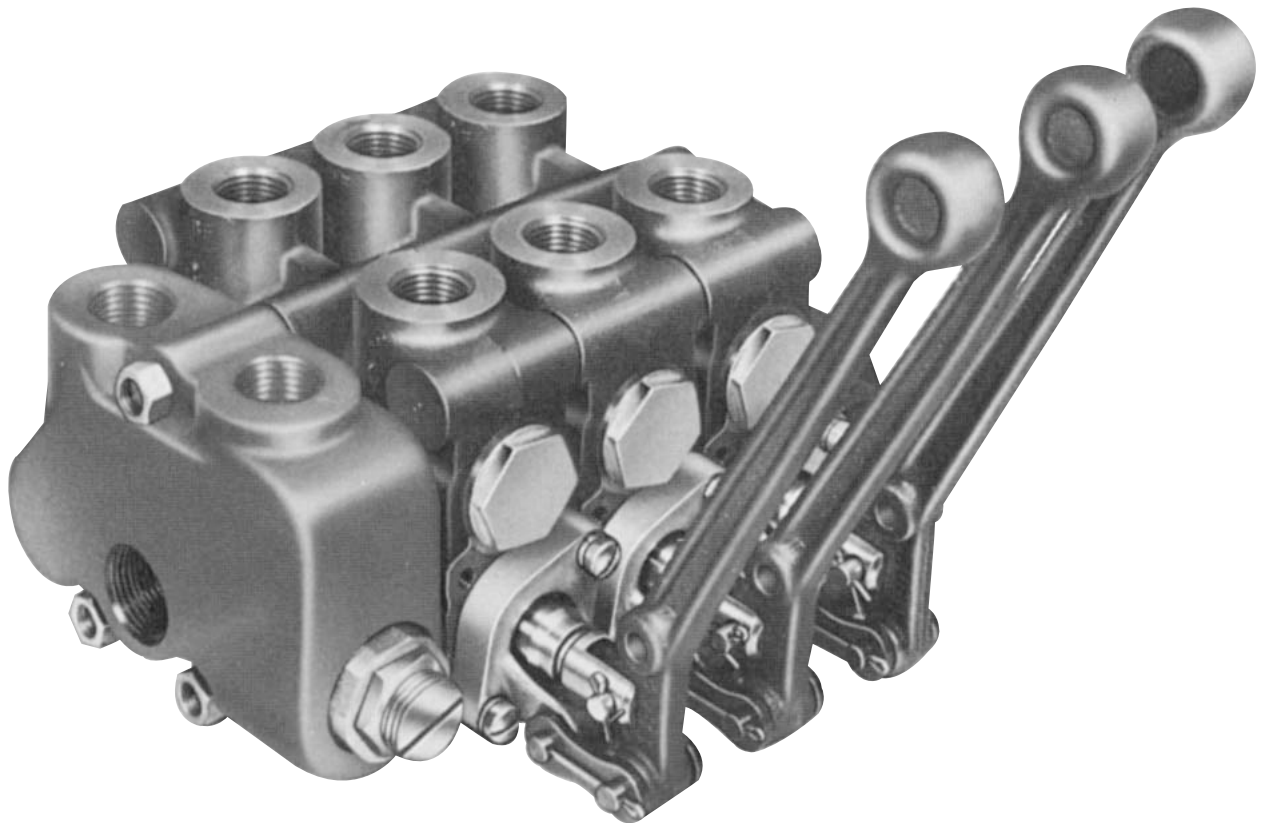




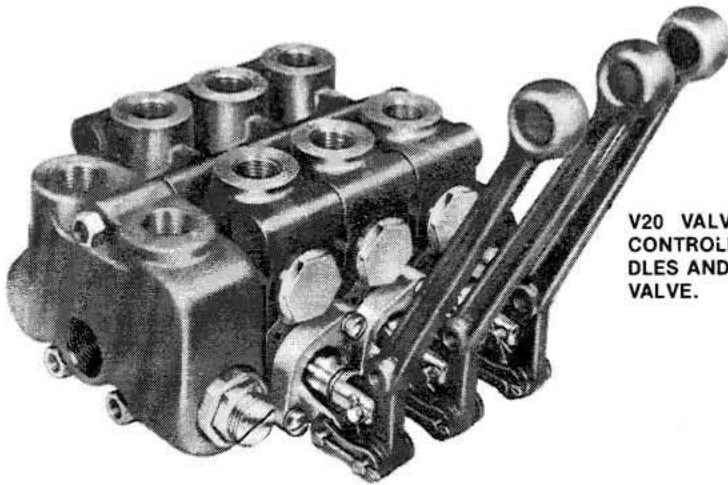
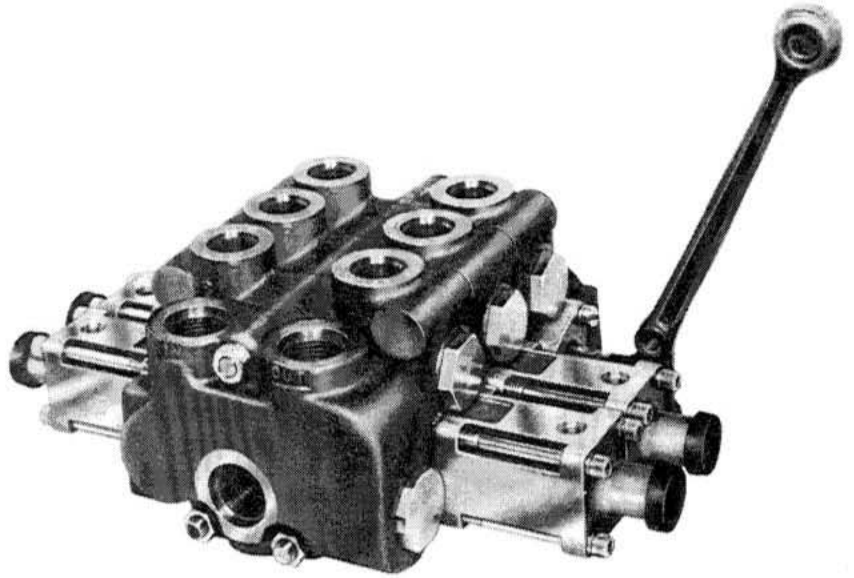
Bulletin HY14-2705-B1/US

Series V20 Directional Control Valves

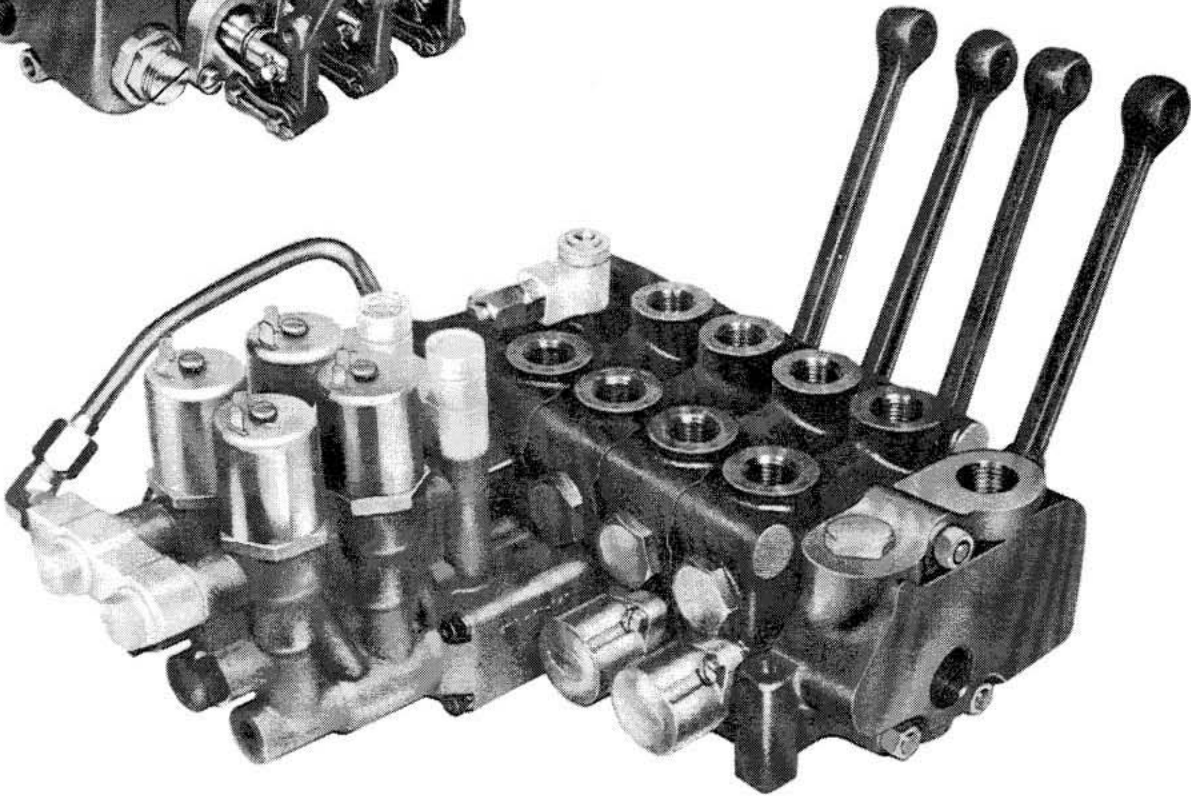
Effective: October 1, 2002
Supersedes: Cat. No. GPD-1106 dated 1/91



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.

Parker 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.

Parker'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.

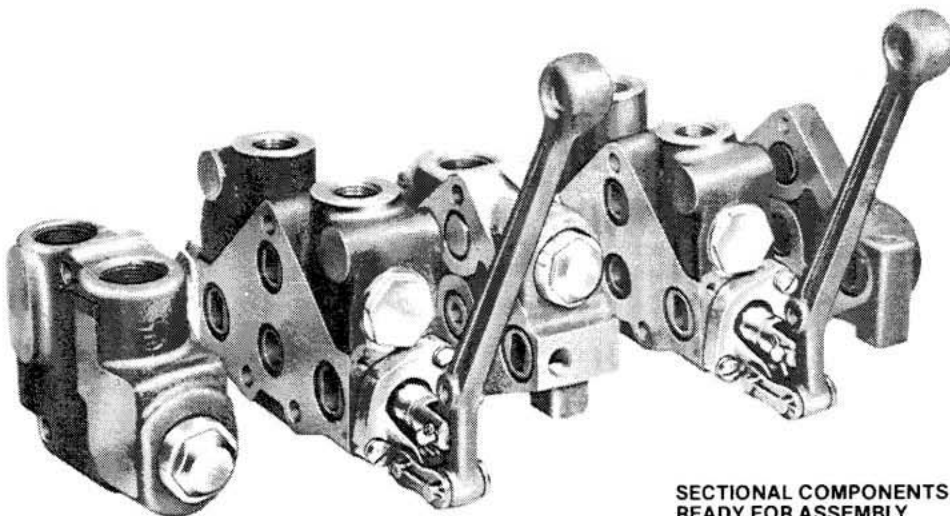
Construction . . . All valve housings are made of ductile cast iron for durability and resistance to shock loads.

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.

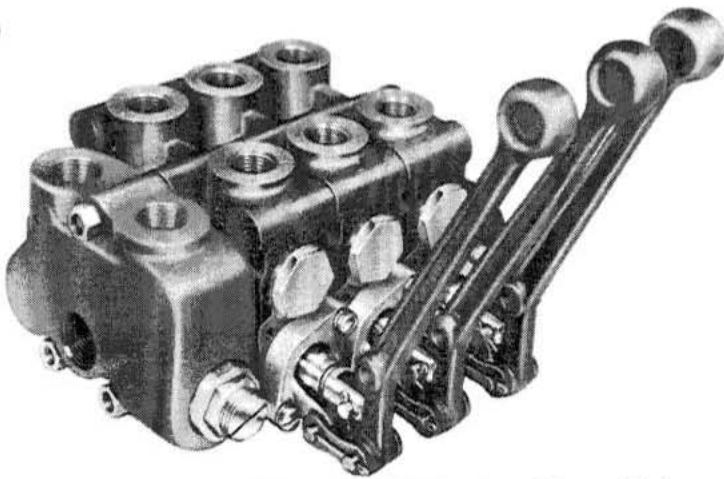
Due to the large number of hydraulic oil manufacturers, and the increasing availability of oil under various brand names, we recommend the customer consult his fluid manufacturer regarding compatibility . . . or test to his own satisfaction.



SECTIONAL COMPONENTS OF A MODEL V20 VALVE
READY FOR ASSEMBLY.

CLOSED CENTER VALVE ASSEMBLIES

Models V20C and V20LS



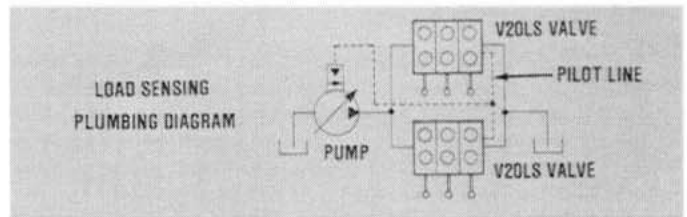
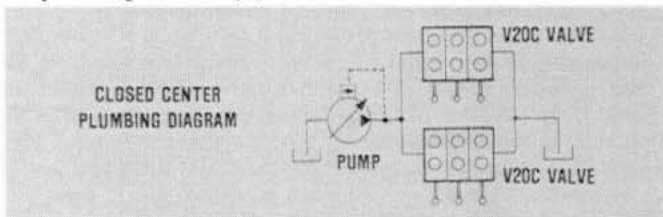
Parker's Models V20C and V20LS Directional Control Valves are available for parallel, hydraulic circuit applications, up to 3500 PSI [242 bar] continuous operating pressure. New spool designs have resulted in lighter spool actuating effort making their finger-tip touch and extra-fine metering characteristics 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.

The Model V20C Directional Control Valve is designed specifically for high standby pressure, closed center systems. The

Model V20LS Directional Control Valve is designed specifically for low standby pressure, closed center systems with load sensing.

Normally, an open center valve may be converted to a closed center valve by plugging the open center core in the outlet cover. Under these conditions, the valve's power core is exposed to high pressure at all times. Leakage may then occur past the valve spool and on into the work port area and cause a cylinder to extend while the valve spool is in neutral position. High pressure build-up at the work port in the Models V20C and V20LS is prevented by installing an anti-drift cartridge. Refer to work port options on page 51.



APPLICATIONS

Two or more Directional Control Valve Assemblies may be supplied from a single, variable displacement pump in the hydraulic system by using a "tee" arrangement. The power beyond option normally available with open center valves is not required for Model V20C or V20LS work sections since neither work section has an open center core.

FEATURES

- Minimal spool actuating effort — Maximum, 50 pounds [23 kg] at the spool
- Improved, extra-fine metering
- Valve housings made of high tensile cast iron for durability and resistance to shock loads.
- Spools are hard, chrome plated for long life and corrosion resistance.

SPECIFICATIONS

Pressure Rating:

Continuous Operating 3500 PSI [242 bar] max.

Capacity:

Nominal Flow 20 GPM [76 litres/min]

Maximum Flow 30 GPM [114 litres/min]

Maximum Exhaust Core Pressure:

With Handle Bracket or Heavy Duty

Spool Seal Retainer Installed

Continuous Operating 500 PSI [34,5 bar]

Intermittent Peak 1000 PSI [69,0 bar]

With Standard Spool Seal Retainer

Installed 200 PSI [13,8 bar]

Filtration Required (Min.) 33 micrometre

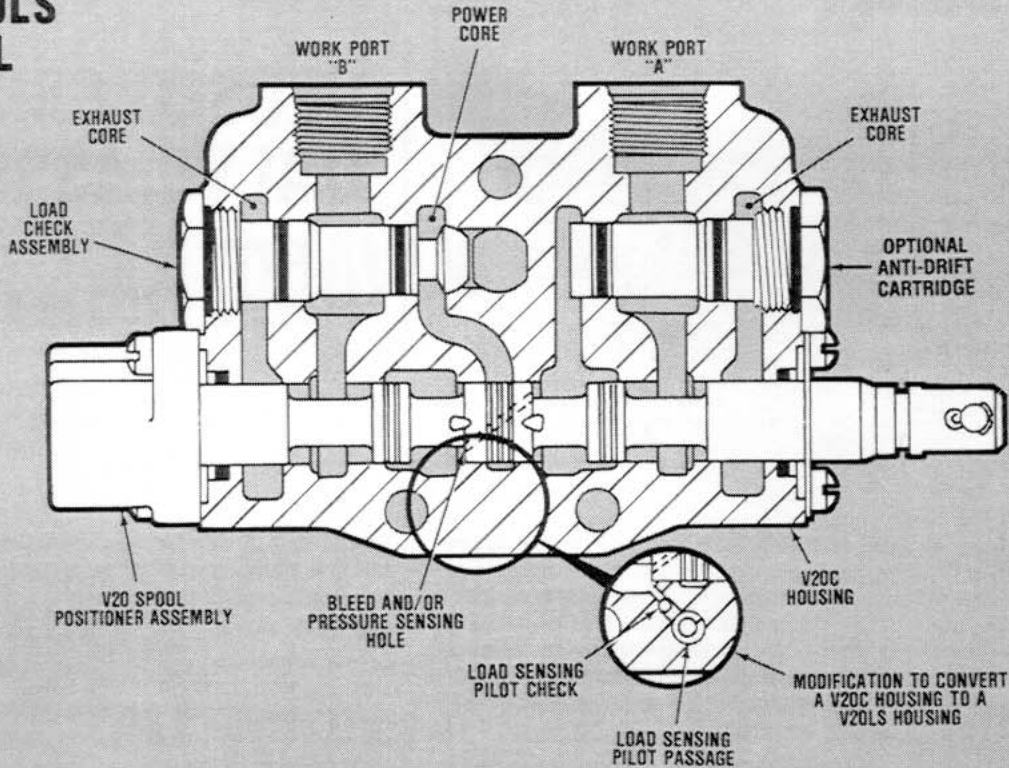
Weight:

Inlet Cover Approx. 6 lbs. [2,7 kg]

Outlet Cover Approx. 3½ lbs. [1,6 kg]

Work Section, Each Approx. 9 lbs. [4,1 kg]

V20C/V20LS SECTIONAL VIEW



VALVE METERING

Closed Center Systems

Valve spool metering is improved because the volume of oil is controlled by the metering notches at a constant pressure drop across the spool. The pump displacement will self-adjust to maintain full system pressure thus creating this constant pressure drop across the spool. Controlling flow across spool metering notches is improved when the pressure drop remains constant.

INLET COVER

Part No. 8398-

The inlet cover is designed to provide a variety of port sizes and locations. This permits valve assemblies to be "customized" using a minimum of external plumbing. For information regarding main system relief valves, refer to pages 10 and 11.

OUTLET COVER

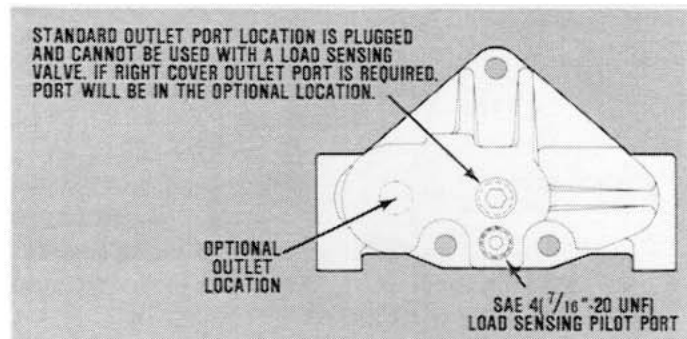
Part No. 6770-

The outlet cover provides an end outlet port. It also provides for a pilot port in load sensing systems. If the outlet port and the pilot port are both required in the outlet cover, the outlet port will be furnished in the optional location. (Refer to illustration.)

A pilot drain option is available for the load sensing outlet cover. This option is required in a load sensing system when a pilot drain orifice is not provided in the pressure compensated pump. The pilot drain orifice relieves the load sensing pilot pressure in the pump compensator after the control valve spool is returned to neutral. It is necessary to relieve this pressure signal in order for the pump to return to its standby pressure setting.

Closed Center Systems with Load Sensing

Valve spool metering is further improved since pump pressure is maintained at the slightly higher standby pressure (150 to 250 PSI [10 to 17 bar]) than is required by the function. This fixed pressure drop remains the same from minimum to maximum load requirements in contrast to the conventional closed center system.



For plumbing convenience, the outlet port may be located in the inlet (left) cover. When it is, a "turnaround" (right) cover will direct exhausting oil back to the inlet cover.

A power beyond option is not available since there is no open center core in V20C or V20LS work sections.

SPOOL ACTION OPTIONS and HANDLE END OPTIONS

The Models V20C and V20LS work sections are available with the same spool action options and handle end options as of-

ferred for the Model V20P except V20LS float option can not be reversed in the housing.

Spool Action Options

Refer to pages 14 through 19.

	CODE SYMBOL		CODE SYMBOL
Spring Return to Neutral (Standard)	—	Hydraulic Remote Spool Actuator *	HR
3-Position Detent	D	Hydraulic Remote Spool Actuator (Manual Override)*	HRO
No. 1889-001 Detent Stop	—	(Request Catalog No. PC-1103)	
4-Position Float	K4		
1-Position, Spool "IN" Detent	R		
1-Position, Spool "OUT" Detent	RO		
2-Position, Spool "IN" and "OUT" Detent	RIO		
Spring Extended Spool	A		
Manual	M		
Internal Pressure Detent Release	KO		
Electro-Mechanical Detent Release	E		
Solenoid Control (Request Catalog No. PC-1104)	—		

* Pilot Pressure For Remote Actuators
300 PSI [21 bar] is required to actuate either Gresen's Solenoid or Hydraulic Remote Actuator Assemblies. This may be accomplished by installing a pressure reducing valve at the pump discharge and plumbing the lower pressure hydraulic fluid to the Remote Actuator Assemblies.

When the system has load sensing, standby pressure must be increased to 300 PSI [21 bar].

Handle and Handle End Options

Refer to pages 20 and 21.

	CODE SYMBOL		CODE SYMBOL
Complete Vertical Handle Assembly	CVHA	Heavy Duty Spool Seal Retainer Assembly, No. K-6029	—
Complete Horizontal Handle Assembly	CHHA	Spool Wiper, No. 1800-001	—
Die Cast Handle Bracket, No. 1801-001	—	Spool Boot Assembly, No. K-6056	—
Cast Iron Handle Bracket, No. 7355-001	—	Less Handle Only	LHO
Standard Spool Seal Retainer Assembly, No. K-6033	—	Less Complete Handle Assembly	LCHA

SPOOL VARIATIONS

Refer to page 13.

	CODE SYMBOL		CODE SYMBOL
3-Way, 3-Position	3	4-Way, 3-Position, Free Flow	F4
3-Way, 3-Position, Free Flow	F3	4-Way, 4-Position, Float	K4
4-Way, 3-Position	4		

WORK PORT OPTIONS

The same work port options which are available for the Model V20P Directional Control Valve are also available for the Models V20C and V20LS in the "B" port location.

In the "A" port location, an optional anti-drift cartridge is also available. The anti-drift cartridge prevents any build-up of pressure at the work ports when the valve is in neutral position. Any leakage past the spool into the sensing cores is drained back to the tank through the anti-drift cartridge. When the work port is powered, pressure closes the anti-drift cartridge to eliminate any flow loss.

The anti-drift cartridge must be installed in the "A" port location only and one is required for each work section in which pressure build-up at the work port will be detrimental to the application.

The anti-drift cartridge replaces the standard load check plug. It is not available where a work port relief or anti-cavitation check is required in the "A" port location.

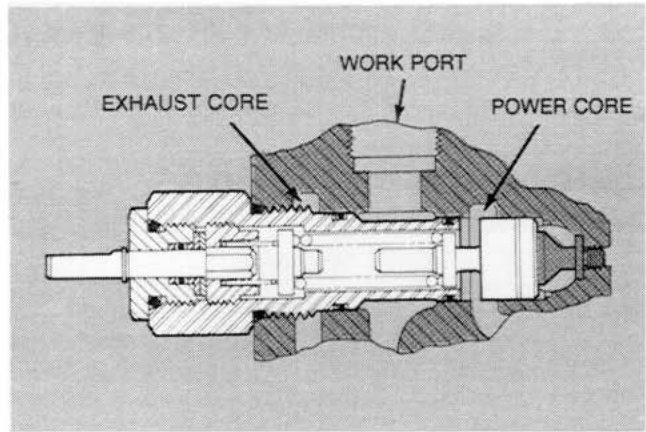
OPTION	ORDER CODE	AVAILABLE FOR:	
		"A" PORT	"B" PORT
Work Port Relief	RC,RP20	x	x
Combination Relief and Anti-Cavitation Check	CRA	x	x
Anti-Cavitation Check	AC	x	x
Load Check		—	x
Anti-Drift Cartridge	B	x	—

Pressure Compensated Flow Control

A pressure compensated flow control option is available for Models V20C and V20LS. This option is installed in the load check area of the valve section and is externally adjustable.

The flow control allows each valve section (both work ports) to operate at a predetermined maximum flow rate independent of pump discharge flow and pressure. Flow ranges of 1 to 5 GPM, 3 to 15 GPM, and 5 to 25 GPM are available.

This flow control option cannot be field installed. Special valve section machining is required.

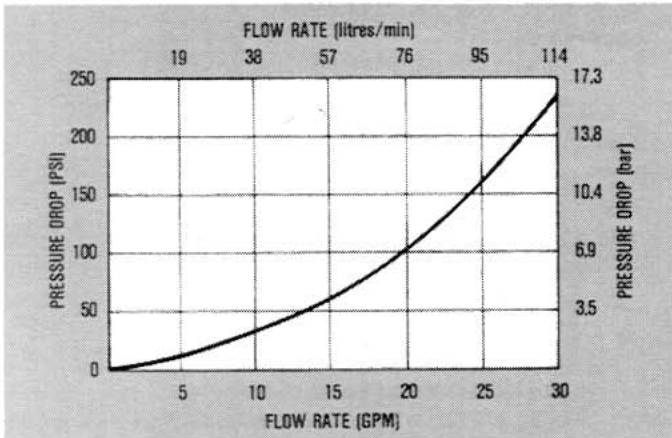


PRESSURE DROP

150 SUS oil at 100° F • Inlet port: SAE 12 • Work port: SAE 10

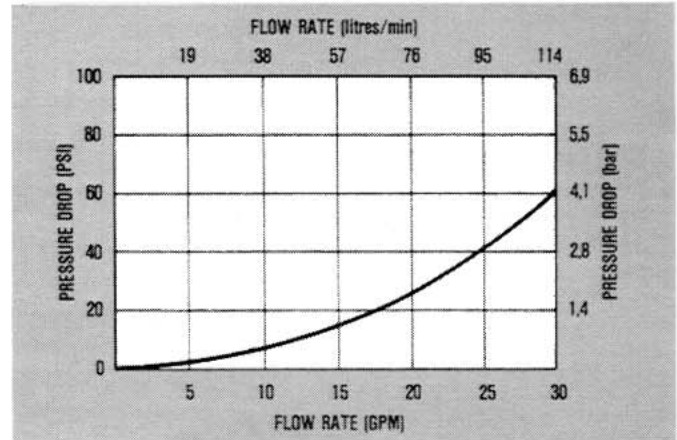
Inlet To Work Port

Typical pressure drop to any work port in a 4-spool valve



Work Port To Outlet

Typical pressure drop from any work port in a 4-spool valve



ORDERING INSTRUCTIONS

To assure delivery of the proper Directional Control Valve, Form 9005 must be completed. Additional ordering information needed for manufacture and assembly of Models V20C and V20LS work sections are:

1. To specify a valve with V20C closed center work sections or V20LS load sensing work sections, write in No. 8364 in the "Center Section Housing No." box for each work section required. Do not check the "Closed Center" box in right cover block.

- Under "Additional Features" write in V20C and check the box in each work section to specify a closed center valve.

OR

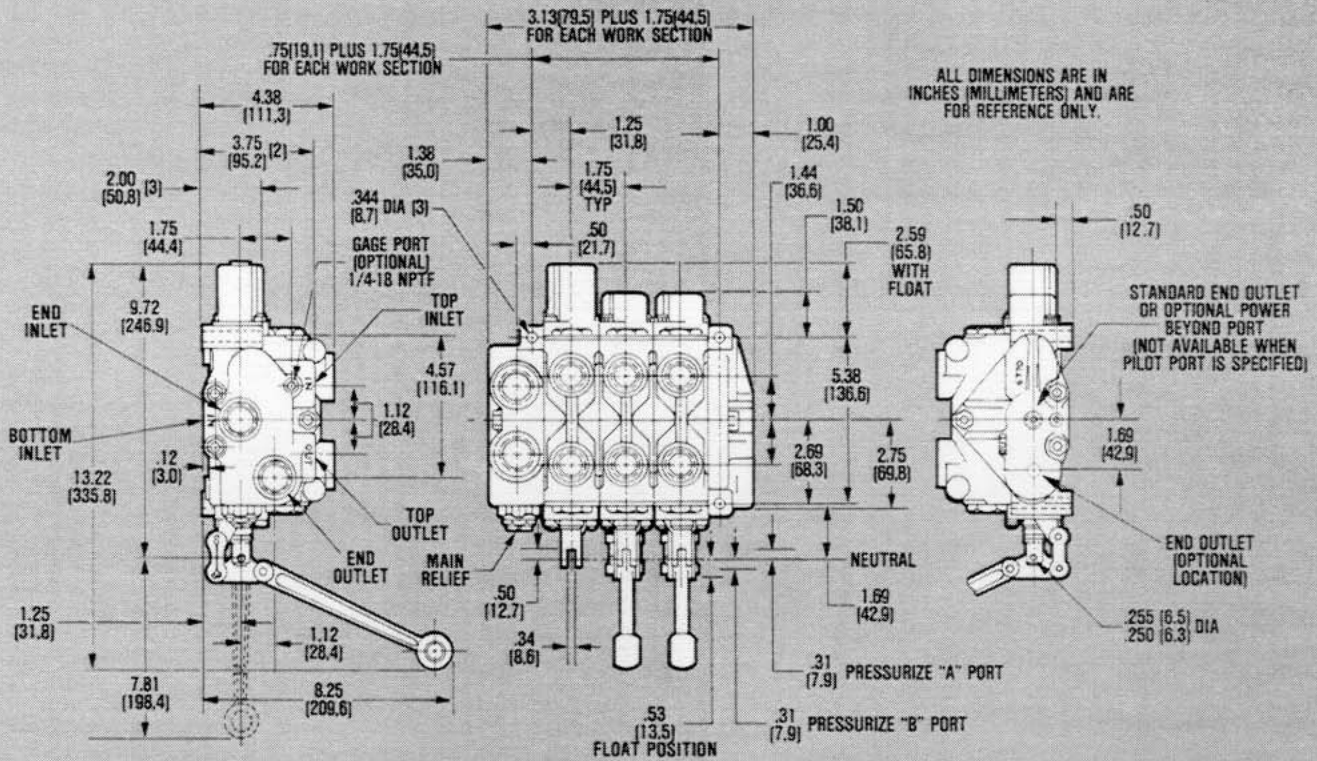
- Write in V20LS and check the box in each work section to specify a load sensing valve. Also specify Housing

No. 6770-LS in right cover block in order to include the SAE 4 pilot port.

2. If an anti-drift cartridge is required, write in under Cylinder Port "A", order symbol Anti-Drift Cartridge and check the box for each work section requiring this option.

NOTE: A V20 closed center valve can also be made from standard V20P, No. 8072, open center section by using a closed center plug in the right cover. To specify this type of closed center valve, write in Housing No. 8072 for center sections and check the closed center box in the right cover. (Anti-drift cartridge cannot be used in this valve.)

DIMENSIONS: Typical V20C and V20LS Assembly



PORTING OPTIONS AVAILABLE

LOCATION	SAE STRAIGHT THREAD PORTS		BSP PIPE PORTS	GAGE PORT	PILOT PORT
	STANDARD	OPTIONAL			
No. 8398 LEFT INLET COVER* End, Top or Bottom Inlet Ports, End or Top Outlet Ports	SAE 12 (1-1/16" - 12 UN)	SAE 10 (3/8" - 14 UNF)	3/4" BSP	SAE 4 (7/16" - 20 UNF)	—
	SAE 10 (3/8" - 14 UNF)	SAE 8 (3/8" - 16 UNF)	1/2" BSP	—	—
No. 6770 RIGHT OUTLET COVER Standard or Optional End Outlet Ports	SAE 12 (1-1/16" - 12 UN)	SAE 10 (3/8" - 14 UNF)	3/4" BSP	—	SAE 4 (7/16" - 20 UNF)

*Top inlet and top outlet ports are cored. If not specified, they will be plugged.

NOTE: All ports in a casting must be the same. SAE and BSP ports cannot be intermixed.

ORDERING

Condensed Table of Options for Complete Valve Assemblies

	Code Symbol	Inlet Cover (Left)	Work Sections					Mid-Inlet Conversion Section		Outlet Cover (Right)
			V20P, V20RP	V20T, V20RT	V20S	V20C	V20LS	Comb. Flow	Split Flow	
Circuits										
Open Center—Parallel	V20P		●					●	●	
Open Center—Parallel (Reduced Pressure Drop)	V20RP		●					●	●	
Open Center—Tandem	V20T			●				●	●	
Open Center—Tandem (Reduced Pressure Drop)	V20RT			●				●	●	
Open Center—Series	V20S				●			●	●	
Closed Center	V20C					●				
Load Sensing	V20LS						●			
Spool Variations										
3-Way, 3-Position	3		●	●	●	●	●			
3-Way, 3-Position, Free Flow	F3		●	●	●	●	●			
4-Way, 3-Position	4		●	●	●	●	●			
4-Way, 3-Position, Free Flow	F4		●	●	●	●	●			
4-Way, 4-Position, Float	K4		●	●	●	●	●			
4-Way, 3-Position, Pilot Operated Check (V20-LO)			●							
Spool Action Options										
Spring Return to Neutral (Standard)			●	●	●	●	●			
3-Position Detent	D		●	●	●	●	●			
No. 1889-001 Detent Stop			●	●	●	●	●			
4-Position Float	K4		●	●	●	●	●			
1-Position, Spool "IN" Detent	R		●	●	●	●	●			
1-Position, Spool "OUT" Detent	RO		●	●	●	●	●			
2-Position, Spool "IN" and "OUT" Detent	RIO		●	●	●	●	●			
Spring Extended Spool	A		●	●	●	●	●			
Manual	M		●	●	●	●	●			
Internal Pressure Detent Release	KO		●	●	●	●	●			
Electro-Mechanical Detent Release	E		●	●	●	●	●			
Solenoid Control			●	●	●	●	●			
Hydraulic Remote	HR, HRO		●	●	●	●	●			
Reliefs, Checks and Restrictors										
Main System Relief (Standard)	WH	●						●	●	
Main System Relief, with Lockwire & Lead Seal	WHNJ	●						●	●	
Main System Relief, Adjustable	WHA	●						●	●	
Main System Relief, Pilot-Operated, Adjustable	RP51A	●						●	●	
Main System Relief, Pilot-Operated, Non-Adjustable	RP51N	●						●	●	
Work Port Relief, Differential Poppet	RC		●	●	●	●	●			
Work Port Relief, Pilot-Operated, Adjustable	RP20A		●	●	●	●	●			
Work Port Relief, Pilot-Operated, Non-Adjustable	RP20N		●	●	●	●	●			
Combination Relief and Anti-Cavitation Check	CRA		●	●	●	●	●			
Anti-Cavitation Check	AC		●	●	●	●	●			
Pilot Operated Check (V20-LO)			●							
Load Check			●	●	●	●	●			
Restrictor			●	●	●	●	●			
Expansion Relief (V20-LO)			●							
No Relief	NR	●	●	●	●	●	●	●	●	
Handle and Handle End Options										
Complete Vertical Handle Assembly	CVHA		●	●	●	●	●			
Complete Horizontal Handle Assembly	CHHA		●	●	●	●	●			
Die Cast Handle Bracket			●	●	●	●	●			
Cast Iron Handle Bracket			●	●	●	●	●			
Standard Retainer Assembly			●	●	●	●	●			
Heavy Duty Retainer Assembly			●	●	●	●	●			
Spool Wiper			●	●	●	●	●			
Boot Assembly			●	●	●	●	●			
Less Handle Only	LHO		●	●	●	●	●			
Less Complete Handle Assembly	LCHA		●	●	●	●	●			
Hydraulic Remote with Handle Override	HRH		●	●	●	●	●			
Application Variations										
Open Center			●	●	●				●	
Closed Center	C		●*	●*		●	●		●	
Power Beyond	Y								●	
Conversion Plug	X								●	
Turnaround									●	

*V20P and V20T Valves can be converted to closed center systems by installing a plug in the outlet cover.



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Bulletin HY14-2705-B1/US,
5C, 9/02, PHD