

Hydraulics

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Eaton®
Directional Control Valves

March 1996



Models 31920 and 31930
with Pilot Operated Checks

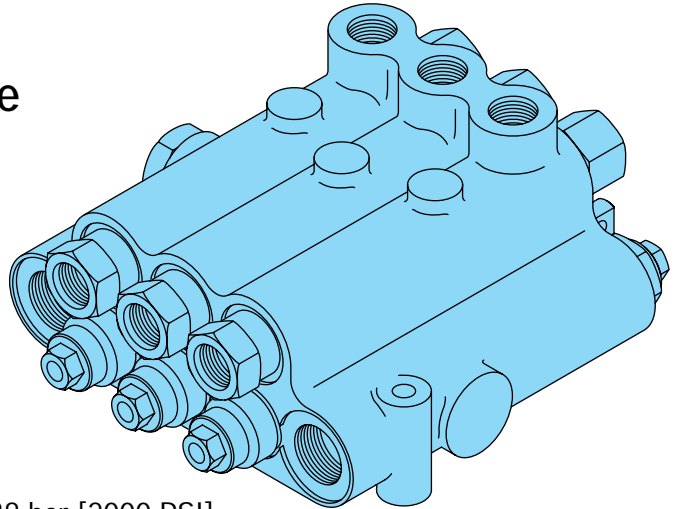
We Manufacture

Solutions

Features and Specifications

Eaton 5 GPM Directional Control Valve with Internal Pilot Operated Checks

Model 31920 with Relief Valve
 Model 31930 without Relief Valve



Standard Features

- Internal Pilot Operated Check at Each Work Port
- Cast Iron Bodies
- Cored Internal Passages
- Adjustable Pin Type Relief Valve, Factory Set at 138 bar [2000 PSI]
- Open Center Parallel Circuit Design
- Precision Ground Induction Hardened Spools with Chrome Plating on Exposed Ends
- 4-Way – 3 Position Vented Spools, Spring Centered to Neutral
- 3/4-16 SAE Inlet and Return Ports
- 9/16-18 SAE Work Ports
- Work Ports Accept 16097 or 16166 Orifice Plates (see Catalog 11-502)
- Body Bored for Pressure Beyond and Plugged

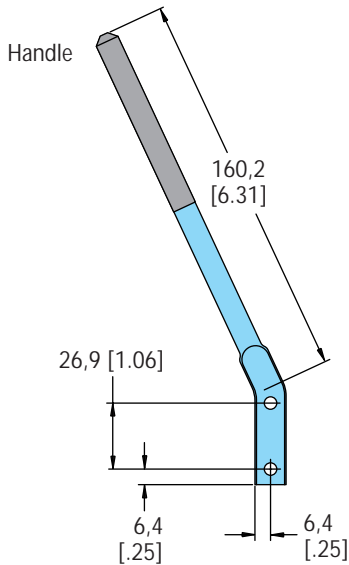
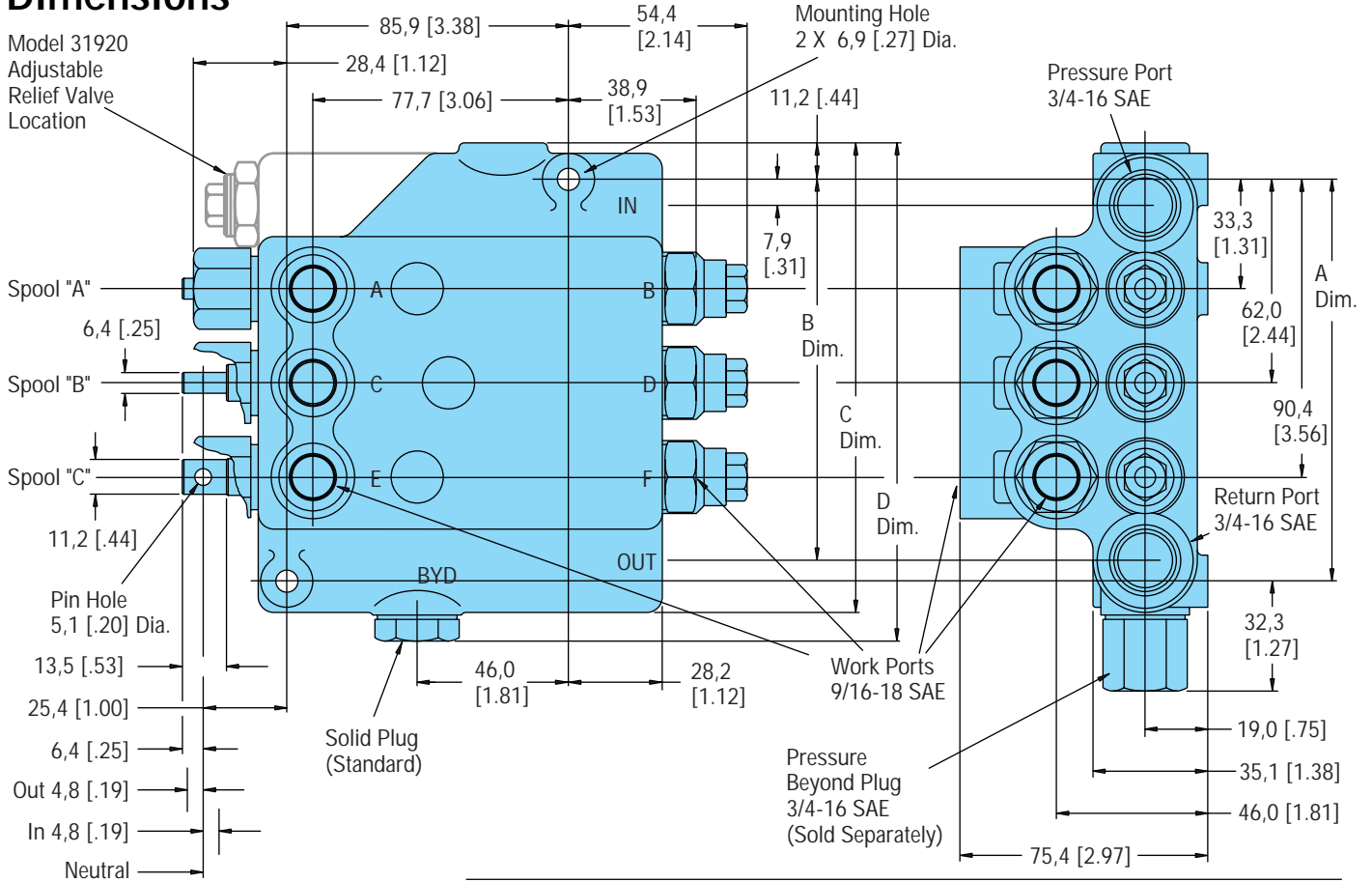
Specifications

Inlet Flow Rate 18,9 L/min. [5 GPM]
 Rated Pressure 172 bar [2500 PSI]
 Maximum Pressure 207 bar [3000 PSI]
 Standard Relief Valve Pressure Setting 138 bar [2000 PSI]
 Maximum Work Port Leakage at 5,2 bar [75 PSI] 0,8 mL/min. [.05 in³/min.]
 Maximum System Temperature 107° C [225° F]

Standard Catalog Assemblies

	Single Spool	Two Spool	Three Spool
With 138 Bar [2000 PSI] Relief Valve	31921-DSA	31922-DSA	31923-DSA
Without Relief Valve	31931-DSA	31932-DSA	31933-DSA

Dimensions



Dimension	Single Spool 31921 and 31931	Two Spool 31922 and 31932	Three Spool 31923 and 31933
A	65,0 [2.56]	93,7 [3.69]	122,2 [4.81]
B	58,7 [2.31]	87,4 [3.44]	115,8 [4.56]
C	88,1 [3.47]	116,8 [4.60]	146,0 [5.75]
D	94,5 [3.72]	122,2 [4.81]	151,6 [5.97]

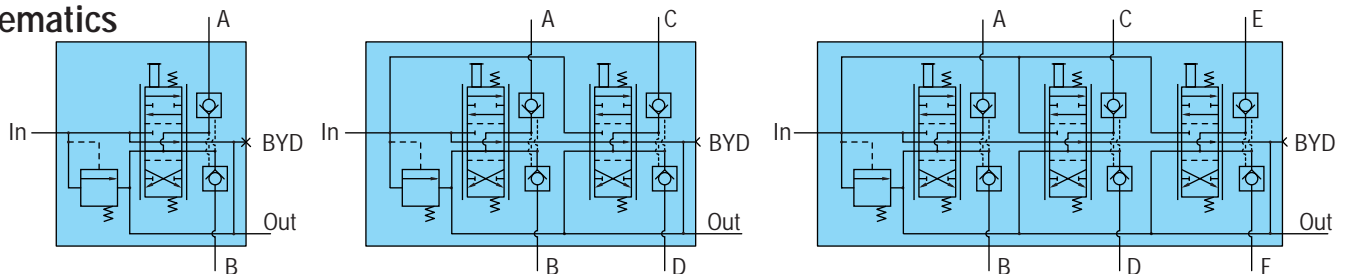
Dimensions in mm [in.]

Approximate Unit Weights

	31920	31930
Single Spool	2,7 [6.0]	2,5 [5.5]
Two Spool	4,1 [9.0]	3,9 [8.5]
Three Spool	5,4 [12.0]	5,0 [11.0]

Weight in Kilograms [Pounds]

Schematics



Options and Performance

Kit	Order Number
Handle Kit	31900-912
(order one kit for each spool)	
Pressure Beyond Plug	
9/16-18 SAE	31900-321
3/4-16 SAE	31900-341
Closed Center Plug	31900-319
Detent Kits	
Detent Out	30931-913
Detent In	30931-914
Detent In and Out	30931-916
Relief Valve Springs (Adjustment Ranges)	
31 - 62 bar [450 - 900 PSI]	17041-22
59 - 76 bar [850 - 1100 PSI]	17042-17
72 - 86 bar [1050 - 1250 PSI]	17046-15
83 - 114 bar [1200 - 1650 PSI]	17044-16
110 - 159 bar [1600 - 2300 PSI] (Std)	17047-31
155 - 172 bar [2250 - 2500 PSI]	17049-36
Seal Repair Kits	
One Spool	30951-900
Two Spool	30952-900
Three Spool	30953-900

- Optional Spool Configurations**
(all spools spring centered to neutral)
- 3 - way, 3 position
(ports "B," "D," and "F" used for 3 - way work ports)
 - 4 - way, 3 position
 - 4 - way, 3 position, detented "in"
 - 4 - way, 3 position, detented "out"
 - 4 - way, 3 position, detented "in" and "out"

• Detented Check Plunger

A detented check plunger is used when a cylinder is to be used in float, and will remain in float even when the spool is returned to neutral. A spring loaded plunger holds the check plunger over, which in turn holds the nylon poppet open, allowing the cylinder to float. The check plunger may be shifted out of the detented position by merely pulling the valve spool "out" to pressurize the open work port.

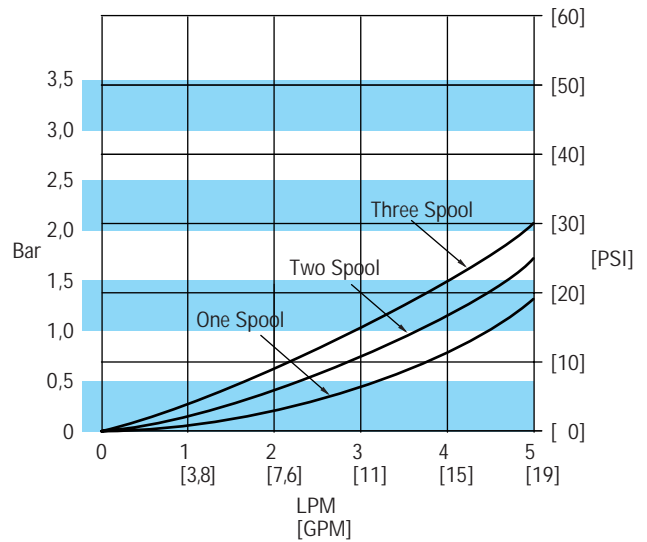
• Single Acting Check Plunger (Special Unloading)

A special single acting unloading check plunger is available which prevents the pump flow from going over system relief each time a single acting cylinder is being retracted and it also provides simultaneous operation of other functions either up or down stream.

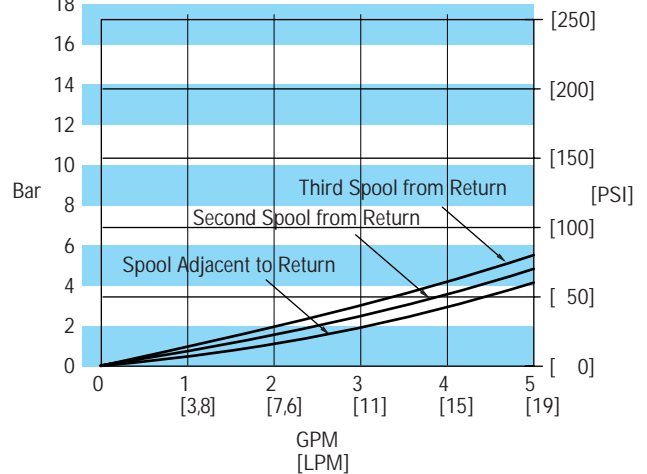
• Adjustable Spool Travel

A spool travel limit adjusting screw is available to limit the spool "In" or spool "Out" travel. This allows the raising or lowering speed of a cylinder to be adjusted without the use of orifice plates.

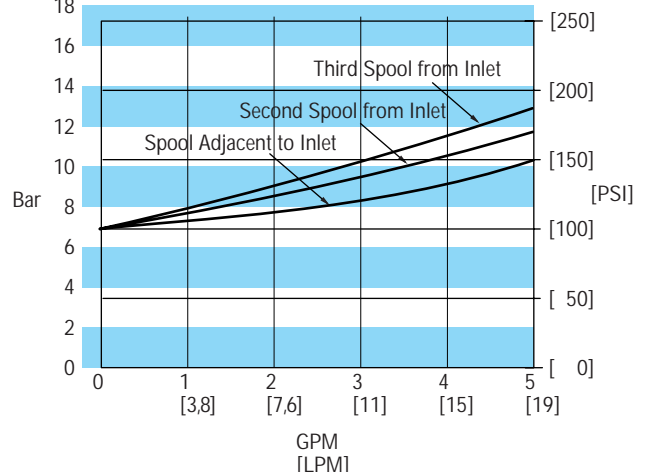
Neutral Flow Pressure Drop



Work Port Pressure Drop Flow: Work Port to Return

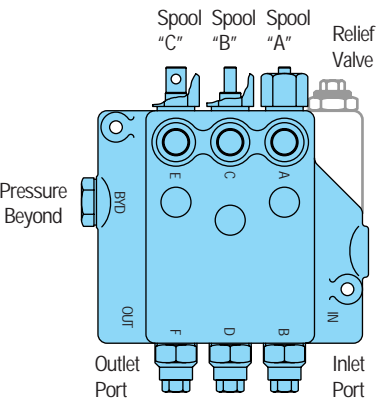


Work Port Pressure Drop Flow: Inlet to Work Port



Tests performed with oil viscosity 150 SUS at 37.7° C [100° F] – oil temperature 54.4° C [130° F].

31920 and 31930 Directional Control Valve Special Order Form

Valve Outlet Port Side	Body Plugs	Spool Options	Spool "C"	Spool "B"	Spool "A"	System Relief Valve	Valve Inlet Port Side
Return Port 3/4-16 SAE (Standard)	<input type="checkbox"/> None	3 - way, 3 position (ports "B," "D" and "F" used for 3-way work ports)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> No Relief Valve	Pressure Port 3/4-16 SAE (Standard)
	<input type="checkbox"/> Solid Plug (Standard)	4 - way, 3 position	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inlet GPM _____	
	<input type="checkbox"/> Pressure Beyond 9/16-18 SAE 31900-321	4 - way, 3 position, detented "in"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pressure Setting _____	
	<input type="checkbox"/> Pressure Beyond 3/4-16 SAE 31900-341	4 - way, 3 position, detented "out"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/> Closed Center 31900-319	4 - way, 3 position, detented "in" and "out"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		Detented check plunger 3 - way	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Valve Orientation 		Adjustable spool travel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Originator _____	Date _____
		Unloading check plunger 3 - way	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Application _____	
		Handles (handle kits, 31900-912, are shipped with valves but not assembled on valve)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Engineer Approval _____	
		16097 Drop-in orifice plates (designate port, orientation, and orifice size)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Customer _____	
		16166 Threaded orifice plates (designate port, and orifice size)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Customer Part No. _____	
						Eaton Part No. _____	

Product Catalogs

To order catalogs, call your Eaton representative

- | | |
|--|---|
| 11-104 - Char-Lynn Hydraulic Motors, J Series | 70422, 70423 and 70523 |
| 11-107 - Medium Duty Piston Motors, Models 74111, 74118, 74318 and 74348 | 11-605 - Gear Pumps, L2 Series Model 25500 through 25508 |
| 11-111 - Char-Lynn Hydraulic Motors, W Series | 11-606 - Medium Duty Piston Pumps, Model 70142/70144 and Model 70145 Variable Displacement Pump |
| 11-112 - VIS Hydraulic Motors | |
| 11-301 - Power Steering, Char-Lynn, 2 Series | 11-609 - Gear Pumps, 26 Series Model 26000 |
| 11-302 - Char-Lynn Torque Generator, 217 Series and 227 Series | 11-700 - Cylinders, Wyr-Loc, Model 580 |
| 11-303 - Power Steering, Char-Lynn, 20 Series | 11-866 - Heavy Duty Hydrostatic Transmissions, Models 33 - 76; Includes description of Pump and Motor Controls |
| 11-500 - Directional Control Valves, Model 31920 and 31930 | |
| 11-501 - Directional Control Valves, Models 31520 and 31530 | 11-872 - Char-Lynn Power Steering - 3,6,12, 4, 110, 230, 450, 25, and 40 Series; Includes Priority Valves, Cushion Crossover Relief Anticavitation Valves, Inlet check Valve, Steering Columns, Steering Wheels, Sizing and Application |
| 11-503 - In-line Self-Level Valves, Model 39055 | |
| 11-504 - In-line Flow Control Valves, Part no. 32604 | 11-878 - Char-Lynn Disc Valve Hydraulic Motors, 2000, 4000, 6000 and 10000 Series |
| 11-506 - Directional Control Valves, Model 30540 | |
| 11-507 - Directional Control Valves, Model 30920 and 30930 | 11-879 - Hydraulic Motors, ME Series |
| 11-508 - Priority, Proportional, Variable Priority and Load Sensing Priority Flow Dividers | 11-880 - Light Duty Hydrostatic Transmission, Model 6, 7, 11 and Model 11 Pump |
| 11-509 - Manually Operated Selector Valves | 11-882 - Controls for Model 33 through 76 Hydrostatic Transmissions |
| 11-510 - Relief Valve Assemblies and Cartridges | 11-885 - Char-Lynn General Purpose Hydraulic Motors, H, S and T Series |
| 11-600 - Medium Duty Piston Pumps, Model 70342 and 70344 | 11-888 - Hydrostatic Transaxles, Models 751, 851, 771, and 781 |
| 11-601 - Medium Duty Piston Pumps, model 72400 (Servo Controlled) | 1-144 - Hydraulic Gear Motors, B1 Series Model 21300 |
| 11-603 - Medium Duty Piston Pumps, Model 70122, | 1-406 - Hydrostatic Right Angle Transaxles, Model 778 |

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