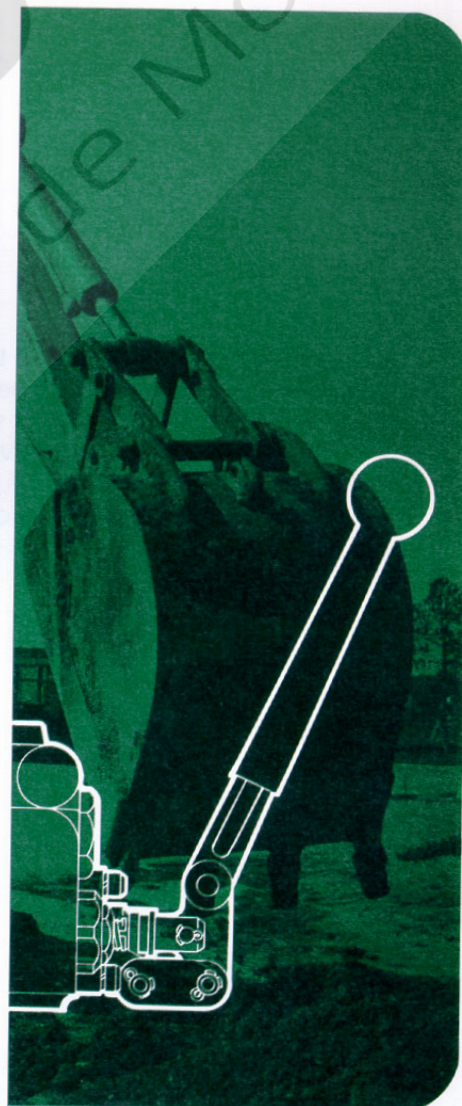
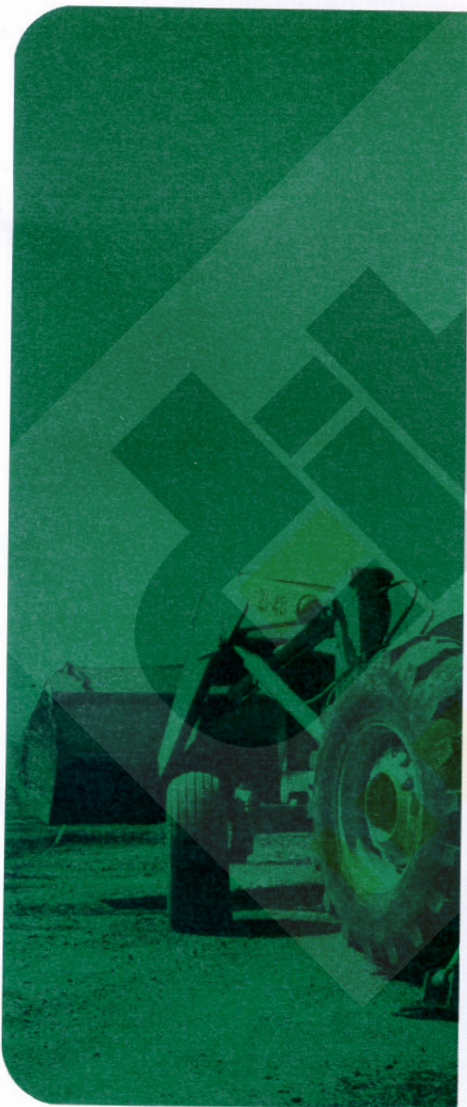


GRESEN®

MODEL V20 DIRECTIONAL CONTROL VALVE

**20 GPM (Nominal)
3500 PSI**

**For Open Center, Closed
Center and Load Sensing
Type Systems**



GRESEN[®]

...a leader in the hydraulic components industry, provides the combined benefits of their years of experience and present-day technological research and development.

Dana provides a full range of products for all equipment applications... industrial
...mobile... agricultural... plus a fully-trained staff of factory and field personnel
ready to provide assistance with any hydraulic problem.

This catalog provides specifications and ordering instructions, complete with drawings
and technical data, allowing you to easily select items that will meet your
specific requirements.

For further information, contact:
Your Gresen Representative or Distributor

HOW TO USE THIS CATALOG

Due to the unlimited combinations of work sections and other valve assembly components, it is difficult to stock an assembly as a "shelf-item." If Dana is to supply the right valve assembly, certain basic information is required that accurately defines the valve required. That basic information is outlined and described in the following pages. If further information is required or if unique Sectional Body Directional Control Valve applications are encountered, contact your Gresen Representative or Distributor.

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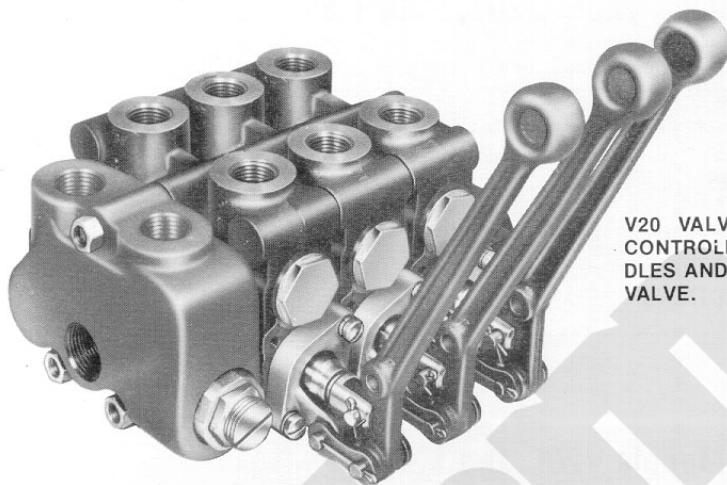
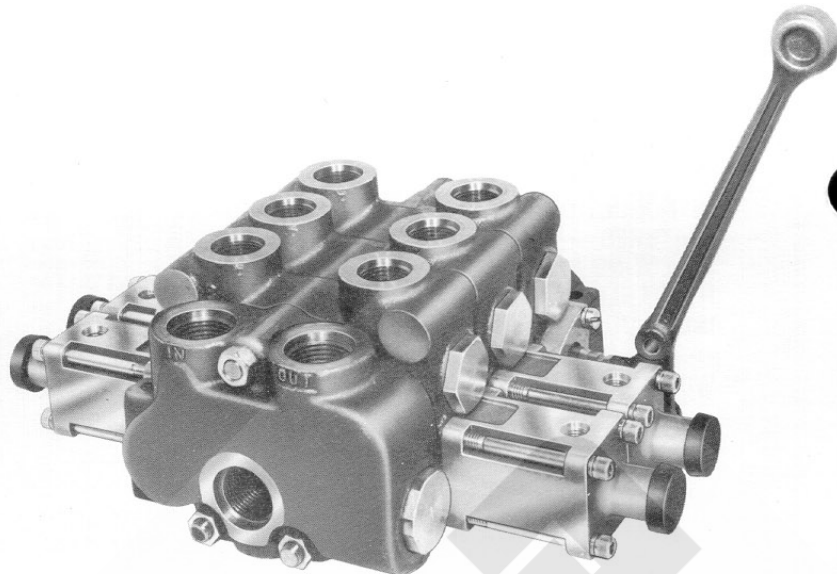
CLOSED CENTER
VALVE ASSEMBLIES

ORDERING

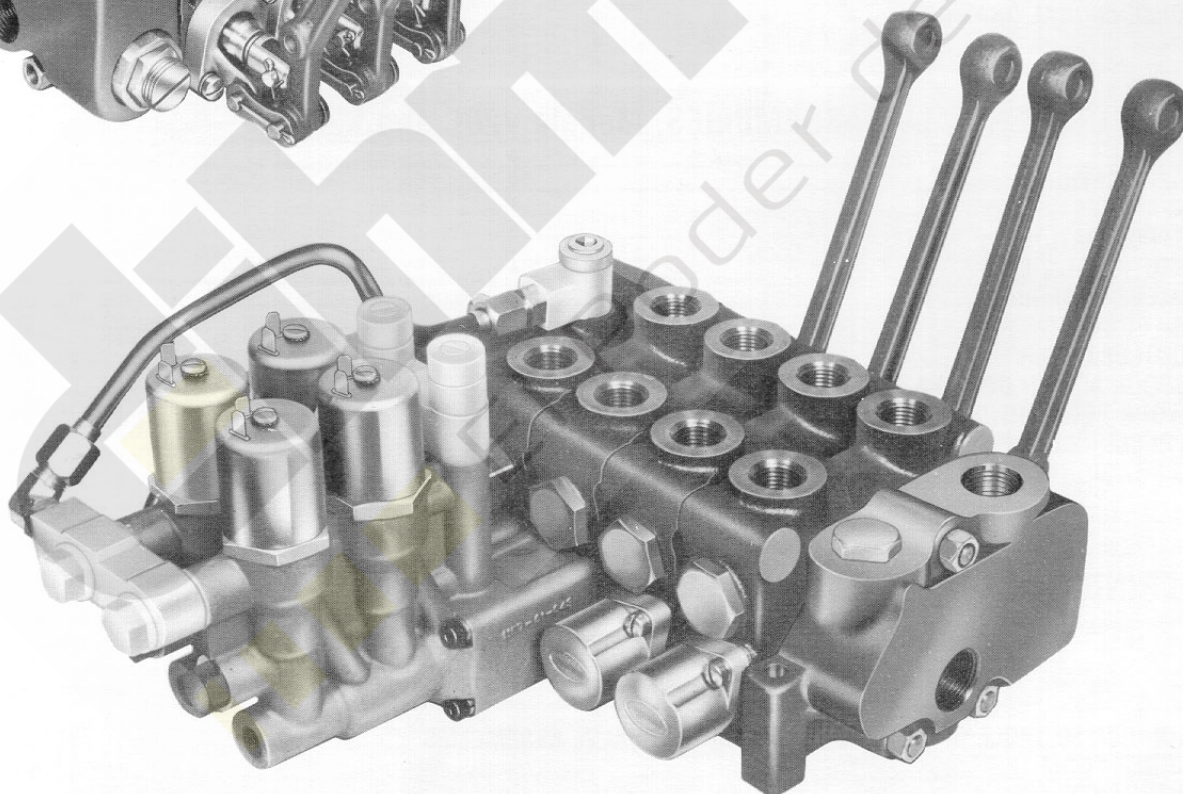
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ORDERING
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V20 VALVE ASSEMBLY WITH TWO HYDRAULIC REMOTE SPOOL ACTUATORS AND ONE MANUALLY CONTROLLED SECTION.



V20 VALVE ASSEMBLY, MANUALLY CONTROLLED WITH VERTICAL HANDLES AND ADJUSTABLE MAIN RELIEF VALVE.



V20 VALVE ASSEMBLY WITH TWO SOLENOID CONTROLLED SECTIONS AND TWO MANUALLY CONTROLLED SECTIONS.

INTRODUCTION

Directional Control Valves . . . start, stop and direct fluid flow. They control extension and retraction of cylinders, rotation of fluid motors and actuators, and sequence other circuit operations.

Gresen offers two basic types of body designs . . . the Monoblock which has all component parts in one single casting . . . and the Sectional Body design.

Sectional Body Valves . . . consist of one or more complete work sections with end covers. The entire assembly is bolted together to form a complete Sectional Body Directional Control Valve. A variety of work sections, spools, and spool actions, end covers and relief combinations are available to provide the exact type of valve assembly required for any given application whether mobile, industrial or agricultural.

Gresen's Model V20 Directional Control Valve is available for parallel, tandem, combined parallel/tandem and series hydraulic circuit applications, up to 3500 PSI [242 bar] continuous operating pressure. Its new spool design has resulted in lighter spool actuating effort making its finger-tip touch and extra-fine metering characteristics ideal for back hoe, front end loader and personnel lift applications. This sensitivity also gives the design engineer a wider latitude of mechanical linkage possibilities.

Service or conversion is simple since individual sections can be added, removed or replaced in the field. Individual service or field conversion sections, rather than complete valve assemblies, can be stocked thus reducing inventories.

FEATURES

Exact Work Port Control . . . is achieved with smooth, positive metering valve spools. Spools are precisely hone-fitted to a matching work section for excellent spool-hold characteristics giving minimum load "leak down."

Built-In Safety . . . Hydraulic system and equipment protection incorporated at each work port eliminates need for any additional external plumbing. Main relief valves, work port relief valves, anti-cavitation checks and work port restrictors are available for safety, equipment protection and positive control.

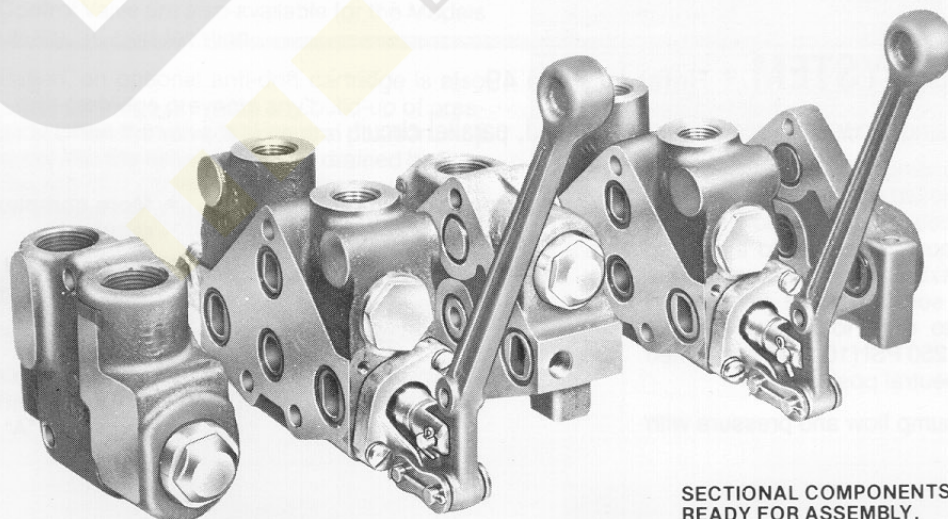
Construction . . . All valve housings are made of ductile cast iron for durability and resistance to shock loads.

Spools are hard, chrome-plated for long life and resistance to corrosion. All spools are select hone-fitted for minimum internal leakage and maximum load-holding ability.

Seal Compatibility . . . All standard Gresen products utilize BUNA-N seals which are compatible with petroleum base, water-in-oil emulsions, and water-glycol fluids. Phosphate ester type fire-resistant fluids will cause BUNA-N seals to swell. This swelling is not normally detrimental to static seals, but will be a problem for dynamic seals such as valve spool seals. Swelling of these seals can result in binding spools. The temperature range of BUNA-N seals is -40°F [-40°C] to $+200^{\circ}\text{F}$ [$+93^{\circ}\text{C}$] for continuous operation.

VITON seals are recommended for most applications that use phosphate-ester type fluids. VITON seals are also recommended for applications that have a continuous operating temperature of $+200^{\circ}\text{F}$ [$+93^{\circ}\text{C}$] or more. VITON seals are available for Model V20 valves.

Due to the large number of hydraulic oil manufacturers, and the increasing availability of oil under various brand names, we recommend the customer consult his fluid manufacturer regarding compatibility . . . or test to his own satisfaction.



SECTIONAL COMPONENTS OF A MODEL V20 VALVE
READY FOR ASSEMBLY.

SELECTING A V20 VALVE

Gresen's V20 Directional Control Valves are offered in six different models and are grouped into two basic systems . . . **open center** and **closed center**. This catalog has grouped these two systems, each into its own section. Full description and specifications for these Valves will be found in their respective sections. To order your V20 Valves, you must first determine which system will be best for your application.

ADVANTAGES

DISADVANTAGES

OPEN CENTER SYSTEM • Refer to Page 23

Model V20P Parallel Circuit • **Model V20T** Tandem Circuit • **Model V20PT** Parallel/Tandem Circuit • **Model V20S** Series Circuit

Hydraulic oil is directed from the inlet port, thru the open center core to the outlet port of the Directional Control Valve when all spools are in the neutral position. Shifting the valve spool directs oil flow to the desired work port.

Maximum circuit pressure is limited by the main relief valve, which relieves into the exhaust core.

In a neutral position, open center systems operate at full flow and at low pressure.

- Requires simpler, fixed displacement pumps
- Lower initial cost
- Components more readily available

- Limited metering capability
- Lower overall efficiency
- Limited simultaneous operation of different functions

CLOSED CENTER SYSTEM • Refer to Page 49

Model V20C Constant Pressure-Parallel Circuit

The Model V20C work section has no open center core. Pump flow is blocked by the valve when the valve spool is in neutral position. Shifting the valve spool directs the oil flow to the desired work port.

A pump that varies the output flow and maintains a predetermined output pressure is required for this type of circuit. Closed center systems typically operate at minimum flow and at high pressure standby when the valve spool is in the neutral position. The only flow required is that which will compensate for internal losses or for other system requirements.

- Delivers only the flow required by the function
- Improved metering
- Faster operation

- Remains at high pressure when on standby
- Requires a more complex, variable displacement, pressure compensated pump

LOAD SENSING SYSTEM • Refer to Page 49

Model V20LS Load Sensing, flow and pressure compensated, parallel circuit

The Model V20LS load sensing work section is identical to the Model V20C closed center section except that internal porting has been added to allow a signal from the selected work port to be sent to the pump compensator through an external line. A flow and pressure compensated load sensing circuit permits the pump output pressure to drop to a relatively low standby pressure (150 to 250 PSI [10 to 17 bar]) when the valve spool is in the neutral position.

This system varies both pump flow and pressure with work load demand.

- Improved pump life
- Increased overall efficiency
- Increased metering capability
- More complex pump control required
- External pilot line between valve and pump compensator required.

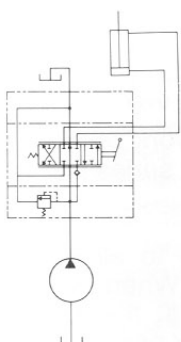
APPLICATION EXAMPLE

Consider an application requiring a maximum flow of 20 GPM [76 litres/min] at a maximum pressure of 2500 PSI [172 bar]. To meet the requirements of the application, the pump must be able to supply maximum flow at maximum pressure when required. However, during most of its operation, it is required to deliver less than its maximum flow at less than its maximum pressure. The way in which the system responds to the reduced-load conditions and the percentage of the total operating time the system will be used under reduced-load conditions should be considered.

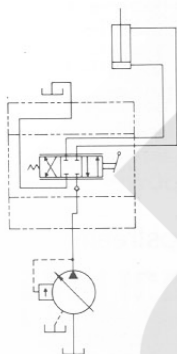
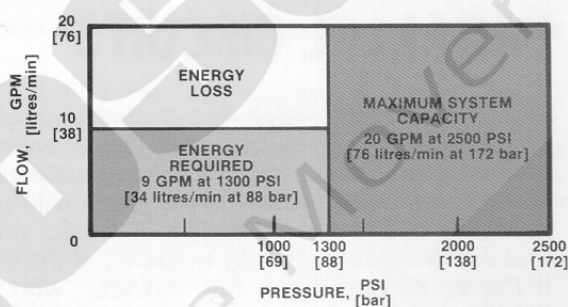
Functions requiring maximum system flow at maximum system pressure will all require approximately the same amount of power, assuming that system components are equivalent in size.

Functions requiring less than maximum flow and pressure best illustrate the advantages of the load sensing system. Consider a function in which a cylinder is to be extended. 1300 PSI [88 bar] is required at a metered flow rate of 9 GPM [34 litres/min].

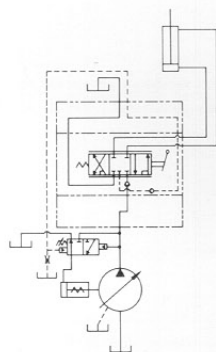
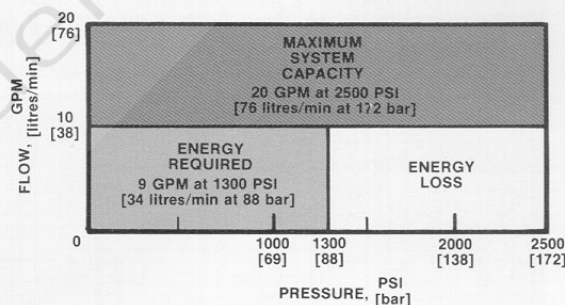
EFFICIENCY



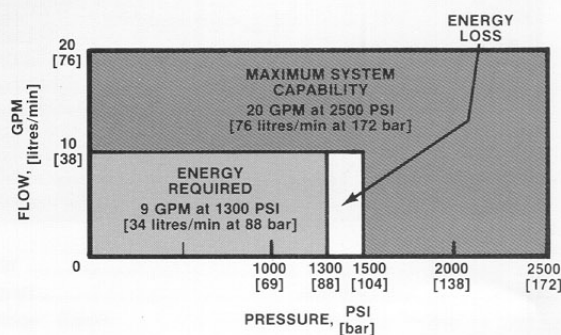
The open center system requires a fixed displacement pump capable of 20 GPM [76 litres/min] and a relief valve set at 2500 PSI [172 bar]. System pressure is determined by load resistance. Therefore, the pump delivers a full 20 GPM [76 litres/min] at 1300 PSI [88 bar] to the control valve. The control valve allows 9 GPM [34 litres/min] to be directed to the cylinder, the remaining 11 GPM [42 litres/min] is directed to the reservoir and its energy lost in the form of heat.



The closed center system requires a variable displacement, pressure compensated pump capable of 20 GPM [76 litres/min] with the compensator set to "destroke" the pump at 2500 PSI [172 bar]. The pump delivers only the required 9 GPM [34 litres/min] to the control valve, but at a pressure of 2500 PSI [172 bar]. Because the cylinder only requires 1300 PSI [88 bar], there is a 1200 PSI [83 bar] pressure drop through the control valve at the 9 GPM [34 litres/min] flow rate. Energy is again lost in the form of heat.



The closed center system with load sensing requires a variable-displacement, pressure compensated pump capable of 20 GPM [76 litres/min] with the compensator set to "destroke" the pump at 200 PSI [14 bar]. As the control valve is shifted to the working position, the pressure within the work port is sensed at the pump compensator. The work port pressure, 1300 PSI [88 bar], is additive to the "destroke" pressure of 200 PSI [14 bar]. Therefore, the pump delivers 9 GPM [34 litres/min] at 1500 PSI [104 bar] to the control valve. There is a 200 PSI [14 bar] pressure drop through the control valve which is lost as heat.

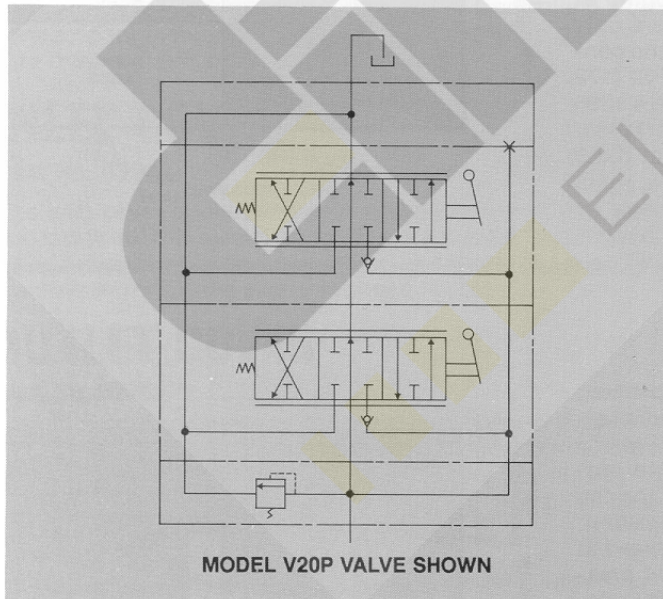


HYDRAULIC CIRCUITS

PARALLEL CIRCUITS

In a parallel circuit valve, two or more spools may be actuated at the same time and the oil will follow the path of least resistance. If a 2-spool valve is used to control two hydraulic cylinders, each with a different load, the cylinder with the lightest load will operate first if both spools are fully actuated at the same time. If the spool controlling the cylinder with the light load is metered (spool not fully actuated), then both cylinders can be operated at the same time.

When a spool is fully actuated, the open center core is blocked and oil is directed into the power core. Oil is then available to the work ports of all sections in the valve assembly.



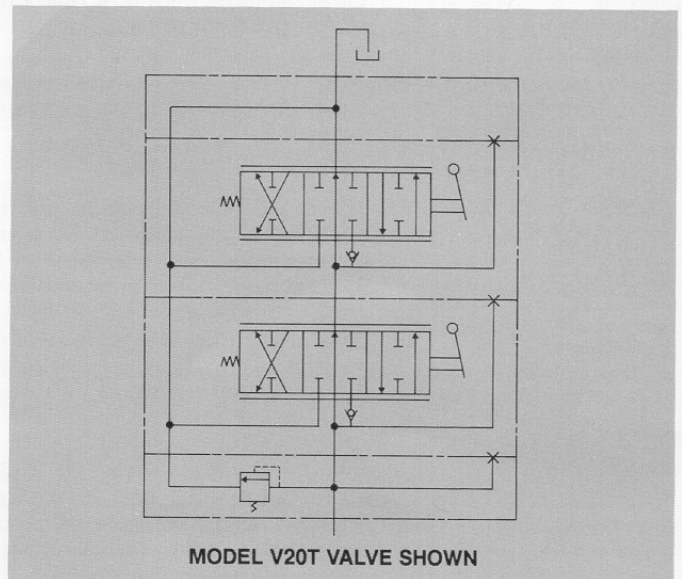
TANDEM CIRCUITS

A valve assembly made up of tandem work sections may be referred to as a priority valve or series parallel valve.

In the neutral position, oil is available to all valve sections through the open center core. When two or more valve spools are fully actuated at the same time, oil will only be available to the work ports of the upstream work section (section closest to the inlet). In a tandem valve, an upstream work section will always have priority over a downstream work section when its spool is fully actuated.

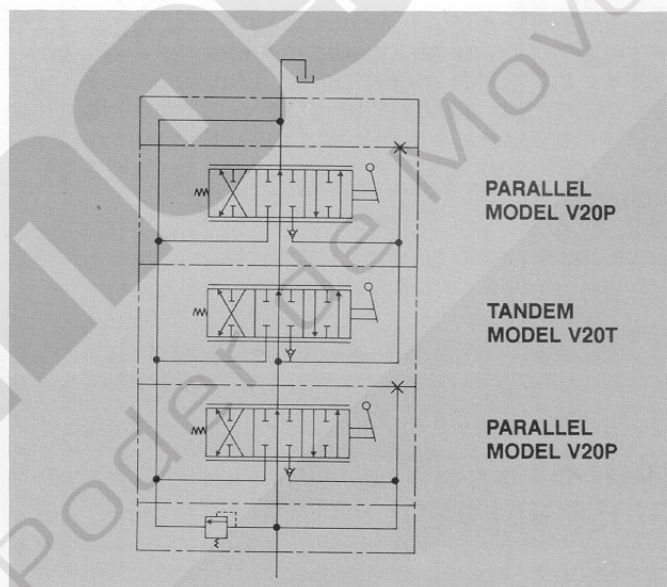
The tandem work section is very similar to the parallel work section with the following exceptions:

1. A passage within the tandem work section connects the open center core with the power core.
2. The power core is blocked on the upstream side of the tandem work section.



COMBINED PARALLEL/TANDEM CIRCUITS

A valve assembly may be made up of any combination of parallel and tandem sections to fit a particular application. In this type of valve assembly, the section upstream from the tandem work section has priority (the tandem section itself does not have priority). The adjacent hydraulic schematic shows a three-work-section valve: the first work section is a parallel valve; the second, a tandem valve; and the third, a parallel valve. Note that in the tandem valve work section the open center core is connected to the power core and the power core from section No. 1 is blocked at the upstream side of the tandem work section. If the spool in section No. 2 is actuated, oil will be available to its work ports. But, if the spool in section No. 1 is fully actuated at the same time, all the oil will go to the work ports of section No. 1. No oil will be available to the second or third work sections.

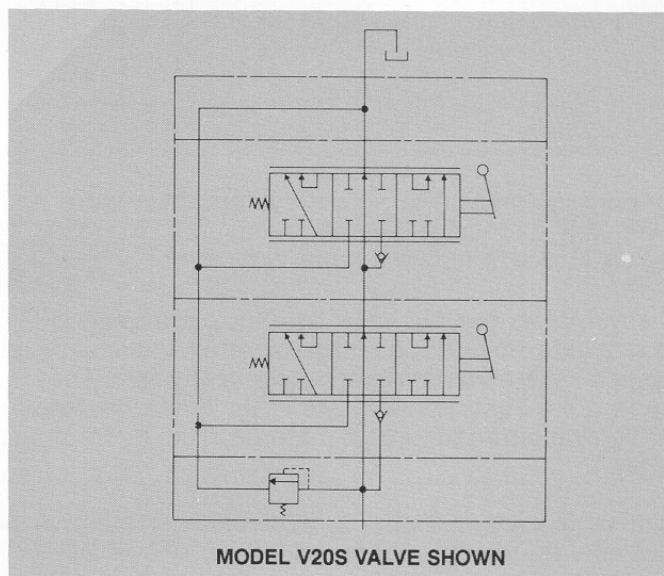


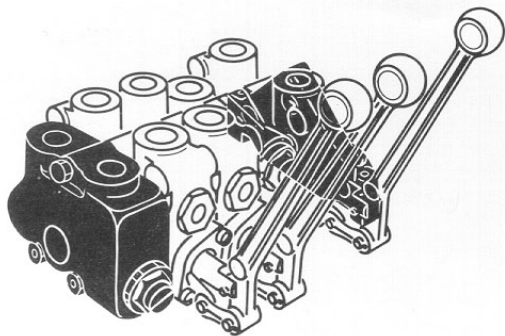
SERIES CIRCUITS

In a series circuit valve, two or more spools may be actuated at the same time. The entire flow of oil is available to each work section in sequence from inlet to outlet port through the open center core. In a 2-spool valve (both spools actuated), oil is directed from the inlet port to a work port of section No. 1. The return oil to work section No. 1 is directed back to the open center core (and not to the tank port as in a parallel valve circuit). The returning oil is then available to section No. 2.

In a series circuit, pressure is additive. That is, the sum of all pressures required by all sections cannot exceed the main relief valve setting or pump pressure capability.

With certain restrictions, Model V20S sections may be intermixed with parallel or tandem work sections in the same valve assembly. Refer to page 38 for V20S stacking sequence restrictions.





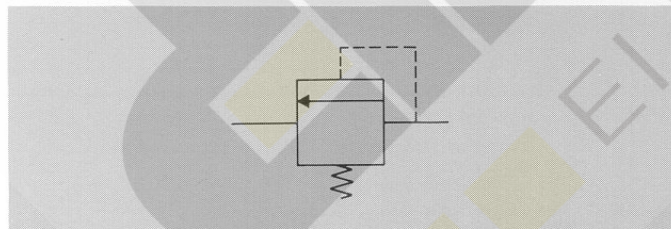
INLET COVERS and OUTLET COVERS

INLET COVERS

Inlet covers are designed to provide a variety of port sizes and locations. This permits valve assemblies to be "customized" using a minimum of external plumbing.

The outlet port may be located in either the inlet (left) cover or the outlet (right) cover. Location must be specified. If the addition of a secondary hydraulic pump is necessary, a mid-inlet conversion section for Model V20P and V20T Valves can be installed between any two work sections, providing an inlet port for the secondary pump (see page 32). Valve inlet covers are machined to accept Model WH or Model RP51 main system relief valve cartridges.

MAIN SYSTEM RELIEF VALVES

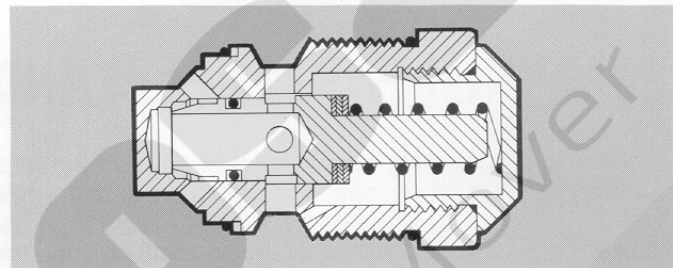


The primary function of a main system relief valve is to prevent excessive system pressures. Normally, this relief valve is installed in the inlet cover.

Relief valves for the V20 Valve Assembly are designed and fabricated in cartridge form to permit easier servicing and allow minimum interchangeability time. They feature quiet operation and are virtually trouble free and highly tolerant of foreign material in the hydraulic system.

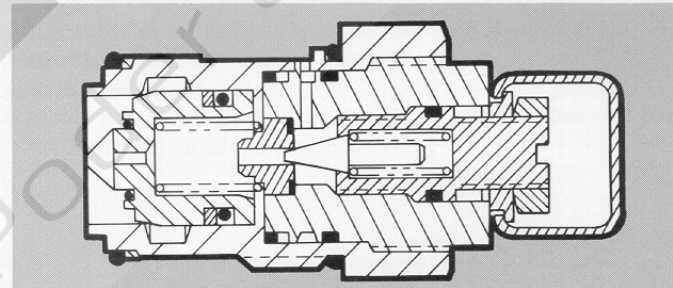
Relief valves are available in adjustable or tamper-proof/non-adjustable configurations.

Model WH-Standard



This unit is shim adjustable with shims within the spring range.

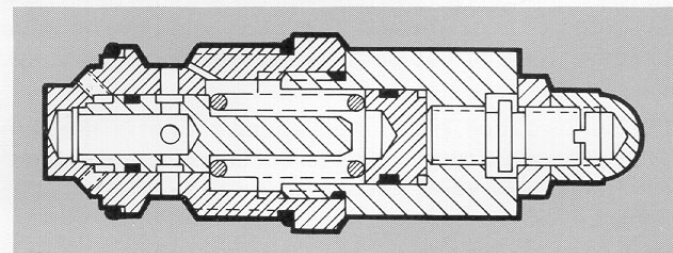
Model RP51 Optional



This relief valve cartridge is a pilot-operated type.

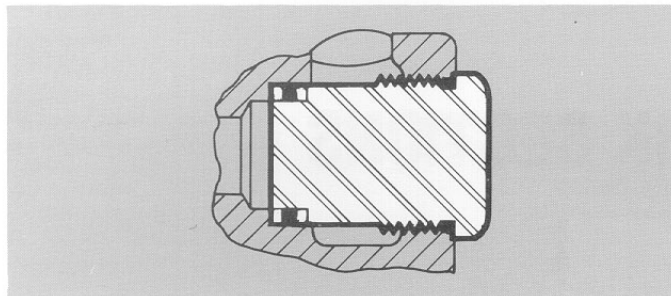
- Model RP51A — externally adjustable
- Model RP51N — tamperproof

Model WHA-Optional



This model is easily adjustable within the spring range.

No Relief Plug, NR, Optional



When a system main relief valve is not required, a "No Relief Plug" is installed in the inlet cover. Cover is machined to accept a Model WH or Model RP51 relief valve if field conversion is required.

2-Stage Relief Valve

A 2-stage relief option is available for Model WH main relief valve cartridges. This option will provide a second (higher) pressure setting when a pilot pressure (750 PSI minimum) is applied to an SAE 6 pilot port in the cartridge. The "high" pressure setting (3000 PSI maximum) is shim adjustable. The "low" pressure setting (500 PSI c/p minimum) is externally screw adjustable and must be specified as a "crack" pressure (1 GPM flow).

OUTLET COVERS

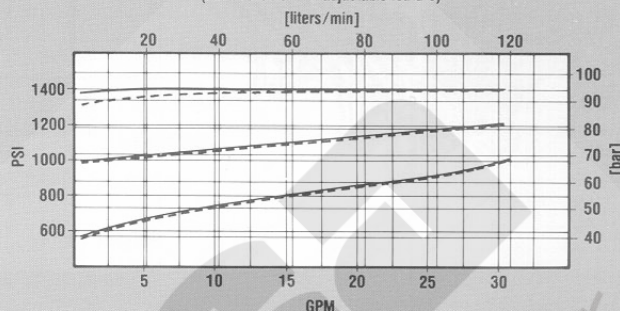
Although the same basic outlet covers are used in all V20 valve assemblies, the available cover options and configurations for open center, closed center, and load sensing type valves are different.

- For Models V20P, V20T, V20PT and V20S, refer to page 25.
- For Models V20C and V20LS, refer to page 50.

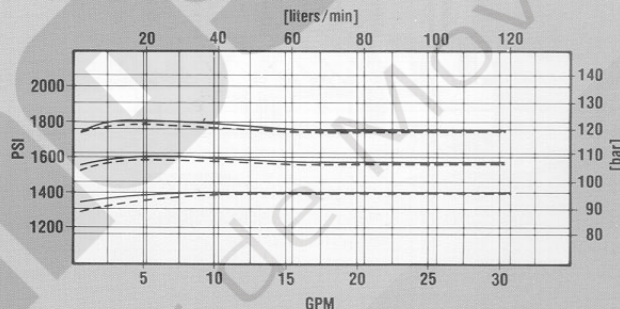
TYPICAL PRESSURE RANGE PERFORMANCE CURVES (150 SUS OIL) MODELS RC and WH RELIEF VALVES

INCREASING FLOW ———
DECREASING FLOW - - - - -

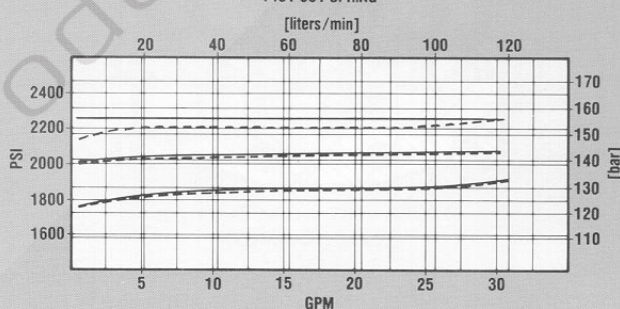
500 PSI TO 1350 PSI [34,50 bar to 93,15 bar] CRACK PRESSURE
1450-001 SPRING
(Not available with adjustable feature)



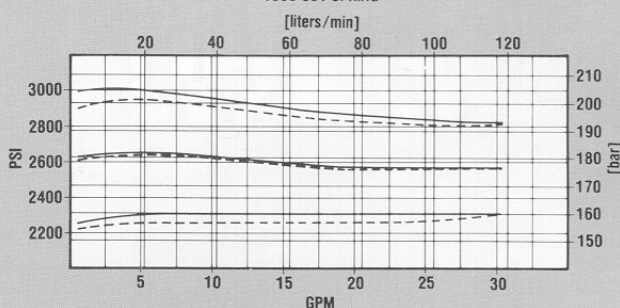
1351 PSI TO 1750 PSI [93,22 bar to 120,75 bar] CRACK PRESSURE
1864-001 SPRING

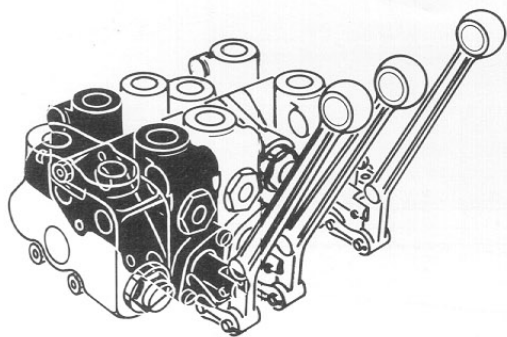


1751 PSI TO 2200 PSI [120,82 bar to 151,80 bar] CRACK PRESSURE
1451-001 SPRING

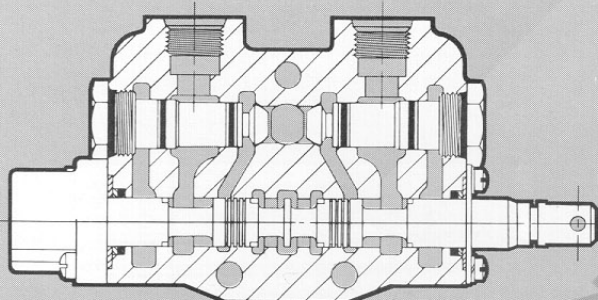


2201 PSI TO 3000 PSI [151,87 bar to 207,00 bar] CRACK PRESSURE
1865-001 SPRING

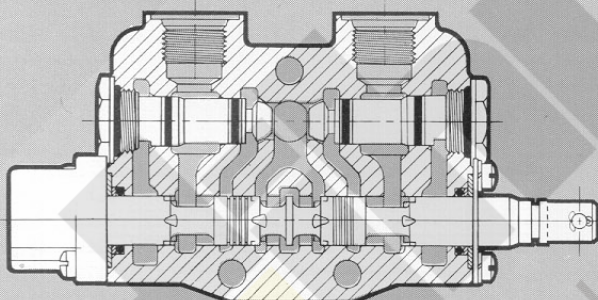




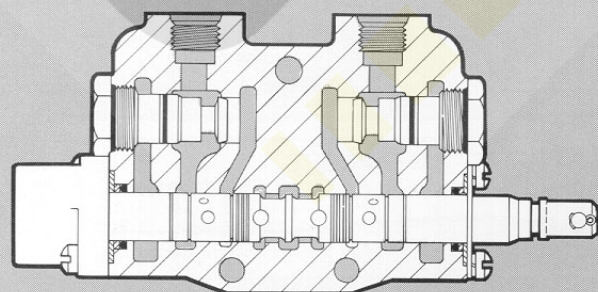
WORK SECTIONS



MODEL V20P WORK SECTION
(8072 HOUSING)



MODEL V20T WORK SECTION
(8112 HOUSING)



MODEL V20S WORK SECTION
(11483 HOUSING)

Work sections in Gresen's Sectional Body Directional Control Valves are precisely machined from high tensile cast iron housings.

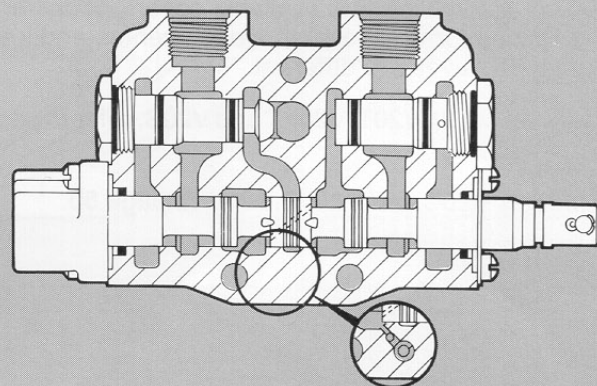
Valve spools may be manually, hydraulically, pneumatically, mechanically or electrically operated. All valve spools are select hone-fitted at the factory for minimum internal leakage and are not field replaceable.

Five types of basic work sections are available:

- Model V20P for open center, parallel circuit applications*
- Model V20T for open center, tandem circuit applications*
- Model V20S for open center, series circuit applications
- Model V20C for closed center, parallel circuit applications
- Model 20LS load sensing, for closed center, parallel circuit applications.

A variety of spools, spool action options and work port options are available for the work sections, depending on the particular application.

*Optional 4-way work sections with reduced open center pressure drop are available for parallel (V20RP) and tandem (V20RT) circuits. These reduced pressure drop sections are interchanged with a standard V20 open center sections and use standard V20 covers. All V20 spools and options are available with these sections. A heavier spool centering spring is required with V20RP and V20RT sections.



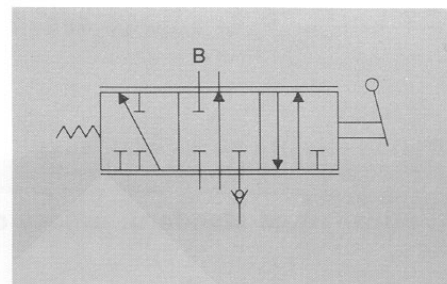
MODEL V20C WORK SECTION
WITH V20LS MODIFICATION
(8364 HOUSING)

SPOOL VARIATIONS

3-Way, 3-Position Spool

Code Symbol 3

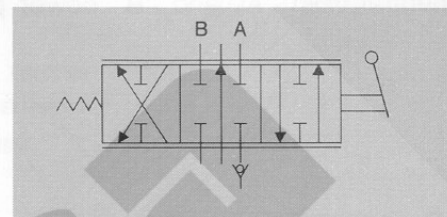
Provides control of single acting cylinders or start and stop of non-reversible hydraulic motors where free-wheeling of motor is not required. The cylinder port is blocked in neutral position.



4-Way, 3-Position Spool

Code Symbol 4

Provides control of double-acting cylinders or reversible hydraulic motors where free-wheeling is not required. Cylinder ports are blocked in neutral position.



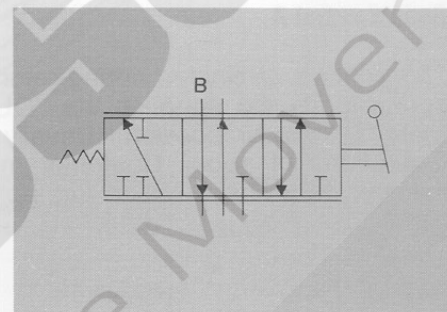
3-Way, 3-Position Free Flow Spool

Code Symbol F3

Provides control of single acting cylinders or start and stop of non-reversible hydraulic motors.

Allows a cylinder to drift or a motor to coast when the valve spool is in the neutral position.

The work port is open to tank port when the spool is in neutral.

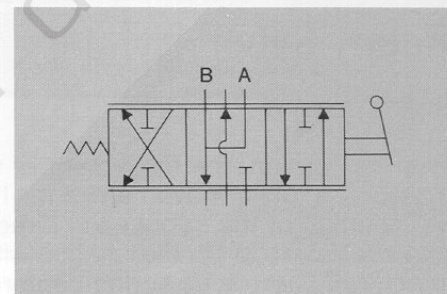


4-Way, 3-Position Free Flow Spool

Code Symbol F4

Provides for control of double-acting cylinders or reversible hydraulic motors.

Free flow spool allows a cylinder to drift or a motor to coast when the valve spool is in the neutral position. Work ports are open to the tank port when the spool is in neutral.



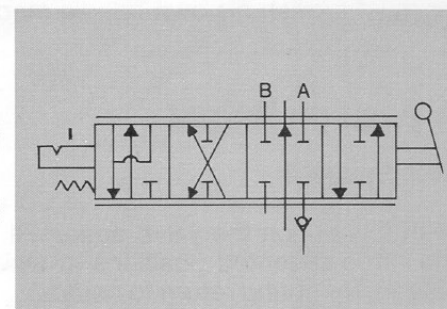
4-Way, 4-Position Float Spool

Code Symbol K4

This spool is the same as the 4-way, 3-position spool, with the addition of a fourth "Float" position.

This spool is spring-centered to neutral from the "A" or "B" work port power position.

Float section may be installed anywhere in the valve stack assembly.



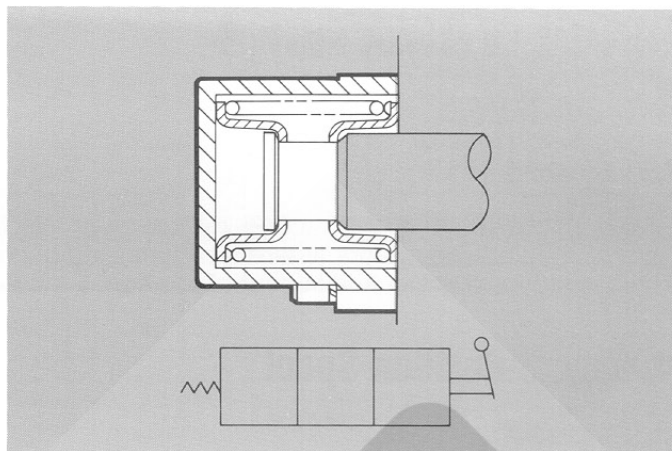
SYMBOLS SHOWN ARE
OPEN CENTER VALVES

SPOOL ACTION OPTIONS

Spring Return to Neutral

(Furnished as standard, unless otherwise specified)

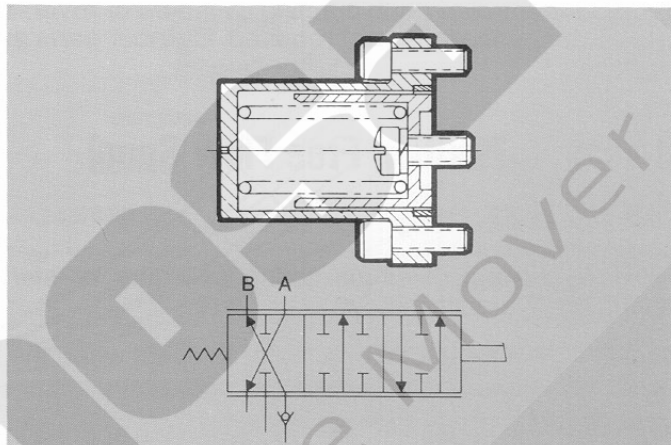
Spool action has three positions with spring return to neutral from "A" and "B" power positions.



Spring Extended Spool

Code Symbol A

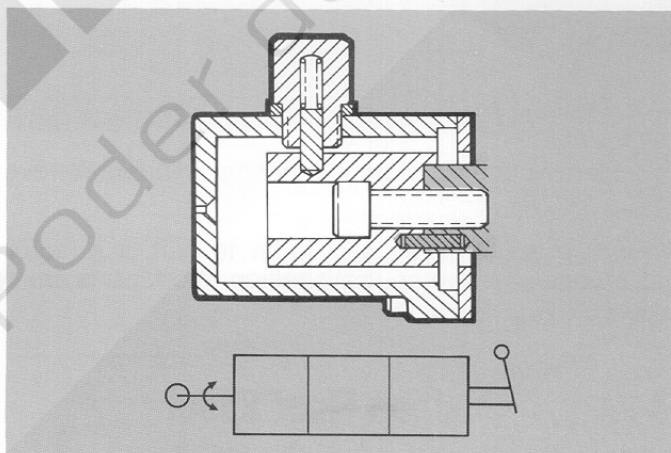
This feature eliminates spring-return to neutral, and spring loads the spool to the "OUT" position only (port "B" power position). Usually used for "Cam-Operation" of spool. Customer must supply cam-follower mechanism. When this option is ordered, a handle assembly is not furnished.



Rotary Spool Actuator

Code Symbol W

With this option, the movement of the spool is controlled by a rotary movement of the handle. Allows for 90° rotation of the spool each direction from center, making 180° total handle rotation with detent position in neutral. There is no spring-centering, therefore the spool will stay in any position placed. Handle assembly option not available with rotary actuator. (Customer must furnish his own handle mechanism.)



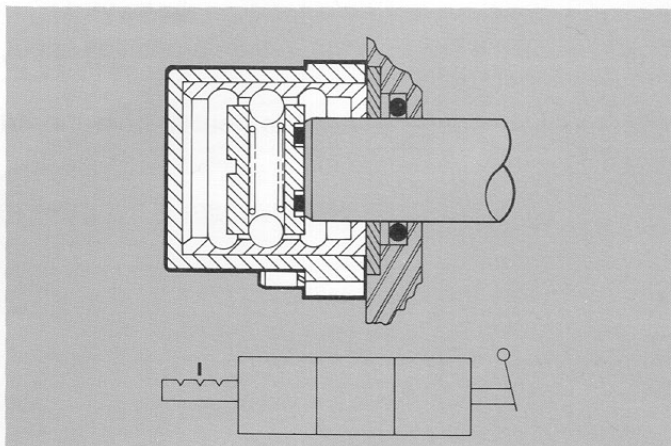
3-Position Detent

Code Symbol D

With this option the valve spool will remain in any of the three detented positions in which it is manually placed. No spring return to neutral.

Detent stop, 1889-001, is available to limit spool travel to two positions—neutral and spool "IN" or neutral and spool "OUT."

NOTE: The detent option is designed to provide operator "FEEL." It is NOT intended for use as a positive spool locking device against excessive external forces or machine vibration.

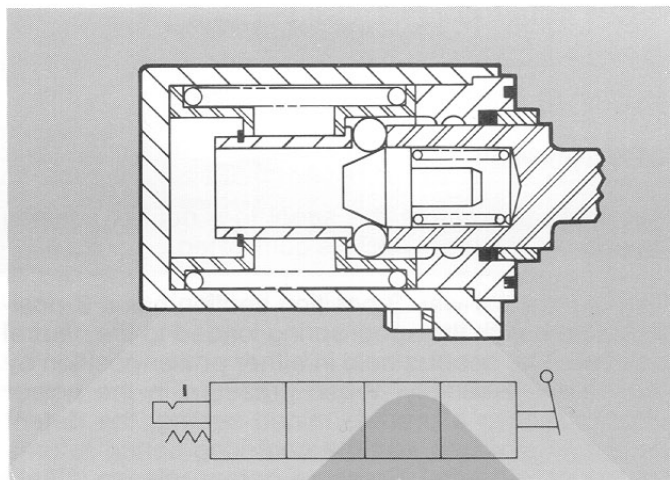


4-Position Float Assembly

Code Symbol K4

This option is spring-centered to neutral from the "A" or "B" work port power position. The fourth position is the detented "Float" position, which allows a cylinder to "Float" or a motor to "Free Wheel."

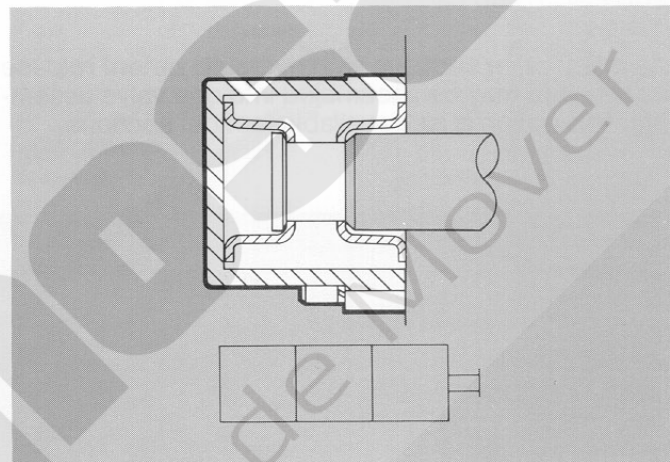
NOTE: Float spool positioners for Series type sections are different from those used in Parallel and Tandem sections.



Manual Actuator

Code Symbol M

The manual spool permits full spool travel without spring centering or detent assemblies.

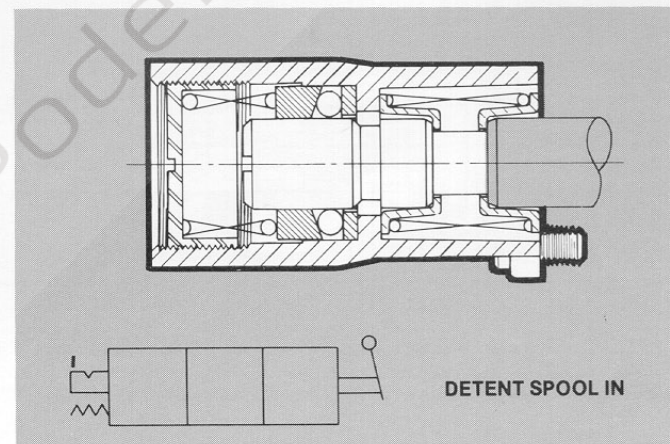


Optional Spool Detent Positions

1-POSITION SPOOL "IN" DETENT WITH SPRING RETURN to NEUTRAL

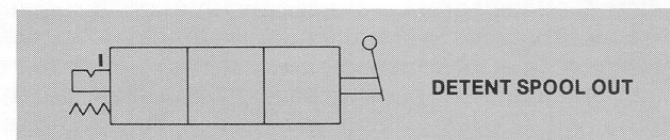
Code Symbol R

Work port "B" remains open to tank in detent position. Allows a single-acting cylinder to "Float."



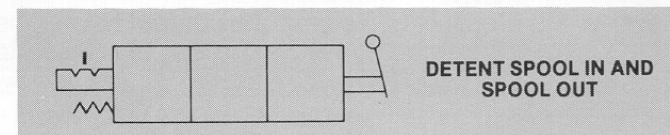
1-POSITION SPOOL "OUT" DETENT WITH SPRING RETURN to NEUTRAL

Code Symbol R0



2-POSITION SPOOL "IN" and "OUT" DETENT WITH SPRING RETURN to NEUTRAL

Code Symbol R10



Internal Hydraulic Detent Release

Code Symbol KO

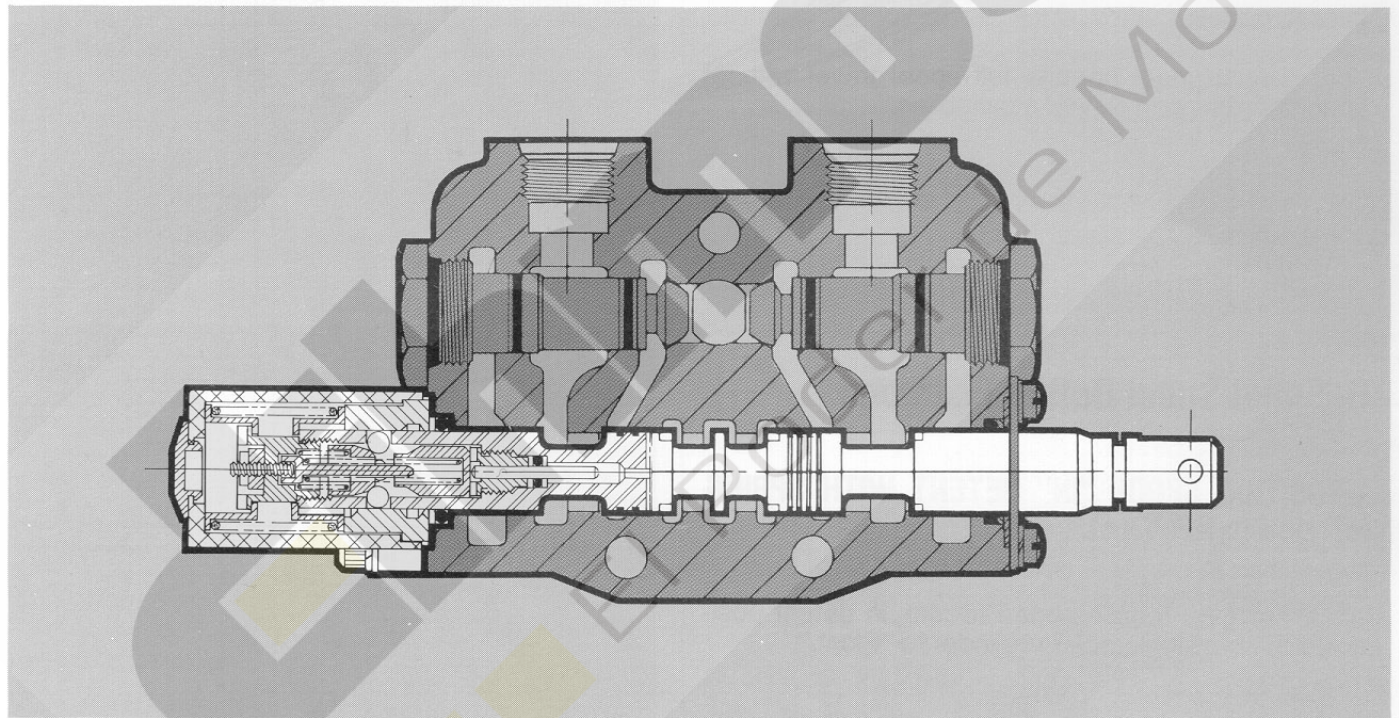
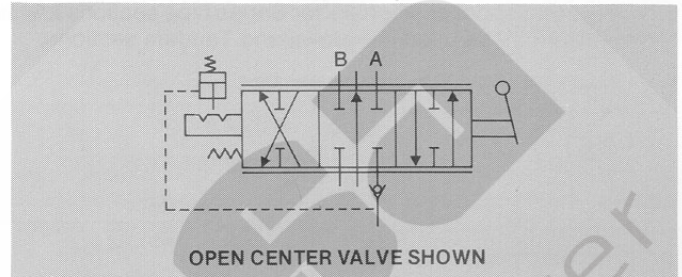
Automatically returns the spool to a neutral position as soon as the work cycle is completed.

The standard 4-way 3-position section has a 2-position detent with the spool spring loaded to the neutral position. The spool is held in either power position by the detent assembly. When pressure in the power circuit reaches a predetermined setting, the detent assembly releases and the centering spring returns the spool to neutral. Pressure detent release is field adjustable. Release pressure must be a minimum of 200 PSI [13,80 bar] below main relief setting.

As many valve sections with hydraulic detent release as required may be assembled into one valve assembly. This option is also available for float sections.

SPECIFICATIONS

Operating Range	500-3500 PSI [35-242 bar]
Normal Setting Tolerance	± 100 PSI [± 7 bar]
Handles	"A" or "B" Port End



PRESSURE RELEASE FROM "A" POWER POSITION

Detent release pressure is sensed through the power core of the valve when the spool is in the "A" power position. In a valve assembly containing two or more KO sections, the section having the lowest detent pressure release setting will release its spool first when the spool is in the "A" power position. Each spool will release to neutral from the "A" power position as the pressure increases. The detent having the highest pressure setting will be the last to release to neutral.

PRESSURE RELEASE FROM "B" POWER POSITION

Detent release pressure is sensed only through the open center core of the valve when the spool is in the "B" power position. When an upstream spool is shifted to either power position, the open center core is blocked off preventing any downstream KO sections from sensing pressure in the open center core. Therefore, a downstream KO section will not release to neutral when an upstream spool is shifted to the "A" or "B" power position. A KO spool will only release to neutral from the "B" power position when all upstream sections are in the neutral or float position.

Electro-Magnetic Spool Release

Code Symbol E

This option incorporates two electro-magnets in the bonnet assembly. The magnets may be energized continuously with a 12 volt DC power supply. When the operator manually shifts the spool to either power position, the spool will be held in position by magnetic force. A return spring will center the spool to neutral when the magnet is de-energized, or the spool may be returned to neutral manually.

The male connector on the bonnet contains three pins marked A, B, and C. Both magnets are connected to a common ground (pin C), pin A is connected to the magnet which will hold the spool in the "A" power position (spool "IN"), and pin B is connected to the magnet which will hold the spool in the "B" power position (spool "OUT").

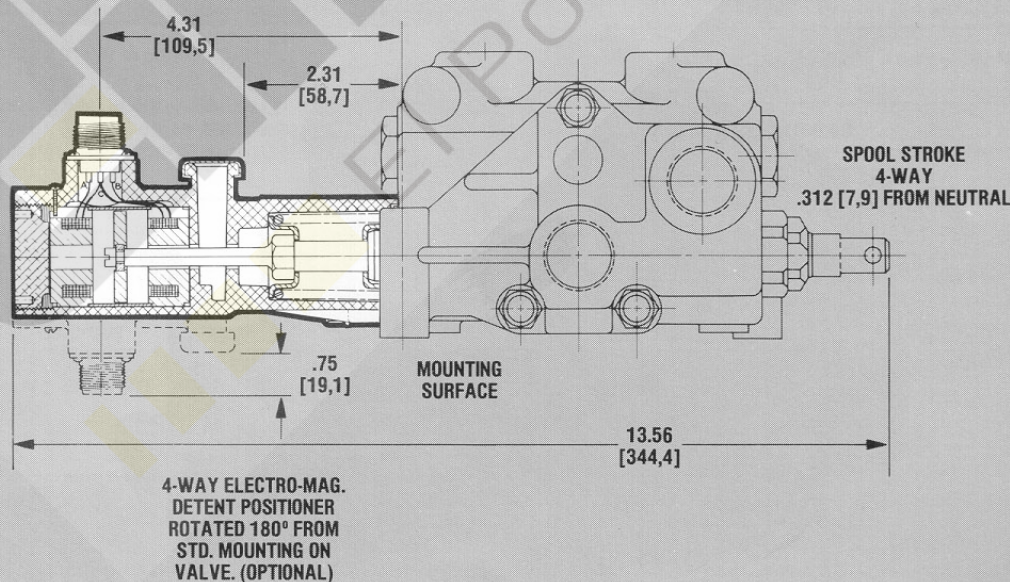
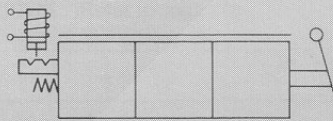
If a one position electric detent is required, only one magnet will be connected to the male connector. Pins A and C will be wired for spool "IN" detent, or pins B and C will be wired for spool "OUT" detent.

The electro-magnetic spool release assembly may be used with an external limit switch (furnished by the customer) to limit the stroke of a cylinder. This results in a more efficient operation, quicker cycle times, and saves time by automatically repositioning the cylinder while the operator is performing other operations. Another advantage is hydraulic system pressure does not build up to main relief valve pressure, which eliminates pressure surges and reduces heat build-up.

SPECIFICATIONS

Spools	Standard 3- or 4-way (not 4-way float)
Supply Voltage	12 volt DC
Male Bonnet Connector	MS 3102A-10SL-3P
Female Connector	MS 3106A-10SL-3S (Furnished by customer)

12 VOLT DC
ELECTRO-MAGNET



Hydraulic Remote Spool Actuator

Code Symbol HR, HRO and HRH

Hydraulic Remote Spool Actuators, Option Code HR, provide for remote operation of the Model V20 Directional Control Valve with two or three-position spools.

An external adjustment screw override, Option Code HRO, is available as an option. The screw provides for emergency manual operation in case of pilot pressure failure or permits lowering a load with the pump shut down.

A handle override feature is also available. Option Code HRH. This option allows full manual control at the valve with remote hydraulic control at a remote location. This option is ideal for applications where two control stations are required.

A customer-supplied, remotely located hydraulic controller will provide infinite spool positioning for metering flow to the work ports of the V20 Valve. The only limitation for metering capability is the pressure regulating performance of the hydraulic controller or the Valve.

Although valve work sections with Actuator control are normally assembled at the factory, field assembly on existing valve work sections is possible. Manually-operated valve work sections may be combined with Actuator-operated valve work sections in any arrangement.

For more information, refer to Gresen Catalog No. PC-1103.

SPECIFICATIONS

DIRECTIONAL CONTROL VALVE

Capacity (nominal) 20 GPM [75 litres/min]
Maximum Operating Pressure 3500 PSI [242 bar]
Maximum Exhaust Core Pressure 500 PSI [34 bar]

SPOOL ACTUATOR

For two, three, or four-position spool functions only
 (Four-position for float operation)

Max. Pressure Rating 500 PSI [34 bar]

Pilot Pressure to Initiate Spool

Movement 60 PSI [4 bar]

Pilot Pressure to Compensate for

Spring Tension at Full Stroke 300 PSI [20 bar]

Pilot Flow 2 to 4 GPM [7.5 to 15 litres/min]



Option "HRO" Shown

Solenoid-Controlled Directional Control Valve

Gresen's on-off solenoid-controlled, pilot operated actuators are designed to provide remote operation of Model V20 Hydraulic Directional Control Valves.

Most Gresen Model V20 Sectional Body Directional Control Valves having a 3-position spool will accept a solenoid-controlled actuator. (Exceptions are the float spool and the standard Free Flow spool. A modified Free Flow spool is available for solenoid operation.)

Each Valve section may be solenoid-controlled, manually-controlled or both.

The sectional-body feature offers maximum flexibility and ease of maintenance. Although valve work sections with solenoid control are normally assembled at the factory, field assembly is possible in order to add additional work sections to an existing assembly.

The outlet tank port may be located in the outlet cover or in the left inlet cover of the control valve assembly.

A power beyond option is **not** available in the outlet cover of V20 solenoid operated valve assemblies. The power beyond option is available in the utility section. If a power beyond option is used in the utility section, the pressure build-up valve must be located in the downstream valve assembly.

For more information regarding electrical system requirements, optional accessories, and dimensions, refer to Gresen Catalog No. PC-1104.

SPECIFICATIONS

Pressure Rating 3500 PSI [242 bar] max.
(Directional Control Valve)

Capacity (Nominal) 20 GPM [75,5 litres/min]

Differential Pilot

Pressure to Actuator 200-300 PSI [14-21 bar]
(A minimum of 200 PSI [13,8 bar]
is required to actuate the valve spool)

Maximum Allowable

System Back Pressure 300 PSI [21 bar]

Pilot Flow to Actuator 2-4 GPM [7,6-15 litres/min]

Operating Oil Temp 180°F [82°C]
(Maximum)

Filtration Req. (Min.) 33 micrometre

Solenoid Power Req. 1.7-1.9 amps, 12 VDC
0.6-0.7 amps, 24 VDC

Weight:

Directional Control Valve Work
Section with Solenoid-Controlled
Actuator Approx. 13 lbs. [5,9 kg]
Utility Section Approx. 9 lbs. [4.1 kg]

Note: Double-throw switches are required when using internal pilot and must be provided by the customer.



HANDLE-END OPTIONS

The clevis end of the spool may be located at either the "A" port or "B" port end of the work section . . . except for the Model V20LS float option (K4) which must be on the "A" port end only. Unless otherwise specified, the handle end will be located at the "A" port end for all sections.

The following handle options are available:

- Complete Vertical Handle and Bracket Assembly (CVHA)
- Complete Horizontal Handle and Bracket Assembly (CHHA)
- Less Handle Only (LHO)
- Less Complete Handle Assembly (LCHA)
- Handle Bracket Only (HBO)



A V20 SERIES VALVE ASSEMBLY WITH TWO HORIZONTAL AND TWO VERTICAL HANDLES.

Complete Handle and Bracket Assembly (CVHA or CHHA)

When handles are required, choose between a vertical and horizontal ductile iron handle. Two brackets—die cast or cast iron—are also available as required for the application.

Handles and handle brackets should be specified by using the following part numbers:

- 1802-001 Vertical Handle (Black)
- 1802-003 Vertical Handle (Plain)
- 3249-001 Horizontal Handle (Black)
- 3249-003 Horizontal Handle (Plain)
- 1801-001 Die Cast Handle Bracket
- 7355-001 Cast Iron Handle Bracket

If a complete handle and bracket assembly is ordered without specifying part numbers for vertical or hori-

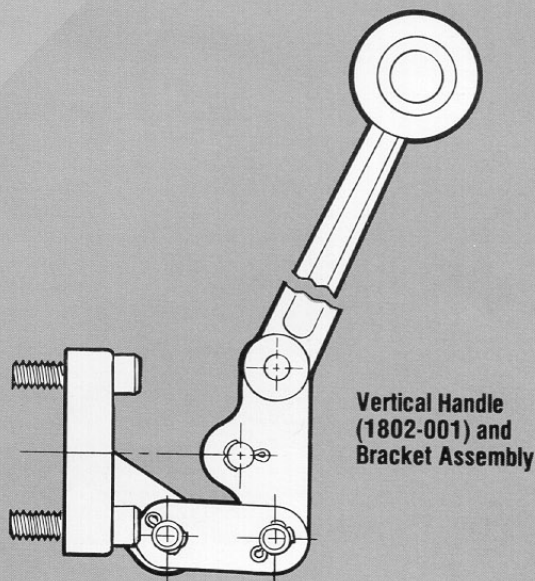
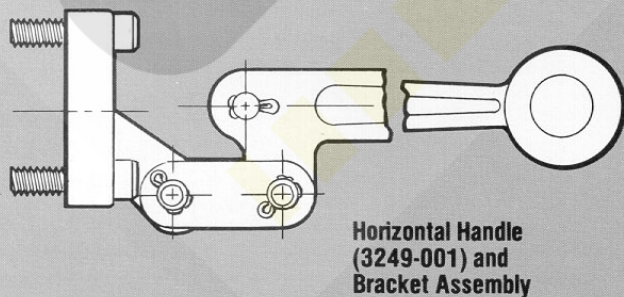
zontal handles, a vertical handle (1802-001) and die cast bracket (1801-001) will be furnished. The bracket may be rotated 180° to reverse handle movement or allow handle to extend below the valve.

Less Handle Only (LHO)

When the application requires a complete bracket and linkage assembly, without a handle, then this designation—LHO—should be specified. An 1801-001 die-cast bracket will be furnished as standard. A 7355-001 cast iron bracket is optional.

Handle Bracket Only (HBO)

Handle and link assembly is omitted. Only a 1801-001 die-cast bracket is installed. A 7355-001 cast iron bracket is optional.

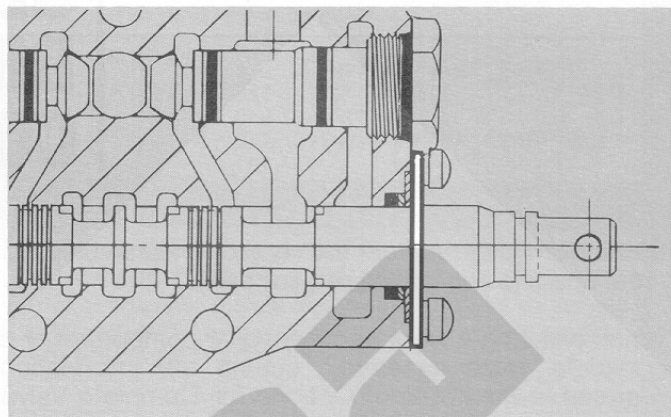


Less Complete Handle Assembly (LCHA)

When a valve work section is specified to be furnished LCHA, the complete handle and bracket assembly will be omitted. When this is done, a spool seal retainer assembly is installed to hold the spool seal assembly in place.

STANDARD SPOOL SEAL RETAINER ASSEMBLY (SPECIFY)

When the complete handle and bracket assembly is omitted from a work section and allowable back pressure is limited to 200 PSI [13,8 bar] a standard spool seal retainer will be installed.

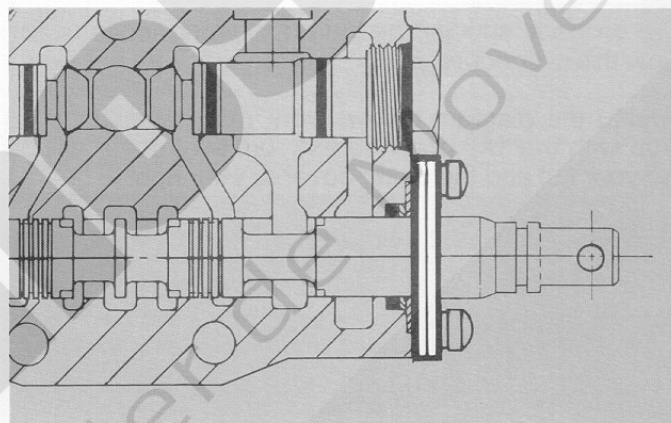


HEAVY DUTY SPOOL SEAL RETAINER ASSEMBLY (SPECIFY)

A heavy duty spool seal retainer must be included in a work section if:

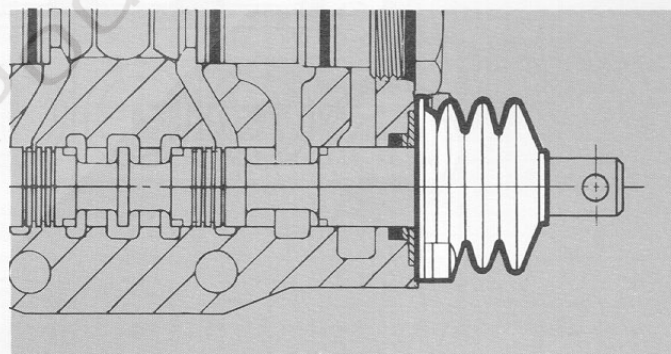
1. Back pressure at the spool seal could exceed 200 PSI [13,8 bar], but not over 1000 PSI [69,00 bar].
2. A secondary spool wiper is desired to reduce contamination at the spool seal . . .

NOTE: Maximum continuous operating exhaust core pressure should not exceed 500 PSI [34 bar].



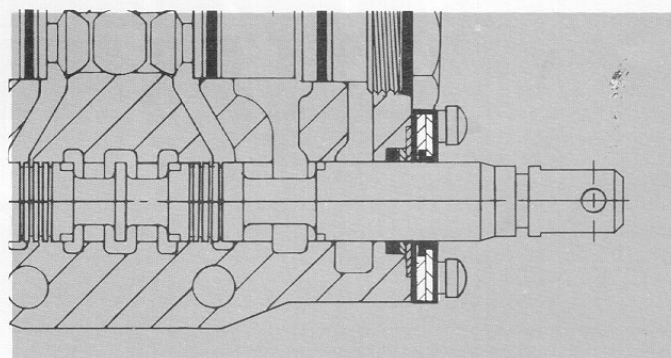
SPOOL PROTECTIVE BOOT ASSEMBLY

A spool protective boot assembly may be used with both the standard retainer assembly and the heavy duty retainer assembly. The boot completely covers the spool seal assembly protecting the area from contamination thereby providing longer seal life. The boot assembly cannot be used if a handle bracket is installed.



SECONDARY SPOOL WIPER SEAL (NO. 1800-001)

An optional wiper seal may be installed in the spool seal area on the handle end to minimize external contamination. The wiper is secured by either the heavy duty retainer or handle bracket. May not be used with standard low pressure seal retainer assembly.



SPECIFYING GRESEN SECTIONAL BODY DIRECTIONAL CONTROL VALVES

Sectional Body Valves are custom assembled to meet specific application requirements.

When ordering a work section, valve component or a complete valve assembly, submit the information required in the Table of Options for Complete Valve Assemblies, page 54. Submit all of the information that applies to your application. Add any option information not specifically referred to in this catalog.

To properly specify the individual work sections, follow this procedure:

Using the diagram below, work ports should be on top with the "A" port nearest you. Inlet cover will be to your left and the outlet cover to your right.

The accompanying sketch of a typical control valve

assembly has the handle assemblies in the standard location at the "A" port end of the valve.

Valve assembly specification forms are available to help simplify the ordering of various sections or complete valve assemblies. When ordering V20 Valves, use Form No. 9005. Specification forms have been included at the back of this Catalog. If additional forms are needed, contact any Gresen Distributor, Representative or the Sales Department, Minneapolis.

On receipt of the information, an order design number will be assigned to your valve assembly. Then, on future orders, the order design number or your part number need only be specified to identify the correct valve section, or assembly.

