

**Eaton®**  
Directional Control Valves



Models 31520 and 31530  
with Pilot Operated Checks

We Manufacture

**Solutions**

**Hydraulics**

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# Hydraulics

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No. 11-501  
March 1991



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Solutions

## Specifications and Ordering Information

# Eaton 15 GPM Directional Control Valve With Internal Pilot Operated Checks

**Model 31520 with Relief Valve**

**Model 31530 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 2000 PSI [138 bar]
- 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
- 7/8-14 SAE Inlet and Return Ports
- 3/4-16 SAE Work Ports
- Body Bored for Pressure Beyond and Plugged

### Specifications

**Inlet Flow Rate** ----- 15 GPM [56.8 L/min.]

**Rated Pressure**----- 2500 PSI [172 bar]

**Maximum Pressure** ----- 3000 PSI [207 bar]

**Standard Relief Valve Pressure Setting** ----- 2000 PSI [138 bar]

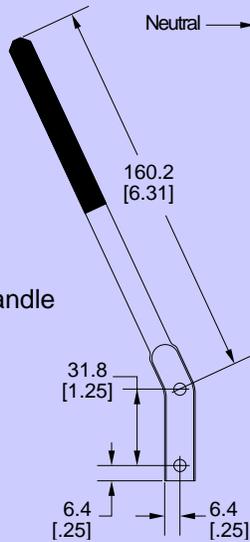
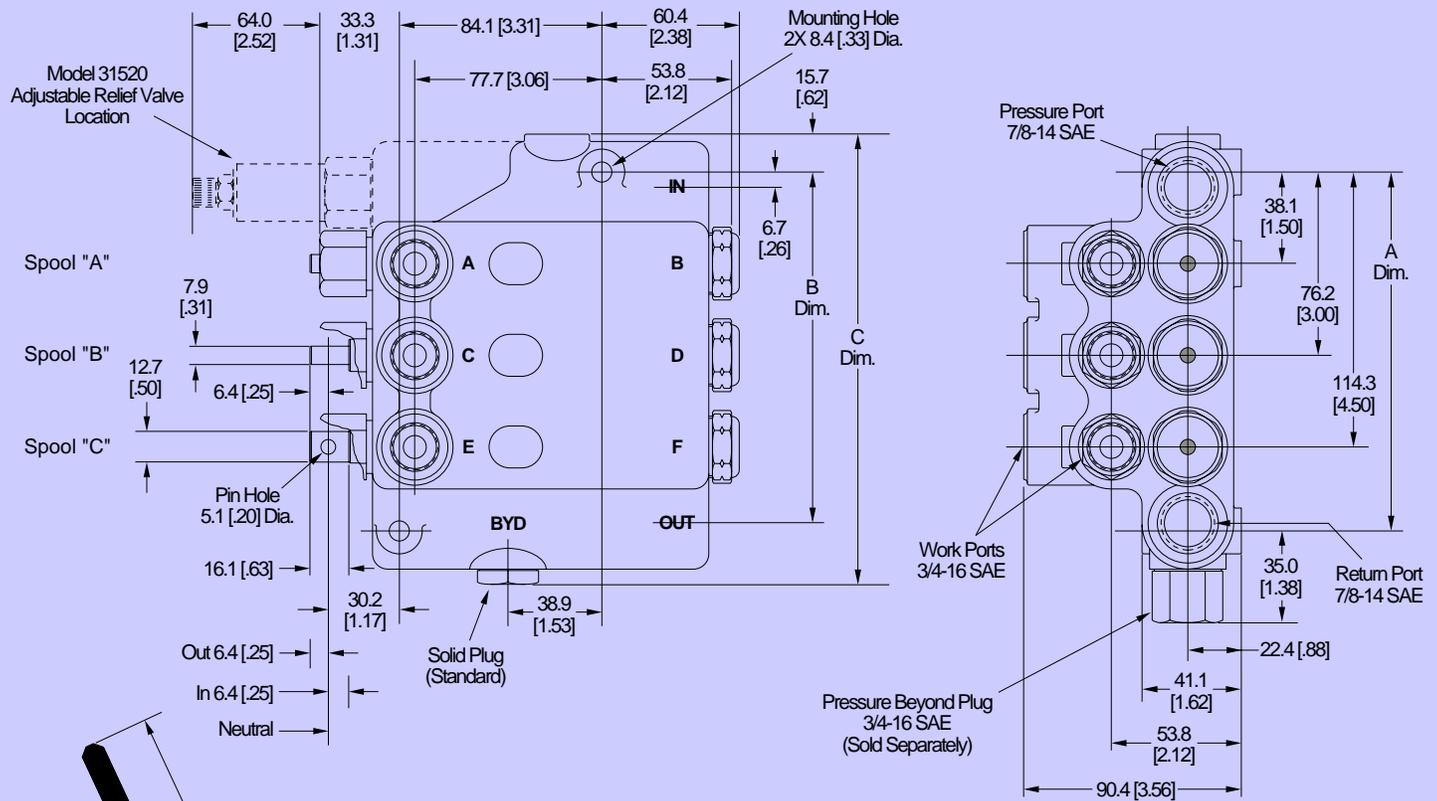
**Maximum Work Port Leakage at 75 PSI [5.2 bar]** --- .05 in<sup>3</sup>/min. [.8 mL/min.]

**Maximum System Temperature** ----- 225° F [107° C]

### Ordering Information

	Single Spool	Two Spool	Three Spool
With 2000 PSI Relief Valve	31521-DSA	31522-DSA	31523-DSA
Without Relief Valve	31531-DSA	31532-DSA	31533-DSA

# Dimensions



Dimension	Single Spool 31521 & 31531	Two Spool 31522 & 31532	Three Spool 31523 & 31533
A	73.2 [2.88]	111.3 [4.38]	149.4 [5.88]
B	70.2 [2.76]	108.3 [4.26]	146.4 [5.76]
C	109.5 [4.31]	147.6 [5.81]	185.7 [7.31]

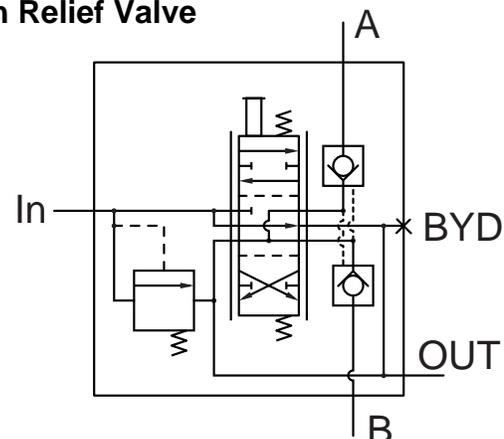
Dimensions in mm [in.]

## Approximate Unit Weights

	31520	31530
Single Spool	4.1 [9.0]	3.4 [7.5]
Two Spool	6.4 [14.0]	5.9 [13.0]
Three Spool	8.6 [19.0]	8.1 [18.0]

Weight in Kilograms [Pounds]

## One Spool Schematic with Relief Valve



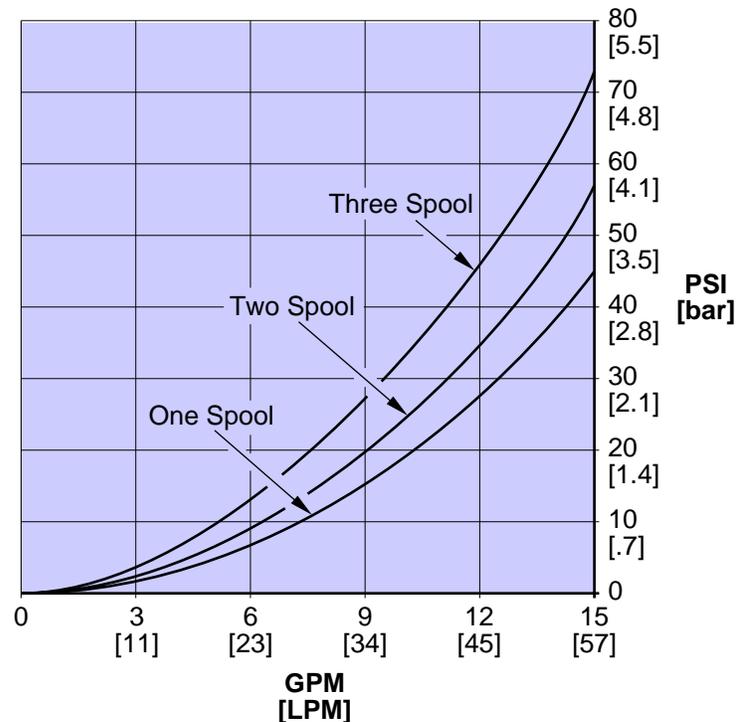
## Option Kits

Kit	Order Number
Handle Kit .....	31500-908
(One Kit per Spool Required)	
Pressure Beyond Plug .....	30501-74
Closed Center Plug .....	30501-96
Seal Repair Kits	
31521-DSA .....	31521-908
31522-DSA .....	31522-913
31523-DSA .....	31523-917
31531-DSA .....	31530-919
31532-DSA .....	31532-902
31533-DSA .....	31530-920
Relief Valve Springs	
1000 - 1500 PSI [69 - 103 bar].....	17060-37
1450 - 2000 PSI [100 - 138 bar].....	17060-38
1950 - 2300 PSI [134 - 159 bar] (Std) ....	17060-39
2250 - 2500 PSI [155 - 172 bar].....	17060-40

Work Ports Accept 16097 and 16166 Series Orifice Plates. See Orifice Plate Catalog Sheet Form No. 11-502.

## Performance Curve

### Neutral Flow Pressure Drop



Test performed with oil viscosity 150 SUS @ 100° F [37.7° C] – oil temperature 130° F [54.4° C]

## Special Order Features

(For Additional Information Contact Your Eaton Area Representative)

### 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.

### Circuit Relief Check Plunger

The circuit relief check plunger is used with a single acting cylinder where full system pressure is not required to operate the cylinder. The pressure ranges of the circuit relief plunger are from 125 PSI up to a maximum of 1100 PSI. The circuit relief plunger is used in conjunction with a special orifice spool designed to limit the flow through the relief valve to a maximum of 2 GPM.

### Special Design Four-Way Spool

This Spool is designed with special metering notches which are used to actuate a small displacement double acting cylinder where precise metering is necessary. This spool is used in combination with a special double acting check plunger which has a very small drain hole bored through the center to relieve any internal high pressure leakage.

### 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.

**Notes:**



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Information contained in this catalog is accurate as of the publication date and is subject to change without notice. Performance values are typical values. Customers are responsible for selecting products for their applications using normal engineering methods.

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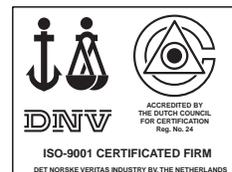
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