

Hydraulic Directional Control Valve Catalogue



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WHO WE ARE

Hydraulics Engineering Quality and Manufacturing Excellence

Who are we?

Since 1967 Hydraulic Projects has been designing and manufacturing hydraulic valves and hydraulic marine autopilots steering equipment from our UK base. With our own in house computer aided design linked to the latest CNC machines, we control the complete process from initial concept through assembly and test to ISO 9001 we guarantee the product to the very highest quality delivered on time.

What do we do?

We manufacture a large range of hydraulic directional control valves supplemented by ancillary valves such as pilot check, service line relief's etc. Additionally, we produce a range of marine autopilot hydraulic steering equipment. We can also tailor our designs to suit your requirements.

Who are our customers?

You will find our values on a vast range of equipment from recovery vehicles to refuse wagons, industrial jigs and fixtures, agricultural machinery, construction and plant equipment, boat winches and many other applications.

Now what do you do?

Just look through our catalogue or browse our web site <u>www.hypro.co.uk</u> for your directional control valves requirements. Or call us to discuss your circuit needs and we will be happy to help you choose the correct valve for your application.

So how can we help you?

Our contact details are shown on the back cover of this catalogue and our dedicated sales team are waiting to take your call.

Ordering

We are happy to accept orders by phone, fax email or post. Please use the catalogue order codes where possible. If you can't see what you require please contact us as our range goes beyond what is printed here. Please check and con-firm availability of items before ordering.

Shipping

We use a national carrier for most orders or 1st class post for smaller items where appropriate. Alternatively you may arrange your own collection but there will be a small packing charge.

Payment

Payment can be made by credit/debit card, cheque or bank transfer. New accounts are strictly on a profoma basis. Credit accounts are available on application and subject to the usual credit checks.

A copy of our full terms and conditions is available on request or alternatively can be viewed or downloaded from our website.



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TECHNICAL DATA

The following data applies to all Hy-Pro sectional and line mounted valves except where otherwise stated:

Maximum pressure		250 bar 210 bar (assemblies containing solenoid sections)
Maximum back pressure		25 bar
Temperature rating minimun Temperature rating maximur Recommended fluid type Fluid cleanliness	n m	-20°c +65°c Mineral based hydraulic ISO VG37 ≥ ISO 19/14/11
Materials Cast Iron Aluminium manifolds		BS 1452-250 BS 1490
External protection Stainless steel Steel		BS 10088-3 Zinc chromate BS 1706 Zn3 Nitrotech NQ3 Black paint HTS1006
Seals Static Reciprocating Spool High Pressure Anti-extrusion rings		Nitrile Viton PTFE PTFE
Relief valves	Unless o 20 L/mir	otherwise requested set 'full open' at n / ISO VG37 @ 30 to 40 degrees C
Service line relief valves Electrical Coil Voltage Coil power Protection Connection Cable Ø (not supplied)	Unless o ISO VG	otherwise requested are set at 'crack' 37 @ 30 to 40 degrees C 12/24 VDC 24W IP67 DIN 43650 6 - 8mm
Pneumatic supply		5-10 bar





V4-40 & V5-60 DIRECTIONAL CONTROL VALVE





V4-40 & V5-60 DIRECTIONAL CONTROL VALVE

DESCRIPTION

A low parallel connected sectional spool valve, lever, solenoid, pneumatic or cable operated. Suitable for open or closed centre series circuits. Spool mechanisms 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.

On the solenoid sections the internal oil pilot system is switched by solenoid operated cartridges using compact 24-Watt DC coils. A damping orifice fitted in the pilot line eliminates the harshness associated with standard direct acting solenoid valves, giving a positive feel to the control system. Solenoid sections can be built in to a valve assembly containing manual sections and any of the extensive range of ancillary valves.

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.
- Excellent 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.
- Open and closed centre options.
- 100% production testing.

As well as the above the solenoid valves further feature

- 12 and 24V DC 24 Watt Coils
- Soft spool action.
- Manual and solenoid sections together in the same bank.
- Lever override option.



V4-40 & V5-60 OPERATING CONDITIONS





V4-40 & V5-60 INSTALLATION DETAILS



V4-40 & V5-60 CONTENTS



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STANDARD INLETS



Pilot Operated or Direct Acting.

Material Cast Iron Weight 0.75kg



Code
RXXX
S
Т
3
4
С
Е



* On solenoid valves the closed centre is made at the outlet cover.

'XXX' = relief valve setting in bar.



Example codes

R190	Т	3	
R140	Т	4	
R140	т	4	Е
	Т	4	С

Relief Valve set 190 Bar with G3/8 Top port

Relief Valve set 140 Bar with G1/2 Top port

Relief Valve set 140 Bar with G1/2 Top port for solenoid sections

No Relief Valve, G1/2 Top port Closed centre

Solenoid pilot drillings omitted for clarity





INLET WITH FLOW SOLENOID UNLOADER



This special inlet includes the pilot pressurising valve for solenoid sections so is used with a standard outlet cover.





Unloader

NO Normally open Unloads P to T unless energised

Relief Valve

Adjustable.	Pilot O	perated
-------------	---------	---------

Manual Override Screw in to operate

BodyAluminiumWeight1.7kgWidthN/a



TYPICAL PRESSURE DROP UNLOADED



INLET WITH FLOW CONTROL

Option	Code	RELIEF VALVE	CONTROL	NEEDLE	MARINISATION
Relief valve	RXXX	DVAG			
Top G1/2 Port	T4	RXXX			
Solenoid	Е				
Handwheel	K				
Screw & lock nut	S				
Standard needle			¬ ∕− к ┝¬	/ F	
Fine needle	F	T4E FCN		$\mathbb{K} \vdash \mathbb{H}$	$X \vdash$
1 Turn needle	L				M
No shut off needle	0				/
Marinised	Μ				

'XXX' = relief valve setting in bar.

Example codes

R140	T4E	FCN	к		
					-
R140	T4E	FCN	s	F	м

Relief Valve set 140 Bar, Standard needle & handwheel

Relief Valve set 140 Bar, Fine needle, Screw adjusted & Marinised



Adjustable range ΔP Inlet to outlet 40 L/min 0-60 L/min ΔP Inlet to service 40 L/min

0.6 bar 4.6 bar

Relief Valve Adjustable. Pilot Operated

Mounting 2x M8x1.5p-6H Body Aluminium Weight 2.0kg





INLET WITH FLOW CONTROL (100L/min)

This special unloading inlet cover maintains 60 L/min to the valve regardless of the inlet flow (up to a maximum of 100 L/min.

Excess flow is returned to the outlet port.

Features internal check valve for reverse connection protection.



'XXX' = relief valve setting in bar.

ΒA





Weight

2.0kg



INLET WITH PROPORTIONAL FLOW CONTROL

This special inlet includes its own return line which is separate from the adjacent spool sections and must be connected to tank.



'XXX' = SETTING IN BAR 'XX' = 12 OR 24VDC



Adjustable range Voltage 0-60 L/min 12 or 24VDC

Relief Valve Adjustable. Direct Acting.

Mounting2x M8x1.5p-6HBodyAluminiumWeight2.0kg





STANDARD OUTLETS

The outlet covers come with G (BSP) ports in either top or side positions. Pressure Carry Over is available by selection of an alternative outlet cover.

If a solenoid spool section is used in the bank an 'E' type outlet is used which contains the pilot pressurising valve and the additional drillings for the connections. Note that if a combined inlet/unloader is fitted the 'E' type outlet is not required.



Pressure Carry Over

Solenoid **Closed Centre**



Option Co	ode
Top port	Т
Side port	S
G1/2 Port	4
G3/4 port	6
Outlet	0
Pressure Carry Over	Ρ
Outlet - solenoid	OE
Pressure Carry Over - Solenoid	ΡE
Closed Centre - Solenoid	CE



Example codes



G3/8 Top port

G3/4 Side port and Pressure Carry Over



G1/2 Top port for Solenoid sections

G1/2 Top port, Closed centre for Solenoid sections





Solenoid

Sections

for Solenoid

Sections

for Solenoid

Sections

DESCRIPTION

The V4-40 and V5-60 working sections have family of spools to suit most applications. There are standard or fine metering options and 2, 3 and 4 position detent / spring centring mechanism combinations.

Actuation options are manual levers – standard / rotary / dual axis (x & +), cable, direct link to the spool, pnuematic or pilot solenoid (with or without manual lever override). The standard manual lever assembly has four orientation options and is universal across the range. Lever knobs are available in a variety of colours.

Spool operated single or twin V3 series micro-switch assembles can be fitted to manual sections with the option of IP67 environmental protection.

Body options consist of standard threaded ports or an interface for the fitment of ancillary valves.





SPOOL OPTIONS

Manual	Code
Cylinder	D
Cylinder - fine metering	K
Motor	Μ
Motor - fine metering	MF
Single acting A port	Α
Single acting B port	В
4 Position float	4
Regenerative	R
Unloading (Dead mans handle	e) P

Solenoid	Code
Cylinder	D
Motor*	M
Single acting A port	A
Single acting B port	B
Pneumatic Cylinder Motor Single acting A port Single acting B port	D M A B



BODY OPTIONS

Body options are available with standard G (BSP) ports or with an ancillary interface to facilitate the fitment of Pilot Check, Service Line Relief or Solenoid 4th Position manifolds.

Option	Code
Standard ports	-
Ancillary interface - Pilot check	Y
Ancillary interface - Service relief	Z







Material Weight

Width

Cast Iron 2.0kg Manual 2.5 kg Solenoid 38.1mm



SPOOL POSITIONING OPTIONS

Code Manual 2, 3 and 4 position centring Spring - 3 Position С mechanisms in a combination of Spring - 2 position P-B 2C spring return and detent location. Detent - 3 Position L Detent - 2 position P-B 2L Detent - 2 position P - A 2Li Spring - 3 Position Detent friction - 3 Position 0 C Spring / Detent - 3 Position F 1 0 2 Float - 4 Position 4C Detent - 4 position 4L Spring - 2 Position P to B Solenoid 2C MMM Solenoid - 3 Position Е 0 2 Solenoid - 2 position 2E Detent - 3 Position **Pneumatic** L Pneumatic - 3 Position Ρ 2 2P Pneumatic - 2 position Detent - 2 Position P to B 2L Detent - 2 Position P to A 2Li **Detent Friction - 3 Position** Solenoid - 3 Position E 0 2 Spring / Detent - 3 Position Solenoid - 2 Position ΜΛΛΛΛ 2E F 2 1 Λ Float - 4 Position **Pneumatic - 3 Position** C P $\left|\right>$ \langle 3 1 0 2 Detent - 4 Position Pneumatic - 2 Position L 2P > | or | <

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CONTROL OPTIONS - STANDARD LEVER & CABLE

The standard lever is common across the sectional valve range. It can be supplied as standard or with environmental protection.

A further option on manual and solenoid sections is to have the lever fitted 'sideways' on - contact us for details.

Code
Х
-
Н
Ν
R

* For cable operation select code X. The mounting holes for the lever accept a standard 'Morse' type cable.





CONTROL OPTIONS - ROTARY LEVER

Used extensively in the forestry and fishing industry to control the speed of conveyors and winches. The Hy-Pro rotary lever has been developed specifically to enable the operator precise control of motors and cylinders. The lever rotates through a \pm 65° 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 a retro-fit to existing single section assemblies. Refer to page 29 for full ordering code.







TYPICAL METERING CHARACTERISTIC



Body

Lever Weight Width Manganese bronze CZ114 Stainless steel 2.0kg N/a



CONTROL OPTIONS - MULTI AXIS

The V4 and V5 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.







ENVIRONMENTAL PROTECTION OPTIONS

The valves are available with a marinised finish to withstand harsh		Code
environments. It comprises black anodised lever housings with	Standard	-
stainless steel handles and locknuts. For further protection such as in marine applications the spool can be	Stainless steel lever & Anodised housing	S
supplied with electro-less nickel plating.	Stainless steel lever, Anodised housing & Nickel plated spool	Μ
Refer to the order and example codes on pages 28 and 29.		

WORKING SECTIONS - MICRO-SWITCH OPTIONS

The V4-40 and V5-60 ranges can be fitted with a micro-switch to enable the activation of auxiliary functions with spool operation.

Micro-switch Options Spring centred Detent Spring/Detent Main spool S/Acting B Main spool S/Acting A Main spool D/Acting	Code C L F B A D	
Standard V3 Switch IP67 V3 Switch	- WP	
POSITIONING S	B A D WP SWITCH	
Hy-P	PO	

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ORDER CODES

Create the order code by reading left to right, following the paths between options. A selection of typical codes are shown on the next page.





ORDER CODES - EXAMPLES

SPOOL

A selection of typical spool section order codes generated by the matrix shown on the previous page. Manual, solenoid and pneumatic spool sections can be used in the same valve assembly.

BODY POSITIONING LEVER PROTECTION OTHER

	– D		С	Η			Cylinder spool Standard ports Spring centred Standard lever
	Μ		L	Н	S		Motor spool Standard ports Detented Marinised lever
MANUA	К		L	Н	Μ		Fine metering cylinder spool Standard ports Detented Marinised lever and spool
	Μ	Ζ	С	R	S		Motor spool Interface for service line relief manifold Spring centred Reversed marinised lever
	- A		С	x			Single acting cylinder spool Standard ports Spring centred No lever
	SPOOL	BODY	POSITIONING	LEVER P	ROTECTIO	N VOLTAG	E
	SPOOL		E	LEVER P	ROTECTION S	N VOLTAG	E Cylinder spool Standard ports Solenoid control Marinised lever 12VDC
SOLENOID	SPOOL D M	BODY	E 2E	LEVER P	S	N VOLTAG	E Cylinder spool Standard ports Solenoid control Marinised lever 12VDC Motor spool Interface for service line relief manifold 2 position solenoid control 24VDC
SOLENOID	<u>SPOOL</u> — D _ M — M	BODY	E 2E E	LEVER P	S	N VOLTAG	Cylinder spool Standard ports Solenoid control Marinised lever 12VDC Motor spool Interface for service line relief manifold 2 position solenoid control 24VDC Motor spool Manifod interface for pilot check valves Solenoid control 24VDC
PNEUMATIC	SPOOL D M M D	<u>ΒΟDY</u>	E 2E P	LEVER P	S S	VOLTAG 12 24 24	Cylinder spool Standard ports Solenoid control Marinised lever 12VDCMotor spool Interface for service line relief manifold 2 position solenoid control 24VDCMotor spool Interface for pilot check valves Solenoid control 24VDCMotor spool Manifod interface for pilot check valves Solenoid control 24VDCCylinder spool Standard ports Pneumatic control Standard lever

FLOW CONTROL SECTION - MANUAL

A fully pressure and flowcompensated metering type flow control, which can be included in V4 and V5 manual and solenoid valve assemblies. The regulated flow is supplied via the pressure gallery to down stream sections, while those 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 version can be supplied to ensure full pump flow is available to the regulated sections even when up-stream sections are in use.

Adjustable range

Relief Valve

Body

Weight

Width

 ΔP Inlet to outlet 40 L/min

Adjustable. Pilot Operated

Aluminium

2.0kg

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38.1mm









FLOW DIVIDER SECTION - MANUAL

The 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, recombining 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 handwheel for continous adjustment or preset with a lock nut.



Input flow @ 60 L/min **Priority flow maximum Priority flow minimum** Secondary flow maximum 60 L/minute Secondary flow minimum $\Delta \mathbf{P}$ inlet to service

Body Weight Width

36 L/minute 0 L/minute 24 L/minute 6.9 bar

Aluminium 0.9 Kg 50mm







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FLOW CONTROL SECTION - ELECTRIC





FLOW DIVIDER SECTION - ELECTRIC

The adjustable priority flow is unaffected by variable pump delivery or pressure changes in either priority or secondary circuits. Control is via a proportional driver plug and $10K\Omega$ Potentiometer. A manually controlled version is also available.

Option	
Proportional 12 VDC)
Proportional 24 VDC)

Manual handwheel Manual Screw Adjuster



Code

12

24

Κ

S

в



0-60 L/min 0-60 L/min 2.0 bar 1.6 bar 2.0 bar

Maximum pressure Coil Power Coil Max Current

 ΔP inlet to tank 40 lpm

∆P inlet to secondary service 40 L/min

 ΔP inlet to priority service 40 L/min

Priority flow Secondary flow

Body Weight Width 210 bar 28 Watts 3.4 Amps @ 20°C

Aluminium 1.5 Kg 70mm





SOLENOID UNLOADER SECTION

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 to override the
other controls of the valve
bank.Option
Relief v
12VDC
24VDCValue
wassemblies to override the
other controls of the valveName
v
v
bar.Name
v
v
v
v
v
v
v
v
v

I	Option Relief valve 12VDC 24VDC	Code RXXX 12 24	R US		
e	'XXX' = relief valve bar.	setting in		RXXX	12
			Ĺ		

Manual override



0

06

STANDARD

RELIEF VALVE



Relief Valve Adjustable.

Pilot Operated

Manual Override Screw in to operate

Unloader

NC Normally closed Unloads P to T unless energised

MaterialAluminiumWeight1.7kgWidth38.1mm


V4-40 & V5-60 INTERSECTIONS

SERIES CONNECTOR SECTION

Series connector sections are designed to be fitted between two working sections, connecting in series the actuators that they control. Series connectors can be 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 seriesconnected valve banks. In such cases, customers are advised to discuss their circuit design with Hy-Pro.















V4-40 & V5-60 INTERSECTIONS

SERIES PARALLEL SECTION

The series parallel section 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 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 sequence.









Aluminium 0.5 kg 38.1mm



V4-40 & V5-60 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 midinlet intersection. An adjustable relief valve is included to protect the pump supplying the sections fed by the midinlet. 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).



MI RXXX

MI T RXXX

∆p at rated flow P to T0.5 barBodyAluminiumWeight0.6 kgWidth38.1mm



PILOT OPERATED CHECK VALVE

The check valves are mounted on the service port face of a 'Y' type spool section. Where a single acting check valve is used, the 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 that 4:1, which is the pilot ratio of this check valve.

When lowering a loaded 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.

Opening pressure Leakage @210 bar Ratio Body Mounting interface Ports V4-40 Ports V5-60 Weight





SERVICE LINE RELIEF & ANTI-CAVITATION VALVE

The 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 but are fully adjustable retrospectively using the socket screw located under the cap nut. The service line relief and anti-cavitation valves can be used on manual and solenoid operated sections.

Relief valve range Adjustment (approx) Anti-cavitation Mounting interface Body Ports V4-40 Ports V5-60 Weight







FLOW L/MIN

41

CROSS-LINE RELIEF VALVE

Option	(
Screw & Locknut	
Handwheel	
Acting on A port	
Acting on B port	

Code -K A B



'XXX' = SETTING IN BAR

The cross line relief valve relieves pressure in the service port and unloads it into the tank port. It is uni-directional but the manifold can be rotated so that the relief valve acts upon either the A service port or B service port. Note that on solenoid sections B port relief only is possible. Adjustment is made by either screw and locknut or by a handwheel







XLR A XXX

XLR B XXX

Relief Valve Range Adjustment Mounting interface Body Ports V4-40 Ports V5-60 Weight Width

20 bar to 250 bar 35 bar per turn Y Type Aluminium G3/8 G1/2 0.5 kg N/a



SOLENOID 4 POSITION VALVE

The solenoid 4 position valve connects both sides of a double acting cylinder to tank allowing it to float. For example when used with a D spool solenoid section on grass cutting or snow ploughing equipment the blades will follow the contours of the ground when the solenoid is actuated.



VOLTAGE

12

12

24

Working section with 'Z' type interface





Coil Power Connector Mounting interface Ports Body Weight Width 24 Watt IP67 Z Type G3/8 Aluminium 1.0kg N/a





V3-100 LPM DIRECTIONAL CONTROL VALVE





V3-100 LPM DIRECTIONAL CONTROL VALVE

DESCRIPTION

The V3-100 directional sectional spool valve is one of the most compact 100 l/min valve available. Designed for pressures up to 250 bar the valve is available with two, three and four position spool control options and a range of spool types. The lever mechanism is a pressure die casting which totally encloses the spool for added protection. A range of optional ancillary valves are also available to be able to match the requirements of the most complicated and demanding circuits.

The V3-100 is also available with solenoid control. It uses 12V and 24V 24 Watt DC coils to switch the internal oil pilot to engage the main spool. A damping orifice fitted in the pilot line eliminates the harshness usually associated with standard direct acting solenoid valves and gives a positive feel to the control system.

Both manual and solenoid sections can be built into a valve assembly and the solenoid sections have the options of lever override.

Application

Designed to be used in applications requiring a rugged, compact control valve with the option of remote control. Typically in the automotive recovery, recycling and agricultural industries where a mix of manual and solenoid control is essential.

Features

- Excellent metering characteristics.
- Excellent load holding.
- Integral load check valve.
- Open and closed centre option.
- Adjustable, pilot operated relief valve.
- Robust enclosed lever mechanism.
- Flow control option.
- 100% production testing.
- Environmental protection option.
- 12 and 24V DC 24 Watt coils.
- Soft spool action.
- Interchangeable with manual sections.
- Lever override option.



V3-100 OPERATING CONDITIONS

Maximum pressure 250 bar 210 bar* Maximum back pressure 25 bar

* Assemblies with solenoids Rated flow 100 l/min

Materials Cast Iron BS1452-250 Aluminium BS1490 Spools Case Harden BS6507 Tie studs BS970/191 817M40T

Tie stud torque 13.5Nm

External protection Black Paint to HTS1006

Stainless steel BS 10088-3

Steel

Zinc chromate BS 1706 Zn3 Nitrotech NQ3 Black paint HTS1006

Static Seals	Nitrile
Reciprocating	Viton
Spool High Pressure	PTFE
Anti Extrusion	PTFE

Electrical Coil Voltage

Max cont. Voltage	12V = 13.8V
-	24V = 27.5V
Coil Power	24W
Protection	IP67
Connection	DIN 43650
Cable Ø	6 - 8mm
(not supplied)	

12 or 24VDC











V3-100 INSTALLATION DETAILS



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V3-100 CONTENTS



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V3-100 INLET COVERS

STANDARD INLET

The inlet covers come with G(BSP) ports in either top or side positions. They can be fitted with or without a relief valve.	Option Relief valve Side port Top port Port size G3/4	Code RXXX S T 6			PORT SIZE
	'XXX' = relief va setting in bar.	alve			
Example codes				<u>т</u>	6
T 6 Inlet wit	h Top G3/4 port				
s 6 Inlet wit	h Side G3/4 por	t			
RXXX T 6 Inlet wit	h Top G3/4 port	and Relief v	valve		
RXXX S 6 Inlet wit	h Side G3/4 por	t and Relief	valve		
Top p Top p Content of the port	ort Relief Valve	P			
Relief Valve Adjustable. Pilot Operated					
Mounting 1 x Ø10.3 Through Material Cast Iron Weight 0.75kg Width N/a	Holes	No Relie	f Valve	Relief Val	ve
Hy-Pr	0				

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V3-100 INLET COVERS

INLET WITH FLOW CONTROL

Option Handwheel	Code K	CONTRO		PORT POSITION	MARINISATION
Screw & lock nut Relief valve Top port G3/4 Side port G3/4 Marinisation 'XXX' = relief valve bar.	S RXXX T6 S6 M setting in	FCN K S	RXXX	T6 S6	

Example codes

FCN	К	R210	Т6
FCN	S		S6

Handwheel, relief valve set 210 Bar, Top G3/4 port

Screw adjuster, no relief valve, SideG3/4 port



Pressure & flow compensatedAdjustable range0-100 L/min∆P Inlet to outlet 40 L/min0.6 barInlet to service 40 L/min4.6 barMax Pressure210 bar

Max Pressure Relief Valve

Adjustable. Pilot Operated

Mounting	2 x Ø10.3 Through Holes
Body	Aluminium
Weight	2.0kg





V3-100 OUTLET COVERS

STANDARD OUTLETS

The outlet covers come with G(BSP) ports in either top or side positions. Pressure carry over is available by selection of an alternative outlet cover.

If a solenoid spool section is used in the assembly an 'E' type outlet is used which contains the pilot pressurising valve and the additional drillings for the pilot connections.







V3-100 OUTLET COVERS







DESCRIPTION

The V3-100 working sections spools to suit most applications. There are positioning options for 2, 3 and 4 position detent / spring centring mechanism combinations. Actuation options are manual levers – standard, rotary, cable, direct link to the spool, or pilot solenoid (with or without manual lever override).

The standard manual lever assembly has four orientation options and is universal across the range. Lever knobs are available in a variety of colours.



SPOOL OPTIONS

There are spools to suit most applications, all with excellent metering characteristics.

Code	Solenoid	Code
D	Cylinder	D
М	Motor	М
А	Single acting A port	А
В		
4		
	Code D M A B 4	CodeSolenoidDCylinderMMotorASingle acting A portB4

Solenoid pilot connections Omitted for clarity.





SPOOL POSITIONING MECHANISMS

2, 3 and 4 position control
mechanisms in a combination
of spring return and detent
location.

Manual	Code
Spring - 3 Position	С
Spring - 2 position	2C
Detent - 3 Position	L
Detent - 2 position	2L
Detent friction - 3 Position	0
Spring / Detent - 3 Position	F
Float - 4 Position	4C
Solenoid	
	-

Solenoid - 3 Position	E
Solenoid - 2 position	2E



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Solenoid - 2 Position



CONTROL OPTIONS

The standard lever is common across the sectional valve range. It can be supplied with environmental protection.

Option	Code
No Lever*	Х
No Lever - solenoid sections	-
Standard Lever	Н
Standard Lever - 90°	Ν
Standard Lever - Reversed	R

* For cable operation select code X. The mounting holes for the lever accept a standard 'Morse' type cable.





CONTROL OPTIONS - ROTARY LEVER

Used extensively in the forestry and fishing industry to control the speed of conveyors and winches. The Hy-Pro rotary lever has been developed specifically to enable the operator precise control of motors and cylinders. The lever rotates through a \pm 90° 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 a retro-fit to existing single section assemblies.



TYPICAL METERING CHARACTERISTIC



Body	
Lever	
Weight	
Width	

bronze CZ114 Stainless steel 2.0kg N/a

Manganese



ENVIRONMENTAL PROTECTION OPTIONS

The valves are available with a marinised finish to withstand harsh	Option Standard	Code -
environments. It comprises black anodised aluminium housings with stainless steel levers and locknuts. For further protection such as in marine applications the spool can be supplied with electro-less nickel plating.	Stainless steel lever & Anodised housing	S
	Stainless steel lever, Anodised housings & Nickel plated spool	М

Refer to the order codes and examples on pages 58 and 59.



ORDER CODES

Create the order code by reading left to right, following the paths between options. A selection of typical codes are shown on the next page.





ORDER CODES - EXAMPLES

A selection of typical spool section order codes generated by the matrix shown on the previous page. Manual and solenoid spool sections can be used in the same valve assembly.



V3-100 INTERSECTIONS

FLOW CONTROL SECTION - MANUAL

A pressure and flow compensated meter-in type flow control which can be included in V3-100 valve manual or solenoid assemblies. The regulated flow is supplied via the pressure gallery to 'down stream' sections, while 'up stream' are unaffected. The flow can be continuously adjusted using a handwheel or preset with a screw and lock nut. A relief valve can be fitted to protect the circuit. There are options for alternate metering and environmental protection.

Screw adjustment

Handwheel adjustment With relief valve

Relief Valve Adjustable. Pilot Operated

Body	Aluminium
Weight	2.5kg
Width	44.5mm



V3-100 INTERSECTIONS

Ontion	Codo	CONTRO	L METERING	RELIEF VALVE	MARINISATION
Handwheel K Screw & lock nut S	K S	FCN			
Standard metering Fine metering 1 Turn 64 L/min	F	K			
metering	L				M
Marinisation	M		EXAMPLES		
(XXX) = relief value setting in bar	FCN	К	HANDWHEEL STANDARD NI	ADJUST EEDLE	
		FCN	S R210	SCREW ADJU RELIEF VALVI	ST E SET 210 BAR
		FCN	КМ	HANDWHEEL STANDARD NI MARINISED B	ADJUST EEDLE DDY



Standard

Relief valve



V3-100 INTERSECTIONS

SERIES CONNECTOR SECTION

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.



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ANCILLARY VALVES





HRV HOSE-REEL VALVE

This compact valve has been specifically designed to operate hose and cable reels. It features a pressure compensated speed control with integral relief valve combined with a 4 positon spool valve.

The desired speed is selected using the handwheel then the direction of rotation is selected using the spring centred lever. The lever can also be detented into a fourth position which allows the reel to 'free wheel'. In the neutral position the reel is locked hydraulically.





Rated flow Flow control adjustment: Relief valve adjustment: Relief valve range: Weight

40 L/min 0-40 L/min 7-250 bar 20-250 bar 3.3kg





V1830 SHUT-OFF VALVE

The V1830 is a two-way design with flow from A to B open in the on position and closed in the off.

It features male threads with 60 degree sealing cones for connection to either rigid or flexible pipe-work.

Typically used to isolate components in a hydraulic circuit.





OFF



Ports Rated flow Internal leakage @210 bar G3/8 27 I/min <2cc/min

Materials

Body Knob Spool Steel zinc plated Thermoplastic Hardened & ground



0.18kg







V2650M FLOW DIVIDER VALVE

The Hy-Pro in-line flow divider valve allows independent control of two hydraulic circuits from one input. The flow is split into a controlled 'Priority' (1) flow to feed one circuit and 'a secondary' (2) flow to feed the other. The priority flow is unaffected by varying pump delivery or pressure changes in either circuit.

Control is either by handwheel (KI) or Screw and locknut (S).







Rated flow

Priority flow maximum Priority flow minimum ΔP inlet to service Maximum pressure Ports

G1/2

0.63 kgs

Weight





PILOT OPERATED CHECK VALVES



V1837	0.28 kg
V1030 M	0.95 kg
V2050 M	1.28 kg



RV40 DIRECT ACTING RELIEF VALVE

The RV40 is a direct acting cartridge valve. It is used in a range of inline mounted manifolds with 3 or 4 G3/8 Ports or as a stand lone cartridge for incorporation in to your manifold. The dual line manifold with two cartridges is commonly used to prevent shock loads in hydraulic motors and equal ended cylinders. Adjustments are made using the cap and lock nut, which can be supplied tamper evident and pre-set if desired.



RV40DSNXXXM4

Performance

Rated flow Max pressure Manifold ports Relief re-seat Range

Installation Torque

Cartridge Lock Nut

Weights

RV40DSNC RV40DSNM2 RV40DSNM3 RV40DSNM4 40 l/min 250 bar G3/8 80% of setting 30-250 bar (ref options) 27 Nm 8 Nm

0.13 kg

0.20 kg

0.22 kg

0.54 kg

0

250

200 150 100 50 10 10 20 30 40 FLOW L/min



RV40 DIRECT ACTING RELIEF VALVE



'XXX' = relief valve setting in bar

RV40DSNXXXM2

RV40DSNXXXM3

RV40DSNXXXM4







А

в













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25.1

7/8" A/F HEX

RV60 DIRECT ACTING RELIEF VALVE

The 60 L/min relief valve is a fast acting direct acting cartridge valve. It is used in a range of inline mounted manifolds with 3 or 4 G1/2 Ports or as a stand lone cartridge for incorporation in to your manifold. The dual line manifold with two cartridges is commonly used to prevent shock loads in hydraulic motors and equal ended cylinders. Adjustments are made using the socket screw and lock nut, which can be fitted with an optional tamper evident cap.

Alternatively a hand wheel adjuster can be specified.



RV60DSNXXXC



RV60DSNXXXM3



RV60DSNXXXM4




RV60 DIRECT ACTING RELIEF VALVE



162.4



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RV60 PILOT OPERATED RELIEF VALVE

The RV60P is a pilot operated relief valve cartridge. They can be used in the Hy-Pro range or V4-40 and V5-60 sectional valves or as an inline valve with a manifold. Two relief valves together in a manifold give dual line relief commonly used to prevent shock loads in hydraulic motors and equal ended cylinders.



RV60PSNXXXC



RV60PSNXXXM3



Performance 60 L/min Rated flow Max pressure 250 bar 250 20 to 250 bar Range 63 bar per turn Rate 200 Manifold ports G1/2 150 Installation Torque BAR Cartridge 27 Nm 100 Lock Nut 8 Nm 50 Weights **RV60PSNC** 0.13 kg RV60PSNM3 0.44 kg 10 20 40 0 30 RV60PSNM4 0.73 kg





RV60 PILOT OPERATED RELIEF VALVE



'XXX' = relief valve setting in bar



RV100 PILOT OPERATED RELIEF VALVE

The RV100 relief valve is a very reliable, pilot operated cartridge valve, with excellent repeatability. Available as a cartridge to fit a standard Hy-Pro cavity or in a range of single and twin cartridge manifolds. The twin cartridge, 4 ported manifold is commonly used to prevent shock loads in hydraulic motors and equal ended cylinders.



RV100PSNXXXC



RV100PSNXXXM3



RV100PSNXXXM4

100

Performance Rated flow Max pressure Manifold ports Adjustment	100 L/min 250 bar G3/4 70 Bar/turn	250			→ 						
Installation Torque Cartridge Lock Nut	27 Nm 8 Nm	200 150									
Weights RV100 PSNXXXC RV100PSNXXXM3 RV100PSNXXXM4	0.19 kg 0.64 kg 1.23 kg	20 100 50	20	3	0	4	0	6	60	8	30
	5						FLOW	/ L/mii	n		



RV100 PILOT OPERATED RELIEF VALVE



'XXX' = relief valve setting in bar



FC60 & FC100 FLOW CONTROL VALVES

Option	Code
60 L/min	FC60
100 L/min	FC100
Hand wheel	K
Screw adjust	S
Standard metering	-
Fine metering	F
1 Turn metering	L
Setting	RXXX*



*XXX = Relief valve setting in Bar



Performance

Flow	FC60	0-60 L/min
Range	FC100	0-100 L/min
Relief Va	live Range	20-250 bar
ΔP Inlet t	to service	6.9 bar
Max pres	sure	250 bar
Max back	k pressure bar	25
Pressure	port	G3/4
Service p	ports FC60	G1/2
Service p	ports FC100	G3/4
Weight		1.5kg





LINE MOUNTED PROPORTIONAL FLOW DIVIDER





G3/8 ROTARY DIVERTER VALVES







Performance Ports Rated flow ∆P at rated flow Maximum pressure	G3/8 27 I/min 1.7 bar 210 bar
Weights Three port Four port	1.14 kg 1.03 kg





MOTOR REVERSING VALVE



Performance

Ports G3/8 Maximum pressure 210 bar

Weights

Including sub plate 1.85kg





G1/2 6 PORT DIVERTER VALVE



Rated flow60 L/minMaximum pressure250 barPortsG1/2Spool Leakage 25°C<10cc/min at 210bar</td>

Weight

2.1 kg





G1/2 6 PORT SOLENOID DIVERTER VALVE

The 6 port diverter valve is available with either solenoid or manual control. The manual version is available with either detent or springcentred spool control. A further option is the fitment of a micro-switch.

Both versions can be fitted with a pilot operated check valve acting on the E and F ports. Please contact us for details. **Option** 12 VDC 24 VDC

Code

12

24











Performance

Rated flow Maximum pressure Ports Spool Leakage @25°C

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Coil

Voltage Power Voltage Connection Protection **Weight** 60 l/min 210 bar G1/2 <10cc/min at 210 bar

12 or 24 VDC 60 Watts 12 or 24 VDC ±10% DIN43650 IP54 3.5 kg





V1836 CROSS LINE RELIEF VALVE







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About Hy-Pro

Our in-house design and technical teams offer the expertise and support expected of an established world-class manufacturer. Our customers, ranging from the agricultural, transport, rail, fishing, construction and industrial sectors, expect named personal support, excellent quality and a rapid service with full back-up...we aim to deliver in full.

Call us today to discuss a bespoke solution from our extensive range or simply for competitively priced spares.

Full technical details of our entire range are available to download from our website

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