Parker Hydraulics

Bulletin PM 1622-20-M1/USA

Parker Pumps Parts & Service

Effective: August 1998

PVP Series Variable Volume Piston Pump Service Bulletin

Model PVP23 **** 20
Model PVP33 **** 20

WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

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Parker Hannifin Corporation
Hydraulic Pump/Motor Division
Greeneville, TN 37745 USA

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Introduction:

The PVP23 or 33 **** 20 series piston pumps are designed to provide long life while operating with Hydraulic Oil. Refer to catalog 1550/USA for limits. However, should maintenance be required, the following instructions should be used for disassembly, replacement of parts, cleaning and assembly.

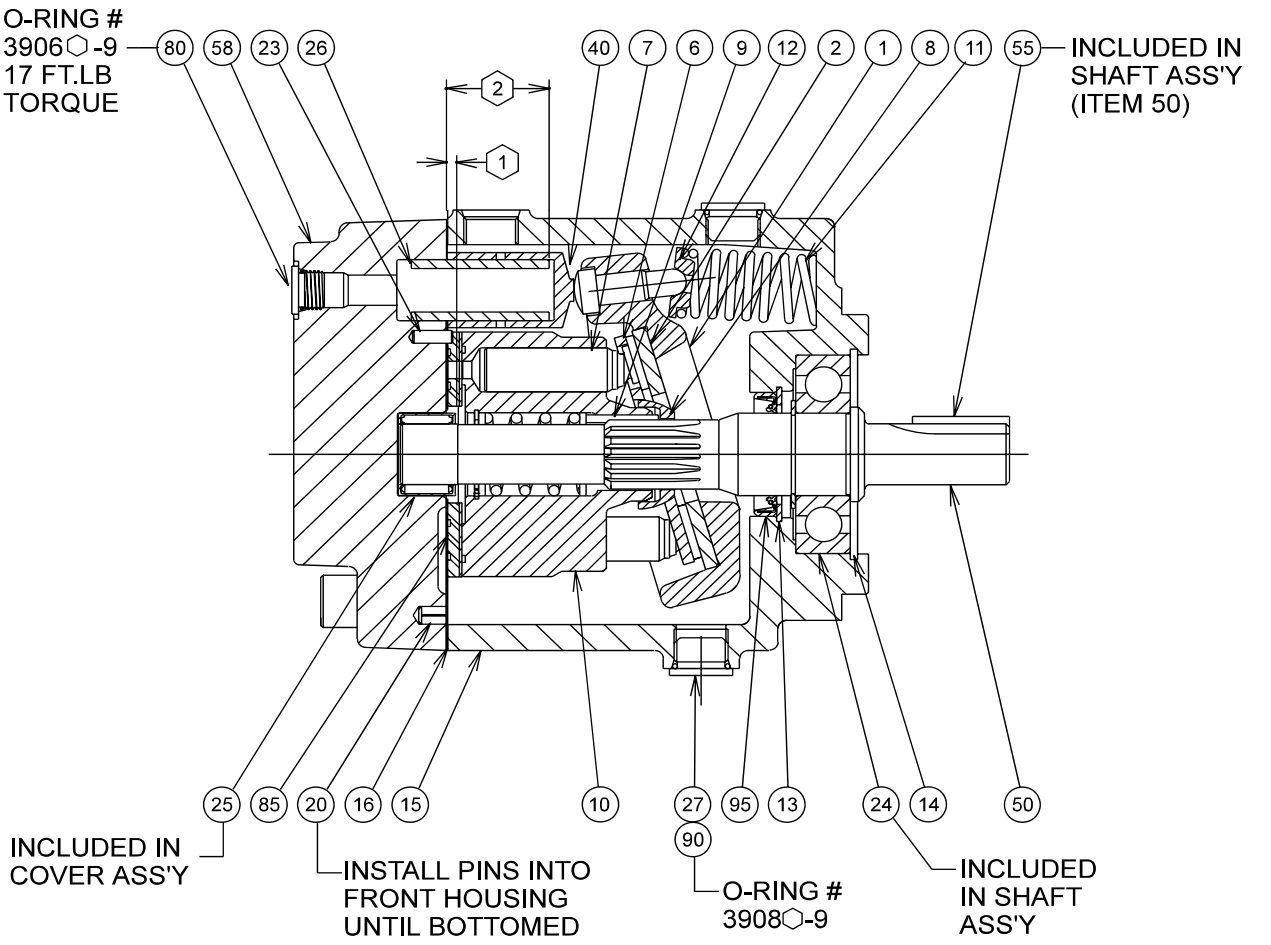
Note:

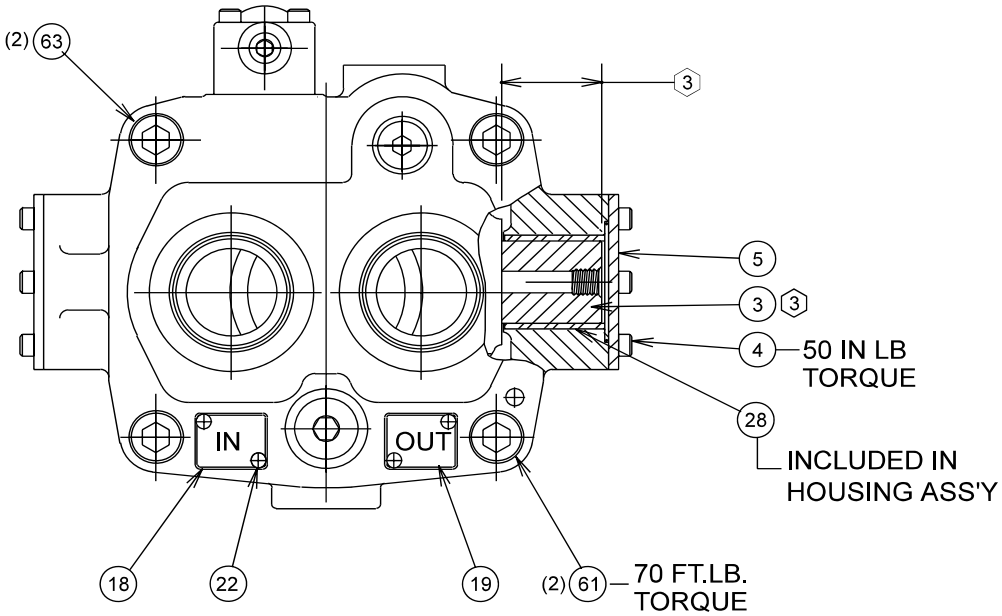
Prior to any pump disassembly, plug the open ports and clean all dirt from the outside of the pump.

Prior to assembly all parts should be cleaned and then lightly coated with oil.

Warning:

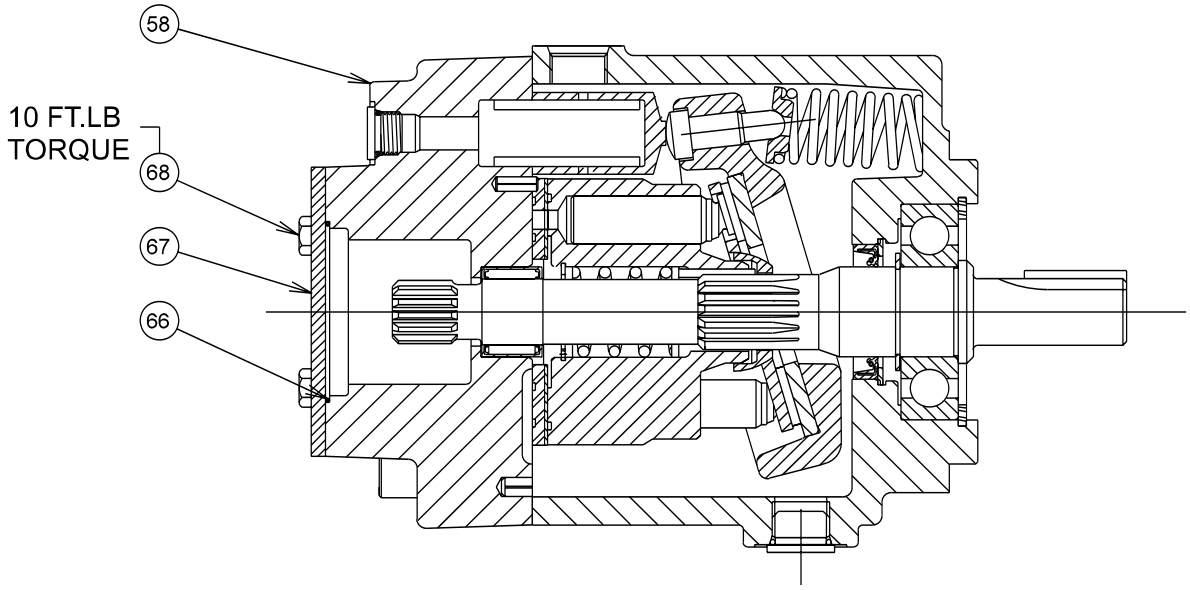
Protective eye wear should be worn during all maintenance procedures.

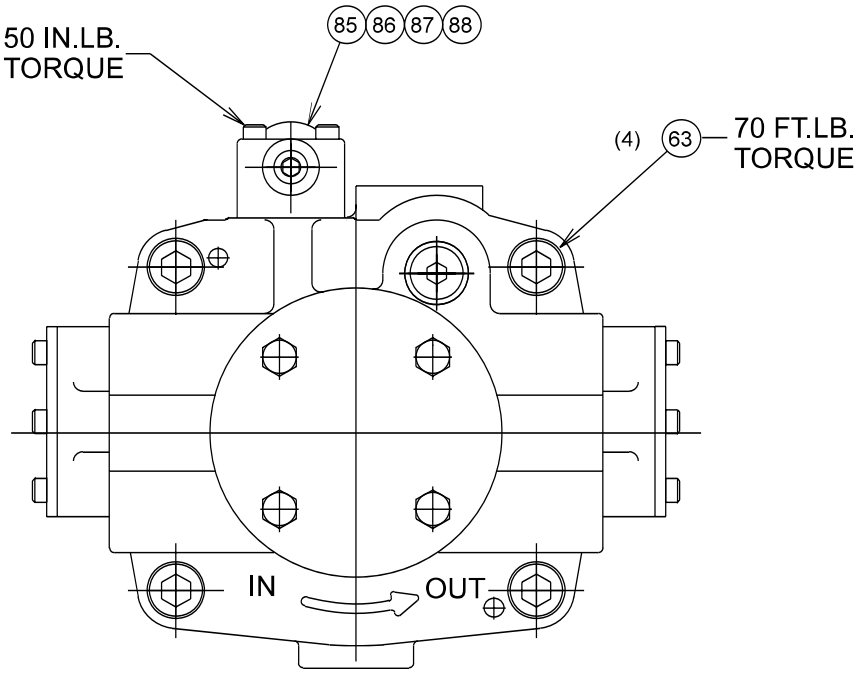


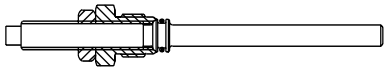


Notes:

1. Installed height of item 25 (needle bearing) into item 58 (rear cover) to be .125/.150.
2. Installed height of item 26 (servo post) into item 58 (rear cover) to be 1.465/1.470.
3. Item 3 (trunnion pin) to be pressed in until shoulder bottoms on swashplate.
4. Illustration shows righthand (CW) rotation pump. Lefthand (CCW) pumps will have the inlet, outlet ports and the rotation arrow reversed.

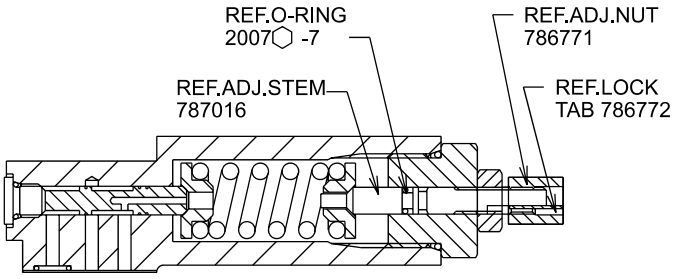




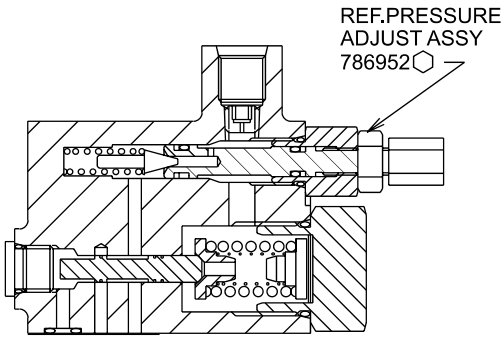


ADJUSTABLE MAX. VOLUME STOP
VOLUME STOP OPTION "2"
O-RING 2011⬡ -9
ITEM #48

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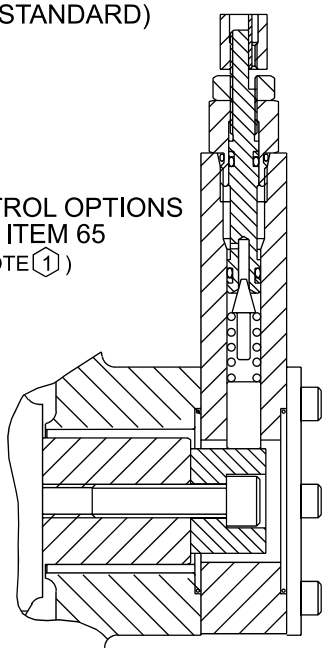


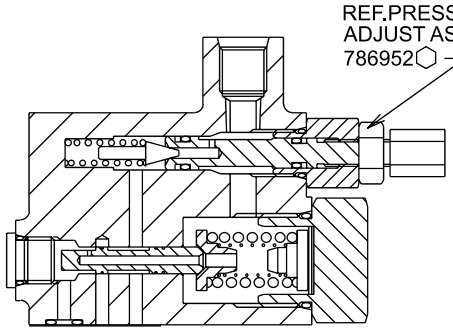
"OMIT" COMPENSATOR (STANDARD)
ITEM 85



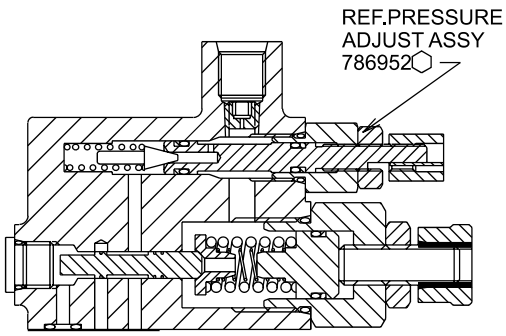
"ME" COMPENSATOR
(REMOTE W/EXTERNAL SENSE)
ITEM 87

POWER CONTROL OPTIONS
"H" & "C" ITEM 65
(SEE NOTE 1)





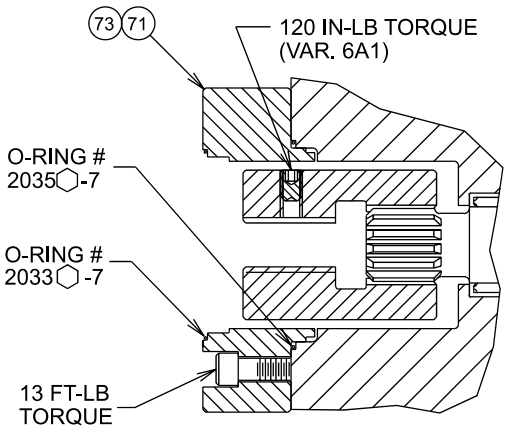
REMOTE CONTROL OPTION "M"
REQUIRED W/POWER OPTION "H"
ITEM 86



LOAD SENSE OPTION "A"
REQUIRED W/POWER OPTION "C"
ITEM 88

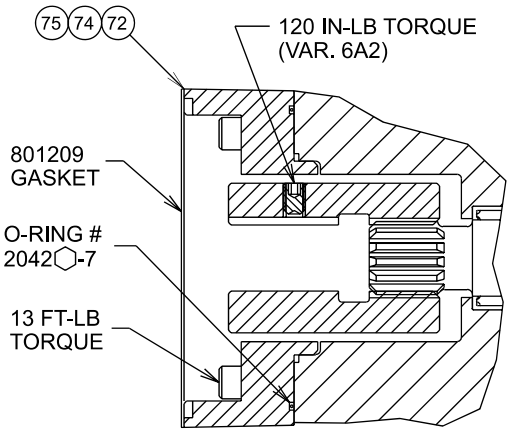
Notes:

1. Must be used with proper compensator assembly. Horsepower (torque) control assembly does not include pressure compensator assembly. For "H" option use "M" compensator. For "C" option use "A" compensator.



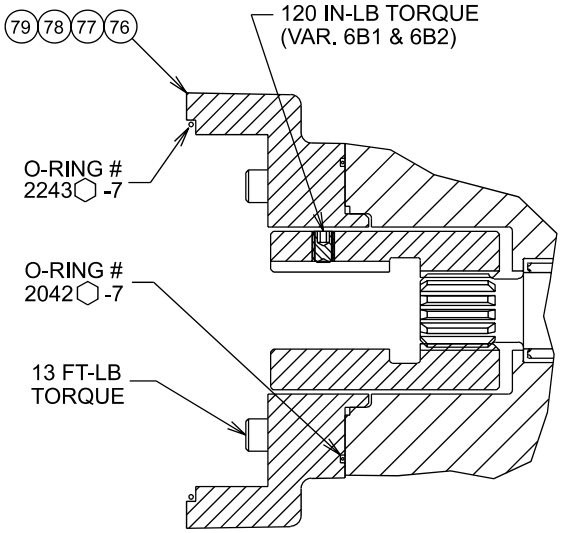
THRU SHAFT VARIATIONS
"6A1"&"6A3"

REAR PUMP CONFIGURATION:
- SAE AA 2 BOLT
- 2.000 PILOT DIAMETER
- SHAFT SIZES:
  - 6A1 - .500 X.125 KEY - KIT# 787233⬡
  - 6A3 - 9 TOOTH 20/40
    PITCH SPLINE - KIT# 787235⬡



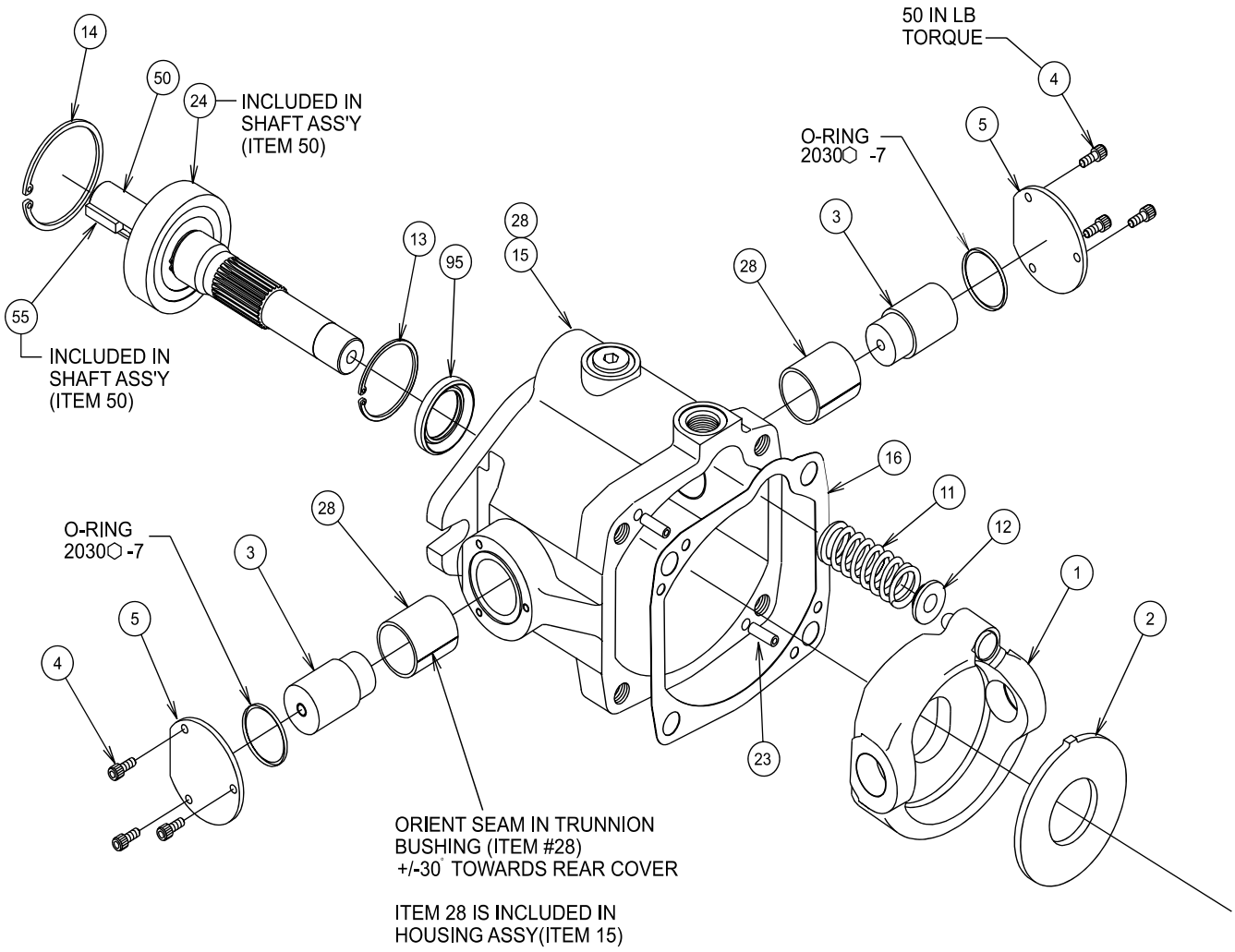
THRU SHAFT VARIATIONS
"6A2","6A4","6A5"
"9A4","9A5"

REAR PUMP CONFIGURATION:
- SAE A 2 BOLT
- 3.250 PILOT DIAMETER
- SHAFT SIZES:
  - 6A2 - .750 X.188 KEY - KIT# 787234⬡
  - 6A4 - 9 TOOTH 16/32
    PITCH SPLINE - KIT# 787236⬡
  - 6A5 - 11 TOOTH 16/32
    PITCH SPLINE - KIT# 787392⬡
  - 9A4 - 9 TOOTH 16/32
    PITCH SPLINE - KIT# 788208⬡
  - 9A5 - 11 TOOTH 16/32
    PITCH SPLINE - KIT# 788209⬡



THRU SHAFT VARIATIONS
"6B1","6B2","6B3","6B4"
"9B3","9B4"

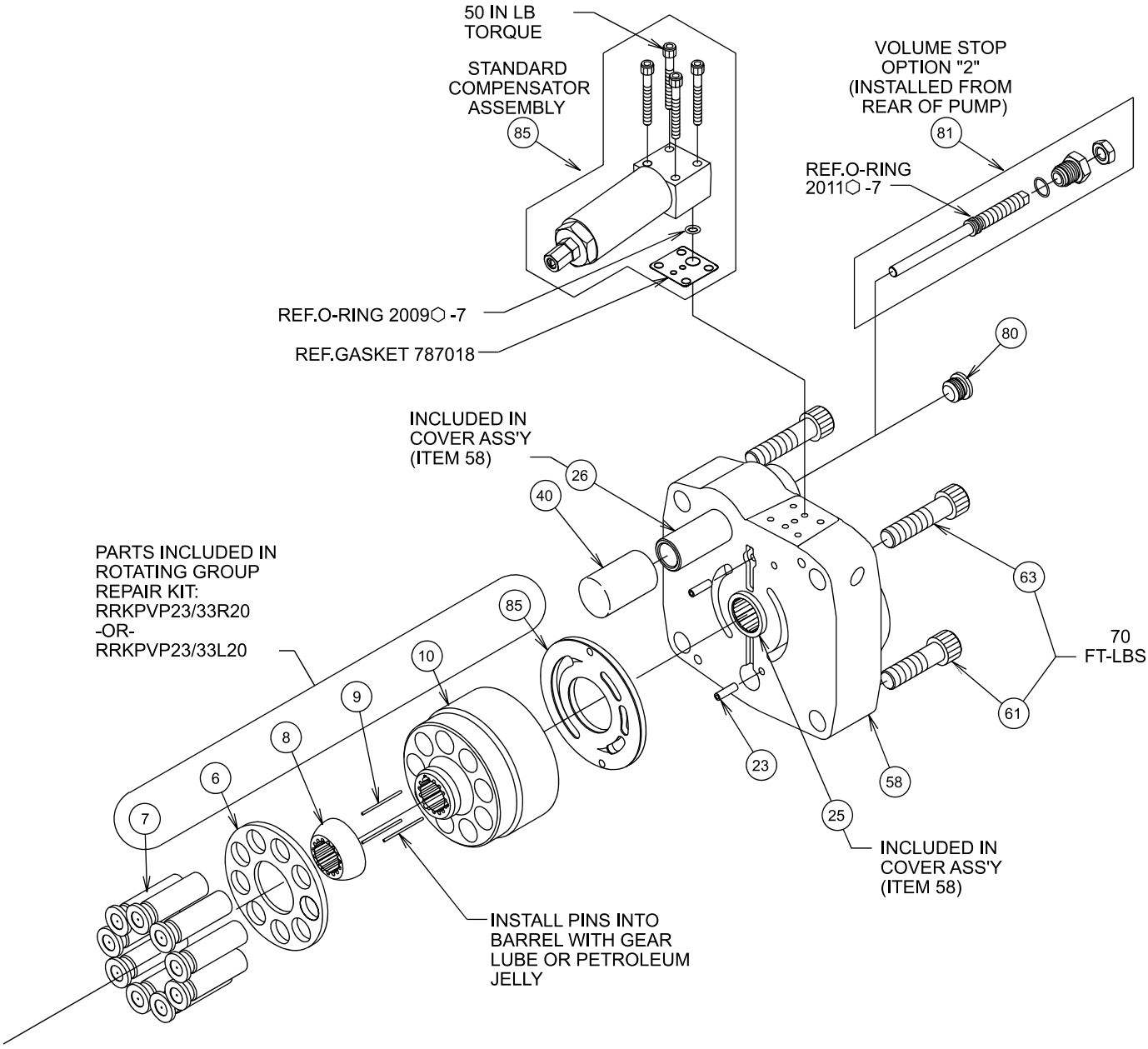
REAR PUMP CONFIGURATION:
- SAE B 2 BOLT
- 4.000 PILOT DIAMETER
- SHAFT SIZES:
  - 6B1 - .875 X.250 KEY - KIT# 787237⬡
  - 6B2 - 1.00 X.250 KEY - KIT# 787238⬡
  - 6B3 - 13 TOOTH 16/32
    PITCH SPLINE - KIT# 787239⬡
  - 6B4 - 15 TOOTH 16/32
    PITCH SPLINE - KIT# 787240⬡
  - 9B3 - 13 TOOTH 16/32
    PITCH SPLINE - KIT# 788210⬡
  - 9B4 - 15 TOOTH 16/32
    PITCH SPLINE - KIT# 788211⬡



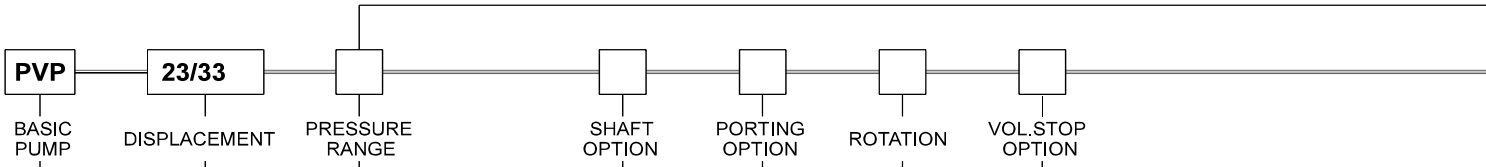
Notes:

1. Illustration shows righthand (CW) rotation pump. Lefthand (CCW) pumps will have the compensator on opposite side, and port plate kidneys reversed.
2. Seal kit (SKPVP23/33⬡20) consists of all O-rings, gaskets and shaft seal.

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10	1000 PSI COMP. SETTING			
20	2000 PSI COMP. SETTING			
30	3000 PSI COMP. SETTING			
36	3600 PSI COMP. SETTING			

OMIT	80	108X6	1	PLUG
2	81	787196	1	VOLUME STOP KIT

R	85	787125	1	PORT PLATE - CW
L	85	787126	1	PORT PLATE - CCW

23	40	788052	1	SERVO PISTON
33	40	787939	1	SERVO PISTON

OMIT	R	58	787367⬡	1	CVR-ASSY-REAR-20
	L	58	787368⬡	1	CVR-ASSY-REAR-20
2	R	58	787369⬡	1	CVR-ASSY-SIDE FLNG
	L	58	787370⬡	1	CVR-ASSY-SIDE FLNG
3	R	58	787371⬡	1	CVR-ASSY-SIDE -20
	L	58	787372⬡	1	CVR-ASSY-SIDE -20
8 9	R	58	----		CVR-SIDE FLNG METRIC
	L	58	-----		CVR-SIDE FLNG METRIC

P	1	788016	1	SWASHPLATE ASSY
	2	787122	1	SLIPPER PLATE
	3	787978	2	TRUNNION PIN
	4	10X209	6	CAP SCREW
	5	787986	2	TRUNNION COVER
	6	787116	1	SLIPPER RETAINER
	7	787115	9	PISTON ASSEMBLY
	8	787117	1	BALL SEAT
	9	787118	3	BARREL PIN
	10	787358	1	BARREL ASSEMBLY
	11	788039	1	SWASH SPRING
	12	787769	1	SPRING RETAINER
V	13	56X322	1	RETAINING RING
	14	56X337	1	RETAINING RING
	15	788056	1	HOUSING ASSY
	16	787143	1	GASKET-COVER
P	20	99X127	2	ROLL PIN
	21	800511	1	NAMEPLATE
	22	39X10	2	DRIVE SCREW
	23	99X83	2	ROLL PIN
	24	787137	1	BALL BEARING
	25	787138	1	NEEDLE BEARING
	26	787147	1	SERVO POST
	28	788041	2	TRUNNION BUSHING

OMIT	17	787162	1	ROTATION ARROW
	18	787163	1	INLET PLATE
	19	787164	1	OUTLET PLATE
	22	39X10	6	DRIVE SCREW
	61	10X294	2	CAP SCREW
	63	10X295	2	CAP SCREW
2 & 3	63	10X295	4	CAP SCREW
	66	2035⬡ -7	1	O-RING
	67	787232	1	COVER PLATE
	68	12X221	4	BOLTS
8 & 9	63	10X295	4	CAP SCREW
	66	2035⬡ -7	1	O-RING
	67	787232	1	PLUG
	68	216X212	4	BOLTS

OMIT	OMIT 2 3	27	788056	1	HOUSING ASSY-SAE/SAE
		37	108X8⬡	2	PLUG(SAE-8)
B	8	27	-----	1	HOUSING-SAE/6149
C		37	788516-08⬡	2	PLUG(ISO 6149)
D	9	27	-----	1	HOUSING-SAE/BSPP
		37	788161⬡	2	PLUG(BSPP)
K	9	27	----	1	HOUSING-METRIC/BSPP
		37	788161⬡	2	PLUG(BSPP)

OMIT	OMIT	50	787359	1	SHAFT ASSY,7/8 STR.
	2,3,8	50	787360	1	SHAFT ASSY,7/8 STR.THRU
B	OMIT	50	787361	1	SHAFT ASSY,13 T
	2,3,8	50	787362	1	SHAFT ASSY,13 T,THRU
C	OMIT	50	787363	1	SHAFT ASSY,1" STR.
	2,3,8	50	787364	1	SHAFT ASSY,1" STR.THRU
D	OMIT	50	787365	1	SHAFT ASSY,15 T
	2,3,8	50	787366	1	SHAFT ASSY,15 T,THRU
K	9		-----		SHAFT ASSY,25 MM STR.

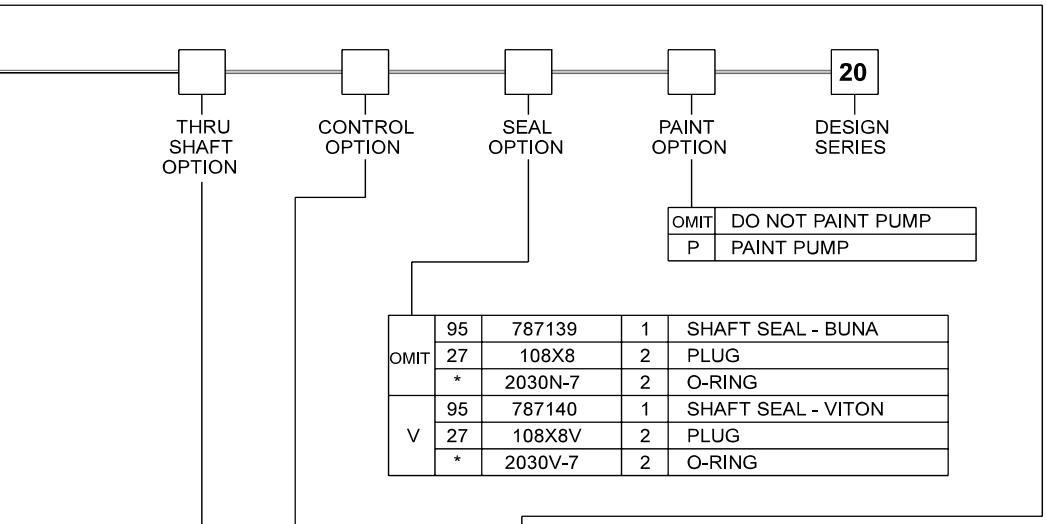
OMIT	55	22X19	1	KEY
C	55	22X19	1	KEY
K	55	788166	1	METRIC KEY

CAUTION

These service parts are intended for use in hydraulic pumps. Incorrect installation or assembly of these parts could cause the pump or pumps being repaired to fail in subsequent use or to operate incorrectly.

The following precautions should be followed:

1. All parts should be cleaned and then lightly coated with mineral oil, or another lubricating fluid compatible with the system fluid being used, prior to assembly.
2. The pump should be disassembled, repaired and reassembled in a clean environment.
3. Use proper tools to disassemble and reassemble the pump.
4. If you are uncertain at how to install these parts, you should obtain assistance either from a Parker Hannifin distributor, or from the Hydraulic Pump/Motor Division.



OMIT	DO NOT PAINT PUMP
P	PAINT PUMP

OMIT	95	787139	1	SHAFT SEAL - BUNA
	27	108X8	2	PLUG
	*	2030N-7	2	O-RING
V	95	787140	1	SHAFT SEAL - VITON
	27	108X8V	2	PLUG
	*	2030V-7	2	O-RING

1	1000 PSI MAX COMP SETTING
2	2000 PSI MAX COMP SETTING
3	3000 PSI MAX COMP SETTING
36	3600 PSI MAX COMP SETTING

OMIT	85	787010⬡-*	1	STANDARD COMP. ASSY
M	86	787028⬡-*	1	REMOTE COMP ASSY (INT)
ME	87	787029⬡-*	1	REMOTE COMP ASSY (EXT)
A	88	787027⬡-*	1	LOAD SENSE COMP ASSY
(2) H	86	787028⬡-*	1	REMOTE COMP ASSY (INT)
	89	788055⬡	1	HORSEPOWER ASSEMBLY
(3) C	88	787027⬡-*	1	LOAD SENSE COMP ASSY
	89	788055⬡	1	HORSEPOWER ASSEMBLY
VO	-	SEE ABOVE	1	USE STD 'OMIT' CONTROL
VM	-	SEE ABOVE	1	USE 'M' CONTROL
VA	-	SEE ABOVE	1	USE 'A' CONTROL
VH	-	SEE ABOVE	1	USE 'H' CONTROL
VC	-	SEE ABOVE	1	USE 'C' CONTROL

NOTE:
WHEN ORDERING CONTROLS FOR METRIC VERSION PUMPS(OPTIONS 8 & 9) ADDITIONAL METRIC SCREWS ARE REQUIRED.

CONTROL	PART NUMBER	QTY	DESCRIPTION
OMIT	210X105	1	CAPSCREW-M5X35MM
ALL OTHER	210X108	1	CAPSCREW-M5X50MM

NOTE:
WHEN ORDERING CONTROLS M,ME,A,C,H FOR METRIC VERSION PUMPS(OPTIONS 8 & 9)AN ADDITIONAL ADAPTOR FITTING IS REQUIRED.

PORTING	PART NUMBER	QTY	DESCRIPTION
8	788517⬡	1	FITTING(ISO6149)
9	788157⬡	1	FITTING(1/4BSPP)

OMIT		70			
6	A1	71	787233	1	"AA" PILOT,1/2 KEYED
	A2	72	787234	1	"A" PILOT,3/4 KEYED
	A4	74	787236	1	"A" PILOT,9T SPLINE
	A5	75	787392	1	"A" PILOT,11T SPLINE
	B1	76	787237	1	"B" PILOT,7/8 KEYED
	B2	77	787238	1	"B" PILOT,1" KEYED
	B3	78	787239	1	"B" PILOT,13T SPLINE
	B4	79	787240	1	"B" PILOT,15T SPLINE
9	A4	-	788208		METRIC - 'A' 9T
	A5	-	788209		METRIC - 'A' 11T
	B3	-	788210		METRIC - 'B' 13T
	B4	-	788211		METRIC - 'B' 15T

Notes:

1. ⬡ O-Ring compound designation
   ⬡ =Nitrile, Ⓥ = Viton.
2. For proper operation of "H" control, it must be used with a remote compensator assembly.
3. For proper operation of "C" control, it must be used with a load sense compensator assembly.
4. Seal Kit P/N SKPVP 23/33⬡20
   Rotation Group Kit P/N:
   RRKPVP23/33□20
   - R - CW
   - L - CCW

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Service Notes:

- Use a clean lubricant (compatible with the working fluid) on all pump components during assembly.
- Most premature pump failures occur when contaminants from a previous failure have not been removed from the system, or cause for previous failure is still present (i.e. water in oil, filter bypassing, etc.)
- Thoroughly clean the reservoir, suction lines, suction strainer, drain lines, etc. before re-installing the pump.
- Always fill the pump case with clean fluid before starting a new or serviced pump for flooded suction, purge air from suction lines by cracking the inlet fitting or vent plug on pump. This should prevent an airlock condition and allow for faster priming.
- Starting the pump slowly by jogging (or turning over engine without allowing it to start) will help the pump prime and make it easier to determine when priming has occurred.
- Start pump with an open circuit whenever possible. Reduce the compensator to it's minimum setting during start-up. Cycle the pump on and off stroke while increasing the compensator to its required setting.

  This will assist in break-in of new components and help purge air from the case.

Basic Troubleshooting:

Pump Will Not Prime

Δ Pump should prime within 30 seconds. If it does not, **STOP**.
Δ Check for proper drive rotation.
Δ Make sure pump shaft is turning (i.e. key at coupling hubs is engaged).
Δ Make sure reservoir is full.
Δ Check for major sources of a suction leak (vent plug open, shaft seal missing (PAVC), flange not tight, pinched O-Ring at flange or pump housing.

Cannot Build Any Pressure

Δ Make sure pump is primed.
Δ Check alignment, especially on PAVC pumps without "9" option.
Δ Make sure systems is not an open circuit. A pump produces flow, not pressure. It can only limit pressure when the system requirement is higher than the pump compensator setting.

Can Only Build A Few Hundred PSI

Δ Compensator is backed all the way out.
Δ The remote or load sense line is vented.
Δ Control orifice or spool is plugged.
Δ Incorrect compensator spool (PVP).
Δ Pressure control dart is lodged open.
Δ Torque control plug is missing (PAVC).

Pump Will Not Compensate

Δ Differential spring over-compressed (i.e. spring guide dislocated).
Δ Control drain line blocked (PAVC).
Δ Pressure control stem vent hole is plugged.
Δ Control spool travel is hindered.
Δ Control orifice is missing (PAVC).
Δ Saturation orifice is missing in load sense circuit.

Notes:

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Notes:

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3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

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NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.

5. Limitation of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER. INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specification for items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between buyer and Seller unless accepted by Seller in written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges byBuyer, in no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, 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.

8. 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 (2) 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.

9. Taxes: Unless otherwise indicated on the face hereof, 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 the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount hereof shall be in addition to amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. 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 Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter "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 an item sold pursuant to this contract 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 an item sold hereunder 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 said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item 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 items 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 item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, buyer shall defend and indemnify Seller for all costs, expenses of or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation, accidents, acts of god, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carries or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representation or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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