

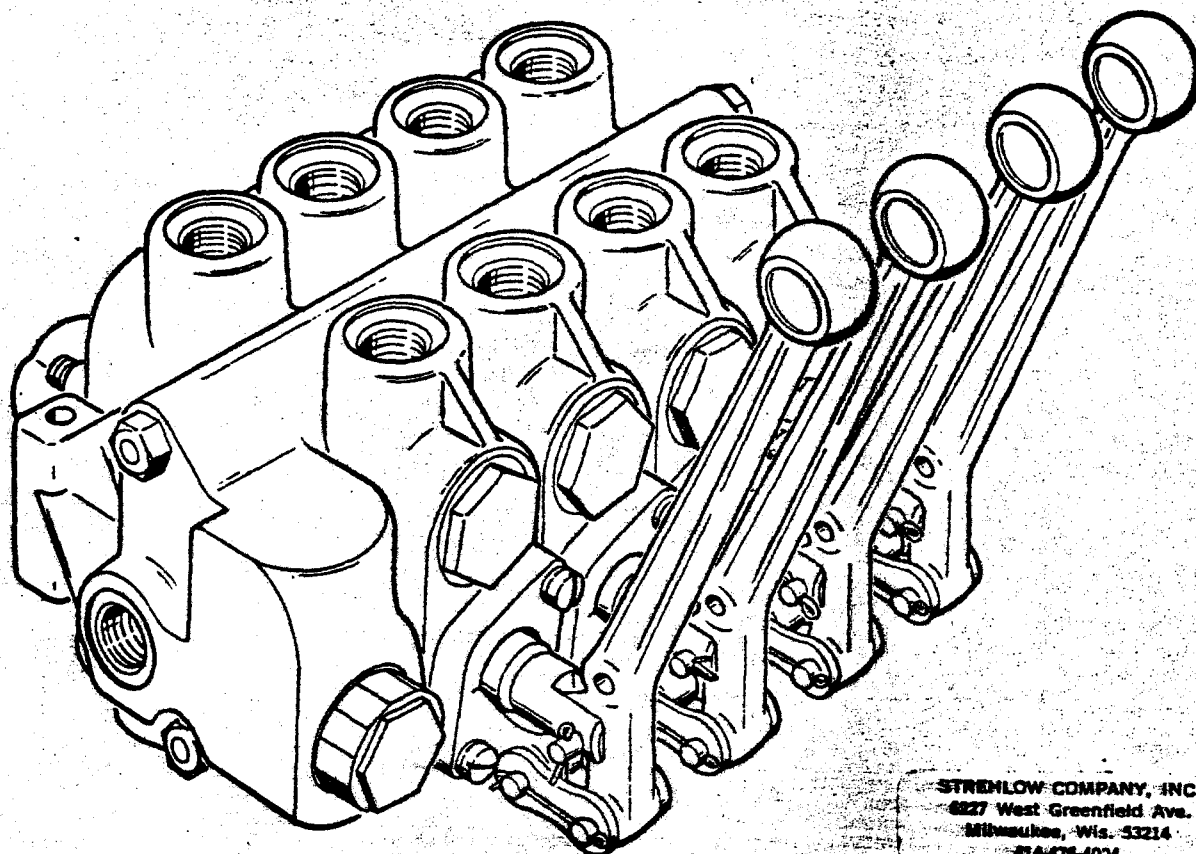


HYDRAULIC COMPONENTS

MODEL CP DIRECTIONAL CONTROL VALVE SECTIONAL BODY

SERVICE

MANUAL



STREHLOW COMPANY, INC.
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Milwaukee, Wis. 53214
414-478-4034

☐ MOBILE ☐ INDUSTRIAL ☐ AGRICULTURAL

SECTION I INTRODUCTION

This manual contains pertinent step-by-step maintenance instructions plus parts ordering information and a complete part and service kit listing for the Model CP Directional Control Valve.

If further assistance is required, contact:

Your Gresen Distributor or Representative.

SECTION II DESCRIPTION

The Model CP Directional Control Valve may be purchased with six different valve sections plus various options to meet the desired job specification.

The following paragraphs describe the six sections and any options with reference to the parts illustrations in Section IV in this manual.

NOTE:

After February 1, 1973, the main valve sections were revised to incorporate an easily changeable spool seal design, and a new section seal machining design. The new sections can be identified by the "rib" on the top of the casting on the "A" port end. See Chart.

	OLD PART NUMBERS (BEFORE FEB. 1, 1973)	NEW PART NUMBERS (AFTER FEB. 1, 1973)
Center Section	1814-000	6721-000
Center Section	1914-000	6732-000
Mid Inlet Section	1886-000	6825-000
Outlet Cover	1816-000	6770-000
Exhaust Seal	1621-001	6815-001
Pressure Seal	1859-001	6814-001

Numbers shown for sections and covers are base casting numbers, not ordering numbers. Refer to Parts Ordering Information, Section III, for ordering information.

4-WAY, 3-POSITION VALVE SECTION (Refer to Figure 4-2)

This section provides control of double-acting cylinders without the floating action plus hydraulic motor start, stop and reverse control where free-wheeling is NOT required. Cylinder ports are blocked in neutral position.

3-WAY, 3-POSITION VALVE SECTION (Refer to Figure 4-3)

This section 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 VALVE SECTION WITH PRESSURE DETENT RELEASE (Refer to Figure 4-4)

This section provides automatic return to neutral position as soon as work cycle is completed.

The spool is held in either power position by a detent assembly until released. When pressure in the power circuit reaches a predetermined setting, the detent assembly releases and the centering spring returns the spool to neutral.

4-WAY, 3-POSITION VALVE SECTION WITH PILOT-OPERATED CHECK ASSEMBLY (Refer to Figure 4-5)

This section combines the functions of a 4-way section and a pilot operated check, or lockout, valve in one valve housing.

Pilot operated checks are used where any fluid leakage through the control valve (cylinder port to tank port) would adversely effect the performance of the system.

Examples are: Clamping devices where any leakage would reduce the clamping pressure; outriggers which must be positioned firmly; elevated work platforms where leakage would cause the platform to settle.

4-WAY, 4-POSITION, FLOAT VALVE SECTION (Refer to Figure 4-6)

This section provides control of double-acting cylinders requiring a floating action such as: loaders, dozers, snow plows, etc.

Incorporated into the valve section is a 4-position float positioner. Three positions are standard double-acting with spring return to neutral. The fourth position is detented to hold control in float (both cylinder ports open to tank).

TANDEM (PRIORITY) SECTION, 3-WAY, 4-WAY, OR 4-WAY FLOAT (Refer to Figure 4-2)

This section allows any upstream valve sections to have priority. Only when the upstream sections are in neutral or metering position will oil be available to this section.

SPOOL ACTION OPTIONS:

A. SPRING RETURN TO NEUTRAL, (Standard). (Refer to Figure 4-8)

Spool will return to neutral position from A or B power position when handle is released.

B. "R" OPTION, Detent with Spring Return to Neutral (Refer to Figure 4-9)

Can be used on either 3-way, 4-way or free flow spool. Has detent position for either spool "in", spool "out" or 2-position detent for both spool "in" and spool "out" positions, with spring return to neutral position.

Recommended for hydraulic motors where the motor operates continuously in one direction (detent position) with only intermittent operation in the opposite direction.

C. "D" OPTION, 3-Position Detent (Refer to Figure 4-10)

Used when manual placement (NO spring return to neutral) is desired in any of three positions—spool in, spool out, and neutral. An optional detent stop (part no. 1889-001) may be used to convert spool action to "neutral" and "spool out" positions only or for "neutral" and "spool in" position only, thus giving a two-position spool action.

D. "A" OPTION, Spring Extended Spool (Refer to Figure 4-11)

This feature eliminates spring return to neutral. The spring returns to the spool "out" position only, usually used for cam operation of spool.

Customer must supply cam follower mechanism.

HANDLE ASSEMBLIES (Refer to Figures 4-13 through 4-16)

Provides choice of either horizontal or vertical handle assemblies.

INLET and OUTLET COVERS (Refer to Section III, Parts Ordering Information)

CYLINDER PORT CHECK and RELIEF VALVE OPTION (Refer to Figures 4-17 through 4-22)

SECTION III MAINTENANCE

REPLACING, ADDING OR REMOVING SECTION ASSEMBLIES

NOTE

For clarification, we shall call the inlet cover containing the main relief the left side of the valve assembly. Refer to Figure 3-1.

1. Before disassembly, it is suggested that each valve section be marked numerically to avoid incorrect reassembly.
2. Remove three assembly stud nuts (Item 19, Figure 4-1) from the right end section using a 9/16" thin wall socket.

3. Remove valve sections by sliding from assembly studs (Item 1, Figure 4-1).

4. If valve sections are to be added or removed, use the proper length assembly studs from the chart below.

No. of Sections	Stud Part No.
1	1841-001
2	1842-001
3	1843-001
4	1844-001
5	1845-001
6	1846-001
7	1847-001
8	1848-001
9	1849-001

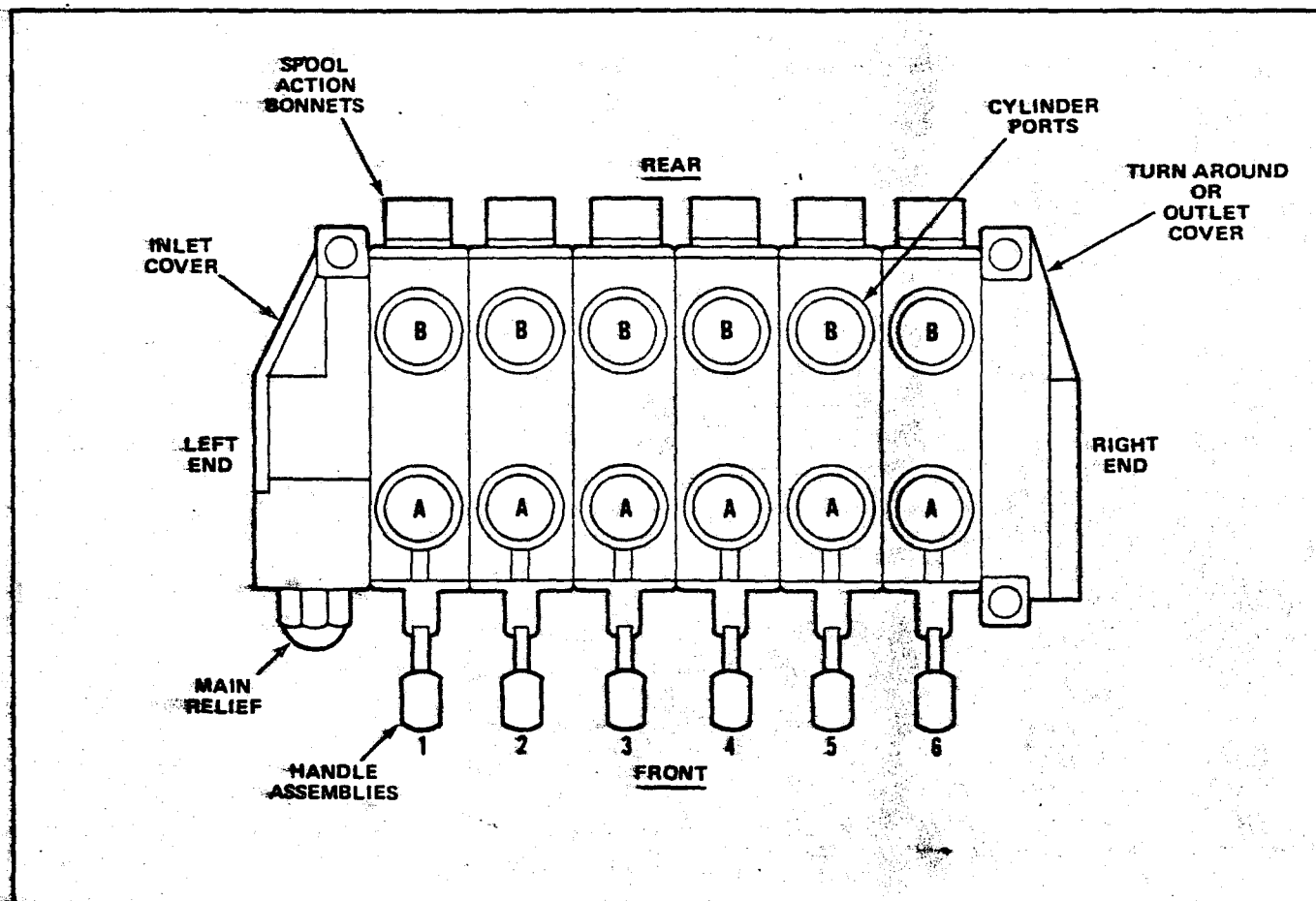


Figure 3-1. Schematic View of Typical Model CP Control Valve Assembly.

NOTE

Use assembly nuts (part no. 1856-001), six required, with all assembly studs. **NO LOCK WASHERS!** All studs are stress-proof material and should be replaced only with original equipment replacement parts.

5. Thoroughly clean O-ring counterbores and ground surfaces of each section.
6. Replace the four O-rings. For valves manufactured prior to February 1, 1973—use two 1621-001 and two 1859-001 seals per section. For valves manufactured after February 1, 1973—use two 6815-001 and two 6814-001 seals per section.
7. Replace valve sections on assembly studs in the same order in which they were removed. O-ring counterbores should be to the left when facing "A" port-end of valve.

NOTE

Use care in replacing valve sections to avoid dislodging O-rings from counterbores.

8. When all valve sections are positioned on assembly studs, replace stud nuts and tighten evenly to 20 ft. lbs. torque.

CAUTION

If stud nuts are not tightened to the proper torque, valve spools may bind or stick, or cause section seals to extrude.

REPLACING SPOOL SEALS

For valves manufactured after February 1, 1973. Valves are identified by casting no. 6721, 6732 or 7121 and by a rib adjacent to the "A" port.

Figure 3-2 shows spool assembly—less the complete handle assembly. When handle bracket is furnished, retainer plates and screws (items 1 and 4, Figure 3-2) are omitted. Seal assembly is retained by the handle bracket which will also retain the optional wiper seal.

1. Remove bonnet assembly parts from back of valves and keep in order of disassembly.

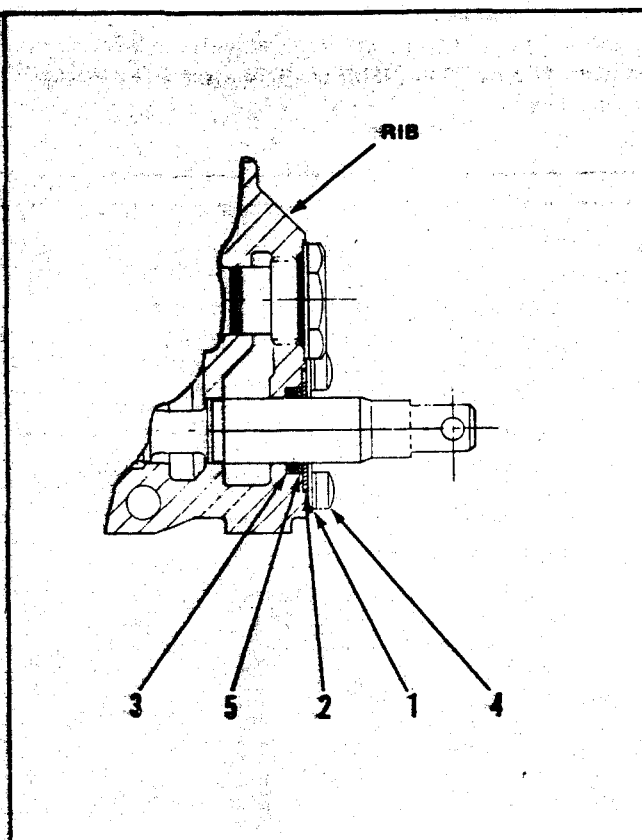


Figure 3-2. Spool Seal Assembly After February 1, 1973.

2. Remove all parts connected to the spool on the front of the valve, either the complete handle bracket assembly, or the seal retainer assembly if a handle bracket is not furnished.

NOTE

DO NOT REMOVE the spool as the seals can be replaced externally. Prevent spool from turning or moving by inserting a screw driver through clevis slot, or running a rod through the pin hole and using as a handle. **DO NOT** hold the spool with a wrench. This will destroy the finish.

3. Remove retainer plate (Item 1, Figure 3-2), retainer plate washer (Item 2), back-up washer (Item 5), and spool seal (Item 3).
4. Thoroughly clean counterbore.
5. Lightly oil new seals. Slide over valve spool and insert in seal counterbore.

For valves manufactured prior to February 1, 1973. Valves are identified by 1814, 1900 or 1914 and the absence of a rib adjacent to "A" port.

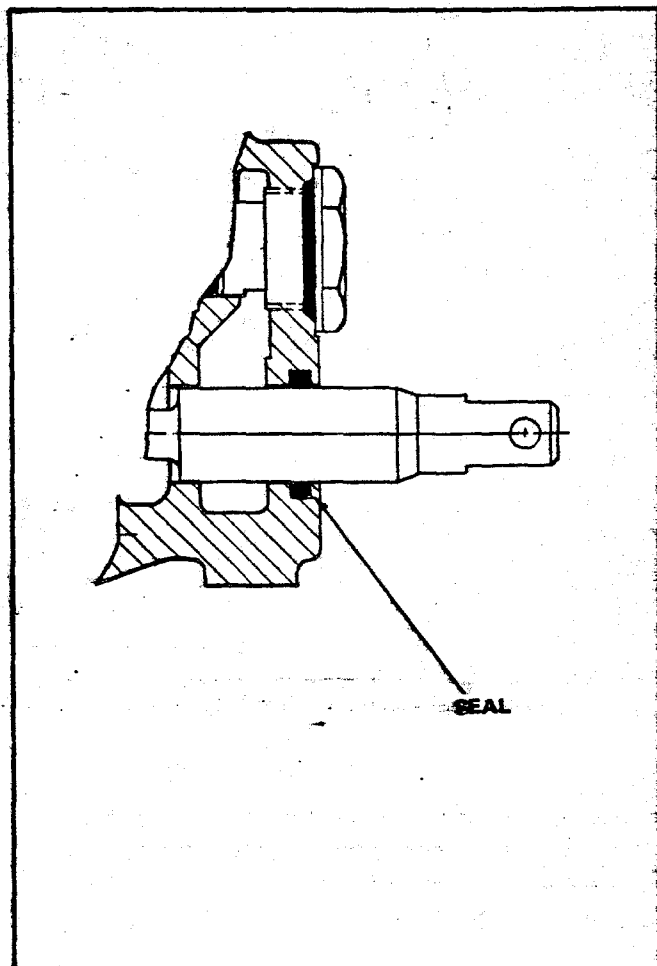


Figure 3-3. Spool Seal Assembly Prior to February 1, 1973.

1. Remove all bonnet assembly parts from back of valve and keep in order of disassembly.
2. Remove all parts connected to the spool on the front of valve, handle, etc.
3. Push spool into housing from the front of the valve until the front seal is exposed, then remove the front seal. Pull spool out of housing from front end, being very careful that neither spool nor bore is scratched or damaged in any way.

NOTE

Each spool must be reinstalled in the same valve section from which it was removed.

4. Remove back seal.
5. Thoroughly clean both seal grooves.
6. Replace the spool through the front of the housing, being sure that the end having the internal thread enters the housing first. Push spool into the valve exposing the front seal groove. Insert a new 1129-001 seal in the front groove. Pinch one side of the seal causing the seal to bend into a shape slightly smaller than the seal groove in the valve. When the seal has been properly placed in the seal groove, straighten the seal by running a smooth rod around the exposed surface of the seal until a perfect fit is obtained. To check, run your finger around the exposed edge of the seal. You should have a smooth perfect ridge with no kinks or twists.
7. Apply a small amount of oil on the 1129-001 seal to prevent it from tearing during assembly.
8. Pull the spool out toward the front of the valve until the spool handle end is exposed. Pull the spool slowly past the seal with a twisting motion to assist the movement. Continue to pull the spool until the back spool seal groove is exposed.

NOTE

DO NOT pull the spool too far as this will allow the seal in the front groove to enter a spool groove and cut the seal when the spool is pushed back.

9. Install the new back seal in the same manner as the front seal taking care that the seal is not twisted or cut.
10. Push the spool into the housing past the seal with a twisting motion until 5/16" of the polished surface of the spool remains exposed on the front of the valve.
11. Reassemble all parts disassembled in step two.
12. Reassemble, in reverse order, all parts disassembled in step one. Use 12 ft. lbs. torque to tighten 1812-001 assembly screw or 1840-001 detent holder.

PARTS ORDERING INFORMATION

Service kits are available for servicing the CP Sectional Valve. Use kit numbers and part numbers shown in the following chart.

Section Part No.	Seal Kits Contains all seals necessary for one section for standard, 3-way and 4-way valves, including 1-set of section seals.	Seal Kits Contains all seals necessary for one float section, including 1-set of section seals.	Section Seal Part No.	Outlet Cover Part No.
1814, 1900 or 1914	FOR VALVES MANUFACTURED PRIOR TO FEBRUARY 1, 1973			1816
	K-6001	K-6002	1621-001 (2 req'd.) 1859-001 (2 req'd.) Identified by non-permanent white mark	
6721, 6732, or 7121 Identified by rib adjacent to "A" port	FOR VALVES MANUFACTURED AFTER FEBRUARY 1, 1973			6770
	K-6027	K-6028	6815-001 (2 req'd.) 6814-001 (2 req'd.) Orange mark removed May, 1974	

Notes:

1. Old and new sections and covers are interchangeable within a valve assembly. However, section seals are not interchangeable with the old and new models.
2. Only the new sections will be available after February 1, 1973.

INLET COVERS – Two Inlet Covers are available.

All inlet covers are machined to accept the model WC relief cartridge. If outlet port is not machined, then the outlet port in the right end section of the valve must be used for tank return line. The inlet cover may be machined with several different combinations of port sizes and locations.

Use the porting charts listed below to arrive at the desired machining modification number. NPT and SAE threads cannot be intermixed in the same casting.

Inlet cover, part no. 1815, has an end inlet port and may have either a top or end-outlet port.

Machining Modification Chart For Inlet Cover, Part No. 1815

All Covers listed include a 1/4"-18 NPT gage port.

Port Location	NPT							SAE							
End In	1/2	1/2	3/4	3/4	3/4	1/2	1/2	10	10	10	12	12	12	10	10
Top Out	1/2			3/4		3/4			10			12			12
End Out		1/2			3/4		3/4			10			12	12	
Machining Modification Number	055	008	005	013	001	009	056	003	046	053	004	057	007	059	058

ORDERING EXAMPLE
FOR INLET COVER:

BASIC CASTING

COVER MACHINING
MODIFICATION

RELIEF VALVE
DETAILS*

1815

057

WC 2000PSI CRACK

*Specify model number of relief valve to be installed; either WC or WCA. Specify relief setting required.

OR

Specify "NR" (no relief) plug installed.

OR

Specify "PSP" plastic shipping plug, installed in relief cavity.

Example: If a left cover with a SAE 12 inlet and SAE 12 top outlet with WC relief set at 2000 PSI cracking is required, order 1815-057-WC 2000 PSI crack.

Inlet cover, part number 1862, has top inlet and top outlet ports. If top outlet port is not machined, the outlet port in the right end section must be used for tank return line. The inlet cover may be machined with several combinations of port sizes and locations. Specify port size by using machining modification number.

NOTE: NPT and SAE ports cannot be intermixed in one casting. Below are listed the available inlet and outlet port sizes.

Machining Modification Chart Inlet Cover, Part No. 1862.

All covers listed include a 1/4"-18 NPT gage port.

Location	NPT			SAE		
	1/2	1/2	3/4	10	10	12
Top In	1/2	3/4	3/4	10	12	12
Top Out	1/2	3/4	3/4	10	12	12
Machining Modification Number	029	007	008	028	030	020

ORDERING EXAMPLE 1862 030 WCA 2000PSI CRACK
 FOR INLET COVER:
 BASIC CASTING
 COVER MACHINING
 MODIFICATION
 RELIEF VALVE
 DETAILS*

*Specify model number of relief valve to be installed; either WC or WCA.

Specify relief setting required.

OR

Specify "NR" (no relief) plug installed.

OR

Specify PSP, plastic shipping plug, installed in relief cavity.

Example: If a left inlet cover with a SAE 10 inlet and a SAE 12 outlet with WCA relief set at 2000 PSI crack is required, order 1862-030-WCA 2000 PSI crack.

OUTLET COVER

If Power Beyond option is specified, optional outlet to tank must be provided in either the Outlet or Inlet Cover.

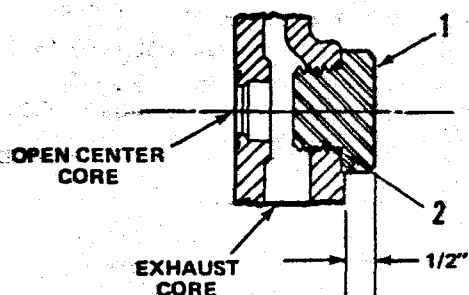
Machining Modification Chart For Outlet Cover, Part No. 6770.

Port Size Available	End Outlet Port Only	Machined for Power Beyond Sleeve, Closed Center Plug and Conversion Plug.	
		With End Outlet	No End Outlet
1/2-14 NPT	6770-004	6770-009	6770-007
3/4-14 NPT	6770-001	6770-005	
SAE 10 (7/8-14 UNF)	6770-002	6770-006	
SAE 12 (1-1/16 12 UNF)	6770-003	6770-013	

Outlet Cover Options

No. 1727 Conversion Plug

Provides for conversion from "Power Beyond" or "Closed-Center" usage to "Open-Center" or vice-versa.



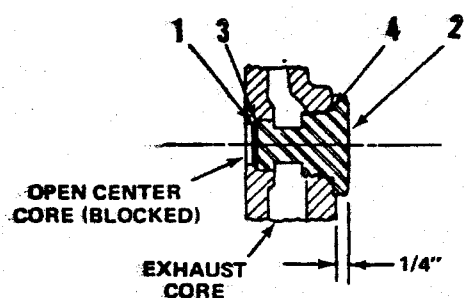
SERVICE KIT K-6016

(Contains 1 Each of Items 1 and 2)

Item No.	Part No.	Description	No. Required
1	1727-001	Conversion Plug	1
2	2709-001	O-Ring Seal	1

No. 1830 Closed-Center Plug Option.

Provides a "Closed-Center" System by plugging the open-center flow passage. It is normally used with a variable displacement pump.



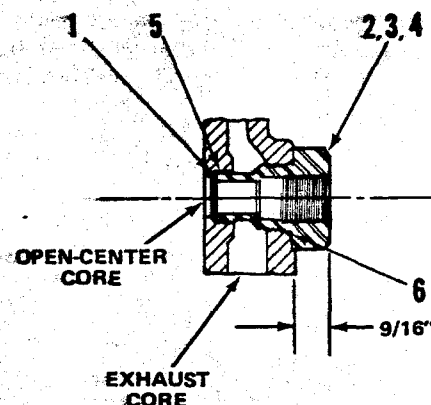
SERVICE KIT K-6015

(Contains 1 Each of Items 1, 2, 3 and 4)

Item No.	Part No.	Description	No. Required
1	1721-001	Seal	1
2	1830-001	Closed-Center Plug	1
3	1858-001	Back-Up Washer	1
4	2709-001	O-Ring Seal	1

No. 1833, 1835 or 1836 Power Beyond Sleeve Options.

Provides for proper hook-up of an additional valve "downstream". The Power Beyond Sleeve prevents subjecting the exhaust core of the valve to back pressure.



SERVICE KITS

K-6017 (1/2 NPT — Contains 1 Each of Items 1, 2, 5, 6)

K-6018 (SAE 8 — Contains 1 Each of Items 1, 3, 5, 6)

K-6019 (SAE 10 — Contains 1 Each of Items 1, 4, 5, 6)

Item No.	Part No.	Description	No Required
1	1721-001	Seal	1
2	1833-001	P.B. Sleeve (1/2-14 NPT)	1
3	1835-001	P.B. Sleeve SAE 8 (3/4-16 UNF)	1
4	1836-001	P.B. Sleeve SAE 10 (7/8-14 UNF)	1
5	1858-001	Back-Up Washer	1
6	2709-001	O-Ring Seal	1

NOTE

To convert from Power Beyond usage to "Open-Center" usage, NEVER ATTEMPT TO PLUG THE POWER BEYOND SLEEVE, as this would convert to "Closed-Center" Valve.

ORDERING EXAMPLE
FOR RIGHT COVER PLATE:

BASIC CASTING

COVER MACHINING

MODIFICATION

OPTION DETAILS

6770

006

Cover with SAE 8 Power
Beyond Sleeve Installed

Example: If a right cover with a SAE 10 outlet and a SAE 8 power beyond sleeve was required, then order per the above description.

CP Valve Center Section

The following information is necessary for proper specification for each CP Valve Center Section:

1. Function of Section
2. Options
3. Cylinder port sizes

4. Cylinder port "A" Options

5. Cylinder port "B" Options

6. Handle end Options

The chart shown below will help in identifying the Options available and the information needed for proper ordering.

Form 2060

FUNCTION OF SECTION	☐ 3-way (cylinder port on handle end will be plugged) } ☐ 4-way } Casting No. 6721 ☐ 4-way, Float } ☐ CP "LO" (pilot operated check) Casting No. 6732 ☐ 3-way Tandem Section } ☐ 4-way Tandem Section } Casting No. 7121
OPTIONAL FEATURES	☐ F—Free-Flow (motor spool) ☐ D—3-position Detent ☐ R—Detent Spool "in" position } ☐ RO—Detent Spool "out" position } Detent with Spring return to Neutral ☐ RIO—Detent Spool in and out position } ☐ KO—Hydraulic Detent Release (From "A" and "B" power position) ☐ A—Spring Extended option
CYLINDER PORT SIZES	☐ 3/8"-18 NPT ☐ SAE 8 (3/4-16 UNF) ☐ 1/2"-14 NPT ☐ SAE 10 (7/8-14 UNF) ☐ (Port sizes cannot be mixed in a valve section)
CYLINDER PORT "A" OPTIONS	☐ Relief RC ☐ Relief RCA ☐ Anti-Cavitation check (A-C) ☐ Combination relief and Anti-Cav. (CRA) ☐ Specify Relief setting: ☐ Crack _____ or Full Flow _____ GPM _____ PSI _____
CYLINDER PORT "B" OPTIONS	☐ Relief RC ☐ Relief RCA ☐ Anti-Cavitation check (A-C) ☐ Combination relief and Anti-Cav. (CRA) ☐ Specify Relief setting: ☐ Crack _____ or Full Flow _____ GPM _____ PSI _____
HANDLE-END OPTIONS	☐ Vertical handle, part no. 1802 ☐ Horizontal handle, part no. 3249 ☐ No handle ☐ Bracket Yes _____ No _____ ☐ Heavy duty retainer Yes _____ No _____ ☐ Handle position "A" port end _____ "B" port end _____ ☐ Float section Push handle to float _____ Pull handle to float _____ ☐ Secondary spool wiper Yes _____ No _____ (available on handle end only—Heavy duty retainer or handle bracket required to retain the wiper seal.)

SECTION IV PARTS LISTING

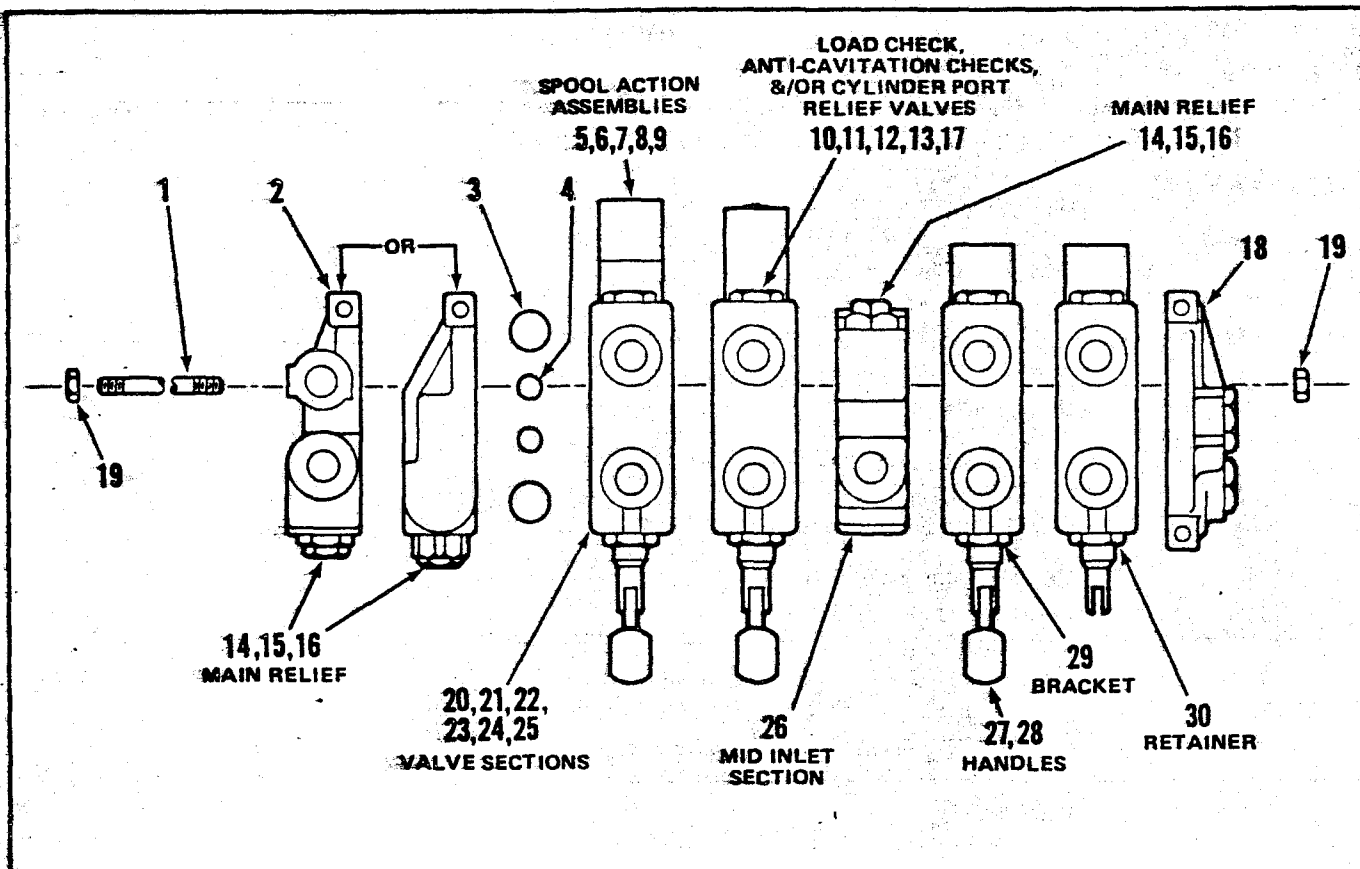


Figure 4-1. Model CP Directional Control Valve, Typical Main Assembly.

MODEL CP DIRECTIONAL CONTROL VALVE, TYPICAL MAIN ASSEMBLY

Item No.	Part No.	Description	Quantity Per Assembly
1	1841-001	STUD, 1-Section	3
	1842-001	STUD, 2-Section	3
	1843-001	STUD, 3-Section	3
	1844-001	STUD, 4-Section	3
	1845-001	STUD, 5-Section	3
	1846-001	STUD, 6-Section	3
	1847-001	STUD, 7-Section	3
	1848-001	STUD, 8-Section	3
	1849-001	STUD, 9-Section	3
2	1862-	COVER, Left (Refer to page 3-6)	1
	1815-	COVER, Left (Refer to page 3-5)	1
3	1621-001	O-RING, Exhaust, Large (Before February 1, 1973)	2 plus 2 per section
	6815-001	O-RING, Exhaust, Large (After February 1, 1973)	2 plus 2 per section

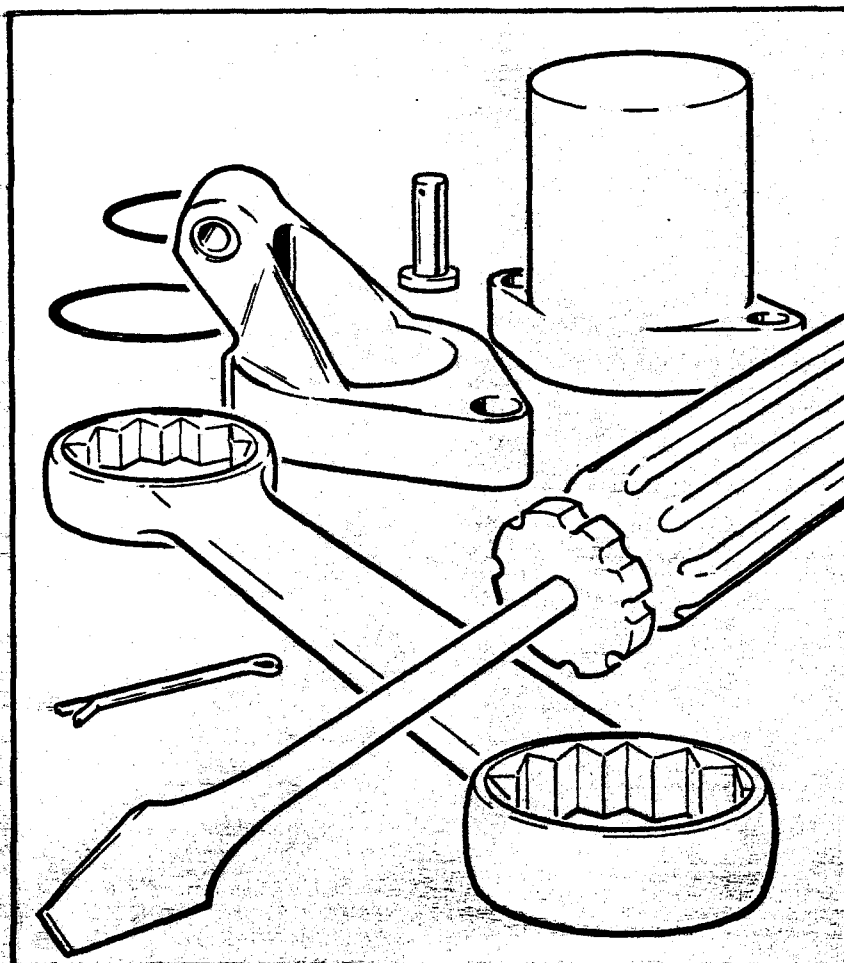
MODEL CP DIRECTIONAL CONTROL VALVE, TYPICAL MAIN ASSEMBLY (Continued)

Item No.	Part No.	Description	Quantity Per Assembly
4	1859-001	O-RING, Pressure, Small (Before February 1, 1973)	2 plus 2 per section
	6814-001	O-RING, Pressure, Small (After February 1, 1973)	2 plus 2 per section
5		POSITIONER, Float Detent, 4-Way, 4-Position (See Figure 4-7)	A/R
6		POSITIONER, Standard Spool (See Figure 4-8)	A/R
7		DETENT, Option "R", With Spring Return to Neutral (See Figure 4-9)	A/R
8		DETENT, Option "D", 3-Position (See Figure 4-10)	A/R
9		SPRING, Option "A", Extended Spool (See Figure 4-11)	A/R
10		CHECK, Anti-Cavitation (See Figure 4-18)	A/R
11		PLUG, Load Check (See Figure 4-17)	A/R
12		RELIEF (RC), Cylinder Port (See Figure 4-20)	A/R
		RELIEF (RCA), Cylinder Port (See Figure 4-21)	A/R
13		CHECK (CRA), Relief/Anti-Cavitation Combination (See Figure 4-22)	A/R
14		RELIEF (WCA) (See Figure 4-24)	A/R
15		RELIEF (WC), Poppet Type (See Figure 4-23)	A/R
16		NO RELIEF (NR), (See Figure 4-25)	A/R
17		CHECK, CP Pilot (See Figure 4-19)	A/R
18	6770	COVER, Right (See page 3-6)	1
19	1856-001	NUT, Stud	6
20	6721-	VALVE SECTION, 4-Way, 4-Position, Float (See Figure 4-6)	A/R
21	6721-	VALVE SECTION, 4-Way, 3-Position (See Figure 4-2)	A/R
22	6721-	VALVE SECTION, 3-Way, 3-Position (See Figure 4-3)	A/R
23	6732-	VALVE SECTION, 4-Way, 3-Position, with Pilot Operated Check (See Figure 4-5)	A/R
24	6721-	VALVE SECTION, 4-Way, 3-Position, with Pressure Detent Release (See Figure 4-4)	A/R
25	7121	VALVE SECTION, Tandem (See Figure 4-2)	A/R
26	6825-001	MID-INLET SECTION, Split Flow, Top Inlet 3/4-14 NPT	A/R
	6825-004	MID-INLET SECTION, Split Flow, Top Inlet 1/2-14 NPT	A/R
	6825-007	MID-INLET SECTION, Split Flow, Top Inlet SAE 12(1-1/16 12 UNF)	A/R
	6825-011	MID-INLET SECTION, Split Flow, Top Inlet SAE 10(7/8-14UNF)	A/R
	6825-005	MID-INLET SECTION, Combined Flow, Top Inlet 3/4-14 NPT	A/R
	6825-008	MID-INLET SECTION, Combined Flow, Top Inlet 1/2-14 NPT	A/R
	6825-013	MID-INLET SECTION, Combined Flow, Top Inlet SAE 10(7/8-14 UNF)	A/R
	6825-016	MID-INLET SECTION, Combined Flow, Top Inlet SAE 12(1-1/16 12 UNF)	A/R
	6825-002	MID-INLET SECTION, Top Cored Hole Plugged with 3/8-18 NPT Plug	A/R
27		HANDLE ASSEMBLY, Vertical (See Figure 4-15)	A/R
28		HANDLE ASSEMBLY, Horizontal (See Figure 4-16)	A/R
29		BRACKET, Standard Handle (See Figure 4-13)	A/R
30		RETAINER, Seal (See Figure 4-14)	A/R



GRESEN SERVICE KITS

**TO REPAIR AND REBUILD ALL
GRESEN HYDRAULIC COMPONENTS**



**REPRESENTED BY
STREHLOW
COMPANY, INC.**

**6227 West Greenfield Ave.
Milwaukee, Wis. 53214
414-476-4004**

SECTIONAL VALVES

MODEL CP DIRECTIONAL CONTROL VALVE

REFER TO PAGES 18-19-20 FOR MAIN RELIEF VALVE SERVICE KITS, WC & NO RELIEF PLUG ASSY. (NR)

SECTION SERVICE KITS FOR VALVES MFG'D. BEFORE FEB. 1, 1973				**	SEAL KIT 6721 FLOAT SECTION		K-6028-A	
**	SEAL KIT, 1814 STD. SECTION, 4 4 WAY, 3 WAY		K-6001		1 0807-001	Spool Seal		
	2 1129-001	Spool Seal			1 6806-001	Spool Seal		
	2 1818-001	Inner Check Plug Seal			1 1615-001	Seal		
	2 1819-001	Outer Check Plug Seal			2 1818-001	Inner Check Plug Seal		
	4 1820-001	Inner Back Up Washer			2 1819-001	Outer Check Plug Seal		
	2 1821-001	Outer Back Up Washer			4 1820-001	Inner Back Up Washer		
	2 2707-001	Plug Seal			2 1821-001	Outer Back Up Washer		
	2 1621-001	Exhaust Seal			2 2707-001	Check Plug Seal		
	2 1859-001	Pressure Seal			2 6815-001	Exhaust Section Seal		
**	SEAL KIT, 1814 FLOAT SECTION		K-6002		2 6814-001	Pressure Section Seal		
					1 1800-001	Spool Wiper		
**	SEAL KIT # 1900 LEVELING SECTION		K-6026		1 1853-001	Seal		
	2 2707-001	Seal O-Ring			1 1853-001	Seal		
	2 1129-001	Seal Quad Ring			1 3265-001	Back Up		
	1 2705-001	Seal O-Ring			6721, 6732 HOUSING SEAL KIT			K-6035
	2 1621-001	Exhaust Seal			2 0807-001	O-Ring Seal		
	2 1859-001	Pressure Seal			2 3265-001	Back Up Washer		K-6029
	1 1818-001	Check Seal			6721 SECTION HEAVY DUTY RETAINER KIT			
	1 1910-001	Check Seal			1 6802-001	Seal Plate		
					2 0562-001	Screw, Sims 1/4 x 5/8		
		1 1857-001	Pin					
**	1814 & 1900 SECTION SEAL KIT		K-6036		1 0086-001	Pin	K-6033	
	2 1129-001	Quad Ring Seal			1 1800-001	Spool Wiper		
					1 6552-001	Plate		
SECTION SERVICE KITS FOR VALVES MFG'D. AFTER FEB. 1, 1973				**	6721-6732 SECTIONS STD. RETAINER KIT		K-6033	
**	SEAL KIT 6721 STD. SECTION 3 WAY, 4 WAY		K-6027		1 6552-001	Seal Plate	K-6056	
	2 0807-001	Spool Seal			2 0562-001	Screw, Sims 1/4 x 5/8		
	2 1818-001	Inner Check Plug Seal			SPOOL PROTECTOR BOOT KIT		K-6039	
	2 1819-001	Outer Check Plug Seal			1 7624-001	Breather Washer		
	4 1820-001	Inner Back Up Washer			2 0562-001	Screw		
	2 1821-001	Outer Back Up Washer			1 7623-001	Boot Retainer		
	2 2707-001	Check Plug Seal			1 7622-001	Dust Boot	K-6040	
	2 6815-001	Exhaust Section Seal			LOCKOUT CHECK SEAL KIT (ONE SIDE ONLY)			
	2 6814-001	Pressure Section Seal			1 0449-001	O-Ring Seal		
**	FLOAT SECTION SPOOL SEAL KIT		K-6034-B		1 2707-001	O-Ring Seal		
	1 3265-001	Back Up Washer			1 1819-001	O-Ring Seal		
	1 1129-001	Quad Ring Seal			1 1821-001	Back Up Washer		
	1 0807-001	O-Ring Seal			1 1818-001	O-Ring Seal		
	1 6806-001	O-Ring Seal			1 3092-001	Back Up Washer		
	1 7749-001	O-Ring Seal			PRESSURE DETENT RELIEF SEAL KIT			
1 1853-001	Quad Ring Seal	1 7684-001	O-Ring Seal	K-6040				
		1 7685-001	O-Ring Seal					
		1 7749-001	O-Ring Seal					
		1 1853-001	O-Ring Seal					

**Kits will seal one section only. If seals are needed to seal a six section valve order six kits.

***Kits will seal one section only. If seals are needed to seal a six section valve order six kits.

MODEL CP DIRECTIONAL CONTROL VALVE

SPOOL ACTION OPTION KITS

"RIO" DETENT - 2 POSITION		K-6009
1 510-001	Screw	
1 1499-001	Lockwasher	
1 509-001	Washer	
1 1874-001	Stop Collar	
1 1773-001	Ball Follower	
1 3091-001	Std. Cent. Spring	
1 1809-001	Stop Collar	
1 1899-001	Bonnet	
1 6220-001	Sleeve	
4 1700-001	Carbon Steel Ball	
1 1872-001	Holder	
2 1808-001	Screw	
1 1634-001	Spring Standard	
1 6756-001	Sleeve	

"R" DETENT (IN POSITION)		K-6010
1 510-001	Screw	
1 1499-001	Lockwasher	
1 509-001	Washer	
1 1874-001	Stop Collar	
1 1773-001	Ball Follower	
1 3091-001	Std. Cent. Spring	
1 1809-001	Stop Collar	
1 1899-001	Bonnet	
1 6221-001	Sleeve	
4 1700-001	Carbon Steel Ball	
1 1872-001	Detent Holder	
2 1808-001	Screw	
1 1634-001	Std. Detent Spring	
1 6756-001	Sleeve	

"RO" DETENT (OUT POSITION)		K-6011
1 510-001	Screw	
1 1499-001	Lockwasher	
1 509-001	Washer	
1 1874-001	Stop Collar	
1 1773-001	Follower	
1 3091-001	Std. Cent. Spring	
1 1809-001	Stop Collar	
1 1899-001	Bonnet	
1 6222-001	Sleeve	
1 1872-001	Holder	
2 1808-001	Screw	
1 1634-001	Std. Detent Spring	
4 1700-001	Carbon Steel Ball	
1 6756-001	Sleeve	

3 POSITION DETENT OPTION		K-6012
2 023-001	Ball	
1 1837-001	Lockwasher	
1 1838-001	Spring	
1 6812-001	Sleeve	
1 1840-001	Holder	
1 1811-001	Bonnet	
2 1808-001	Bonnet Screw	

"A" SPRING EXTENDED OPTION		K-6013-B
1 1761-001	Return Spring	
1 1824-001	Bonnet	
1 1860-001	Stop Collar	
2 1808-001	Bonnet Screw	
1 6756-001	Sleeve	
1 1813-001	Lockwasher	
1 1812-001	Cap Screw	

"K" FLOAT POSITIONER OPTION

1 7749-001	O-Ring
4 1700-001	Steel Ball
1 1824-001	Float Bonnet
2 1826-001	Stop Collar
1 1827-001	Detent Sleeve
1 1828-001	Ball Follower
1 1829-001	Detent Spring
1 1852-001	Retaining Ring
1 1853-001	Spool Seal
2 1808-001	Bonnet Screw
1 3091-001	Spring

STANDARD SPRING RETURN TO NEUTRAL

1 3091-001	Return Spring
2 1809-001	Spring Collar
1 1812-001	Assembly Screw
1 1811-001	Bonnet
1 1810-001	Spool Collar
1 1813-001	Lockwasher
2 1808-001	Bonnet Screw

CYLINDER PORT OPTION KITS

REFER TO PAGE 18 FOR KITS COVERING CYLINDER PORT RELIEF VALVES, MODELS, RC-RCA-CRA.

COMPLETE ANTI-CAV KIT (FOR ONE PORT)

1 071-001	Ball
1 1818-001	O-Ring
1 1819-001	O-Ring
2 1820-001	Inner Back Up Washer
1 1821-001	Outer Back Up Washer
1 1822-001	Check Body
1 1823-001	Check Ball Retainer
1 2707-001	O-Ring
1 2781-001	Steel Check
1 1868-001	Check Spring

CHECK PLUG KIT (ONE SIDE ONLY)

1 2707-001	O-Ring
1 1821-001	Outer Back Up Washer
1 1819-001	Outer O-Ring
1 1868-001	Lift Check Spring
2 1820-001	Inner Back Up Washer
1 1818-001	Inner O-Ring
1 2781-001	Check Poppet
1 1817-001	Check Body

LOCKOUT CHECK (ONE SIDE ONLY)

1 3092-001	Back Up Washer
1 1818-001	O-Ring
1 071-001	Ball
1 1581-001	Spring
1 2707-001	O-Ring
1 449-001	O-Ring
1 215-001	Check Body
1 216-001	Cap
1 1819-001	O-Ring Seal
1 1821-001	Back Up Washer

* For 1814 lock-out section only. Cannot be installed on 1814 section to convert to lock-out option.

MODEL CP DIRECTIONAL CONTROL VALVE

SEAL KIT, CHECK PLUG ANTI-CAV OPTION (ONE SIDE ONLY)		K-6032	HANDLE AND BRACKET KITS	
1 2707-001	O-Ring Seal		VERTICAL HANDLE ASSEMBLY	
1 1819-001	O-Ring Seal (Outer)		1 1801-001	Bracket
1 1821-001	Back Up Washer (Outer)		2 1808-001	Screw
1 1818-001	O-Ring Seal (Inner)		1 5032-928-001	Link
2 1820-001	Back Up Washer (Inner)	1 929-001	Cotter Pin	
CHECK PLUG KIT, STEEL BODY SPECIAL (ONE SIDE ONLY)		K-6030	1 086-001	Cotter Pin
1 2707-001	O-Ring Seal		1 1857-001	Pin
1 1821-001	Back Up Washer (Outer)		1 1802-001	Handle
1 1819-001	O-Ring Seal (Outer)		HORIZONTAL HANDLE ASSEMBLY	
1 1868-001	Lift Check Spring		1 3249-001	Handle
2 1820-001	Back Up Washer (Inner)	1 1801-001	Bracket	
1 1818-001	O-Ring Seal (Inner)	2 1808-001	Screw	
1 2781-001	Check Poppet	1 5032-928-001	Link Assembly	
1 3411-001	Check Body (Steel)	1 929-001	Cotter Pin	
OUTLET PORT OPTION KITS POWER BEYOND & CLOSED CENTER PLUG SEAL KIT ONLY		K-6025	1 086-001	Cotter Pin
1 1721-001	O-Ring		1 1857-001	Pin
1 1858-001	Back Up Washer		HANDLE BRACKET ASSEMBLY	
1 2709-001	O-Ring		1 1801-001	Bracket
			2 1808-001	Screw
CLOSED CENTER OPTION		K-6015	1 1857-001	Handle Pin
1 1721-001	Seal		1 0086-001	Cotter Pin
1 1830-001	Closed Center Plug		*Valves cannot be converted in the field to power beyond operation unless castings have been previously machined for power beyond option.	
1 1858-001	Back Up Washer		VENT VALVE	
1 2709-001	O-Ring		1 1823-001	Retainer
CONVERSION PLUG OPTION		K-6016	1 7099-001	Body
1 1727-001	Plug		2 3702-001	Pin
1 2709-001	O-Ring		1 7113-001	Pin
			1 7114-001	Actuator
			1 3191-001	Seal
POWER BEYOND OPTION (1/2"NPTF)		K-6017	1 1821-001	Washer
1 1721-001	Seal		1 1819-001	Seal
1 1833-001	Power Beyond Sleeve		2 1820-001	Washer
1 1858-001	Back Up Washer		1 1818-001	Seal
1 2709-001	O-Ring		1 2707-001	Seal
POWER BEYOND OPTION (SAE 8)		K-6018	PISTON AND CYLINDER KIT	
1 1721-001	Seal		1 1705-001	Piston
1 1835-001	Power Beyond Sleeve		1 3159-001	Piston Pin
1 1858-001	Back Up Washer		1 1708-001	Cylinder
1 2709-001	O-Ring		COMPLETE SEAL KIT	
POWER BEYOND OPTION (SAE 10)		K-6019	1 2710-001	O Ring Seal
1 1721-001	Seal		1 2917-001	Back Up
1 1836-001	Power Beyond Sleeve		1 1785-001	Back Up
1 1858-001	Back Up Washer		1 7552-001	Back Up
1 2709-001	O-Ring		1 0926-001	O Ring Seal
			1 1783-001	Back Up
			1 1698-001	O Ring Seal
			1 0449-001	O Ring Seal
			1 2705-001	O Ring Seal

*Valves cannot be converted in the field to power beyond operation unless castings have been previously machined for power beyond option.

MODEL CP DIRECTIONAL CONTROL VALVE

VITON SEAL KITS

CHECK PLUG KIT W/VITON SEALS (ONE SIDE ONLY)		K-6044	VITON SEAL KIT RC RELIEF		K-6041
CHECK ONE SIDE	1 7448-001 Viton Seal 1 1821-001 Back Up (Outer) 1 7445-001 Viton Seal (Outer) 1 1868-001 Check Spring 2 1820-001 Back Up (Inner) 1 7444-001 Viton Seal (Inner) 1 2781-001 Steel Check 1 1817-001 Body		CP CS	1 7444-001 Viton Seal 1 7445-001 Viton Seal 2 7448-001 Viton Seal 2 1820-001 Back Up (Inner) 1 1821-001 Back Up (Outer)	
NR MAIN RELIEF OPTION W/VITON SEALS		K-6045	VITON SEAL KIT WC RELIEF		K-6042
CP CS	1 1668-001 Plug 1 7446-001 Viton Seal 1 1851-001 Back Up 1 7447-001 Viton Seal		CP CS	1 7447-001 Viton Seal 1 7446-001 Viton Seal 1 1851-001 Seal Back-Up 1 7448-001 Viton Seal	
VITON SEAL KIT 6721, STD. SECTION 3 WAY, 4 WAY		K-6046	SPOOL SEAL KIT 6721, 6732 HOUSINGS		K-6048
	2 7449-001 Viton Spool Seal 2 7444-001 Viton Inner Check Plug Seal 2 7445-001 Viton Outer Check Plug Seal 4 1820-001 Back Up (Inner) 2 1821-001 Back Up (Outer) 2 7448-001 Viton Seal, Check Plug 2 7451-001 Viton Exh. Sect. Seal 2 7450-001 Viton Press. Sect. Seal 1 1800-001 Spool Wiper			2 7449-001 Viton Seal 2 3265-001 Back Up	
STEEL CHECK PLUG KIT W/VITON SEALS (ONE SIDE ONLY)		K-6047	VITON SEAL KIT ANTI-CAV OPTION (ONE SIDE ONLY)		K-6043
STEEL SEALS	1 7448-001 Viton Seal 1 1821-001 Back Up (Outer) 1 7445-001 Viton Seal (Outer) 1 1868-001 Check Spring 2 1820-001 Back Up (Inner) 1 7444-001 Viton Seal (Inner) 1 2781-001 Check Poppet 1 3411-001 Steel Body			1 071-001 Ball 1 7444-001 Viton Seal 1 7445-001 Viton Seal 2 1820-001 Back Up (Inner) 1 1821-001 Back Up (Outer) 1 1822-001 Anti-Cav Body 1 1823-001 Ball Retainer 1 7448-001 Viton Seal 1 2781-001 Steel Check 1 1868-001 Check Spring	
VITON SEAL KIT 6721 FLOAT SECT.		K-6049	POWER BEYOND OPTION (SAE NO. 10W/VITON SEALS)		K-6055
	1 7449-001 Viton Spool Seal 1 7614-001 Viton Spool Seal 1 7447-001 Viton Seal 2 7444-001 Inner Check Plug Seal Viton 2 7445-001 Outer Check Plug Seal Viton 4 1820-001 Inner Back Up 2 1821-001 Outer Back Up 2 7448-001 Viton Check Plug Seal 2 7451-001 Viton Exh. Seal 2 7450-001 Viton Press. Sect. Seal 1 1800-001 Spool Wiper 1 7613-001 Viton Quad Seal 1 3285-001 Back Up		CP CS	1 7612-001 Viton Seal 1 1836-001 P B Sleeve 1 1858-001 Back Up 1 6277-001 Viton Seal	
			CP CS	1 7612-001 Viton Seal 1 1835-001 P B Sleeve 1 1858-001 Back Up 1 6277-001 Viton Seal	K-6054
			CP CS	1 7612-001 Viton Seal 1 1833-001 P B Sleeve 1 1858-001 Back Up 1 6277-001 Viton Seal	K-6053
CONVERSION PLUG OPTION W/VITON SEALS		K-6052			
	1 1727-001 Conversion Plug 1 6277-001 Viton Seal		CP CS		