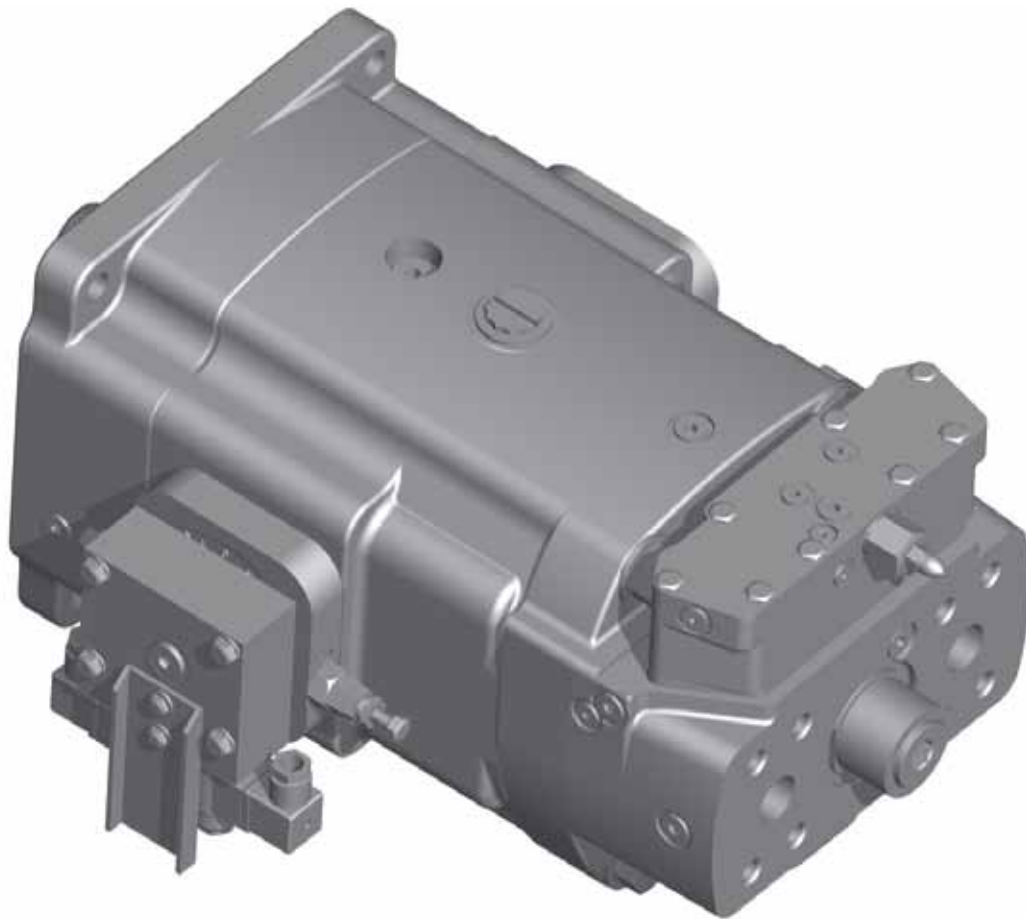




GOLD CUP® **Spare Parts and Exploded Views**

P11 & 14 Options

HY28-2677-03/GC/US

Effective: March 15, 2013

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

Hydraulic Pump Division and Denison Hydraulics

The Hydraulic Pump Division of Parker Hannifin was formed in 2004 when our significant piston pump business was expanded through the acquisition of **Denison Hydraulics**. The addition of **Denison** allowed us to marry the wealth of knowledge that both companies have in the design, manufacture, and application of piston products in both open circuit and closed circuit system applications. Since before WWII, **Denison** products have been chosen for Military test stand applications and for shipboard hydraulic applications being recognized as technology leaders.

The heavy duty **GOLD CUP®** series of pumps in this catalog represent a broadening of our product offering with hydrostatic transmission applications in marine, drilling, and shredding applications, among others. The tried and true design of the **GOLD CUP®** product line incorporates features such as integral servo and replenishing pump, hot oil shuttle, and a unique servo control system; all of which combine to provide a rugged self contained package which can withstand the harshest of conditions and continue to perform with trouble free long life.

The division is a leading worldwide manufacturer of hydraulic components and systems for earthmoving and construction vehicles; for mining equipment; for pulp and paper, chemical and other processing equipment; for ships and ordnance equipment; and for such in-plant machines as machine tools, plastic molding, die casters, and stamping presses.



DENISON	Hydraulics
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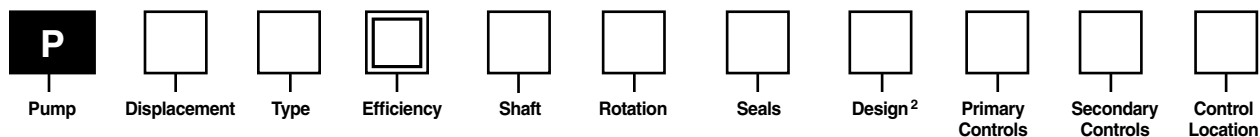
OFFER OF SALE

The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributor. This offer and its acceptance are governed by the provisions stated in the detailed "Offer of Sale" elsewhere in this document.

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Notes:

1. Parts list and associated drawings shown in this bulletin are for standard model pumps only. All documentation for special "M2" modification pump model numbers must be verified with a HPD Factory Representative prior to ordering parts for such products.
2. * Indicates Special Instructions or Considerations.
3. ** Indicates Common Parts.
4. N/A Indicates Not Available or Not Applicable.
5. All documentation shown in this bulletin is intended for P11/P14 design level "C" model pumps only. Refer to pump model number/ordering code to determine design level.
6. See ordering code for all configuration options.
7. All orientation references are described when viewing pump from main drive shaft with valve block up.
8. Assembly part numbers with - 0 suffixes, indicate Buna N (Nitrile) seal compound. For Ethylene Propylene, (EPR), compound, use - 4 suffix. For Fluorocarbon compound use - 5 suffixes.
9. Detail part numbers for O-rings with 671 / 691 prefix, indicate Buna N (Nitrile) seal compound. For Ethylene Propylene, (EPR), compound, use 674 / 694 prefix. For Fluorocarbon compound use 675 / 695 prefix.
10. Drawings with items marked with double balloons "◎", indicate assemblies.



Code	Displacement
6	6.00 in³/rev (98 cc/rev)
7	7.25 in³/rev (119 cc/rev)
8	8.00 in³/rev (131 cc/rev)
11	11.0 in³/rev (180 cc/rev)
14	14.0 in³/rev (229 cc/rev)
24	24.6 in³/rev (403 cc/rev)
30	30.6 in³/rev (501 cc/rev)

Code	Type
F	Fixed Displacement, Open/Closed Circuit
M	Fixed Displacement with High Torque Thru-Drive, Open/Closed Circuit
P	Variable Displacement, Closed Circuit
X	Variable Displacement with Medium Torque Thru-Drive, Closed Circuit
S	Variable Displacement with Medium Torque Thru-Drive & Shuttle Package, Closed Circuit
R	Variable Displacement with High Torque Thru-Drive, Closed Circuit
L	Variable Displacement with High Torque Thru-Drive & Shuttle Package, Closed Circuit
V	Variable Displacement, Open Circuit (P6, 7, 8, 11 & 14 only)
D	Variable Displacement, Open & Closed Circuit (P6, 7 & 8 only)

Code	Efficiency
H	High Efficiency (P24 only)
Omit	Standard Efficiency

Code	Shaft
2	Keyed SAE – Mechanical Shaft Seal (Single Lip Seal on P6, 7, 8F/M)
3	Splined SAE – Mechanical Shaft Seal (Single Lip Seal on P6, 7, 8F/M)
4	Keyed SAE-D (Mounting & Shaft) – Mechanical Shaft Seal (P6, 7 & 8 only, Single Lip Seal on Fixed Displacement Pumps)
-5	Splined SAE-D (Mounting & Shaft) – Mechanical Shaft Seal (P6, 7 & 8 only, Single Lip Seal on Fixed Displacement Pumps)
7	Keyed SAE – Double Lip Shaft Seal
8	Splined SAE – Double Lip Shaft Seal
9	Keyed (long) SAE – Double Lip Shaft Seal
10	Keyed (long) SAE – Mechanical Shaft Seal

Code	Rotation
R	Clockwise
L	Counterclockwise

Code	Seals
1	Nitrile (Buna-N)
4	EPR 1,3
5	Fluorocarbon

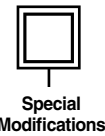
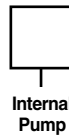
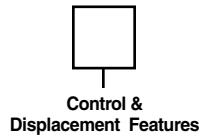
Code	Primary Controls
Omit	None (Fixed Displacement only)
10	Screw Adjustment (Spring Offset to Maximum Displacement)
2A	Cylinder Control w/Adjustable Maximum Volume Stops
2H	Cylinder Control – 3-Position (Spring Control with Zero Adjustment)
2M	Cylinder Control – 2-Position Electrohydraulic w/Adjustable Maximum Volume Stop (Spring Offset to Maximum Displacement) ¹
2N	Cylinder Control – 3-Position (Spring Centered) Electrohydraulic ¹
40	Rotary Servo – Spring Centered
4A	Rotary Servo – Spring Centered w/ Adjustable Maximum Volume Stops
4B	Rotary Servo – Spring Centered w/ Automatic Brake Control
4C	Rotary Servo – Spring centered w/ Adjustable Maximum Volume Stops & Automatic Brake Control
5A	Electrohydraulic Stroker w/Adjustable Maximum Volume Stops ¹
5C	Electrohydraulic Stroker w/Adjustable Maximum Volume Stops & Automatic Brake Control ¹
7D	High IQ with 10 GPM Servo Valve & Volume Indicator ¹
7F	High IQ with 10 GPM Servo Valve & 4A (Rotary Servo) Control ¹
7J	High IQ with DF+ Valve & Volume Indicator ¹
7K	High IQ with DF+ Valve & 4A (Rotary Servo) Control ¹
8A	Hydraulic Stroker w/Adjustable Maximum Volume Stops
8C	Hydraulic Stroker w/Adjustable Maximum Volume Stops & Automatic Brake Control
9A	Electrohydraulic Stroker w/Adjustable Maximum Volume Stops ¹
9C	Electrohydraulic Stroker w/Adjustable Maximum Volume Stops & Automatic Brake Control ¹
9D	Electro-hydraulic stroker w/ adjustable maximum volume stops

Code	Secondary Controls
Omit	None (Fixed Displacement only)
2	Volume Indicator
4	Torque Limiter & Volume Indicator
6	Cam Position Feedback Potentiometer ¹
7	Cam Position Feedback RVD (AC) ¹
8	Cam Position Feedback RVD (DC) ¹

Code	Control Location
Omit	None (Fixed Displacement only)
A	Primary Control on Port A Side
B	Primary Control on Port B Side

- 1 Not ATEX approved.
2 Assigned by manufacturer
3 Not available when using "5A" or "5C" primary controls. Pump will be unpainted unless otherwise specified.

 = Omit if not required



Control	Code	Control & Displacement Features
2M* & 2N*	00	CETOP3, NG6 Valve, 110AC/60Hz with Hirschmann Connector ¹
	01	CETOP3, NG6 Valve, 12VDC with Hirschmann Connector ¹
	02	CETOP3, NG6 Valve, 240VAC/50Hz with Hirschmann Connector ¹
	03	CETOP3, NG6 Valve, 110VAC/60Hz, Wiring Box ¹
	04	CETOP3, NG6 Valve, 12VDC, Wiring Box ¹
	05	CETOP3 (D03, NG6) Interface, No Valve ¹
	06	CETOP3, NG6 Valve, 24VDC with Hirschmann Connector ¹
	07	CETOP3, NG6 Valve, 110VAC/50Hz with Hirschmann Connector ¹
5**	00	With Deadband ¹
	01	Without Deadband ¹
7**	00	Without Manual Override Shutoff ¹
	01	With Manual Override Shutoff ¹ (required for F & K primary options)
8**	00	75-350 PSI (5-24 Bar)
	01	75-435 PSI (5-30 Bar)
	02	100-375 PSI (7-26 Bar)
	03	150-400 PSI (10-28 Bar)
	04	75-250 PSI (5-17 Bar)
g**	00	24VDC
	01	12VDC
All Other	00	None ¹
Pump	Code	Reduced Displacement
P**F & P**M	00	Standard Cam (19°)
	10	P6 with 17° Cam – 5.3 in ³ /rev (87cc/rev) P7 with 17° Cam – 6.4 in ³ /rev (105 cc/rev) P8 with 17° Cam – 7.1 in ³ /rev (116 cc/rev) P11 with 17° Cam – 9.7 in ³ /rev (160 cc/rev) P14 with 17° Cam – 12.5 in ³ /rev (205 cc/rev) P24 with 17° Cam – 22.0 in ³ /rev (360 cc/rev) P30 with 17° Cam – 27.2 in ³ /rev (446 cc/rev)
	20	P6 with 15° Cam – 4.6 in ³ /rev (76 cc/rev) P7 with 15° Cam – 5.6 in ³ /rev (92 cc/rev) P8 with 15° Cam – 6.2 in ³ /rev (102 cc/rev) P11 with 15° Cam – 8.5 in ³ /rev (140 cc/rev) P14 with 15° Cam – 10.9 in ³ /rev (179 cc/rev)
	30	P6 with 13° Cam – 4.0 in ³ /rev (66 cc/rev) P7 with 13° Cam – 4.8 in ³ /rev (79 cc/rev) P8 with 13° Cam – 5.3 in ³ /rev (88 cc/rev)

Code	Internal Pump
0	1.07 in ³ /rev (17.5 cc/rev) – P6, 7, 8P/S/X/V/D & P11, 14V only** 2.14 in ³ /rev (35 cc/rev) – P11, 14P/S/X only** 2.81 in ³ /rev (46 cc/rev) – P24, 30P/S/X only (standard)**
1	1.61 in ³ /rev (26.4 cc/rev) – P24, 30P/S/X only (auxiliary external replenishing flow required)
2	1.05 in ³ /rev (17.2 cc/rev) – P24, 30P/S/X only (auxiliary external replenishing flow required)
3	3.56 in ³ /rev (58.3 cc/rev) – P24, 30P/S/X only
4	4.84 in ³ /rev (79.3 cc/rev) – P24, 30P/S/X only
5	5.42 in ³ /rev (88.8 cc/rev) – P24, 30P/S/X only
6	6.10 in ³ /rev (100.0 cc/rev) – P24, 30P/S/X only
X	No Internal Pump (standard on P*R/L/F/M)

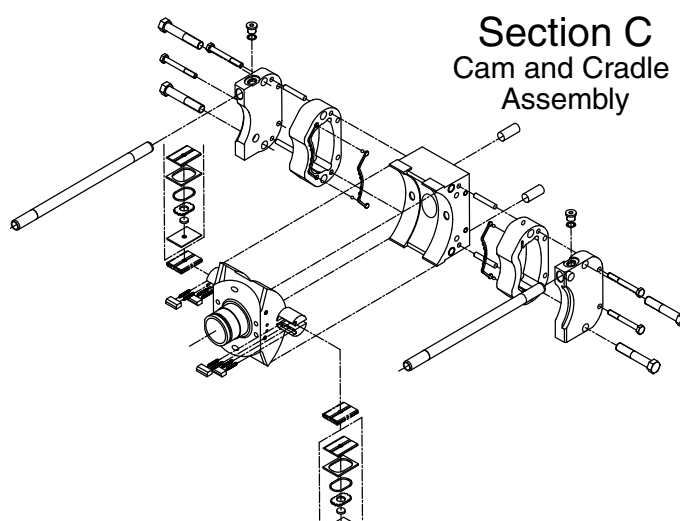
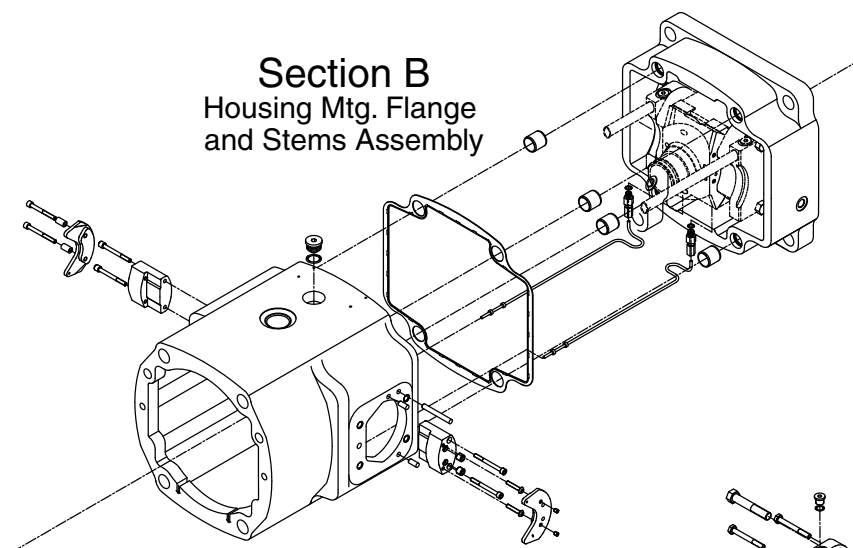
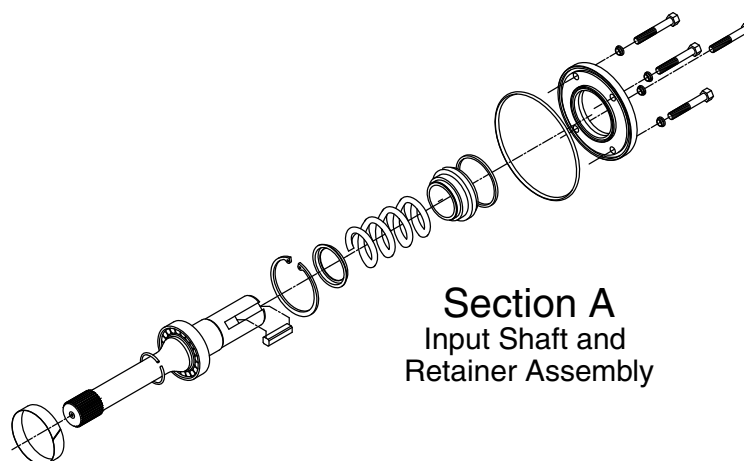
** Omit code if no external drive is required.

Code	External Drive
Omit	None ¹
M	Blanking plate – for P6, 7, 8, 11, 14S/X only
A	SAE-A (SAE 82-2) – P6, 7, 8, 11, 14S/X/R/L/M only
B	SAE-B (SAE 101-2) – P6, 7, 8, 11, 14, 24, 30S/X/R/L/M SAE-B (SAE 101-4) – P11, 14, 24, 30R/L/M
C	SAE-C (SAE 127-2) – P6, 7, 8, 11, 14, 24, 30R/L/M & P24, 30S/X SAE-C (SAE 127-4) – P11, 14, 24, 30R/L/M
D	SAE-D (SAE 152-4) – P11, 14, 24, 30R/L/M only
E	SAE-E (SAE 165-4) – P11, 14, 24, 30R/L/M only
F	SAE-F (SAE 177-4) – P24, 30R/L/M only

Code	External Mounting
Omit	No External Drive Required
0	No External Pump Mounted
1	External Pump Mounted (must be separately specified) – Requires Special Modification “-M2” ¹
2	ATEX Externally Mounted Pump

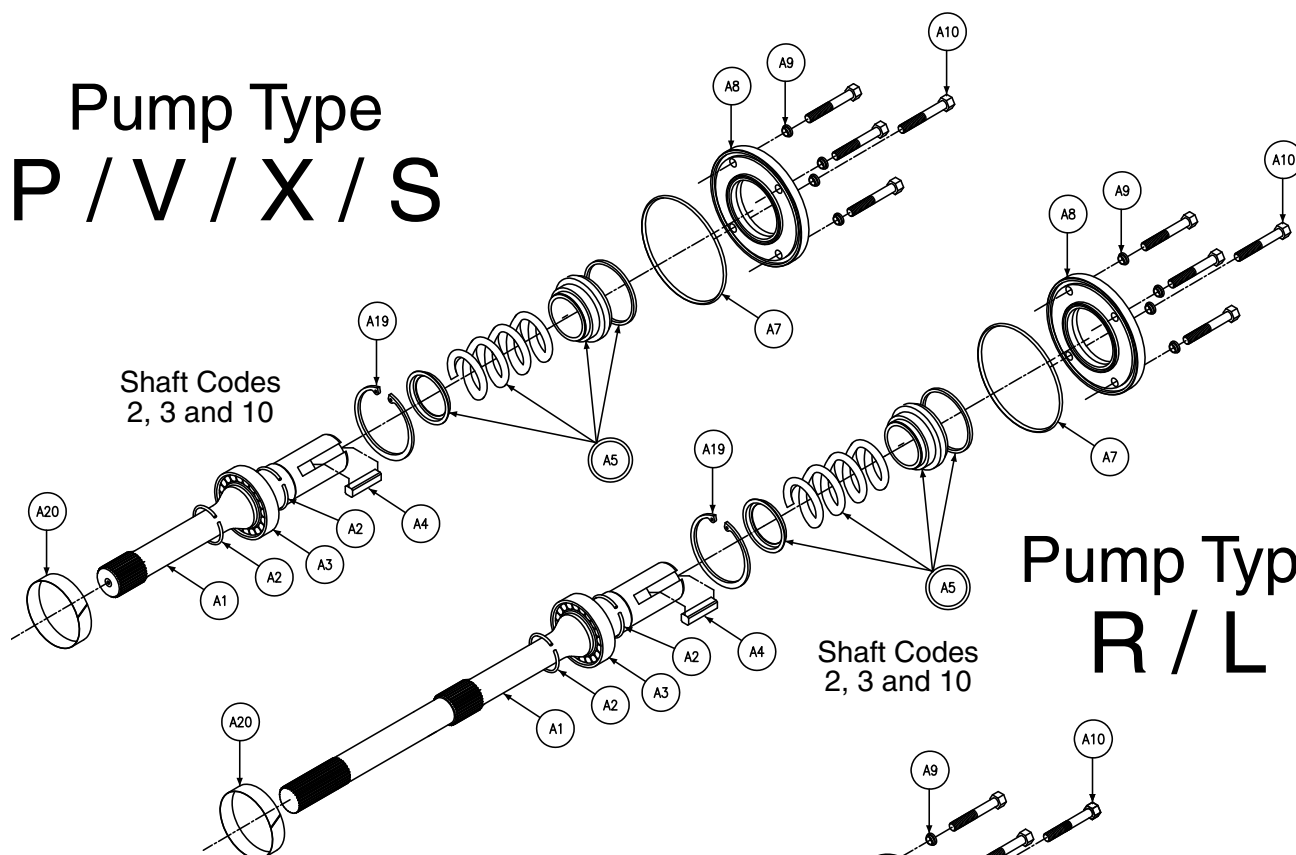
Code	Special Modifications
Omit	None
NP	No Paint ¹
EX	ATEX APPROVED PUMP (May contain additional modifications. Contact tech support.)
M2	Other Special Modification (example: bronze caged barrel bearing for low viscosity fluids, tandem pumps, etc.) ¹

= Omit if not required



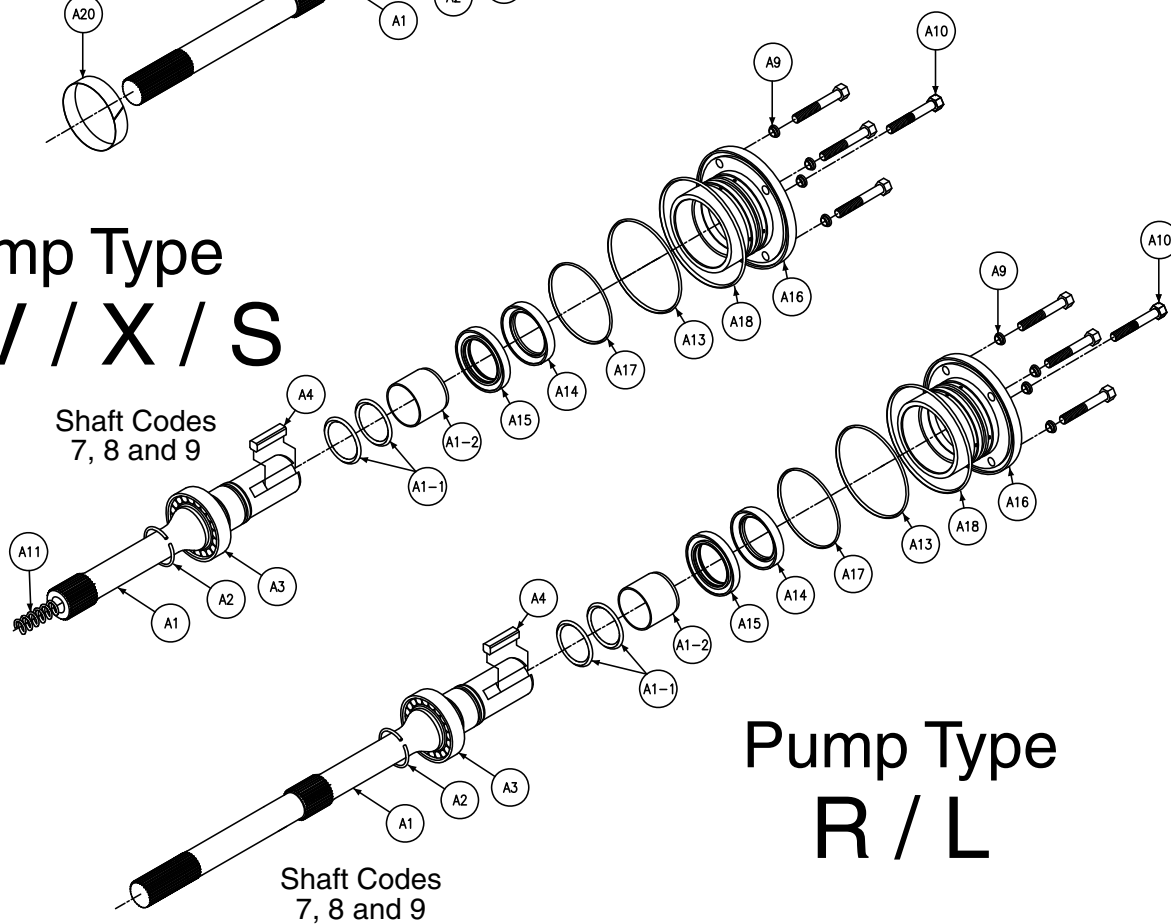


Pump Type P / V / X / S



Pump Type R / L

Pump Type P / V / X / S



Pump Type R / L

Section A							
P11/14 Input shaft and retainer							
Balloon #	Pump Type	Shaft Code	Rotation	Seal Code	Item #	Description	Qty
A1	P/V/X/S	2	**	**	033-71601-0	Shaft, Keyed	1
	P/V/X/S	3	**	**	033-71604-0	Shaft, Splined	
	P/V/X/S	7	**	**	* 033-94180-0	Shaft, Keyed	
	P/V/X/S	8	**	**	* 033-94181-0	Shaft, Splined	
	P/V/X/S	9	**	**	* 033-94220-0	Shaft, Keyed	
	P/V/X/S	10	**	**	033-93608-0	Shaft, Keyed	
	R/L	2	**	**	033-92617-0	Shaft, Keyed	
	R/L	3	**	**	033-92619-0	Shaft, Splined	
	R/L	7	**	**	* 033-94182-0	Shaft, Keyed	
	R/L	8	**	**	* 033-94183-0	Shaft, Splined	
A1-1	P/V/X/S/R/L	7/8/9	**	1	671-00131-0	Gasket O-ring	2
	P/V/X/S/R/L	7/8/9	**	4	674-00131-0		
	P/V/X/S/R/L	7/8/9	**	5	675-00131-0		
A1-2	P/V/X/S/R/L	7/8/9	**	**	033-94184-0	Sleeve, Shaft	1
A2	**	2/3/10	**	**	033-71641-0	Retaining ring	2
	**	7/8/9	**	**	033-59504-0		1
A3	**	2/3/10	**	**	230-82148-0	Shaft Bearing	1
	**	7/8/9	**	**	230-82214-0		
A4	**	2/7	**	**	033-71514-0	Key	1
	**	9/10	**	**	033-93618-0		
A5	**	2/3/10	**	1	623-00016-0	Shaft seal	1
	**	2/3/10	**	4	623-00016-4		
	**	2/3/10	**	5	623-00016-5		
A7	**	2/3/10	**	1	671-00249-0	Gasket O-ring	1
	**	2/3/10	**	4	674-00249-0		
	**	2/3/10	**	5	675-00249-0		
A8	**	2/3/10	**	**	033-57872-0	Seal retainer	1
A9	**	**	**	**	631-45007-0	Nyltite Gasket	4
A10	**	**	**	**	306-40021-0	Hex Hd cap screw	4
A11	P/V/X/S	7/8/9	**	**	033-91713-0	Pre load spring	1
A13	P/V/X/S/R/L	7/8/9	**	1	671-00044-0	Gasket O-ring	1
	P/V/X/S/R/L	7/8/9	**	4	674-00044-0		
	P/V/X/S/R/L	7/8/9	**	5	675-00044-0		
A14	P/V/X/S/R/L	7/8/9	CW	1	620-82104-0	Inner seal	1
	P/V/X/S/R/L	7/8/9	CCW	1	620-82105-0		
A15	P/V/X/S/R/L	7/8/9	**	1	620-82101-0	Outer Seal	1
	P/V/X/S/R/L	7/8/9	**	4	N/A		
	P/V/X/S/R/L	7/8/9	**	5	N/A		
A16	**	7/8/9	**	**	033-91709-0	Seal retainer	1
A17	**	7/8/9	**	1	671-00237-0	Gasket O-ring	1
	**	7/8/9	**	4	674-00237-0		
	**	7/8/9	**	5	675-00237-0		
A18	**	7/8/9	**	1	671-00251-0	Gasket O-ring	1
	**	7/8/9	**	4	674-00251-0		
	**	7/8/9	**	5	675-00251-0		
A19	**	2/3/10	**	**	356-65013-0	Retaining ring	1
A20	**	2/3/10	**	**	033-53984-0	Brg. shim, .007"	select fit 1 only
	**	2/3/10	**	**	033-53983-0	Brg. shim, .008"	

Note: Shaft part numbers marked with * are not usable without items A1-1 & A1-2, (o-rings and sleeve).

Section A Kits Listed on Next Page.

P11/14 Seal Kits

Note: Seal kits for "M" mod pumps and for aux pumps require part number verification with HPD factory representatives. Seal Kit part numbers below contain all seals for the following items.

1. Main pump
2. Valve block
3. Input/output controls
4. shaft seal

Shaft Code	Rotation	Seal code	Part number
2/3	**	1	S23-17032-0
2/3	**	4	S23-17032-4
2/3	**	5	S23-17032-5
7/8/9	CW	1	S23-17033-0
7/8/9	CW	4	S23-17033-4
7/8/9	CW	5	S23-17033-5
7/8/9	CCW	1	S23-17034-0
7/8/9	CCW	4	S23-17034-4
7/8/9	CCW	5	S23-17034-5

P11/14 Shaft and Bearing Assembly Kits

Composed of Items: A1, A2, A3, A4, and A1-1, A1-2 for 7 / 8 / 9 shafts as applicable.

Shaft Code	Pump Type	Part Number
2	P/V/X/S	S13-43969-0
3	P/V/X/S	S13-43968-0
7	P/V/X/S	S23-18182-0
8	P/V/X/S	S23-18183-0
9	P/V/X/S	S23-18268-0
10	P/V/X/S	S23-17489-0
2	R/L	S23-16255-0
3	R/L	S23-16257-0
7	R/L	S23-18184-0
8	R/L	S23-18185-0
9	R/L	S23-18269-0
10	R/L	S23-17495-0

P11/14 Shaft Sleeve and O'rings

Replacement shaft sleeve & o'rings are available for P/V/X/S/R/L units with 7/8/9 shafts only. However, special tools are required to press old sleeve off and new sleeve on shaft. Reference tool drawing, 213-0-004203, see page 9 for drawing details.

Pump Type	Shaft Code	Qty	Seal Code	Part Number	Description
P/V/X/S	7/8/9	2	1	671-00131-0	gasket o'ring
P/V/X/S			4	674-00131-0	
P/V/X/S			5	675-00131-0	
P/V/X/S	7	1	**	* 033-94180-0	* shaft
P/V/X/S	8	1	**	* 033-94181-0	
P/V/X/S	9	1	**	* 033-94220-0	
R/L	7	1	**	* 033-94182-0	* shaft
R/L	8	1	**	* 033-94183-0	
R/L	9	1	**	* 033-94221-0	
P/V/X/S	7	1	**	033-94184-0	shaft sleeve
P/V/X/S	8	1	**		
P/V/X/S	9	1	**		

Note: Shaft P/N's marked with * are not usable without items A1-1 & A1-2, (o'rings and sleeve).

P11/14 Shaft and Seal Retainer Assembly Kits

Composed of Items: A1, A1-1, A1-2, A2, A3, A4, A9, A10, A13, A14, A15, A16, A17, & A18

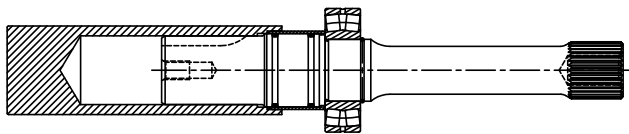
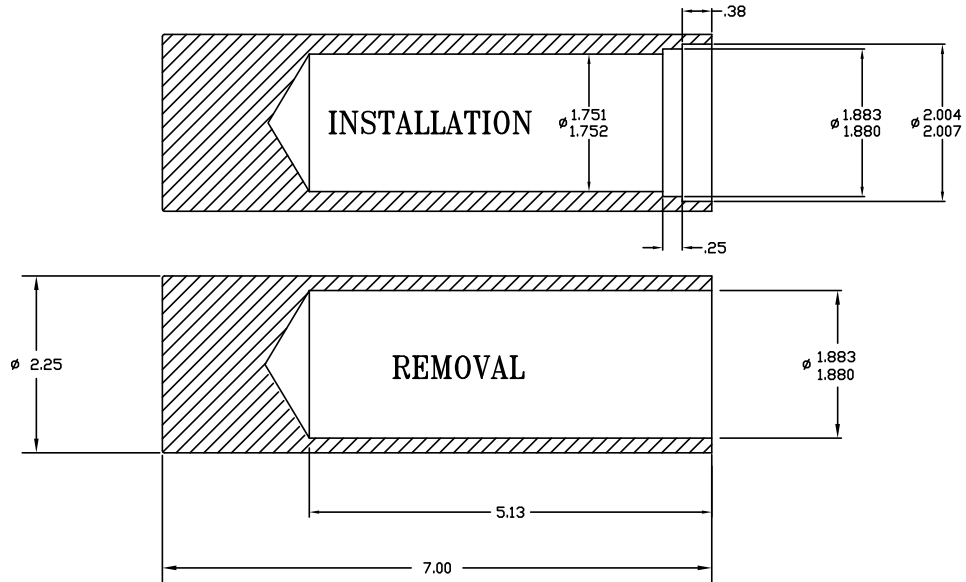
Shaft Code	Pump Type	Rotation	Seal Code	Part Number
7	P/V/X/S	CW	1	S23 -15219-0
8	P/V/X/S	CW	1	S23 -15923-0
9	P/V/X/S	CW	1	S23 -19502-0
7	P/V/X/S	CW	5	S23 -15219-5
8	P/V/X/S	CW	5	S23 -15923-5
9	P/V/X/S	CW	5	S23 -19502-5
7	P/V/X/S	CCW	1	S23 -15350-0
8	P/V/X/S	CCW	1	S23 -15891-0
9	P/V/X/S	CCW	1	S23 -19503-0
7	P/V/X/S	CCW	5	S23 -15350-5
8	P/V/X/S	CCW	5	S23 -15891-5
9	P/V/X/S	CCW	5	S23 -19503-5
7	R/L	CW	1	S23 -16807-0
8	R/L	CW	1	S23 -16805-0
9	R/L	CW	1	S23 -19504-0
7	R/L	CW	5	S23 -16807-5
8	R/L	CW	5	S23 -16805-5
9	R/L	CW	5	S23 -19504-5
7	R/L	CCW	1	S23 -16808-0
8	R/L	CCW	1	S23 -16806-0
9	R/L	CCW	1	S23 -19505-0
7	R/L	CCW	5	S23 -16808-5
8	R/L	CCW	5	S23 -16806-5
9	R/L	CCW	5	S23 -19505-5

P11/14 Seal retainer assembly kits

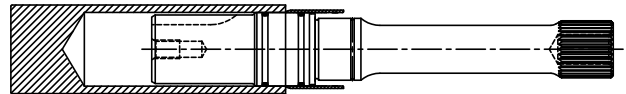
Composed of Items: A14, A15 and A16

Shaft Code	Pump Type	Rotation	Seal Code	Part Number
7/8/9	P/V/X/S/R/L	CW	1	S23-15215-0
7/8/9	P/V/X/S/R/L	CCW	1	S23-15217-0

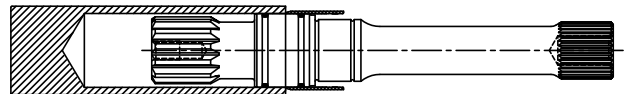
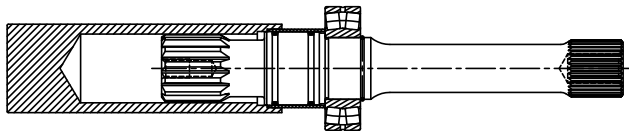
MATERIAL: MEDIUM CARBON STEEL HEAT TREATED TO 27-34 RC



DO NOT HAMMER OR OTHERWISE IMPACT!
APPLY A CONSTANT PRESSING FORCE ONLY!

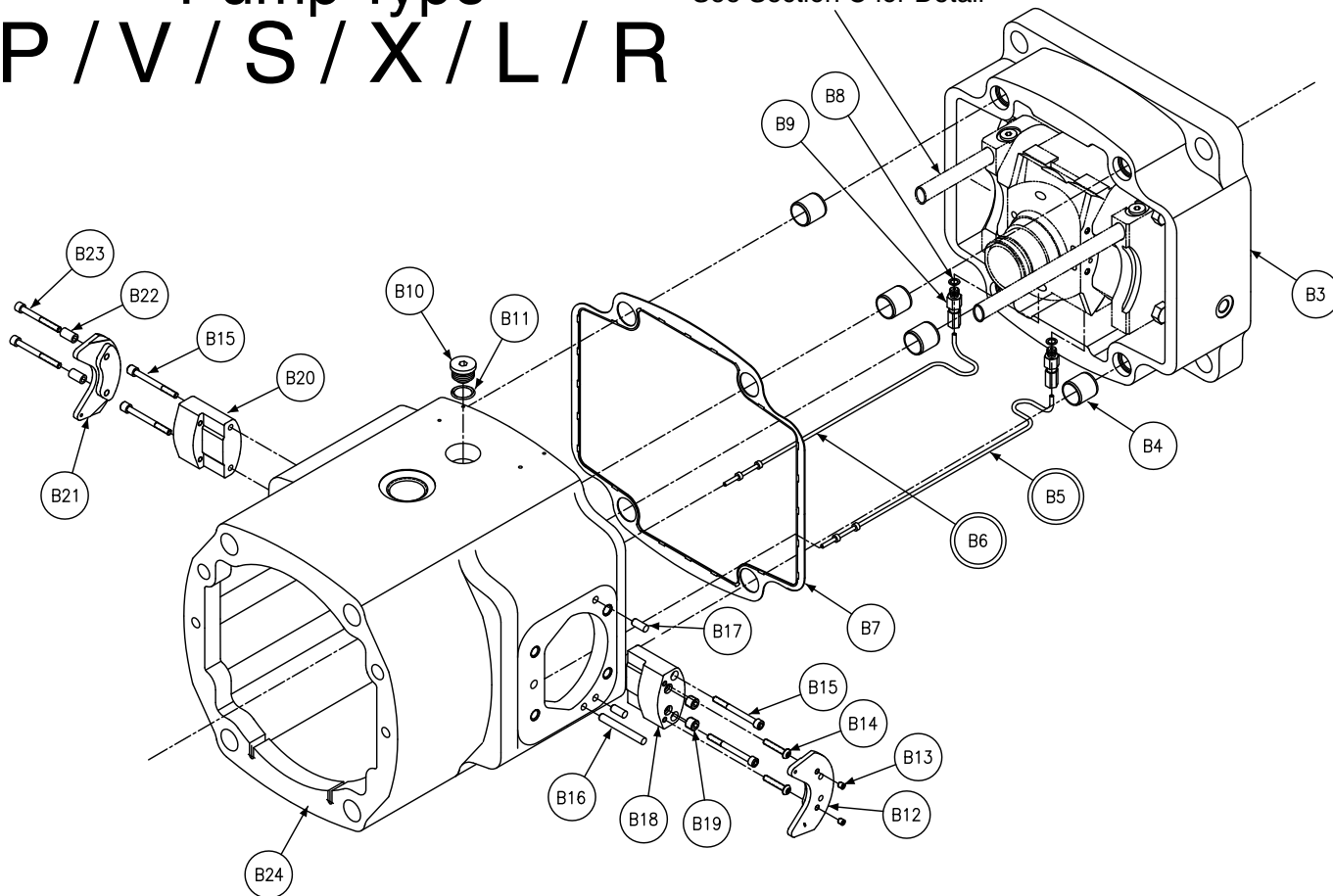


DO NOT PRESS OFF BEARING USING SLEEVE!
PRESS OFF BEARING AND THEN SLEEVE!



Pump Type P / V / S / X / L / R

See Section C for Detail



Note: Above view shows input on "A" side of pump.

Section B						
P11/14 Housing, Mounting Flange, Input, and Output Stems						
Balloon #	Pump Type	Shaft Code	Seal Code	Item #	Description	Qty
B3	P11/14 P/V/S/X/R/L	2/3/10	**	033-71546-0	Mounting Flange	1
	**	7/8/9	**	033-91711-0		
B4	**	**	**	033-72664-0	Locating Sleeve	4
B5	**	**	**	S13-43966-0	Left Feed Tube	1
B6	**	**	**	S13-43967-0	Right Feed Tube	1
B7	**	**	**	033-91076-0	Housing/Mounting Flange Gasket	1
B8	**	**	1	691-00902-0	Gasket O-ring	2
		**	4	694-00902-0		
		**	5	695-00902-0		
B9	**	**	**	492-15265-0	Straight thread connector	2
B10	**	**	**	033-91106-0	Barrel bearing retainer	1
B11	**	**	1	691-00908-0	Gasket O-ring	1
		**	4	694-00908-0		
		**	5	695-00908-0		
B12	**	**	**	033-53874-0	Servo Input Plate	1
B13	**	**	**	312-09032-0	Screw	2
B14	**	**	**	353-25073-0	Button Head Screw	2
B15	**	**	**	359-09240-0	Socket Head Cap Screw	4
B16	**	**	**	325-16320-0	Roll Pin	2
B17	**	**	**	324-21608-0	Dowel Pin	4
B18	**	**	**	033-71596-0	Servo Stem	1
B19	P11/14 P/S/X/R/L	**	**	036-20641-0	Flush, Plug 1/16" NPT with 1/16" Dia. Orifice	2
	P11/14 V	**	**			1
B20	**	**	**	033-71616-0	Balance Stem	1
B21	**	**	**	033-70546-0	Balance Plate	1
B22	**	**	**	033-71247-0	Spacer	2
B23	**	**	**	359-09180-0	Socket Head Cap Screw	2
B24	P11/14 P/V/S/X/R/L	**	**	033-91191-0	Housing, Variable Volume	1

Stem Kits

Input stem kits include the following:

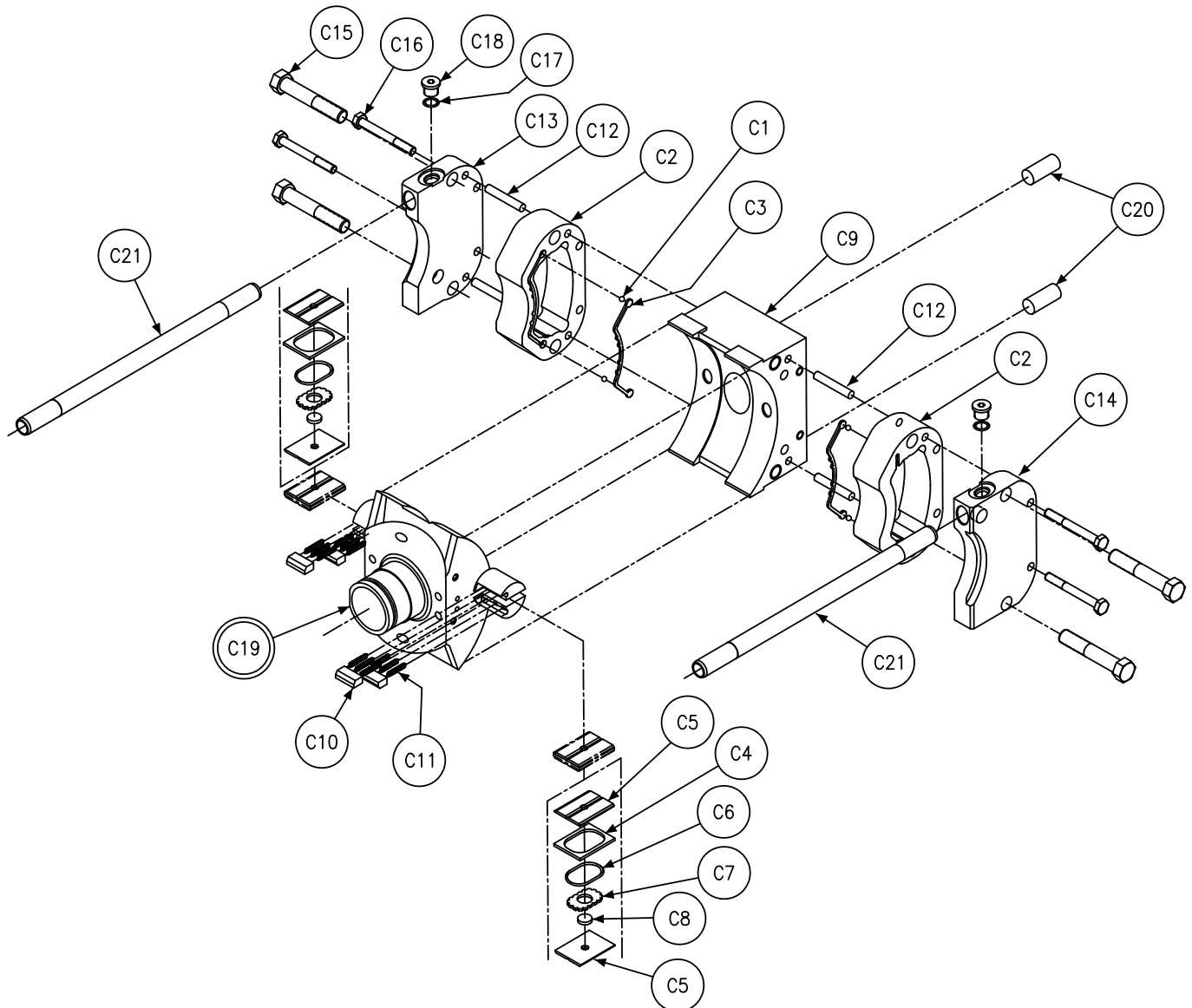
B12, B13, B14, B15, B18 and B19

Output stem kits include the following:

B15, B20, B21, B22 and B23

	Part Number
P11/14 Input Stem Kit	S23-12276-0
P11/14 Output Stem Kit	S23-03782-0
P11/14 Input Stem Kit for 700 Control	S23-03781-0
P11/14"V" Input Stem Assy	S23-17876-0

Pump Type P / V / X / S / L / R



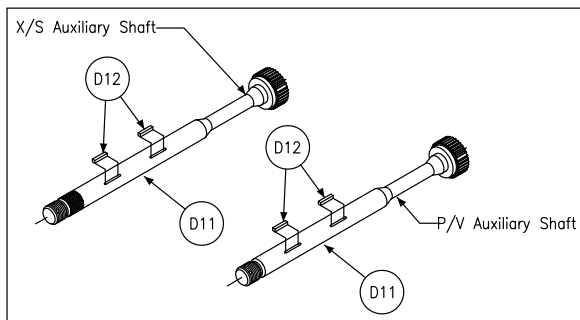
Section C						
P11/14 Cam and Cradle						
Balloon #	Shaft Code	Rotation	Seal Code	Item #	Description	Qty
C1	**	**	**	201-06001-0	Check Ball	4
C2	**	**	**	033-71615-0	Vane Chamber	2
C3	**	**	1	606-25040-0	Molded Seal	2
	**	**	4	606-25040-4		
	**	**	5	606-25040-5		
C4	**	**	**	033-71611-0	Vane Seal	2
C5	**	**	**	033-71608-0	Vane Seal Backup Plate	4
C6	**	**	1	691-00125-0	Gasket O-ring	2
	**	**	4	694-00125-0		
	**	**	5	695-00125-0		
C7	**	**	**	033-71607-0	Vane Spacer	2
C8	**	**	**	033-70803-0	Check Valve	2
C9	2/3/10	**	**	033-57879-0	Rocker Cradle	1
	7/8/9	**	**	033-91712-0		
C10	**	**	**	033-72234-0	Vane Holddown	4
C11	**	**	**	033-72233-0	Spring Holddown	12
C12	**	**	**	324-22428-0	Dowel Pins	4
C13	**	CCW	**	033-71595-0	Right Control Cover	1
	**	CW	**	033-71598-0		
C14	**	CCW	**	033-71593-0	Left Control Cover	1
	**	CW	**	033-71597-0		
C15	**	**	**	306-40189-0	Hex Hd Cap Screw	4
C16	**	**	**	306-40140-0	Hex Hd Cap Screw	4
C17	**	**	1	691-00905-0	Gasket O-ring	2
	**	**	4	694-00905-0		
	**	**	5	695-00905-0		
C18	**	**	**	488-35020-0	Hex Socket Plug	2
C19	**	**	**	S23-12107-0	Rocker Cam and Plug Assembly	1
C20	**	**	**	324-23216-0	Dowel Pin	2
C21	**	**	**	033-71609-0	Tube	2

Cam and Cradle assembly

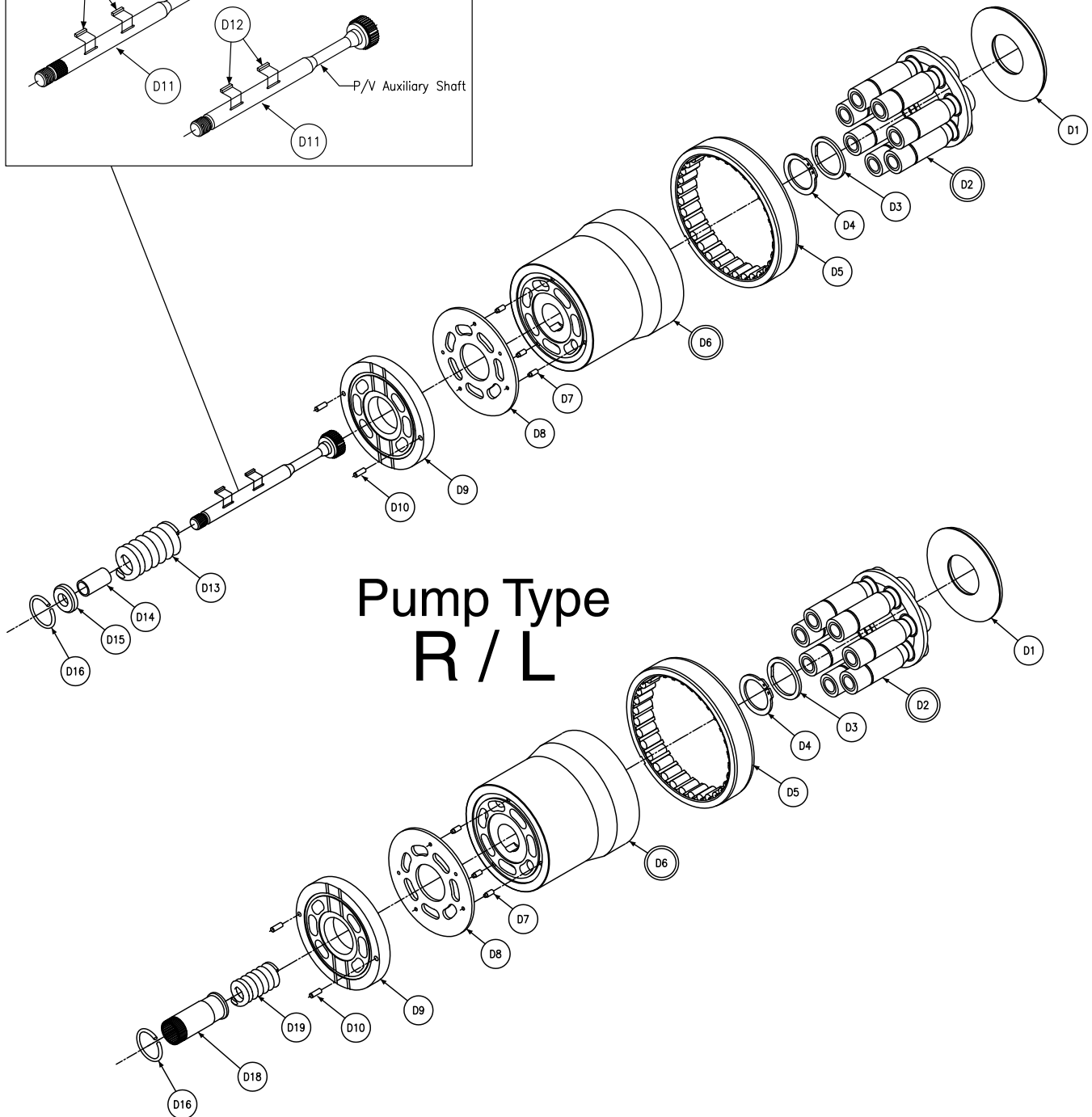
Composed of Items: C1 thru C21

P11/14 P,V,X,S,R,L

Part Number	Shaft Type	Rotation
S23-17240-0	2/3/10	CW
S23-17241-0	2/3/10	CCW
S23-18966-0	7/8/9	CW
S23-18967-0	7/8/9	CCW



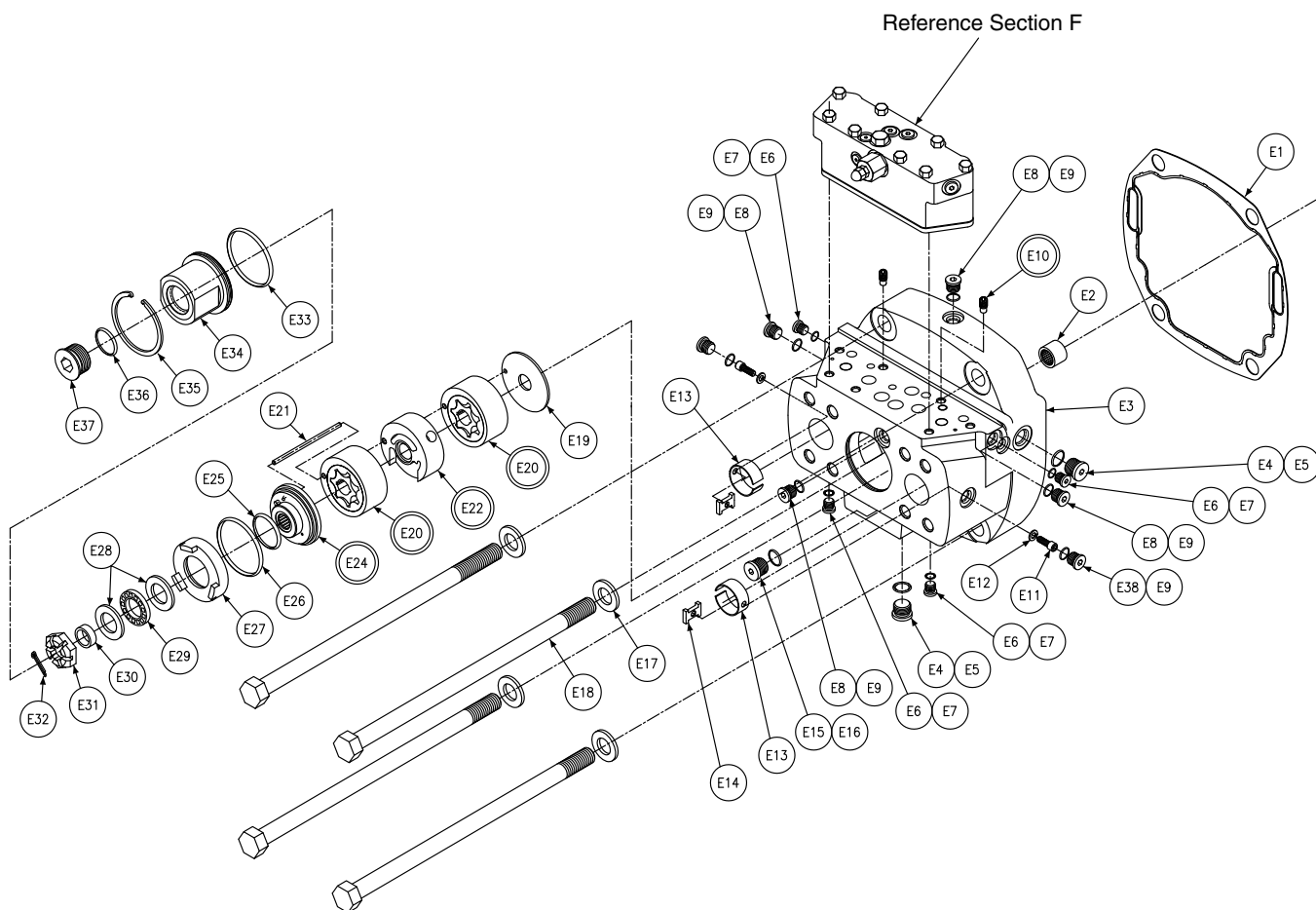
Pump Type
P / V / X / S



Section D						
P11/14 Rotating group						
Balloon #	Displacement	Pump Type	Rotation	Item #	Description	Qty
D1	**	**	**	033-71569-0	Creep plate	1
D2	P11	**	**	S13-45544-0	Piston and Shoes w/Retainer Assembly	1
	P14	**	**	S13-43970-0		
D3	**	**	**	033-91706-0	Bearing, thrust	1
D4	**	**	**	033-71556-0	Retaining Ring, Yellow, .109/.107 thk	1
	**	**	**	035-71557-0	Retaining Ring, Green, .107/.105 thk	
	**	**	**	035-71558-0	Retaining Ring, Red, .105/.103 thk	
	**	**	**	035-71559-0	Retaining Ring, Blue, .103/.101 thk	
	**	**	**	033-91231-0	Retaining Ring, White, .100/.098 thk	
D5	**	**	**	033-91190-0	Barrel Bearing	1
D6	P11	**	**	S13-45381-0	Barrel Assembly	1
	P14	**	**	S13-43965-0		
D7	**	**	**	033-49825-0	Pin, Face & Port Plate	3
D8	P11	**	**	033-71921-0	Face plate	1
	P14	**	**	033-71575-0		
D9	P11	P/S/X/R/L	CW	033-71915-0	Port Plate	1
	P11	P/S/X/R/L	CCW	033-71914-0		
	P14	P/S/X/R/L	CW	033-71617-0		
	P14	P/S/X/R/L	CCW	033-71600-0		
	P11	V	CW	033-91195-0		
	P11	V	CCW	033-91224-0		
	P14	V	CW	033-91241-0		
	P14	V	CCW	033-91242-0		
D10	**	**	**	324-21610-0	Dowel Pin	2
D11	**	P/V	**	033-71603-0	Shaft, Auxiliary Drive	1
	**	S/X	**	033-91053-0		
D12	**	V	**	211-22034-0	Square Key	1
	**	P/S/V/X	**			2
D13	**	P/S/V/X	**	033-71562-0	Holddown Spring	1
D14	**	P/S/V/X	**	033-71561-0	Barrel Stop	1
D15	**	P/S/V/X	**	033-71560-0	Spring Retainer	1
D16	**	**	**	033-71564-0	Retaining Ring	1
D18	**	R/L	**	033-92687-0	Holddown Sleeve	1
D19	**	R/L	**	033-92686-0	Holddown Spring	1

Major Rotating Group			
Composed of Items:			
D1,D2,D5,D6,D7, D8, D9,and D10			
Displacement	Model Type	Rotation	Part Number
P11	P/X/S/R/L	CW	S23-17101-0
P11	P/X/S/R/L	CCW	S23-17102-0
P11	V	CW	S23-17105-0
P11	V	CCW	S23-17106-0
P14	P/X/S/R/L	CW	S23-17103-0
P14	P/X/S/R/L	CCW	S23-17104-0
P14	V	CW	S23-17107-0
P14	V	CCW	S23-17108-0

Barrel Hold Down			
Composed of Items:			
D11,D13,D14,D15 and D16 For P/V/X/S			
No Kit available for R/L versions			
Displacement	Model Type	Rotation	Part Number
P11/14	P/V	**	S23-17250-0
P11/14	X/S	**	S23-17251-0

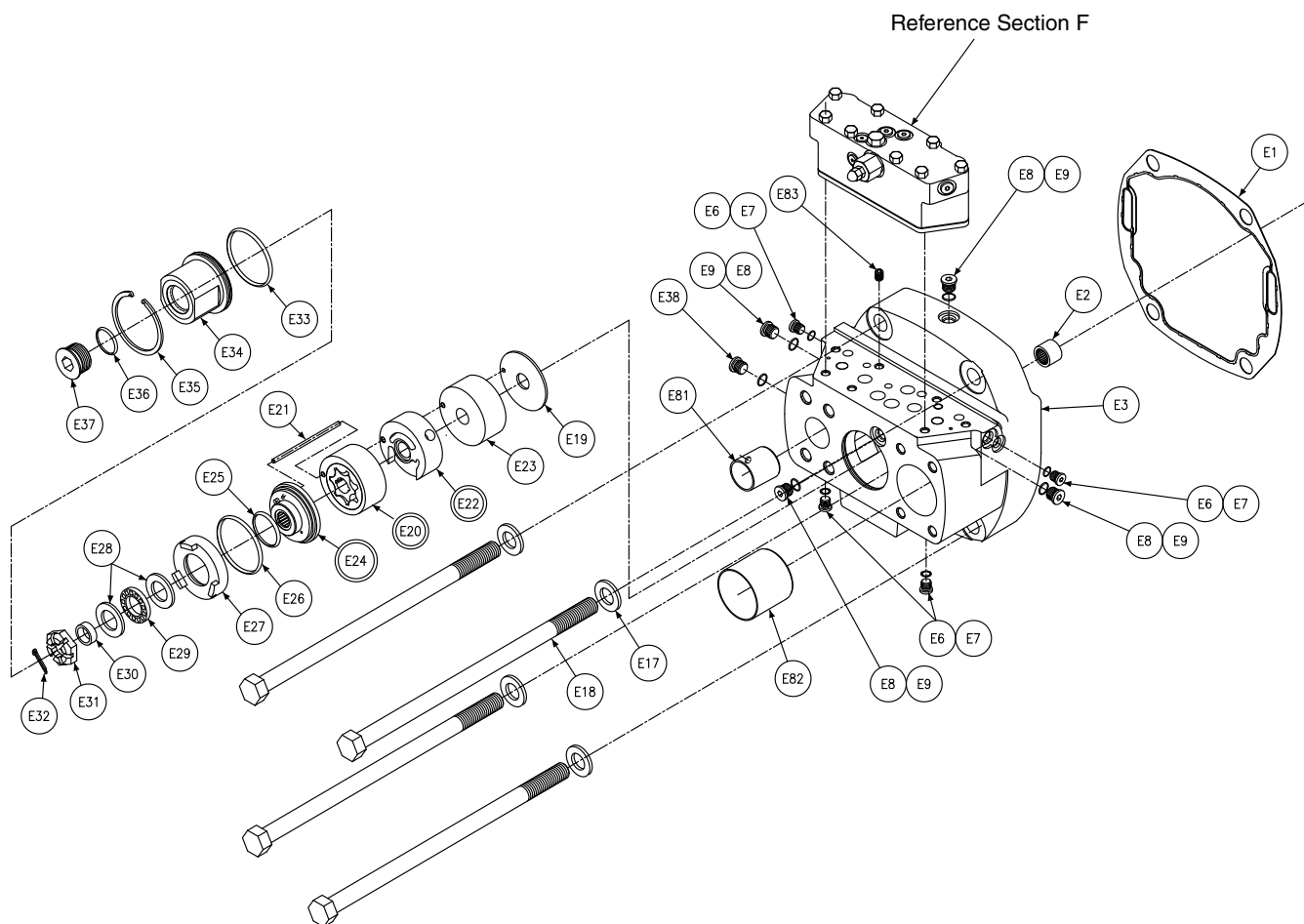
**Gerotor Assembly****Composed of Items:**

E2, E19, E20, E21, E22, E24, E25, E26, E27, E28, E29, E30, E32, and E33

No Kit available for R/L versions

Displacement	Pump Type	Rotation	Part Number
P11/14	P	CW	S23-17043-0
P11/14	P	CCW	S23-17044-0

Section E					
P11/14 P Port block					
Balloon #	Rotation	Seal Code	Item #	Description	Qty
E1	**	**	033-91079-0	Port Block Gasket Housing	1
E2	**	**	230-82146-0	Needle Bearing	1
E3	**	**	033-57912-0	Port Block	1
E4	**	**	488-35018-0	Hex Socket Plug	2
E5	**	1	691-00908-0	Gasket O-ring	2
	**	4	694-00908-0		
	**	5	695-00908-0		
E6	**	**	488-35001-0	Plug	4
E7	**	1	691-00904-0	Gasket O-ring	4
	**	4	694-00904-0		
	**	5	695-00904-0		
E8	**	**	488-35041-0	Plug	4
E9	**	1	691-00906-0	Gasket O-ring	6
	**	4	674-00906-0		
	**	5	695-00906-0		
E10	**	**	S13-40266-0	Check Valve Assembly	2
E11	**	**	033-70908-0	Screw	2
E12	**	**	348-10016-0	Washer, Lock	2
E13	**	**	033-70502-0	Ring Check, P11/14P	2
E14	**	**	033-70489-0	Clamp	2
E15	**	**	488-35055-0	Hex Socket Plug	1
E16	**	1	691-00910-0	Gasket O-ring	1
	**	4	674-00910-0		
	**	5	695-00910-0		
E17	**	**	350-10109-0	Washer	4
E18	**	**	306-40172-0	Hex Hd Cap Screw	4
E19	**	**	033-71619-0	Side Plate	1
E20	**	**	S13-43334-0	Eccentric Ring and Gerotor Assembly	2
E21	**	**	033-71620-0	Dowel Pin	1
E22	**	**	013-43963-0	Center Port Plate Assembly	1
E24	CW	**	S13-46762-0	Side Plate and Bearing Assembly	1
	CCW	**	S13-46763-0		
E25	**	1	671-00129-0	Gasket O-ring	1
	**	4	674-00129-0		
	**	5	675-00129-0		
E26	**	1	671-00144-0	Gasket O-ring	1
	**	4	674-00144-0		
	**	5	675-00144-0		
E27	**	**	033-70531-0	Pressure Plate	1
E28	**	**	350-10081-0	Thrust Washer	2
E29	**	**	230-82164-0	Thrust Bearing	1
E30	**	**	033-72101-0	Ring, Seal	1
E31	**	**	033-72026-0	Holddown Nut	1
E32	**	**	322-04324-0	Cotter Pin	1
E33	**	1	671-00147-0	Gasket O-ring	1
	**	4	674-00147-0		
	**	5	675-00147-0		
E34	**	**	033-72100-0	Auxiliary End Cover	1
E35	**	**	356-65082-0	Ring, Retaining	1
E36	**	1	691-00916-0	Gasket O-ring	1
	**	4	694-00916-0		
	**	5	695-00916-0		
E37	**	**	488-35024-0	Hex Socket Plug	1
E38	**	**	488-35003-0	Hex Hd Plug	2

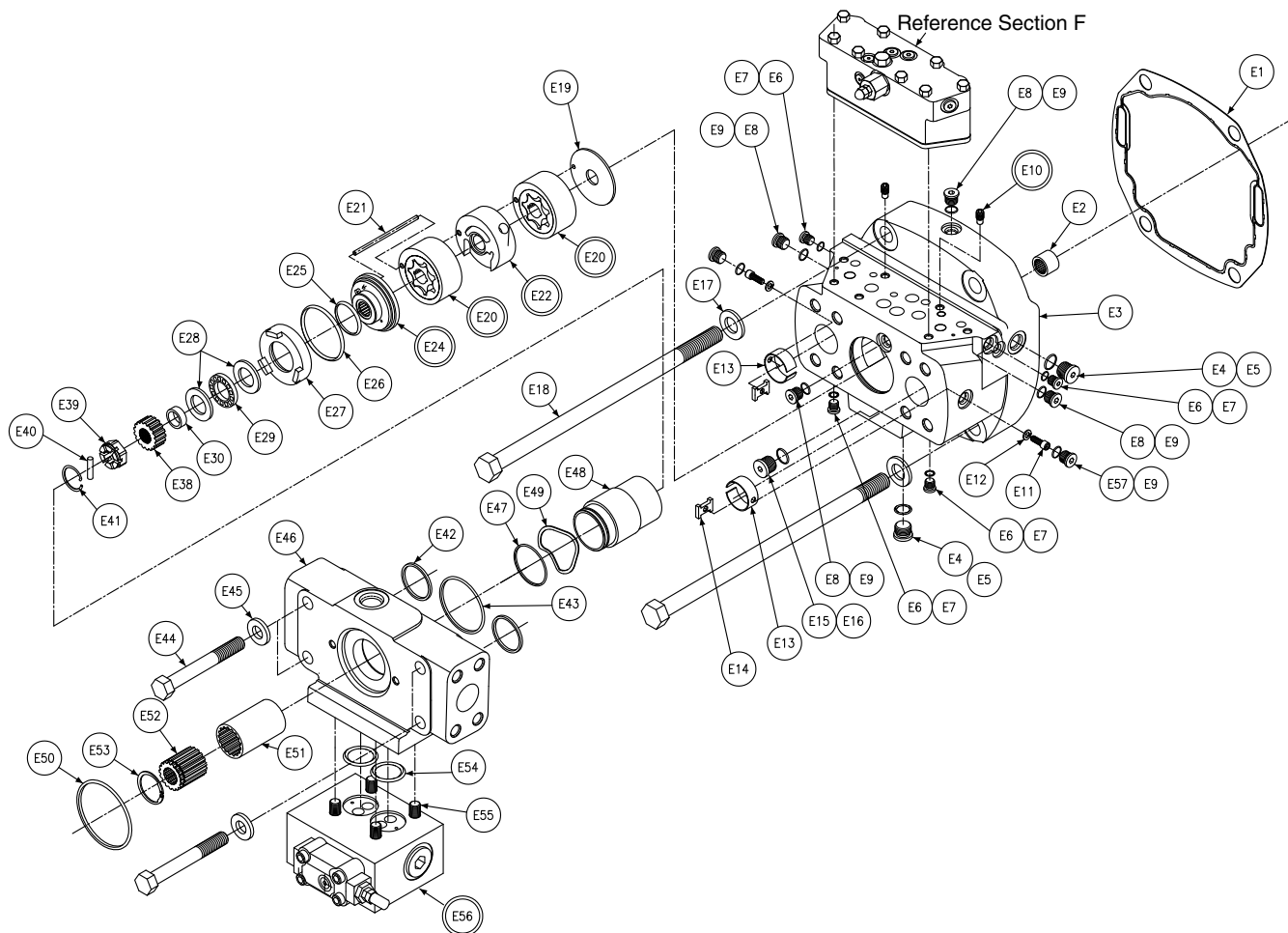
**Gerotor Assembly**

Composed of Items: E2, E19, E20, E21, E22, E24, E25, E26, E27, E28, E29, E30, E32, and E33

No Kit available for R/L versions

Displacement	Pump Type	Rotation	Part Number
P11/14	V	CW	S23-17047-0
P11/14	V	CCW	S23-17048-0

Section E					
P11/14 V Port block					
Balloon #	Rotation	Seal Code	Item #	Description	Qty
E1	**	**	033-91079-0	Port Block Gasket Housing	1
E2	**	**	230-82146-0	Needle Bearing	1
E3	**	**	033-91194-0	Port block	1
E6	**	**	488-35001-0	Plug	4
E7	**	1	691-00904-0	Gasket O-ring	4
	**	4	694-00904-0		
	**	5	695-00904-0		
E8	**	**	488-35041-0	Plug	4
E9	**	1	691-00906-0	Gasket O-ring	5
	**	4	674-00906-0		
	**	5	695-00906-0		
E17	**	**	350-10109-0	Washer	4
E18	**	**	306-40172-0	Hex Hd Cap Screw	4
E19	**	**	033-71619-0	Side Plate	1
E20	**	**	S13-43334-0	Eccentric Ring and Gerotor Assembly	1
E21	**	**	033-71620-0	Dowel Pin	1
E22	**	**	S13-43963-0	Center Port Plate Assembly	1
E23	**	**	033-72620-0	Gerotor Plug	1
E24	CW	**	S13-46762-0	Side Plate and Bearing Assembly	1
	CCW	**	S13-46763-0		
E25	**	1	671-00129-0	Gasket O-ring	1
	**	4	674-00129-0		
	**	5	675-00129-0		
E26	**	1	671-00144-0	Gasket O-ring	1
	**	4	674-00144-0		
	**	5	675-00144-0		
E27	**	**	033-70531-0	Pressure Plate	1
E28	**	**	350-10081-0	Thrust Washer	2
E29	**	**	230-82164-0	Thrust Bearing	1
E30	**	**	033-72101-0	Ring, Seal	1
E31	**	**	033-72026-0	Holddown Nut	1
E32	**	**	322-04324-0	Cotter Pin	1
E33	**	1	671-00147-0	Gasket O-ring	1
	**	4	674-00147-0		
	**	5	675-00147-0		
E34	**	**	033-72100-0	Auxiliary End Cover	1
E35	**	**	356-65082-0	Ring, Retaining	1
E36	**	1	691-00916-0	Gasket O-ring	1
	**	4	694-00916-0		
	**	5	695-00916-0		
E37	**	**	488-35024-0	Plug	1
E38	**	**	488-35003-0	Plug	1
E81	**	**	033-57893-0	Solid Check, P11/14V 1.5 inch	1
E82	**	**	033-57324-0	Solid Check, P11/14V 2.5 inch	1
E83	**	**	353-25037-0	Hex Socket Screw	1

**Gerotor Assembly**

Composed of Items: E2, E19, E20, E21, E22, E24, E25, E26, E27, E28, E29, E30, E32, and E33

No Kit available for R/L versions

Displacement	Model Type	Rotation	Part Number
P11/14	S/X	CW	S23-17043-0
P11/14	S/X	CCW	S23-17044-0

Section View - E - Pump Type - S & X - Port Block Assembly

Spare Parts and Exploded Views

Section E							
P11/14 S&X Port block							
Balloon #	Pump Type	Rotation	Seal Code	Thru Drive Code	Item #	Description	Qty
E1	**	**	**	**	033-91079-0	Port Block Gasket Housing	1
E2	**	**	**	**	230-82146-0	Needle Bearing	1
E3	**	**	**	**	033-57912-0	Port Block	1
E4	**	**	**	**	488-35018-0	Hex Socket plug	2
E5	**	**	1	**	691-00908-0	Gasket O-ring	2
	**	**	4	**	694-00908-0		
	**	**	5	**	695-00908-0		
E6	**	**	**	**	488-35001-0	Plug	4
E7	**	**	1	**	691-00904-0	Gasket O-ring	4
	**	**	4	**	694-00904-0		
	**	**	5	**	695-00904-0		
E8	**	**	**	**	488-35041-0	Plug	4
E9	**	**	1	**	691-00906-0	Gasket O-ring	6
	**	**	4	**	674-00906-0		
	**	**	5	**	695-00906-0		
E10	**	**	**	**	S13-40266-0	Check Valve Assembly	2
E11	**	**	**	**	033-70908-0	Screw	2
E12	**	**	**	**	348-10016-0	Washer, Lock	2
E13	**	**	**	**	033-70502-0	Ring Check	2
E14	**	**	**	**	033-70489-0	Clamp	2
E15	**	**	**	**	488-35055-0	Hex Socket Plug	1
E16	**	**	1	**	691-00910-0	Gasket O-ring	1
	**	**	4	**	674-00910-0		
	**	**	5	**	695-00910-0		
E17	**	**	**	**	350-10109-0	Washer	4
E18	**	**	**	**	306-40172-0	Hex Hd Cap Screw	4
E19	**	**	**	**	033-71619-0	Side Plate	1
E20	**	**	**	**	S13-43334-0	Eccentric Ring and Gerotor Assembly	2
E21	**	**	**	**	033-71620-0	Dowel Pin	1
E22	**	**	**	**	013-43963-0	Center Port Plate Assembly	1
E24	**	CW	**	**	S13-46762-0	Side Plate and Bearing Assembly	1
	**	CCW	**	**	S13-46763-0		
E25	**	**	1	**	671-00129-0	Gasket O-ring	1
	**	**	4	**	674-00129-0		
	**	**	5	**	675-00129-0		
E26	**	**	1	**	671-00144-0	Gasket O-ring	1
	**	**	4	**	674-00144-0		
	**	**	5	**	675-00144-0		
E27	**	**	**	**	033-70531-0	Pressure Plate	1
E28	**	**	**	**	350-10081-0	Thrust Washer	2
E29	**	**	**	**	230-82164-0	Thrust Bearing	1
E30	**	**	**	**	033-72101-0	Ring, Seal	1
E38	**	**	**	**	033-91051-0	Insert - Spline	1
E39	**	**	**	**	033-91052-0	Holddown Nut	1
E40	**	**	**	**	033-53921-0	Holddown Pin	1
E41	**	**	**	**	033-53923-0	Holddown Pin Retainer	1
E42	**	**	1	**	691-10131-0	Gasket O-ring	2
	**	**	4	**	694-10131-0		
	**	**	5	**	695-10131-0		

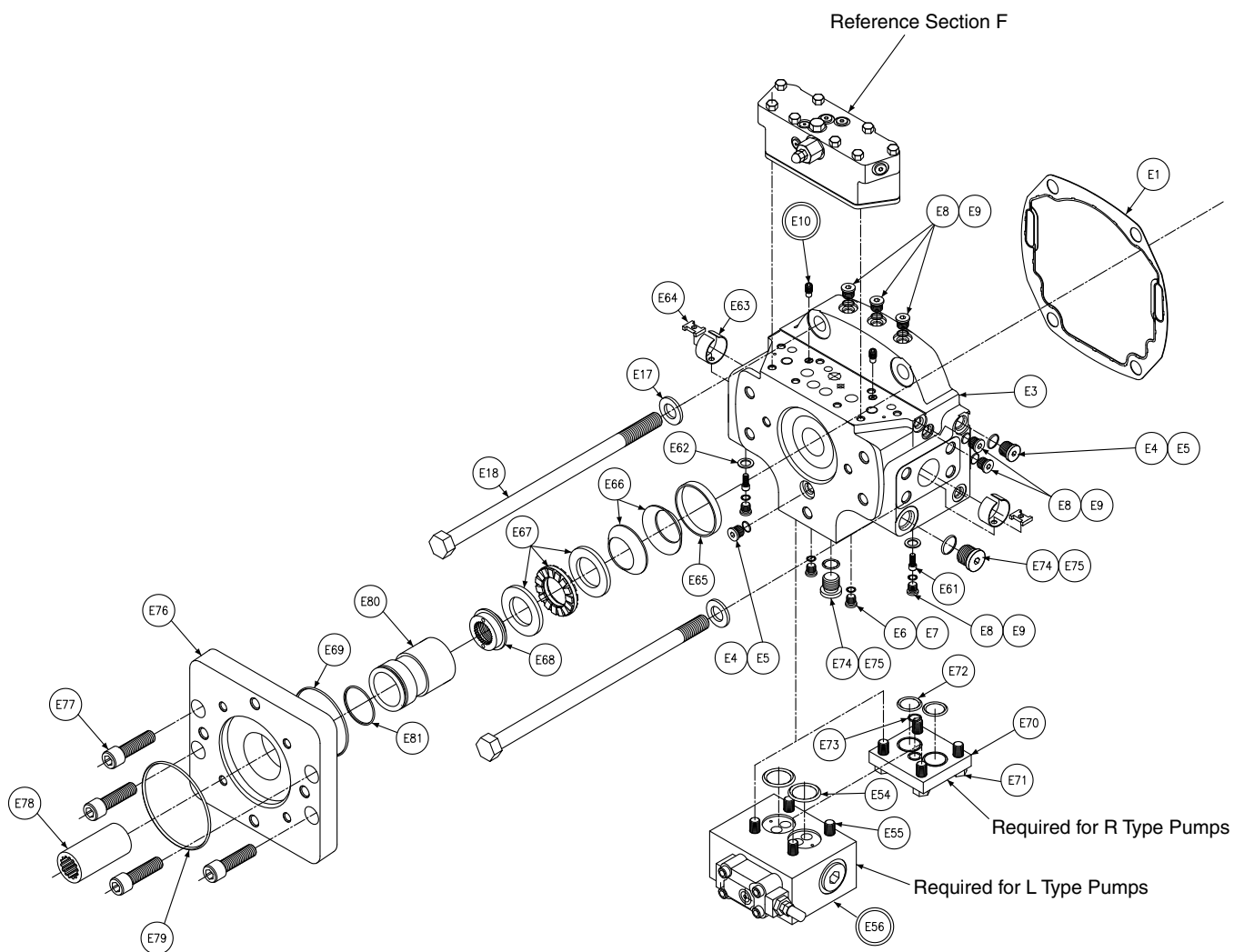
Section E table CONTINUED on next page.

Section View - E - Pump Type - S & X - Port Block Assembly

Spare Parts and Exploded Views

Section E CONTINUED							
Balloon #	Pump Type	Rotation	Seal Code	Thru Drive Code	Item #	Description	Qty
E43	**	**	1	**	671-00147-0	Gasket O-ring	1
	**	**	4	**	674-00147-0		
	**	**	5	**	675-00147-0		
E44	**	**	**	**	306-40088-0	Hex Hd Cap Screw	4
E45	**	**	**	**	350-10136-0	Washer	4
E46	S	**	**	A	033-91015-0	SAE A Adaptor for P11/14 S	1
	X	**	**	A	033-57958-0	SAE A Adaptor for P11/14 X	
	S	**	**	B	033-57967-0	SAE B Adaptor for P11/14 S	
	X	**	**	B	033-57957-0	SAE B Adaptor for P11/14 X	
E47	**	**	1	**	671-00033-0	Gasket O-ring	1
	**	**	4	**	674-00033-0		
	**	**	5	**	675-00033-0		
E48	**	**	**	**	033-57966-0	Replenish Isolation Tube	1
E49	**	**	**	**	225-92093-0	Wave Spring	1
E50	**	**	1	A	671-00152-0	Gasket O-ring	1
	**	**	4	A	674-00152-0		
	**	**	5	A	675-00152-0		
	**	**	1	B	671-00155-0		
	**	**	4	B	674-00155-0		
	**	**	5	B	675-00155-0		
E51	**	**	**	**	033-57963-0	Coupling	1
E52	**	**	**	A	033-57965-0	Insert	1
	**	**	**	B	033-57964-0		
E53	**	**	**	**	356-65128-0	Retaining Ring	1
E54	**	**	1	**	691-10221-0	Gasket O-ring	2
	**	**	4	**	694-10221-0		
	**	**	5	**	695-10221-0		
E55	**	**	**	**	306-40224-0	Hex Hd Cap Screw	4
E56	**	**	1	**	080030100001	Ext Pilot Drain Shuttle Ass'y	1
	**	**	5	**	080030100002	Ext Pilot Drain Shuttle Ass'y	
E57	**	**	**	**	488-35003-0	Hex Hd Plug	2

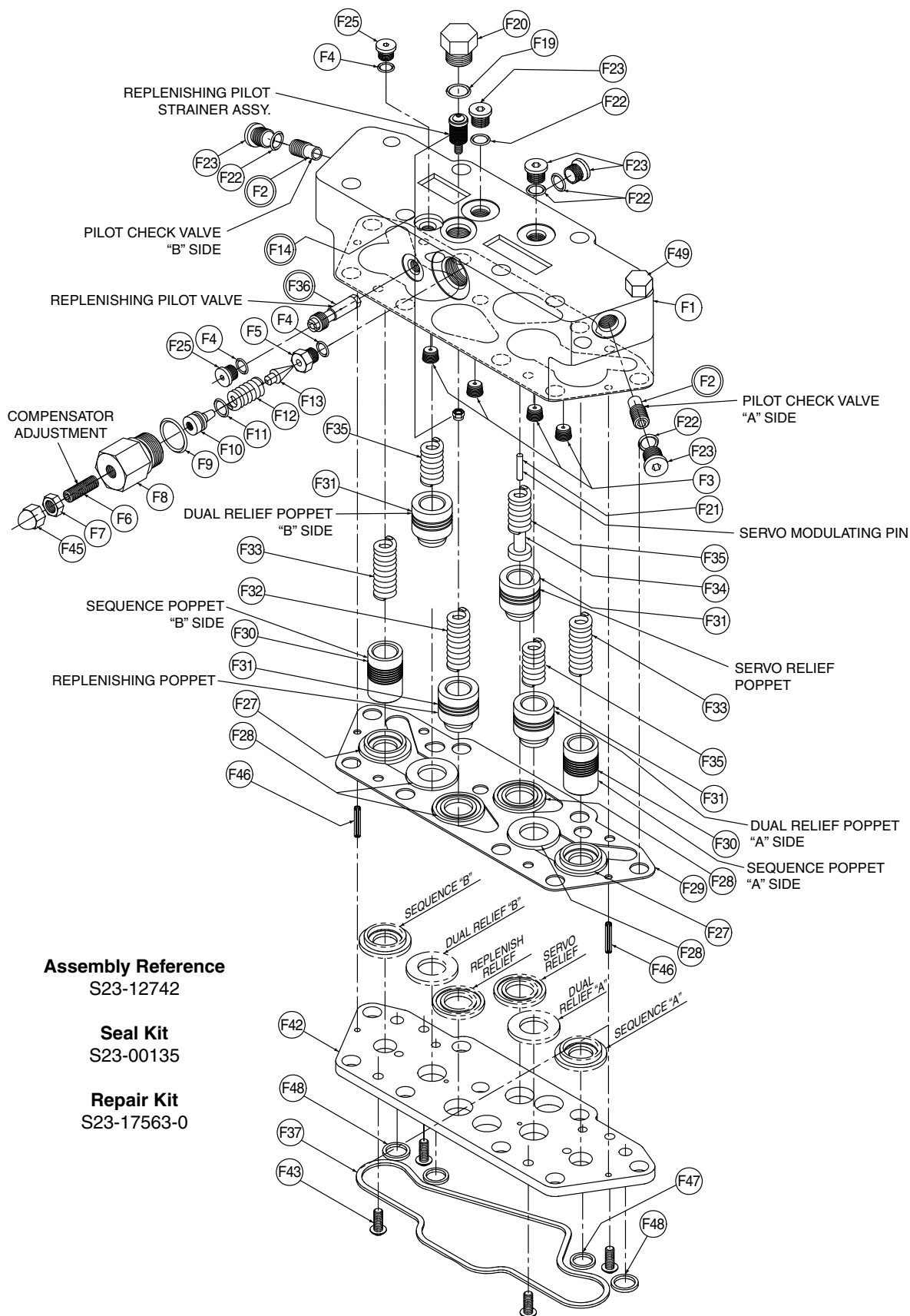
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Section View - E - Pump Type - R & L - Port Block Assembly Spare Parts and Exploded Views

Section E				
P11/14 R & L Port block				
Balloon #	Seal Code	Item #	Description	Qty
E1	**	033-91079-0	Port Block Gasket Housing	1
E3	**	033-92426-0	Port Block	1
E4	**	488-35018-0	Hex Socket Plug	3
E5	1	691-00908-0	Gasket O-ring	3
	4	694-00908-0		
	5	695-00908-0		
E6	**	488-35001-0	Plug	2
E7	1	691-00904-0	Gasket O-ring	2
	4	694-00904-0		
	5	695-00904-0		
E8	**	488-35041-0	Plug	11
E9	1	691-00906-0	Gasket O-ring	11
	4	674-00906-0		
	5	695-00906-0		
E10	**	S13-40266-0	Check Valve Assembly	2
E17	**	350-10109-0	Washer	4
E18	**	306-40172-0	Hex Hd Cap Screw	4
E54	1	691-10221-0	Gasket O-ring	2
	4	694-10221-0		
	5	695-10221-0		
E55	**	306-40224-0	Hex Hd Cap Screw	4
E56	1	080030100001	Ext Pilot Drain Shuttle Ass'y	1
	5	080030100002	Ext Pilot Drain Shuttle Ass'y	
E61	**	359-11100-0	Screw	2
E62	**	033-57450-0	Washer, Lock	2
E63	**	033-95533-0	Ring Check	2
E64	**	033-95534-0	Clamp	2
E65	**	033-92688-0	Locating Race	1
E66	**	033-92689-0	Disc Spring	2
E67	**	230-82222-0	Thrust Bearing	1
E68	**	033-92690-0	Hold Down Nut	1
E69	1	671-00155-0	Gasket O-ring	1
	4	674-00155-0		
	5	675-00155-0		
E70	**	033-57642-0	Cover Plate	1
E71	**	306-40080-0	Hex Hd Cap Screw	4
E72	1	691-00024-0	Gasket O-ring	2
	4	N/A		
	5	695-00024-0		
E73	1	691-00015-0	Gasket O-ring	1
	4	N/A		
	5	695-00015-0		
E74	**	488-35018-0	Plug	3
E75	1	691-00912-0	Gasket O-ring	3
	4	694-00912-0		
	5	695-00912-0		
E80	**	033-92691-0	Replenish Isolation Tube	3
E81	1	671-00147-0	Gasket O-ring	1
	4	674-00147-0		
	5	675-00147-0		

SAE A Adaptor				
Balloon	Seal Code	Part Number	Qty	Description
E76	**	033-92684-0	1	SAE "A" Adaptor
E77	**	358-20200-0	2	Hex Hd Cap Screw
E78	**	033-92693-0	1	SAE "A" Coupling
E79	1	671-00152-0	1	Gasket O-ring
	4	674-00152-0		
	5	675-00152-0		
SAE B Adaptor				
Balloon	Seal Code	Part Number	Qty	Description
E76	**	033-92981-0	1	SAE "B" Adaptor
E77	**	358-24220-0	4	Hex Hd Cap Screw
E78	**	033-92982-0	1	SAE "B" Coupling
E79	1	671-00155-0	1	Gasket O-ring
	4	674-00155-0		
	5	675-00155-0		
SAE C Adaptor				
Balloon	Seal Code	Part Number	Qty	Description
E76	**	033-92555-0	1	SAE "C" Adaptor
E77	**	358-24220-0	4	Hex Hd Cap Screw
E78	**	033-92607-0	1	SAE "C" Coupling
E79	1	671-00159-0	1	Gasket O-ring
	4	674-00159-0		
	5	675-00159-0		
SAE D Adaptor				
Balloon	Seal Code	Part Number	Qty	Description
E76	**	033-92558-0	1	SAE "D" Adaptor
E77	**	358-24260-0	4	Hex Hd Cap Screw
E78	**	033-92482-0	1	SAE "D"/"E" Coupling
E79	1	671-00163-0	1	Gasket O-ring
	4	674-00163-0		
	5	675-00163-0		
SAE E Adaptor				
Balloon	Seal Code	Part Number	Qty	Description
E76	**	033-92467-0	1	SAE "E" Adaptor
E77	**	358-24260-0	4	Hex Hd Cap Screw
E78	**	033-92482-0	1	SAE "D"/"E" Coupling
E79	1	671-00165-0	1	Gasket O-ring
	4	674-00165-0		
	5	675-00165-0		



Section F				
Valve Block Assembly (Reference S23-12742)				
Balloon #	Seal Code	Item #	Description	Qty
F1	**	033-91221-0	Valve Body	1
F2	**	S13-40266-0	Valve Check	2
F3	**	033-91249-0	.046 Dia. Orifice Plug	4
F4	1	691-00903-0	Gasket O-ring	3
	4	694-00903-0		
	5	695-00903-0		
F5	**	033-70508-0	Seat	1
F6	**	312-13160-0	Screw-socket hd	1
F7	**	335-13100-0	Nut-Jam	1
F8	**	033-70545-0	Housing Guide	1
F9	1	691-00910-0	Gasket O-ring	1
	4	694-00910-0		
	5	695-00910-0		
F10	**	033-21767-0	Piston	1
F11	1	671-00012-0	Gasket O-ring	1
	4	674-00012-0		
	5	675-00012-0		
F12	**	032-91798-0	Spring	1
F13	**	036-12288-0	Cone	1
F14	**	S13-43240-0	Assy, Repl Strainer	1
F19	1	691-00906-0	Gasket O-ring	1
	4	694-00906-0		
	5	695-00906-0		
F20	**	488-35003-0	Plug	1
F21	**	230-82226-0	Pin 1/8X5/8 (P units)	1
F22	1	691-00904-0	Gasket O-ring	5
	4	694-00904-0		
	5	695-00904-0		
F23	**	488-35001-0	Plug	5
F25	**	488-35049-0	Plug	2
F27	**	033-70507-0	Seat, Sequence	2
F28	**	033-70500-0	Seat, Repl & Servo	4
F29	**	033-91193-0	Gasket, Valve Block	1
F30	**	033-72378-0	Poppet, Sequence	2
F31	**	033-72379-0	Poppet, Dual & Repl.	4
F32	**	033-22141-0	Spring, Repl.	1
F33	**	033-70512-0	Spring, Sequence	2
F34	**	033-70482-0	Spring, Retainer	1
F35	**	033-71086-0	Spring, Dual Relief	3
F36	**	S23-12814-0	Pilot Valve - Repl Relief	1
F37	1	671-00050-0	Gasket O-ring	1
	4	674-00050-0		
	5	675-00050-0		
F42	**	033-91422-0	Plate, Retainer	1
F43	**	353-25078-0	Screw, Button Head	4
F45	**	327-25006-0	Nut, Acron	1
F46	**	325-08120-0	Pin, Spring	2
F47	1	671-00013-0	Gasket O-ring	2
	4	674-00013-0		
	5	675-00013-0		
F48	1	671-00014-0	Gasket O-ring	2
	4	674-00014-0		
	5	675-00014-0		
F49	**	306-40169-0	Screw, HHC 3/8-16 UNC X 3 1/4 Lg. Grade 8	8

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2. Price Adjustments; Payments. Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyer's request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's changes in shipping, product specifications or in accordance with Section 13, herein.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of eighteen months from the date of delivery to Buyer. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.

7. Contingencies. Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.

8. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

9. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

10. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

12. Improper Use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

13. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

14. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

15. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

16. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

17. Termination. This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

18. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

19. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

20. Taxes. Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. Equal Opportunity Clause. For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRRA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.



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