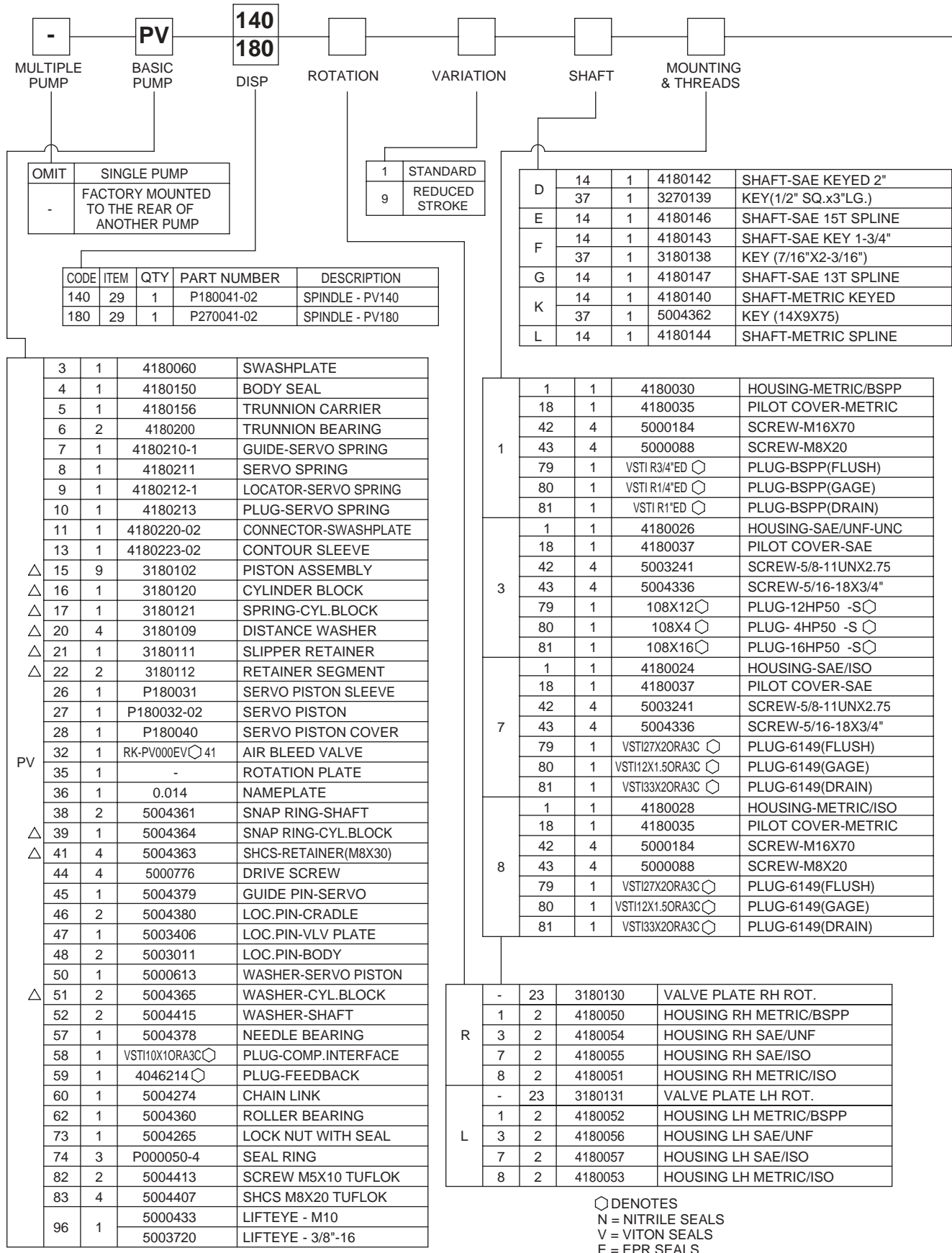


NOTES:

1. PUMP SHOWN IS RIGHT HAND (CW) ROTATION. LEFT HAND (CCW) ROTATION PUMPS HAVE THE INLET, OUTLET, DRAIN AND GAGE PORTS REVERSED. COMPENSATOR MOUNT, AIRBLEED AND VALVE PLATE KIDNEYS WILL ALSO BE REVERSED.
2. PUMP SHOWN WITHOUT COMPENSATOR ASSEMBLY - SEE PAGE 6 AND 7 FOR AVAILABLE COMPENSATOR OPTIONS.





FWS	STD COMP. 1000-5075 PSI	SEE PAGE 6 FOR COMPENSATOR ASSEMBLIES (STANDARD) (REMOTE) (LOAD SENSE) OPTIONS
FHS	STD COMP. 600-3050 PSI	
FDS	STD COMP. 150-2000 PSI	
FR	C "FRC" REMOTE COMP	SEE PAGE 7 FOR HORSEPOWER ASSEMBLIES (REMOTE COMP) (L/S COMP) (CARTRIDGE) (H.P. CONES)
	1 "FR1"&"FRZ" REMOTE PRESSURE COMP	
	Z	
FF	C "FFC" LOAD SENSE COMP	SEE PAGE 7 FOR HORSEPOWER ASSEMBLIES (REMOTE COMP) (L/S COMP) (CARTRIDGE) (H.P. CONES)
	1 "FF1"&"FFZ" LOAD SENSE COMP	
	Z	
K**	30 HORSEPOWER CONTROL	SEE PAGE 7 FOR HORSEPOWER ASSEMBLIES (REMOTE COMP) (L/S COMP) (CARTRIDGE) (H.P. CONES)
M**	35 HORSEPOWER CONTROL	
S**	50 HORSEPOWER CONTROL	
T**	60 HORSEPOWER CONTROL	
U**	75 HORSEPOWER CONTROL	
W**	90 HORSEPOWER CONTROL	
Y**	120 HORSEPOWER CONTROL	
Z**	150 HORSEPOWER CONTROL	

PAINT OPTION	OMIT	NO PAINT
	P	PAINT

MULTIPLE PUMP	OMIT	SINGLE PUMP
	-	PUMP FACTORY MOUNTED ON REAR

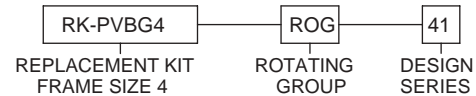
T1	31	1	A000021	T/S COVER PLATE
	69	1	2153 \odot -9	O-RING
	97	2	5000115	SCREW M10X25-METRIC
2		5002993	SCREW 3/8-16X1-SAE	
A7	91	1	3180082-7	COUPLING-9T,16/32
	-	1	MK-PVBG4A* \odot 41	T/S ADAPT.KIT "A"
B3	91	1	3180082-6	COUPLING-13T,16/32
	-	1	MK-PVBG4B* \odot 41	T/S ADAPT.KIT "B"
W3	91	1	3180082-5	COUPLING-15T,16/32
	-	1	MK-PVBG4B* \odot 41	T/S ADAPT.KIT "B"
C3	91	1	3180082-4	COUPLING-14T,20/40
	-	1	MK-PVBG4C* \odot 41	T/S ADAPT.KIT "C"
D3	91	1	3180082-2	COUPLING-13T,8/16
	-	1	MK-PVBG4D* \odot 41	T/S ADAPT.KIT "D"
J3	91	1	3180081-4	COUP.SPL N25X1.5X15
	-	1	MK-PVBG4J* \odot 41	T/S ADAPT.KIT-100MM
K3	91	1	3180081-3	COUP.SPL N32X1.5X20
	-	1	MK-PVBG4K* \odot 41	T/S ADAPT.KIT-125MM
L2	91	1	3180081-22	COUP.SPL N50X2X24
	-	1	MK-PVBG4L* \odot 41	T/S ADAPT.KIT-160MM
L3	91	1	3180081-2	COUP.SPL N40X1.5X25
	-	1	MK-PVBG4L* \odot 41	T/S ADAPT.KIT-160MM
Z3	91	1	3180082-20	COUP.SPL 15T,8/16
	-	1	MK-PVBG4D* \odot 41	T/S ADAPT.KIT-160MM
SEE PAGE * FOR PARTS BREAKDOWN ON THRU SHAFT KIT ASSEMBLIES AND COUPLING REF. NUMBERS				

N	63	2	5000902	O-RING 2-010-N552-90
	65	1	5000954	O-RING 2-136-N552-90
	66	1	5004368	O-RING 2-036-N552-90
	67	1	5004417	O-RING 2-157-N552-90
	68	1	5000958	O-RING 2-140-N552-90
	70	1	5000960	O-RING 2-145-N552-90
	71	1	5003647	O-RING 2-035-N552-90
	72	1	5004381	SHAFT SEAL-60X80X7 N
	75	1	5003630	B/U-RING 8-136-N300-90
	76	1	5004268	B/U-RING 8-035-N300-90
	77	1	5004384	B/U-RING 8-036-N300-90
	90	1	5000904	O-RING 2-012-N552-90
	V	63	2	5001012
65		1	5001056	O-RING 2-136-V747-75
66		1	5004369	O-RING 2-036-V747-75
67		1	5004418	O-RING 2-157-V747-75
68		1	5001060	O-RING 2-140-V747-75
70		1	5004446	O-RING 2-145-V747-75
71		1	5003648	O-RING 2-035-V747-75
72		1	5004382	SHAFT SEAL-60X80X7 V
75		1	5003631	B/U-RING 8-136-V709-90
76		1	5004315	B/U-RING 8-035-V709-90
77	1	5004385	B/U-RING 8-036-V709-90	
90	1	5001014	O-RING 2-012-V747-75	
E	63	2	5002535	O-RING 2-010-E540-80
	65	1	5004448	O-RING 2-136-E540-80
	66	1	5004370	O-RING 2-036-E540-80
	67	1	5004419	O-RING 2-157-E540-80
	68	1	5003604	O-RING 2-140-E540-80
	70	1	5004447	O-RING 2-145-E540-80
	71	1	5004308	O-RING 2-035-E540-80
	72	1	5004383	SHAFT SEAL-60X80X7 E
	75	1	5003632	B/U-RING 8-136-E652-90
	76	1	5004316	B/U-RING 8-035-E652-90
77	1	5004386	B/U-RING 8-036-E652-90	
90	1	5002537	O-RING 2-012-E540-80	
W	72	1	5004482	SHAFT SEAL-60X80X7 W
	"W" OPTION USES NITRILE ("N") SEALS			

NOTE:
 THRU SHAFT OPTION CODE:
 * DENOTES
 M = METRIC SCREWS(THR'D 1 & 8)
 S = UNC SCREWS(THR'D 3 & 7)

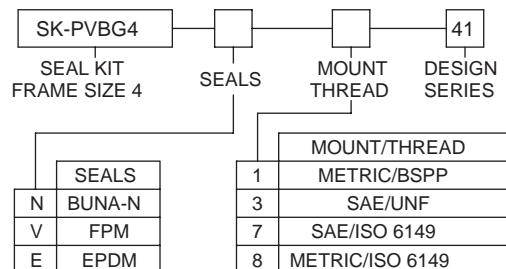
\odot DENOTES
 N = NITRILE SEALS
 V = VITON SEALS
 E = EPR SEALS

ROTATING GROUP KIT



NOTE:
 1. VALVE PLATE (ITEM 23) MUST BE ORDERED SEPARATE.
 2. Δ = ALL PARTS INCLUDED IN "ROTATING GROUP" KIT.

SEAL KITS



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 reinstalling 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 its 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**

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

Cannot Build Any Pressure

- △ Make sure pump is primed.
- △ Check alignment.
- △ 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

- △ Compensator is backed all the way out.
- △ The remote or load sense line is vented.
- △ Control orifice or spool is plugged.
- △ Incorrect compensator spool.
- △ Pressure control dart is lodged open.

Pump Will Not Compensate

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

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2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

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.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. **THIS WARRANTY COMPROMISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW. TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.**

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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 by Buyer, 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.

FPG 9-91-P



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