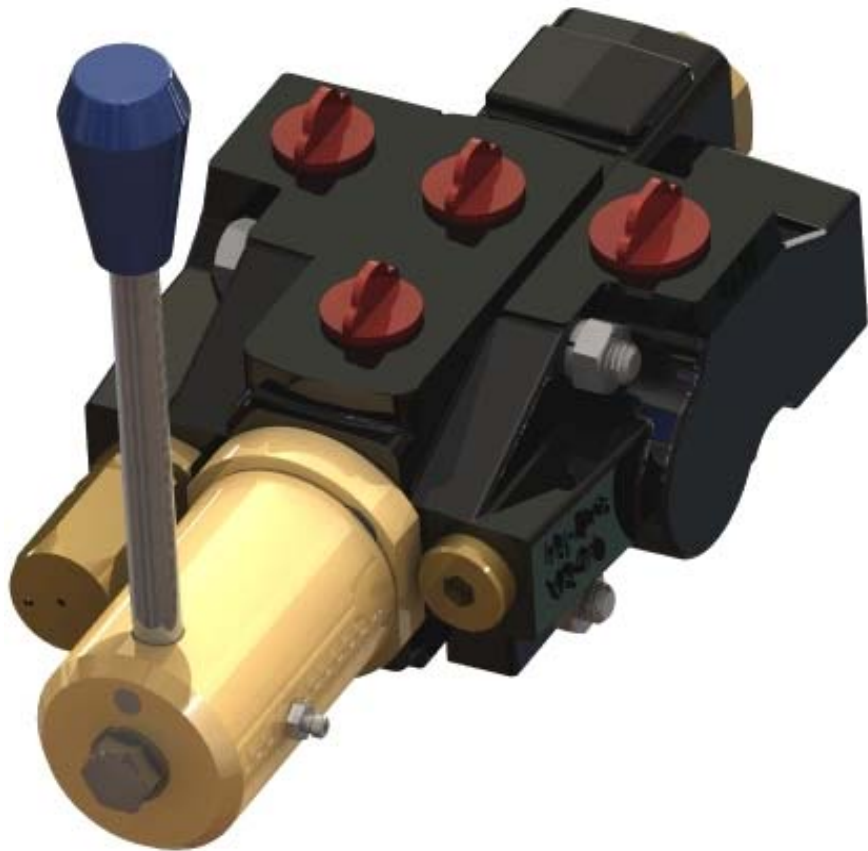
Description

The Hy-Pro rotary lever has been developed specifically to enable the operator precise control of motors and cylinders in the fishing and other industries.

The lever rotates through a $\pm 65^\circ$ arc and operates a scroll which converts the rotary action of the lever into axial movement of the spool.

The mechanism has a friction detent feature which positively holds the spool in neutral or will maintain the selected position when operated.

Because of the geometry of the lever it is not possible to include it in multi-section valves but it is retro-fitable to existing V4 single section assemblies.

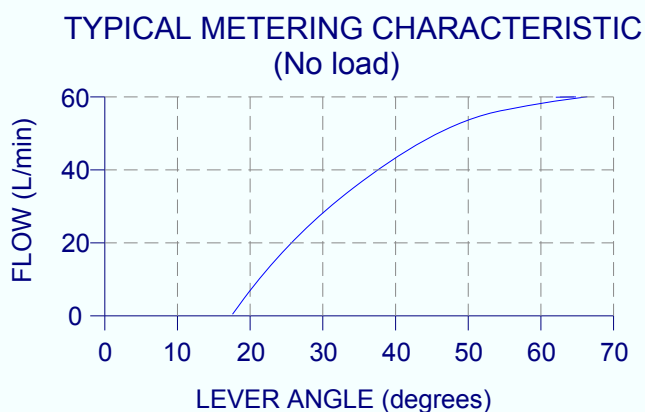


Application

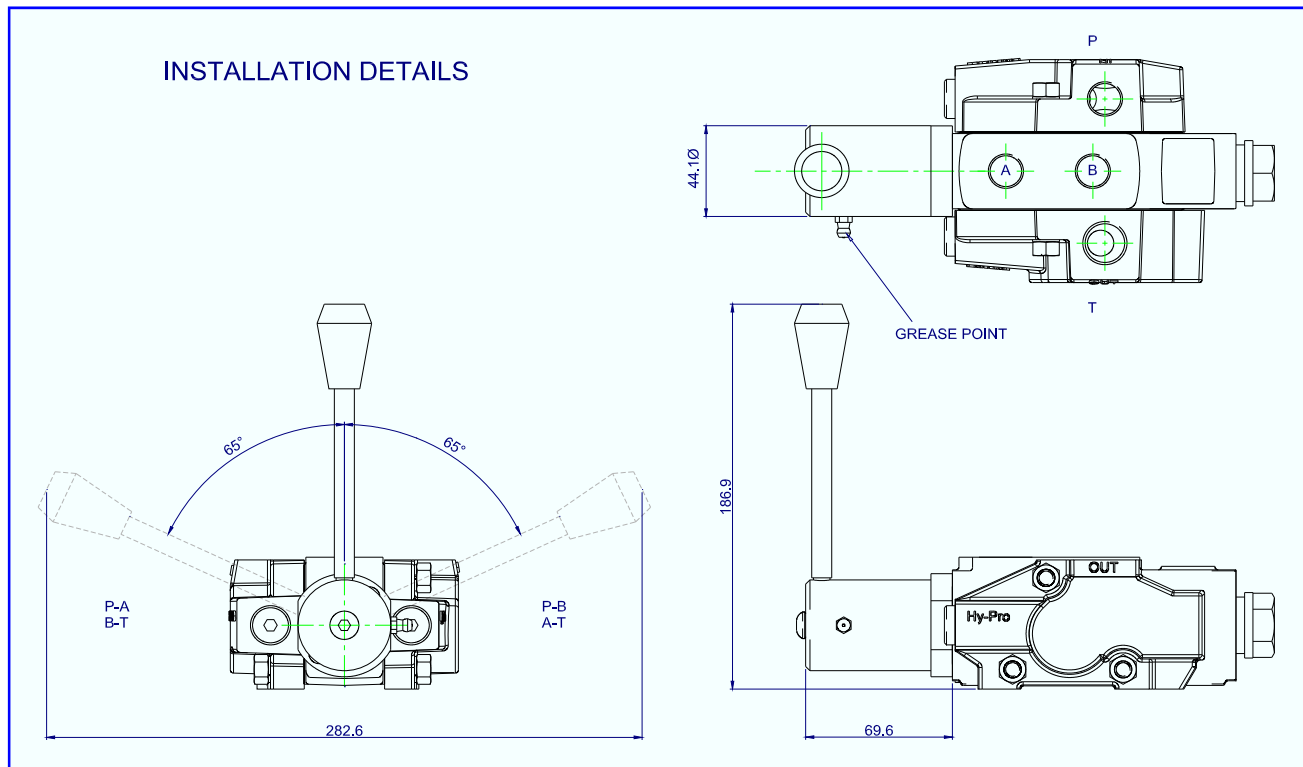
Used extensively in the forestry and fishing industry to control the speed of conveyors and winches.

Features

- $\pm 65^\circ$ movement.
- Compact design.
- Spool options.
- Neutral detent.
- Friction hold.
- Robust mechanism.
- Toughened components.
- Bronze Body and cast iron construction.
- Retro fit-able.



V4 CONTROL



Rotary Lever Specification

Performance

Refer to graph
Lever movement $\pm 65^\circ$

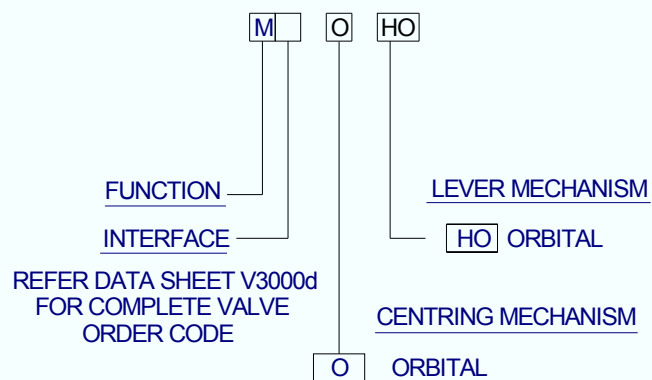
Materials

Body internal Cast Iron BS 1452
Body external Manganese bronze CZ114

Friction/detent Steel Nitrotech NQ3

Weight 4.9 kg
(Complete assembly
as per drawing)

ORDER CODE



V4 CONTROL

DUAL AXIS LEVERS

The V4 dual axis levers operate two sections either simultaneously or individually, allowing the operator to have total control of two sections using 360 degrees of movement.

The H+ version controls section one in the north and south planes and section two in the east and west . Combinations of movement are achieved between these points.

The HX version controls both sections in the north, south, east and west planes and individual sections between these points.

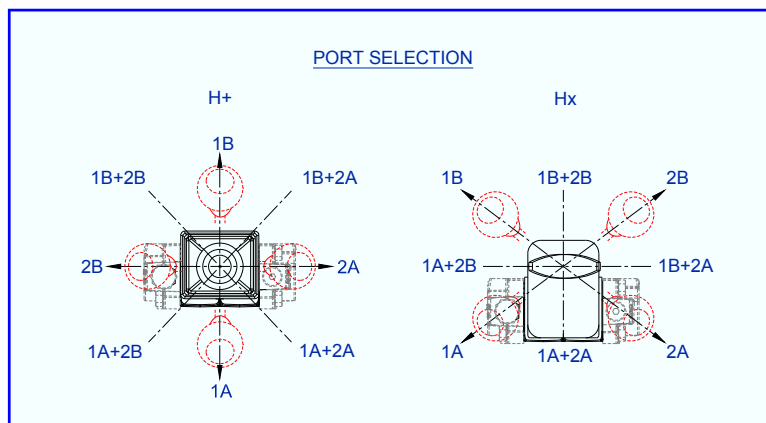


Description

A mounting plate fastened to both sections provides a pivot point for the lever assembly. A yoke is then attached to each spool via ball joints, the 360 degrees of rotation generated is thus converted into reciprocating action for each spool.

Application

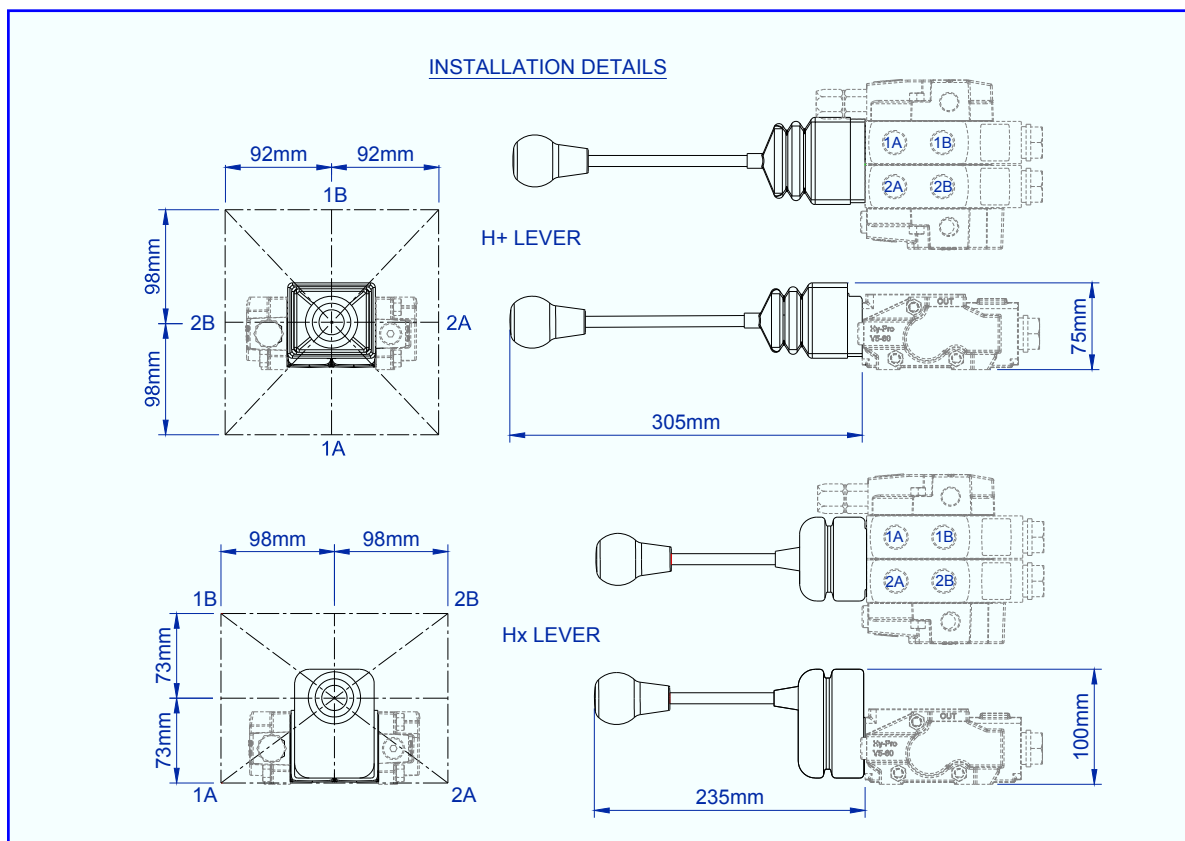
Industry standard for back hoe applications. Used extensively in the construction and mining industry for controlling boom movement. This type of lever is also used to control lorry mounted cranes.



Features

- Smooth operation
- Robust construction
- Precision ball-joints.
- Steel parts.
- Protective gaiter.

V4 CONTROL



Multi Axis Lever Specification

Performance

Minimum operating Force-
 One spool 2.5 kg
 Two spool 5.0 kg

Material & protection

Housing: Aluminium BS 1490
 Yoke: Steel Nitrotech NQ3
 Steel parts: Zinc chromate BS 1706 Zn3

Weights

H+ 0.53 kg
 Hx 0.31 kg

ORDER CODE

