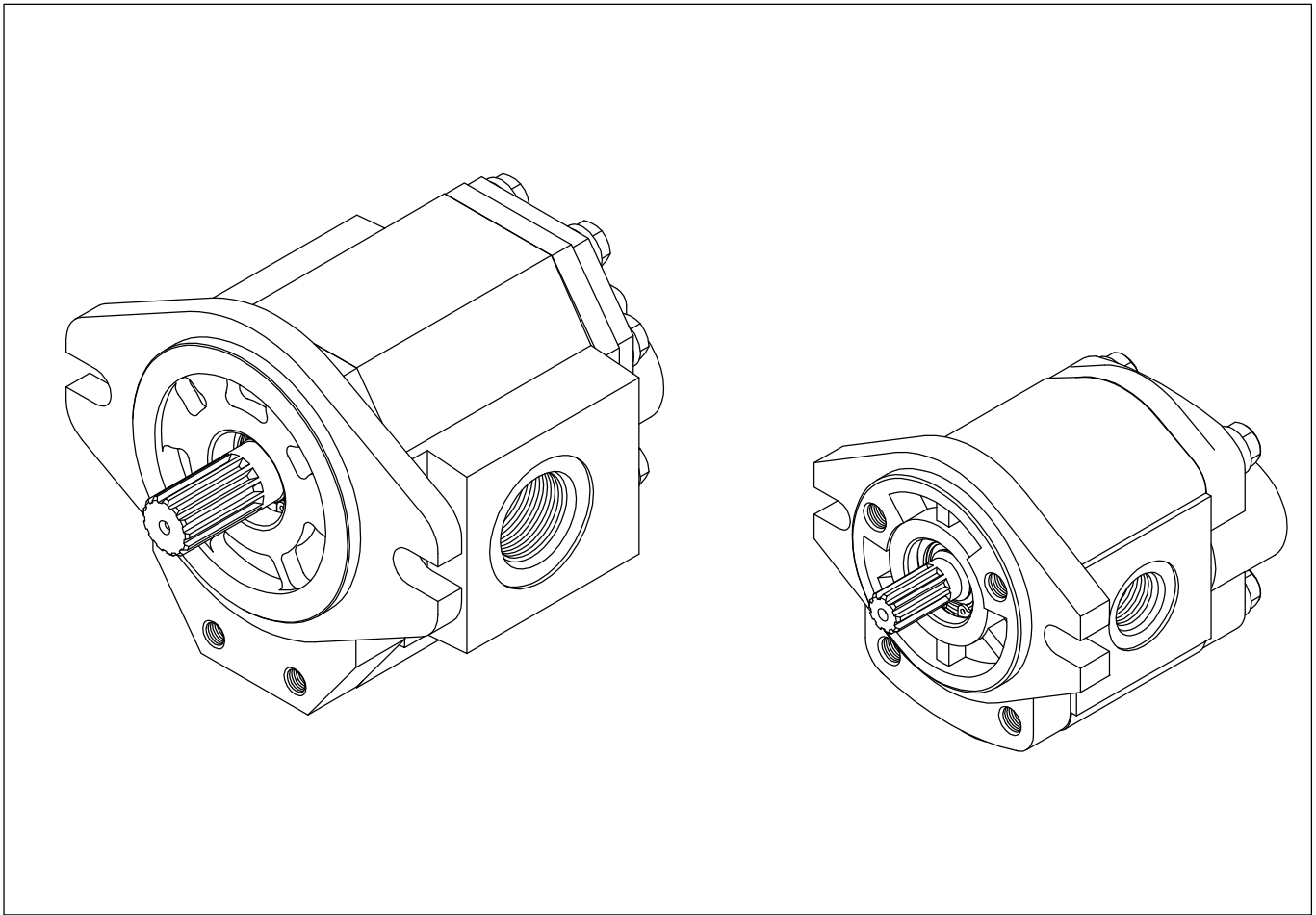


# SP20B AND SP25A SERIES PUMP PARTS MANUAL



PRINCE MFG. CORP.



Date: July 2013

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## GENERAL SAFETY PRECAUTIONS FOR HYDRAULIC PUMPS

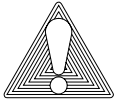
1) ALL HYDRAULIC PUMPS MUST BE PROPERLY INSTALLED INTO THE HYDRAULIC SYSTEM TO PREVENT PERSONAL INJURY AND/OR PROPERTY DAMAGE. FURTHER, THE IMPROPER SERVICING OF A PUMP MAY RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE. PLEASE READ AND UNDERSTAND ALL CATALOG AND SERVICE INFORMATION BEFORE STARTING. AS WITH ALL MECHANICAL WORK THE PROPER TOOLS, KNOWLEDGE, AND SAFETY EQUIPMENT ARE REQUIRED. ALWAYS WEAR SAFETY GLASSES.

2) MAKE SURE ALL PRESSURE HAS BEEN RELIEVED IN THE HYDRAULIC LINES BEFORE INSTALLING OR SERVICING A HYDRAULIC PUMP



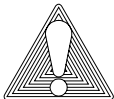
WARNING: ESCAPING HYDRAULIC FLUID UNDER PRESSURE CAN HAVE SUFFICIENT FORCE TO PENETRATE SKIN, CAUSING SERIOUS PERSONAL INJURY. DO NOT USE YOUR HAND TO CHECK FOR HYDRAULIC LEAKS.

3) BEFORE INSTALLING OR SERVICING A HYDRAULIC COMPONENT MAKE SURE ALL WEIGHT HAS BEEN REMOVED FROM THE CYLINDERS OR MOTORS BEFORE DISCONNECTING HYDRAULIC LINES.

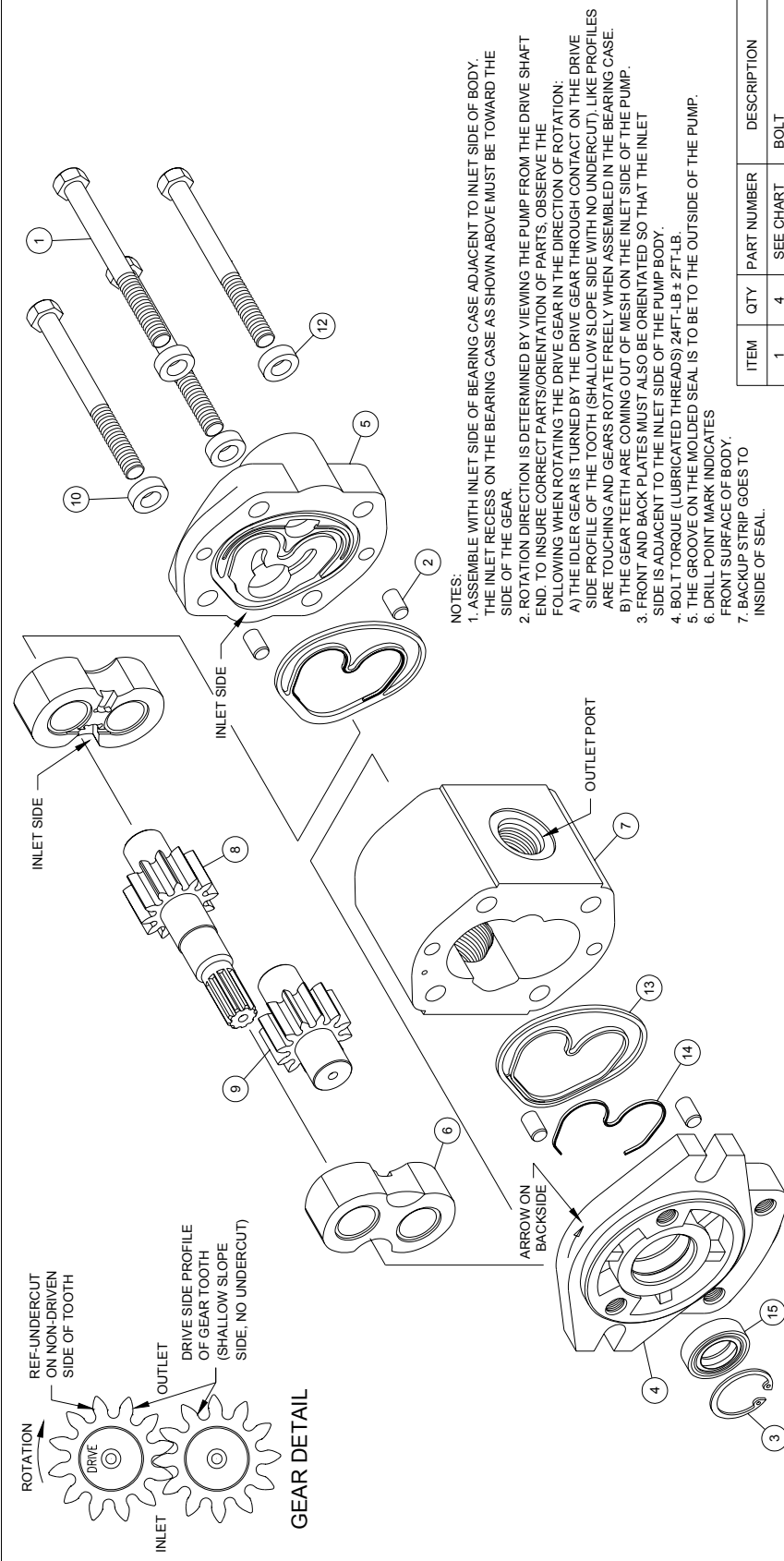


WARNING: DISCONNECTING THE HYDRAULIC LINES WHILE THE CYLINDER OR MOTOR IS UNDER LOAD MAY RESULT IN THE UNEXPECTED RAPID MOVEMENT OF MACHINE RESULTING IN SERIOUS PERSONAL INJURY.

4) DO NOT EXCEED THE OPERATING SPECIFICATIONS FOR PRESSURE, FLOW OR TEMPERATURE. ALL HYDRAULIC SYSTEMS REQUIRE A MEANS TO LIMIT THE MAXIMUM PRESSURE. THIS REQUIRES EITHER A PRESSURE RELIEF VALVE IN THE SYSTEM OR A PUMP THAT HAS PRESSURE COMPENSATION.



WARNING: OVERPRESSURE MAY CAUSE SUDDEN AND UNEXPECTED FAILURE OF A COMPONENT IN THE HYDRAULIC SYSTEM RESULTING IN SERIOUS PERSONAL INJURY. ALWAYS USE A GAUGE WHEN ADJUSTING A RELIEF VALVE.

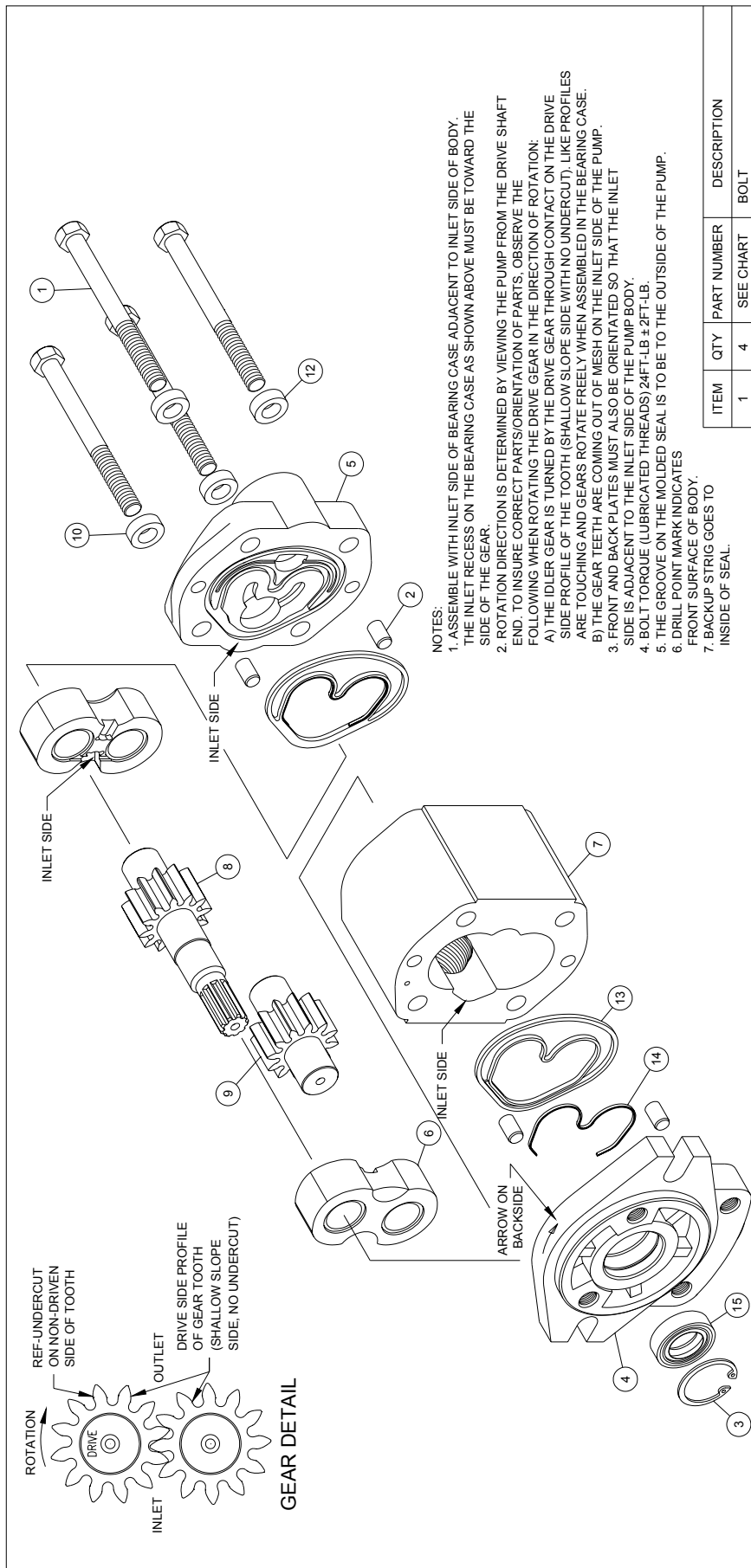


- NOTES:**
- ASSEMBLE WITH INLET SIDE OF BEARING CASE ADJACENT TO INLET SIDE OF BODY. THE INLET RECESS ON THE BEARING CASE AS SHOWN ABOVE MUST BE TOWARD THE SIDE OF THE GEAR.
  - ROTATION DIRECTION IS DETERMINED BY VIEWING THE PUMP FROM THE DRIVE SHAFT END. TO INSURE CORRECT PARTS/ORIENTATION OF PARTS, OBSERVE THE FOLLOWING WHEN ROTATING THE DRIVE GEAR IN THE DIRECTION OF ROTATION:
    - THE IDLER GEAR IS TURNED BY THE DRIVE GEAR THROUGH CONTACT ON THE DRIVE SIDE PROFILE OF THE TOOTH (SHALLOW SLOPE SIDE WITH NO UNDERCUT). LIKE PROFILES ARE TOUCHING AND GEARS ROTATE FREELY WHEN ASSEMBLED IN THE BEARING CASE.
    - THE GEAR TEETH ARE COMING OUT OF MESH ON THE INLET SIDE OF THE PUMP.
  - FRONT AND BACK PLATES MUST ALSO BE ORIENTATED SO THAT THE INLET SIDE IS ADJACENT TO THE INLET SIDE OF THE PUMP BODY.
  - BOLT TORQUE (LUBRICATED THREADS) 24FT-LB + 2FT-LB.
  - THE GROOVE ON THE MOLDED SEAL IS TO BE TO THE OUTSIDE OF THE PUMP.
  - DRILL POINT MARK INDICATES FRONT SURFACE OF BODY.
  - BACKUP STRIP GOES TO INSIDE OF SEAL.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	SEE CHART	BOLT
2	4	190100037	DOWEL PINS
3*	1	230001125	SNAP RING
4	1	500501010	FRONT PLATE
5	1	500501501	BACK PLATE
6	2	500502004	BEARING CARRIER ASSY
7	1	SEE CHART	BODY
8	1	SEE CHART	DRIVE GEAR
9	1	SEE CHART	IDLER GEAR
10	2	500507500	WASHER (UPPER) (.060 THK)
11	1	500507504	KEY FOR 5/8 KEYS SHAFT
12	2	SEE CHART	WASHER (LOWER)
13*	2	500512000	SEAL
14*	2	500512101	BACK-UP STRIP
15*	1	500512500	SHAFT SEAL STD.
15	1	500512503	SHAFT SEAL MED. PRESSURE
	*	PMCK-SP20	SEAL KIT (*ITEMS INCLUDED)

PUMP SIZE	BOLTS (ITEM 1)	BODY (ITEM 7)	DRIVE GEAR (ITEM 8)										WASHERS (LOWER) (ITEM 12)
			9 T SPLINE DRV	5/8 KEYS DRV	11 T SPLINE DRV	3/4 KEYS DRV	10 T SPLINE DRV	IDLER GEAR	500506010	500507500 (.060)			
SP20B 06	170002133 (3.50)	500503015	500504513	500504512	500504515	500504514	500504515	500504010	500504010	500504040	500506000	500507500 (.120)	
SP20B 08	170002087 (3.75)	500503100	500504000	500504100	500504050	500504010	500504050	500504011	500504011	500504041	500506001	500507500 (.060)	
SP20B 09	170002087 (3.75)	500503101	500504001	500504101	500504051	500504011	500504051	500504011	500504011	500504041	500506001	500507500 (.060)	
SP20B 11	170002087 (3.75)	500503102	500504002	500504102	500504052	500504012	500504052	500504012	500504012	500504042	500506002	500507500 (.060)	
SP20B 14	170002055 (4)	500503103	500504003	500504103	500504053	500504013	500504053	500504013	500504013	500504043	500506003	500507500 (.060)	
SP20B 16	170002055 (4)	500503104	500504004	500504104	500504054	500504014	500504054	500504014	500504014	500504044	500506004	500507500 (.060)	
SP20B 20	170002081 (4.5)	500503105	500504005	500504105	500504055	500504015	500504055	500504015	500504015	500504045	500506005	500507500 (.120)	
SP20B 23	170002081 (4.5)	500503106	500504006	500504106	500504056	500504016	500504056	500504016	500504016	500504046	500506006	500507501 (.120)	
SP20A 27	170002083 (5)	500503107	500504007	500504107	500504057	500504017	500504057	500504017	500504017	500504047	500506007	500507502 (.350)	
SP20B 30	170002083 (5)	500503108	500504008	500504108	500504058	500504018	500504058	500504018	500504018	500504048	500506008	500507506 (.240)	
SP20B 33	170002083 (5)	500503109	500504009	500504109	500504059	500504019	500504059	500504019	500504019	500504049	500506009	500507500 (.060)	

**SP20B PUMP-CLOCKWISE ROTATION-SIDE PORTS (SP20B\_\_A9H\_\_R)**

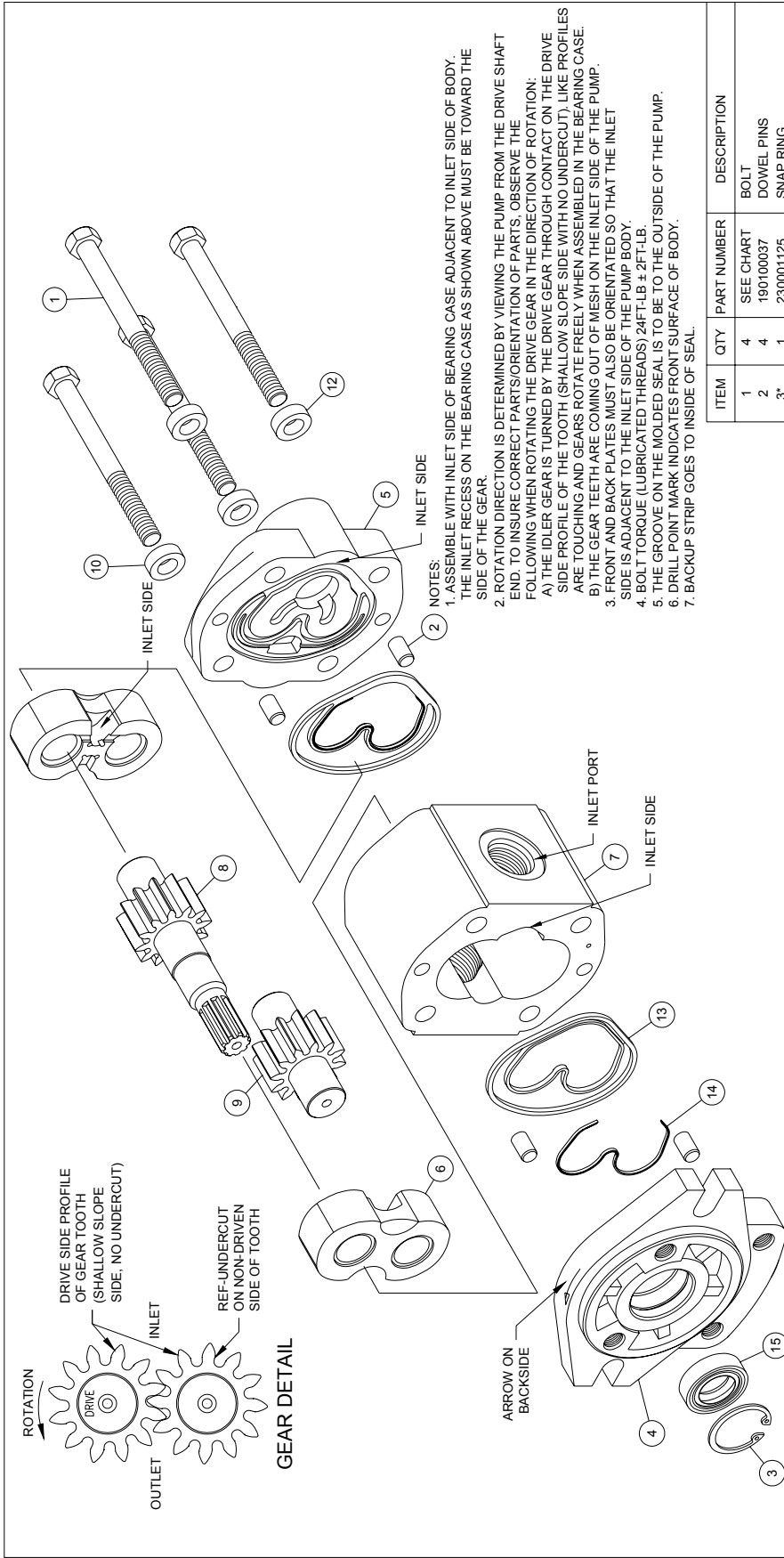


- NOTES:**
- ASSEMBLE WITH INLET SIDE OF BEARING CASE ADJACENT TO INLET SIDE OF BODY. THE INLET RECESS ON THE BEARING CASE AS SHOWN ABOVE MUST BE TOWARD THE SIDE OF THE GEAR.
  - ROTATION DIRECTION IS DETERMINED BY VIEWING THE PUMP FROM THE DRIVE SHAFT END. TO INSURE CORRECT PARTS/ORIENTATION OF PARTS, OBSERVE THE FOLLOWING WHEN ROTATING THE DRIVE GEAR IN THE DIRECTION OF ROTATION:
    - THE IDLER GEAR IS TURNED BY THE DRIVE GEAR THROUGH CONTACT ON THE DRIVE SIDE PROFILE OF THE TOOTH (SHALLOW SLOPE SIDE WITH NO UNDERCUT). LIKE PROFILES ARE TOUCHING AND GEARS ROTATE FREELY WHEN ASSEMBLED IN THE BEARING CASE.
    - THE GEAR TEETH ARE COMING OUT OF MESH ON THE INLET SIDE OF THE PUMP.
  - FRONT AND BACK PLATES MUST ALSO BE ORIENTATED SO THAT THE INLET SIDE IS ADJACENT TO THE INLET SIDE OF THE PUMP BODY.
  - BOLT TORQUE (LUBRICATED THREADS) 24FT-LB ± 2FT-LB.
  - THE GROOVE ON THE MOLDED SEAL IS TO BE TO THE OUTSIDE OF THE PUMP.
  - DRILL POINT MARK INDICATES FRONT SURFACE OF BODY.
  - BACKUP STRIG GOES TO INSIDE OF SEAL.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	SEE CHART	BOLT
2	4	190100037	DOWEL PINS
3*	1	230001125	SNAP RING
4	1	500501010	FRONT PLATE
5	1	500501500	BACK PLATE
6	2	500502004	BEARING CARRIER ASSY
7	1	SEE CHART	BODY
8	1	SEE CHART	DRIVE GEAR
9	1	SEE CHART	IDLER GEAR
10	2	500507500	WASHER (UPPER) (.060 THK)
11	1	500507504	KEY FOR 5/8 KEYED SHAFT
11	1	500507523	KEY FOR 3/4 KEYED SHAFT
12	2	SEE CHART	WASHER (LOWER)
13*	2	500512000	SEAL
14*	2	500512101	BACK-UP STRIP
15*	1	500512500	SHAFT SEAL STD.
15	1	500512503	SHAFT SEAL MED. PRESSURE
	*	PMCK-SP20	SEAL KIT (*ITEMS INCLUDED)

PUMP SIZE	BOLTS (ITEM 1)	BODY (ITEM 7)	DRIVE GEAR (ITEM 8)										WASHERS (LOWER) (ITEM 12)
			9 T SPLINE DRV	5/8 KEYED DRV	11 T SPLINE DRV	3/4 KEYED DRV	10 T SPLINE DRV	IDLER GEAR	500507500 (.060)				
SP20B 06	170002133 (3.50)	500503018	500504513	500504512	500504515	500504514	500504010	500506010	500507500 (.060)				
SP20B 08	170002087 (3.75)	500503000	500504000	500504100	500504050	500504010	500506000	500507501 (.120)	500507500 (.060)				
SP20B 09	170002087 (3.75)	500503001	500504001	500504101	500504051	500504011	500506001	500507500 (.060)	500507500 (.060)				
SP20B 11	170002087 (3.75)	500503002	500504002	500504102	500504052	500504012	500506002	500507500 (.060)	500507500 (.060)				
SP20B 14	170002055 (4)	500503003	500504003	500504103	500504053	500504013	500506003	500507500 (.060)	500507500 (.060)				
SP20B 16	170002055 (4)	500503004	500504004	500504104	500504054	500504014	500506004	500507500 (.060)	500507500 (.060)				
SP20B 20	170002081 (4.5)	500503005	500504005	500504105	500504055	500504015	500506005	500507506 (.240)	500507500 (.060)				
SP20B 23	170002081 (4.5)	500503006	500504006	500504106	500504056	500504016	500506006	500507501 (.120)	500507500 (.060)				
SP20B 27	170002083 (5)	500503007	500504007	500504107	500504057	500504017	500506007	500507502 (.350)	500507500 (.060)				
SP20B 30	170002083 (5)	500503008	500504008	500504108	500504058	500504018	500506008	500507506 (.240)	500507500 (.060)				
SP20B 33	170002083 (5)	500503009	500504009	500504109	500504059	500504019	500506009	500507500 (.060)	500507500 (.060)				

**SP20B PUMP-CLOCKWISE ROTATION-REAR PORTS (SP20B\_\_D9H\_\_R)**

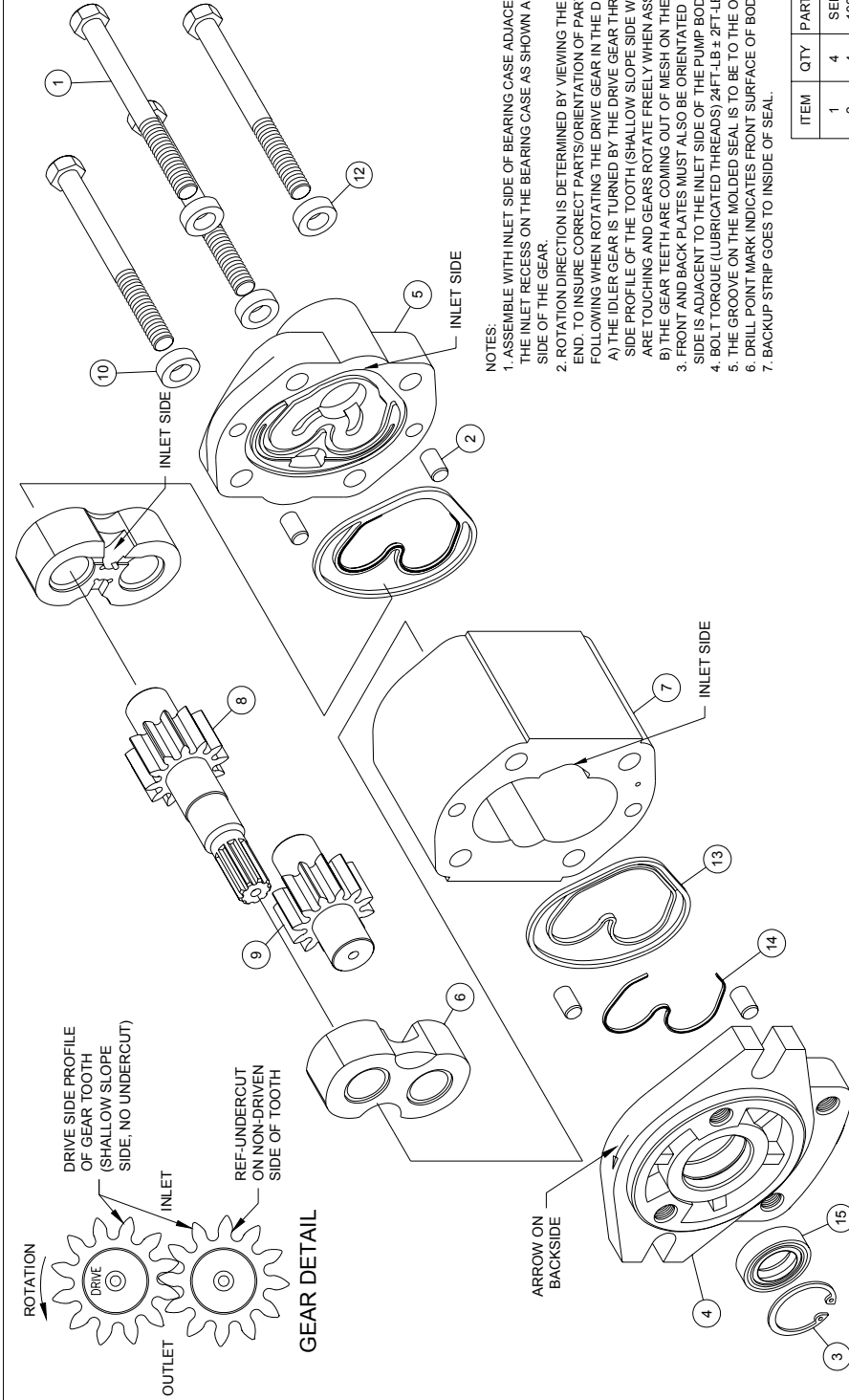


**NOTES:**  
 1. ASSEMBLE WITH INLET SIDE OF BEARING CASE ADJACENT TO INLET SIDE OF BODY. THE INLET RECESS ON THE BEARING CASE AS SHOWN ABOVE MUST BE TOWARD THE SIDE OF THE GEAR.  
 2. ROTATION DIRECTION IS DETERMINED BY VIEWING THE PUMP FROM THE DRIVE SHAFT END. TO INSURE CORRECT PARTS/ORIENTATION OF PARTS, OBSERVE THE FOLLOWING WHEN ROTATING THE DRIVE GEAR IN THE DIRECTION OF ROTATION:  
 A) THE IDLER GEAR IS TURNED BY THE DRIVE GEAR THROUGH CONTACT ON THE DRIVE SIDE PROFILE OF THE TOOTH (SHALLOW SLOPE SIDE WITH NO UNDERCUT), LIKE PROFILES ARE TOUCHING AND GEARS ROTATE FREELY WHEN ASSEMBLED IN THE BEARING CASE.  
 B) THE GEAR TEETH ARE COMING OUT OF MESH ON THE INLET SIDE OF THE BEARING CASE.  
 3. FRONT AND BACK PLATES MUST ALSO BE ORIENTATED SO THAT THE INLET SIDE IS ADJACENT TO THE INLET SIDE OF THE PUMP BODY.  
 4. BOLT TORQUE (LUBRICATED THREADS) 24FT-LB ± 2FT-LB.  
 5. THE GROOVE ON THE MOLDED SEAL IS TO BE TO THE OUTSIDE OF THE PUMP.  
 6. DRILL POINT MARK INDICATES FRONT SURFACE OF BODY.  
 7. BACKUP STRIP GOES TO INSIDE OF SEAL.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	SEE CHART	BOLT
2	4	190100037	DOWEL PINS
3*	1	230001125	SNAP RING
4	1	500501000	FRONT PLATE
5	1	500501501	BACK PLATE
6	2	500502004	BEARING CARRIER ASSY
7	1	SEE CHART	BODY
8	1	SEE CHART	DRIVE GEAR
9	1	SEE CHART	IDLER GEAR
10	2	500507500	WASHER (UPPER) (.060 THK)
11	1	500507504	KEY FOR 5/8 KEYS SHAFT
12	2	500507523	KEY FOR 3/4 KEYS SHAFT
13*	2	500512000	SEAL
14*	2	500512101	BACK-UP STRIP
15*	1	500512500	SHAFT SEAL STD.
15	1	500512503	SHAFT SEAL MED. PRESSURE
	1	PMCK-SP20	SEAL KIT (*ITEMS INCLUDED)

PUMP SIZE	BOLTS (ITEM 1)	BODY (ITEM 7)	DRIVE GEAR (ITEM 8)					IDLER GEAR	WASHERS (LOWER) (ITEM 12)
			5/8 KEYS DRV	11 T SPLINE DRV	3/4 KEYS DRV	10 T SPLINE DRV	500506000		
SP20B 06	170002133 (.350)	500503015	500505511	500505510	500505512	500505513	500506010	500507500 (.060)	
SP20B 08	170002087 (3.75)	500503100	500505000	500505100	500505010	500505050	500506000	500507501 (.120)	
SP20B 09	170002087 (3.75)	500503101	500505001	500505101	500505011	500505051	500506001	500507500 (.060)	
SP20B 11	170002087 (3.75)	500503102	500505002	500505102	500505012	500505052	500506002	500507500 (.060)	
SP20B 14	170002055 (4)	500503103	500505003	500505103	500505013	500505053	500506003	500507500 (.060)	
SP20B 16	170002055 (4)	500503104	500505004	500505104	500505014	500505054	500506004	500507500 (.060)	
SP20B 20	170002081 (4.5)	500503105	500505005	500505105	500505015	500505055	500506005	500507500 (.240)	
SP20B 23	170002081 (4.5)	500503106	500505006	500505106	500505016	500505056	500506006	500507501 (.120)	
SP20B 27	170002083 (5)	500503107	500505007	500505107	500505017	500505057	500506007	500507502 (.350)	
SP20B 30	170002083 (5)	500503108	500505008	500505108	500505018	500505058	500506008	500507506 (.240)	
SP20B 33	170002083 (5)	500503109	500505009	500505109	500505019	500505059	500506009	500507500 (.060)	

**SP20B PUMP-COUNTER CLOCKWISE ROTATION-SIDE PORTS (SP20B\_\_A9H\_\_L)**



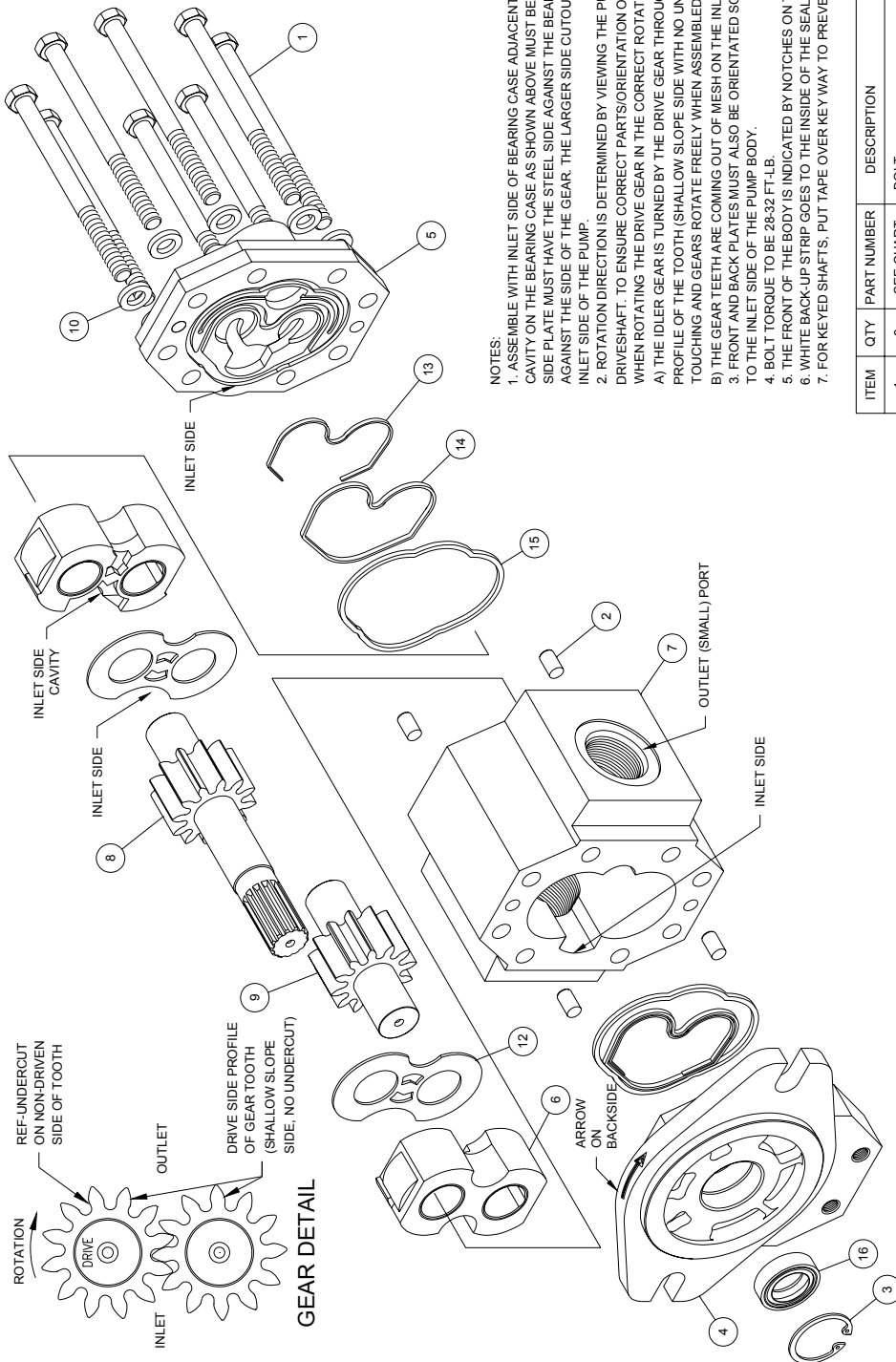
**NOTES:**

1. ASSEMBLE WITH INLET SIDE OF BEARING CASE ADJACENT TO INLET SIDE OF BODY. THE INLET RECESS ON THE BEARING CASE AS SHOWN ABOVE MUST BE TOWARD THE SIDE OF THE GEAR.
2. ROTATION DIRECTION IS DETERMINED BY VIEWING THE PUMP FROM THE DRIVE SHAFT END. TO INSURE CORRECT PART ORIENTATION OF PARTS, OBSERVE THE FOLLOWING WHEN ROTATING THE DRIVE GEAR IN THE DIRECTION OF ROTATION:
  - A) THE IDLER GEAR IS TURNED BY THE DRIVE GEAR THROUGH CONTACT ON THE DRIVE SIDE PROFILE OF THE TOOTH (SHALLOW SLOPE SIDE WITH NO UNDERCUT). LIKE PROFILES ARE TOUCHING AND GEARS ROTATE FREELY WHEN ASSEMBLED IN THE BEARING CASE.
  - B) THE GEAR TEETH ARE COMING OUT OF MESH ON THE INLET SIDE OF THE PUMP.
3. FRONT AND BACK PLATES MUST ALSO BE ORIENTATED SO THAT THE INLET SIDE IS ADJACENT TO THE INLET SIDE OF THE PUMP BODY.
4. BOLT TORQUE (LUBRICATED THREADS) 24FT-LB ± 2FT-LB.
5. THE GROOVE ON THE MOLDED SEAL IS TO BE TO THE OUTSIDE OF THE PUMP.
6. DRILL POINT MARK INDICATES FRONT SURFACE OF BODY.
7. BACKUP STRIP GOES TO INSIDE OF SEAL.

PUMP SIZE	BOLTS (ITEM 1)	BODY (ITEM 7)	9 T SPLINE DRV	5/8 KEYS DRV	11 T SPLINE DRV	3/4 KEYS DRV	10 T SPLINE DRV	IDLER GEAR	WASHERS (LOWER) (ITEM 12)
SP20B 06	17002133 (350)	500503018	500505511	500505510	500505513	500505512	500505040	500506000	500507500 (060)
SP20B 08	170022087 (375)	500503000	500505000	500505100	500505050	500505010	500505040	500506000	500507501 (120)
SP20B 09	170022087 (375)	500503001	500505001	500505101	500505051	500505011	500505041	500506001	500507500 (060)
SP20B 11	170022087 (375)	500503002	500505002	500505102	500505052	500505012	500505042	500506002	500507500 (060)
SP20B 14	170022055 (4)	500503003	500505003	500505103	500505053	500505013	500505043	500506003	500507500 (060)
SP20B 16	170022055 (4)	500503004	500505004	500505104	500505054	500505014	500505044	500506004	500507500 (060)
SP20B 20	170022081 (4.5)	500503005	500505005	500505105	500505055	500505015	500505045	500506005	500507506 (120)
SP20B 23	170022081 (4.5)	500503006	500505006	500505106	500505056	500505016	500505046	500506006	500507500 (120)
SP20B 27	170022083 (5)	500503007	500505007	500505107	500505057	500505017	500505047	500506007	500507502 (350)
SP20B 30	170022083 (5)	500503008	500505008	500505108	500505058	500505018	500505048	500506008	500507506 (240)
SP20B 33	170022083 (5)	500503009	500505009	500505109	500505059	500505019	500505049	500506009	500507500 (060)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	SEE CHART	BOLT
2	4	190100037	DOWEL PINS
3*	1	230001125	SNAP RING
4	1	500501000	FRONT PLATE
5	1	500501500	BACK PLATE
6	2	500502004	BEARING CARRIER ASSY
7	1	SEE CHART	BODY
8	1	SEE CHART	DRIVE GEAR
9	1	SEE CHART	IDLER GEAR
10	2	SEE CHART	WASHER (UPPER) (.060 THK)
11	1	500507504	KEY FOR 5/8 KEYS SHAFT
12	2	SEE CHART	WASHER (LOWER)
13*	2	500512000	SEAL
14*	2	500512101	BACK-UP STRIP
15*	1	500512500	SHAFT SEAL STD.
	*	500512503	SHAFT SEAL MED. PRESSURE
	*	PNICK-SP20	SEAL KIT (ITEMS INCLUDED)

**SP20B PUMP-COUNTER CLOCKWISE  
ROTATION-REAR PORTS (SP20B\_\_D9H\_-L)**

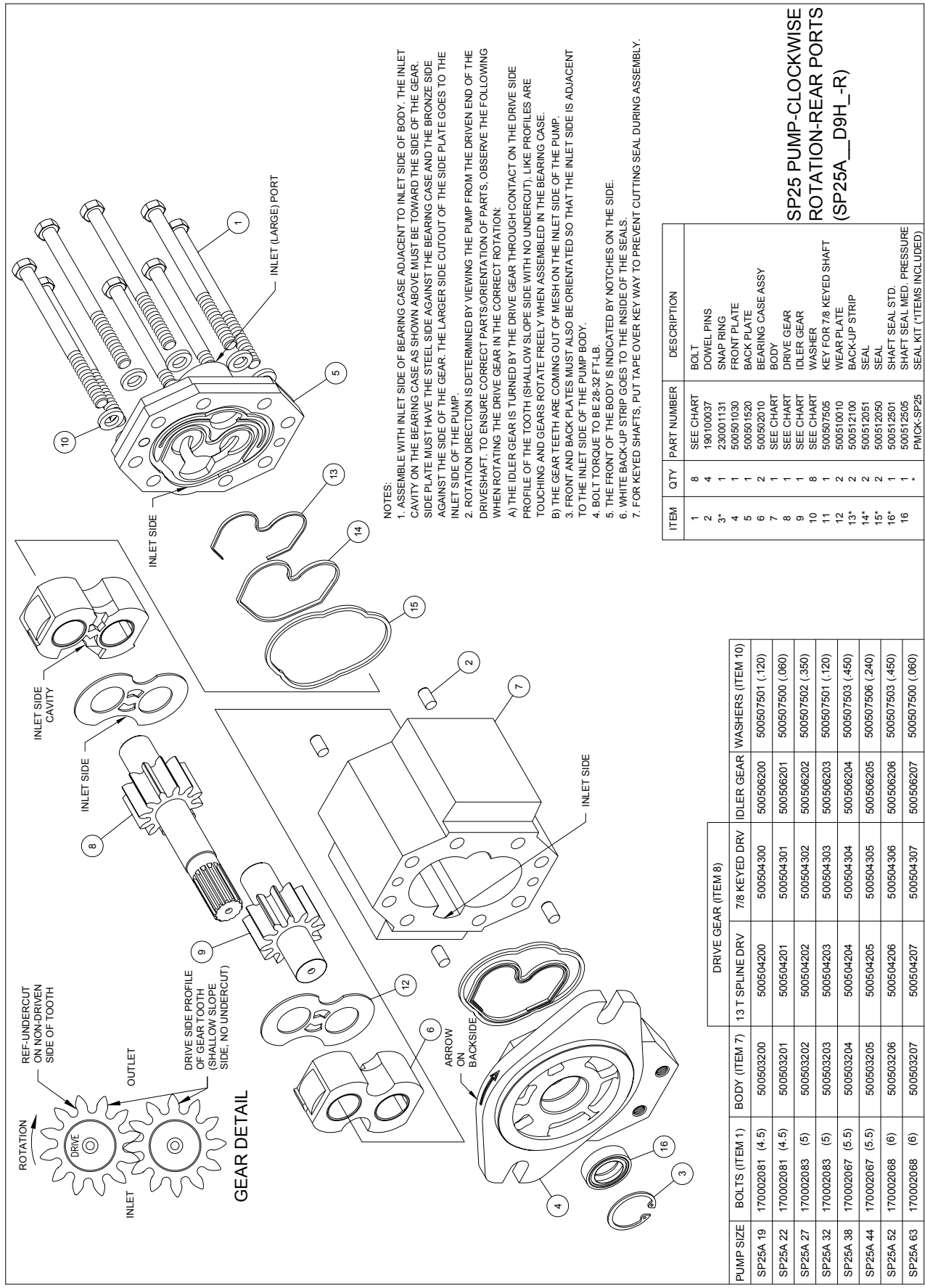


- NOTES:**
- ASSEMBLE WITH INLET SIDE OF BEARING CASE ADJACENT TO INLET SIDE OF BODY. THE INLET CAVITY ON THE BEARING CASE AS SHOWN ABOVE MUST BE TOWARD THE SIDE OF THE GEAR. SIDE PLATE MUST HAVE THE STEEL SIDE AGAINST THE BEARING CASE AND THE BRONZE SIDE AGAINST THE SIDE OF THE GEAR. THE LARGER SIDE CUTOFF OF THE SIDE PLATE GOES TO THE INLET SIDE OF THE PUMP.
  - ROTATION DIRECTION IS DETERMINED BY VIEWING THE PUMP FROM THE DRIVEN END OF THE DRIVESHAFT. TO ENSURE CORRECT PARTS/ORIENTATION OF PARTS, OBSERVE THE FOLLOWING WHEN ROTATING THE DRIVE GEAR IN THE CORRECT ROTATION:
    - THE IDLER GEAR IS TURNED BY THE DRIVE GEAR THROUGH CONTACT ON THE DRIVE SIDE PROFILE OF THE TOOTH (SHALLOW SLOPE SIDE WITH NO UNDERCUT). LIKE PROFILES ARE TOUCHING AND GEARS ROTATE FREELY WHEN ASSEMBLED IN THE BEARING CASE.
    - THE GEAR TEETH ARE COMING OUT OF MESH ON THE INLET SIDE OF THE PUMP.
    - FRONT AND BACK PLATES MUST ALSO BE ORIENTATED SO THAT THE INLET SIDE IS ADJACENT TO THE INLET SIDE OF THE PUMP BODY.
  - BOLT TORQUE TO BE 28-32 FT-LB.
  - THE FRONT OF THE BODY IS INDICATED BY NOTCHES ON THE SIDE.
  - WHITE BACK-UP STRIP GOES TO THE INSIDE OF THE SEALS.
  - FOR KEYS SHAFTS, PUT TAPE OVER KEY WAY TO PREVENT CUTTING SEAL DURING ASSEMBLY.

**SP25 PUMP-CLOCKWISE  
ROTATION-SIDE PORTS  
(SP25A\_\_A9H\_\_R)**

ITEM	QTY	PART NUMBER	DESCRIPTION
1	8	SEE CHART	BOLT
2	4	190100037	DOWEL PINS
3*	1	230001131	SNAP RING
4	1	500501030	FRONT PLATE
5	1	500501521	BACK PLATE
6	2	500502010	BEARING CASE ASSY
7	1	SEE CHART	BODY
8	1	SEE CHART	DRIVE GEAR
9	1	SEE CHART	IDLER GEAR
10	8	SEE CHART	WASHER
11	1	500507505	KEY FOR 7/8 KEYS SHAFT
12	2	500510010	WEAR PLATE
13*	2	500512100	BACK-UP STRIP
14*	2	500512051	SEAL
15*	2	500512050	SEAL
16*	1	500512501	SHAFT SEAL STD.
16	1	500512505	SHAFT SEAL MED. PRESSURE
		PMCK-SP25	SEAL KIT (*ITEMS INCLUDED)

PUMP SIZE	BOLTS (ITEM 1)	BODY (ITEM 7)	DRIVE GEAR (ITEM 8)			IDLER GEAR	WASHERS (ITEM 10)
			13 T SPLINE DRV	7/8 KEYS DRV	500504300		
SP25A 19	170002081 (4.5)	500503300	500504200	500504300	500506200	500507501 (.120)	500507500 (.060)
SP25A 22	170002081 (4.5)	500503301	500504201	500504301	500506201	500507500 (.060)	500507500 (.350)
SP25A 27	170002083 (5)	500503302	500504202	500504302	500506202	500507501 (.120)	500507503 (450)
SP25A 32	170002083 (5)	500503303	500504203	500504303	500506203	500507506 (.240)	500507503 (450)
SP25A 38	170002067 (5.5)	500503304	500504204	500504304	500506204	500507506 (.240)	500507503 (450)
SP25A 44	170002067 (5.5)	500503305	500504205	500504305	500506205	500507506 (.240)	500507503 (450)
SP25A 52	170002068 (6)	500503306	500504206	500504306	500506206	500507500 (.060)	500507500 (.060)
SP25A 63	170002068 (6)	500503307	500504207	500504307	500506207		



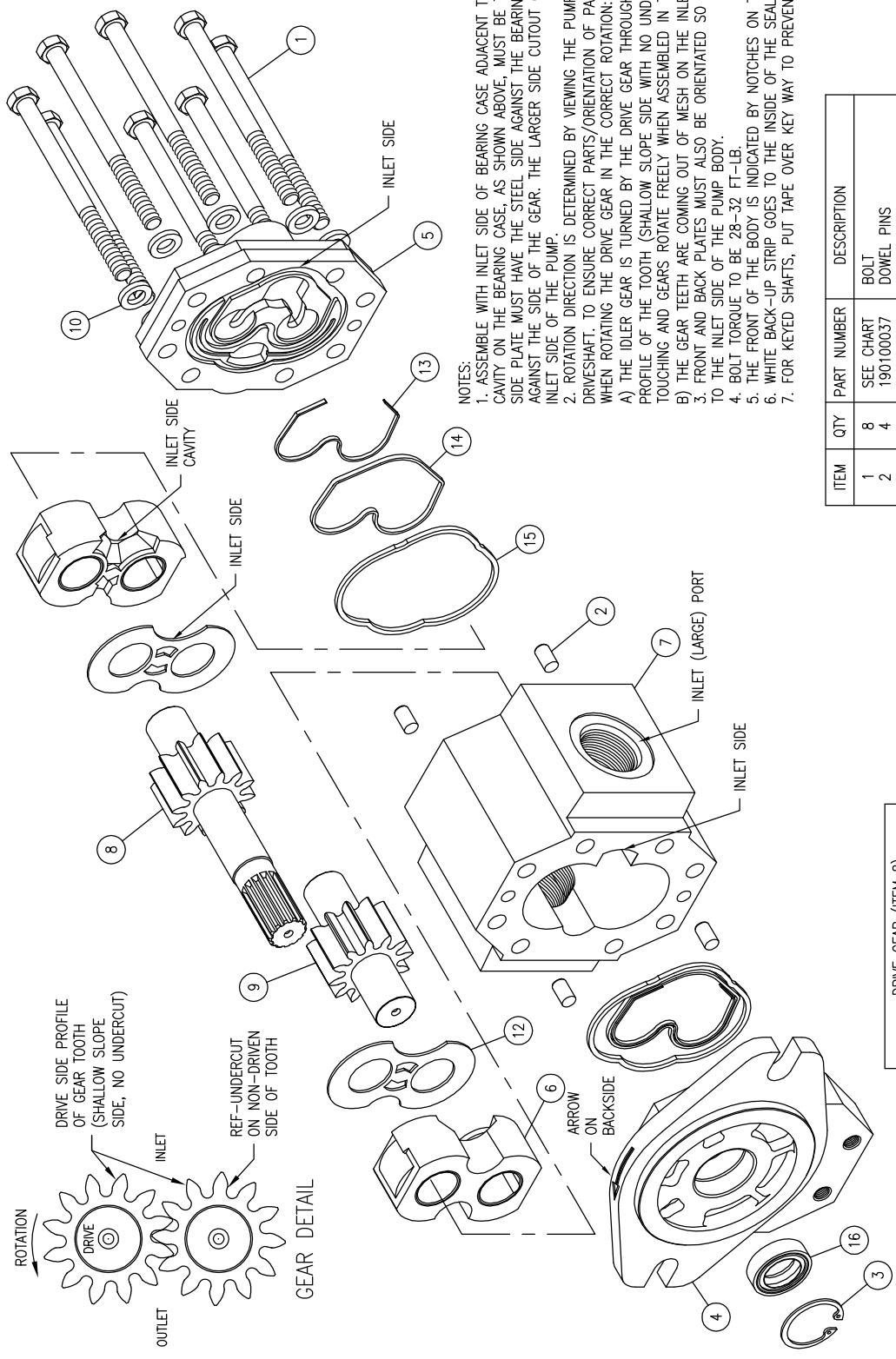
- NOTES:**
- ASSEMBLE WITH INLET SIDE OF BEARING CASE ADJACENT TO INLET SIDE OF BODY. THE INLET CAVITY ON THE BEARING CASE AS SHOWN ABOVE MUST BE TOWARD THE SIDE OF THE GEAR. SIDE PLATE MUST HAVE THE STEEL SIDE AGAINST THE BEARING CASE AND THE BRONZE SIDE AGAINST THE SIDE OF THE GEAR. THE LARGER SIDE CUTOFF OF THE SIDE PLATE GOES TO THE INLET SIDE OF THE PUMP.
  - ROTATION DIRECTION IS DETERMINED BY VIEWING THE PUMP FROM THE DRIVEN END OF THE DRIVESHAFT. TO ENSURE CORRECT PARTS/ORIENTATION OF PARTS, OBSERVE THE FOLLOWING WHEN ROTATING THE DRIVE GEAR IN THE CORRECT ROTATION:
    - THE IDLER GEAR IS TURNED BY THE DRIVE GEAR THROUGH CONTACT ON THE DRIVE SIDE PROFILE OF THE TOOTH (SHALLOW SLOPE SIDE WITH NO UNDERCUT). LIKE PROFILES ARE TOUCHING AND GEARS ROTATE FREELY WHEN ASSEMBLED IN THE BEARING CASE.
    - THE GEAR TEETH ARE COMING OUT OF MESH ON THE INLET SIDE OF THE PUMP.
    - FRONT AND BACK PLATES MUST ALSO BE ORIENTATED SO THAT THE INLET SIDE IS ADJACENT TO THE INLET SIDE OF THE PUMP BODY.
    - BOLT TORQUE TO BE 28.32 FT.LB.
  - THE FRONT OF THE BODY IS INDICATED BY NOTCHES ON THE SIDE.
  - WHITE BACK-UP STRIP GOES TO THE INSIDE OF THE SEALS.
  - FOR KEYS SHAFTS, PUT TAPE OVER KEY WAY TO PREVENT CUTTING SEAL DURING ASSEMBLY.

**SP25 PUMP-CLOCKWISE  
ROTATION-REAR PORTS  
(SP25A\_\_D9H\_\_R)**

ITEM	QTY	PART NUMBER	DESCRIPTION
1	8	SEE CHART	BOLT
2	4	190100037	DOWEL PINS
3*	1	230001131	SNAP RING
4	1	500501030	FRONT PLATE
5	1	500501520	BACK PLATE
6	2	500502010	BEARING CASE ASSY
7	1	SEE CHART	BODY
8	1	SEE CHART	DRIVE GEAR
9	1	SEE CHART	IDLER GEAR
10	8	SEE CHART	WASHER
11	1	500507505	KEY FOR 7/8 KEYS SHAFT
12	2	500510010	WEAR PLATE
13*	2	500512100	BACK-UP STRIP
14*	2	500512051	SEAL
15*	2	500512050	SHAFT SEAL STD.
16*	1	500512501	SHAFT SEAL MED. PRESSURE
16	1	500512505	SHAFT SEAL STD.
	*	PMCK-SP25	SEAL KIT (*ITEMS INCLUDED)

PUMP SIZE	BOLTS (ITEM 1)	BODY (ITEM 7)	DRIVE GEAR (ITEM 8)			WASHERS (ITEM 10)
			13 T SPLINE DRV	7/8 KEYS DRV	IDLER GEAR	
SP25A 19	170002081 (4.5)	500503200	500504200	500504300	500506200	500507501 (.120)
SP25A 22	170002081 (4.5)	500503201	500504201	500504301	500506201	500507500 (.060)
SP25A 27	170002083 (5)	500503202	500504202	500504302	500506202	500507502 (.350)
SP25A 32	170002083 (5)	500503203	500504203	500504303	500506203	500507501 (.120)
SP25A 38	170002067 (5.5)	500503204	500504204	500504304	500506204	500507503 (.450)
SP25A 44	170002067 (5.5)	500503205	500504205	500504305	500506205	500507506 (.240)
SP25A 52	170002068 (6)	500503206	500504206	500504306	500506206	500507503 (.450)
SP25A 63	170002068 (6)	500503207	500504207	500504307	500506207	500507500 (.060)



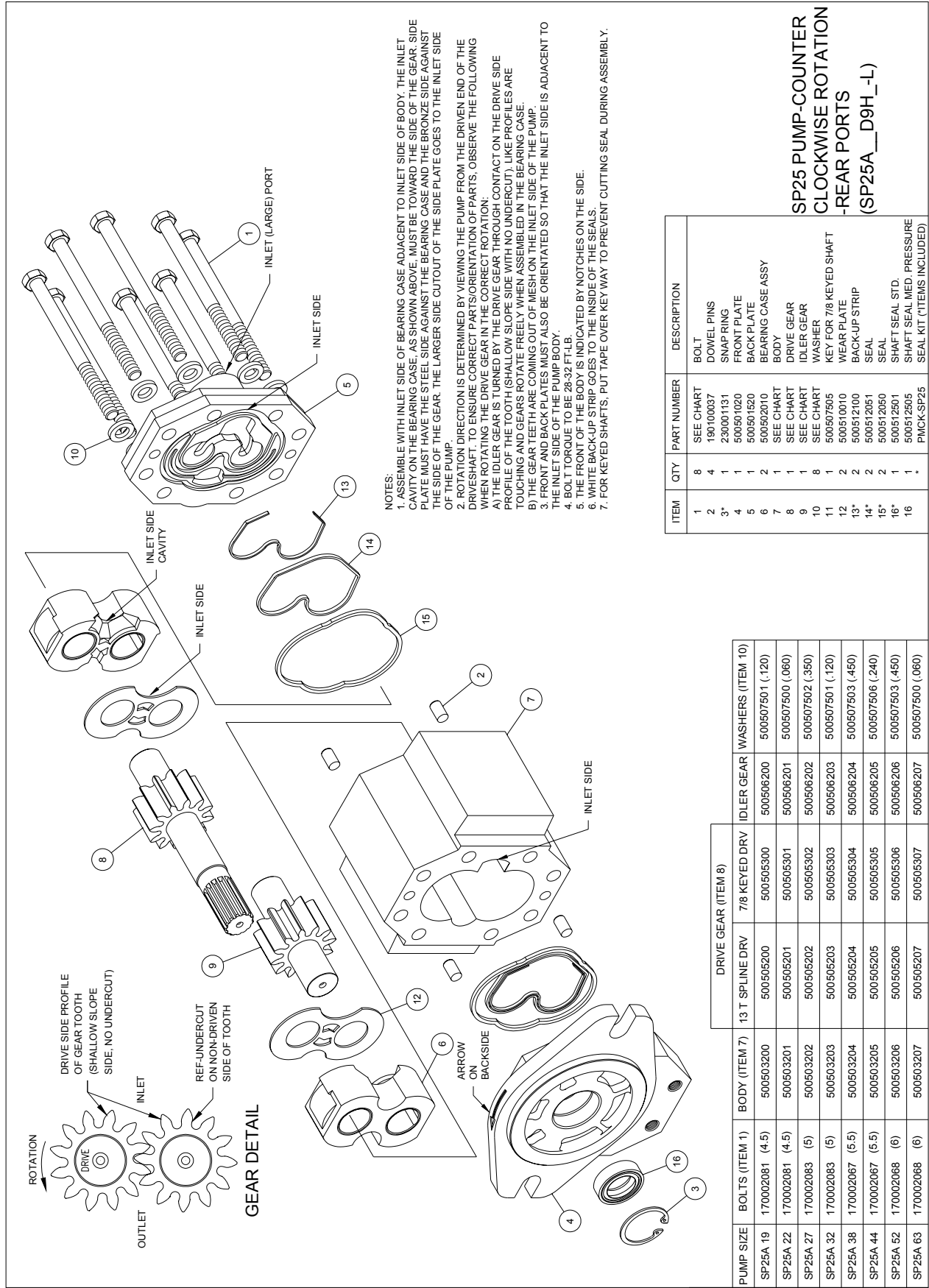


- NOTES:**
1. ASSEMBLE WITH INLET SIDE OF BEARING CASE ADJACENT TO INLET SIDE OF BODY. THE INLET CAVITY ON THE BEARING CASE, AS SHOWN ABOVE, MUST BE TOWARD THE SIDE OF THE GEAR. SIDE PLATE MUST HAVE THE STEEL SIDE AGAINST THE BEARING CASE AND THE BRONZE SIDE AGAINST THE SIDE OF THE GEAR. THE LARGER SIDE CUTOFF OF THE SIDE PLATE GOES TO THE INLET SIDE OF THE PUMP.
  2. ROTATION DIRECTION IS DETERMINED BY VIEWING THE PUMP FROM THE DRIVEN END OF THE DRIVESHAFT. TO ENSURE CORRECT PARTS/ORIENTATION OF PARTS, OBSERVE THE FOLLOWING WHEN ROTATING THE DRIVE GEAR IN THE CORRECT ROTATION:
    - A) THE IDLER GEAR IS TURNED BY THE DRIVE GEAR THROUGH CONTACT ON THE DRIVE SIDE PROFILE OF THE TOOTH (SHALLOW SLOPE SIDE WITH NO UNDERCUT). LIKE PROFILES ARE TOUCHING AND GEARS ROTATE FREELY WHEN ASSEMBLED IN THE BEARING CASE.
    - B) THE GEAR TEETH ARE COMING OUT OF MESH ON THE INLET SIDE OF THE PUMP.
  3. FRONT AND BACK PLATES MUST ALSO BE ORIENTATED SO THAT THE INLET SIDE IS ADJACENT TO THE INLET SIDE OF THE PUMP BODY.
  4. BOLT TORQUE TO BE 28-32 FT-LB.
  5. THE FRONT OF THE BODY IS INDICATED BY NOTCHES ON THE SIDE.
  6. WHITE BACK-UP STRIP GOES TO THE INSIDE OF THE SEALS.
  7. FOR KEYS SHAFTS, PUT TAPE OVER KEY WAY TO PREVENT CUTTING SEAL DURING ASSEMBLY.

SP25 PUMP-COUNTER  
CLOCKWISE ROTATION  
-SIDE PORTS  
(SP25A\_\_A9H\_-L)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	8	SEE CHART	BOLT
2	4	190100037	DOWEL PINS
3*	1	230001131	SNAP RING
4	1	500501020	FRONT PLATE
5	1	500501521	BACK PLATE
6	2	500502010	BEARING CASE ASSY
7	1	SEE CHART	BODY
8	1	SEE CHART	DRIVE GEAR
9	1	SEE CHART	IDLER GEAR
10	8	SEE CHART	WASHER
11	1	500507505	KEY FOR 7/8 KEYS SHAFT
12	2	500510010	WEAR PLATE
13*	2	500512100	BACK-UP STRIP
14*	2	500512051	SEAL
15*	2	500512050	SEAL
16*	1	500512501	SHAFT SEAL STD.
16	1	500512505	SHAFT SEAL MED. PRESSURE
	*	PMCK-SP25	SEAL KIT (*ITEMS INCLUDED)

PUMP SIZE	BOLTS (ITEM 1)	BODY (ITEM 7)	DRIVE GEAR (ITEM 8)		IDLER GEAR	WASHERS (ITEM 10)
			13 T SPLINE DRV	7/8 KEYS DRV		
SP25A 19	170002081 (4.5)	500503300	500505200	500505300	500506200	500507501 (.120)
SP25A 22	170002081 (4.5)	500503301	500505201	500505301	500506201	500507500 (.060)
SP25A 27	170002083 (5)	500503302	500505202	500505302	500506202	500507502 (.350)
SP25A 32	170002083 (5)	500503303	500505203	500505303	500506203	500507501 (.120)
SP25A 38	170002067 (5.5)	500503304	500505204	500505304	500506204	500507503 (.450)
SP25A 44	170002067 (5.5)	500503305	500505205	500505305	500506205	500507506 (.240)
SP25A 52	170002068 (6)	500503306	500505206	500505306	500506206	500507503 (.450)
SP25A 63	170002068 (6)	500503307	500505207	500505307	500506207	500507500 (.060)



- NOTES:**
1. ASSEMBLE WITH INLET SIDE OF BEARING CASE ADJACENT TO INLET SIDE OF BODY. THE INLET CAVITY ON THE BEARING CASE, AS SHOWN ABOVE, MUST BE TOWARD THE SIDE OF THE GEAR. SIDE PLATE MUST HAVE THE STEEL SIDE AGAINST THE BEARING CASE AND THE BRONZE SIDE AGAINST THE SIDE OF THE GEAR. THE LARGER SIDE CUTOFF OF THE SIDE PLATE GOES TO THE INLET SIDE OF THE PUMP.
  2. ROTATION DIRECTION IS DETERMINED BY VIEWING THE PUMP FROM THE DRIVEN END OF THE DRIVESHAFT. TO ENSURE CORRECT PARTS/ORIENTATION OF PARTS, OBSERVE THE FOLLOWING:
    - A) WHEN ROTATING THE DRIVE GEAR IN THE CORRECT ROTATION:
    - B) THE IDLER GEAR IS TURNED BY THE DRIVE GEAR THROUGH CONTACT ON THE DRIVE SIDE PROFILE OF THE TOOTH (SHALLOW SLOPE SIDE WITH NO UNDERCUT). LIKE PROFILES ARE TOUCHING AND GEARS ROTATE FREELY WHEN ASSEMBLED IN THE BEARING CASE.
    - C) THE GEAR TEETH ARE COMING OUT OF MESH ON THE INLET SIDE OF THE PUMP.
  3. FRONT AND BACK PLATES MUST ALSO BE ORIENTATED SO THAT THE INLET SIDE IS ADJACENT TO THE INLET SIDE OF THE PUMP BODY.
  4. BOLT TORQUE TO BE 28-32 FT-LB.
  5. THE FRONT OF THE BODY IS INDICATED BY NOTCHES ON THE SIDE.
  6. WHITE BACK-UP STRIP GOES TO THE INSIDE OF THE SEALS.
  7. FOR KEYS SHAFTS, PUT TAPE OVER KEY WAY TO PREVENT CUTTING SEAL DURING ASSEMBLY.

**SP25 PUMP-COUNTER  
CLOCKWISE ROTATION  
-REAR PORTS  
(SP25A\_\_D9H\_L-L)**

ITEM	QTY	PART NUMBER	DESCRIPTION
1	8	SEE CHART	BOLT
2	4	190100037	DOWEL PINS
3*	1	230001131	SNAP RING
4	1	606901020	FRONT PLATE
5	1	500501520	BACK PLATE
6	2	500502010	BEARING CASE ASSY
7	1	SEE CHART	BODY
8	1	SEE CHART	DRIVE GEAR
9	1	SEE CHART	IDLER GEAR
10	8	SEE CHART	WASHER
11	1	500507505	KEY FOR 7/8 KEYS SHAFT
12	2	500510010	WEAR PLATE
13*	2	500512100	BACK-UP STRIP
14*	2	500512050	SEAL
15*	2	500512050	SEAL
16*	1	500512501	SHAFT SEAL STD.
16	1	500512505	SHAFT SEAL MED. PRESSURE
	1	PMCK-SP25	SEAL KIT (ITEMS INCLUDED)

PUMP SIZE	BOLTS (ITEM 1)	BODY (ITEM 7)	DRIVE GEAR (ITEM 8)			IDLER GEAR	WASHERS (ITEM 10)
			13 T SPLINE DRV	7/8 KEYS DRV	7/8 KEYS DRV		
SP25A 19	170002081 (4.5)	500503200	500505200	500505300	500506200	500507501 (.120)	
SP25A 22	170002081 (4.5)	500503201	500505201	500505301	500506201	500507500 (.060)	
SP25A 27	170002083 (5)	500503202	500505202	500505302	500506202	500507502 (.350)	
SP25A 32	170002083 (5)	500503203	500505203	500505303	500506203	500507501 (.120)	
SP25A 38	170002067 (5.5)	500503204	500505204	500505304	500506204	500507503 (.450)	
SP25A 44	170002067 (5.5)	500503205	500505205	500505305	500506205	500507506 (.240)	
SP25A 52	170002068 (6)	500503206	500505206	500505306	500506206	500507503 (.450)	
SP25A 63	170002068 (6)	500503207	500505207	500505307	500506207	500507500 (.060)	

# SP20B ROTATION CHANGE INSTRUCTIONS

NOTE: Maintaining proper orientation of the pump and pump parts is critical when changing rotation. In order to maintain a reference, lay pump on its side and orient as shown in the exploded view, so that the drive shaft is farthest away from you and the drive end is on the left. For reference purposes, use drawing in conjunction with instructions.

## PUMP DISASSEMBLY:

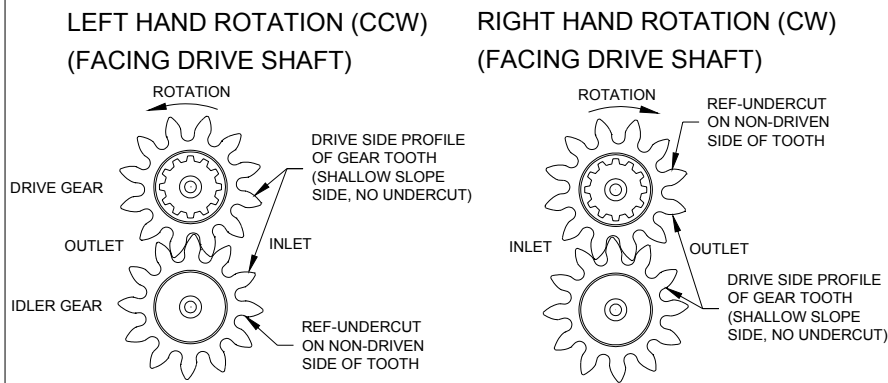
1. Remove the through bolts and washers holding the pump together.
2. Remove the rear cover. If the seal and backup strip come out of the seal groove, replace them with the white backup strip to the inside of the black seal and the groove on the molded seal to the bottom of the seal groove.
3. If the pump has a keyed shaft, remove the key and, to avoid cutting the seal, place tape over the shaft keyway slot (If the new shaft has a keyway, place tape over it also).
4. Remove the front cover, leaving the gear assembly inside the body
5. Slide the complete gear assembly including: drive gear, idler gear and two bearing carriers, out of the body as one unit. You may have to slide the assembly back and forth a few times within the body to remove ridges formed when the pump was first broke in.
6. If dowel pins have remained in either of the covers, take them out and place them in the body.

## CONVERTING THE ROTATION OF THE GEAR ASSEMBLY:

1. Orient the gear assembly that was just removed from the body on its side so that the drive shaft is farthest away from you and the drive end is on the left side.
2. Slide both bearing carriers off of the shafts without changing their orientation.
3. Replace the drive gear with the new drive gear of the opposite rotation (keeping drive end on the left).
4. Rotate the idler gear "end for end" so that the shaft area that was on the left side is now on the right side.
5. Bring the gears back together.
6. Rotate the bearing carriers so that the bearing that went over the drive shaft now goes over the idler shaft. Keep the same side closest to the gear during rotation. Insure that the inlet cavity (see drawing) will go towards the gear.
7. Slide both bearing carriers back onto the shafts. If the correct gears are in place and correctly orientated, the bearing carriers will slide on the shafts easily and the gears will rotate relatively freely within the bearing carriers. (See drawing for gear mesh detail.)

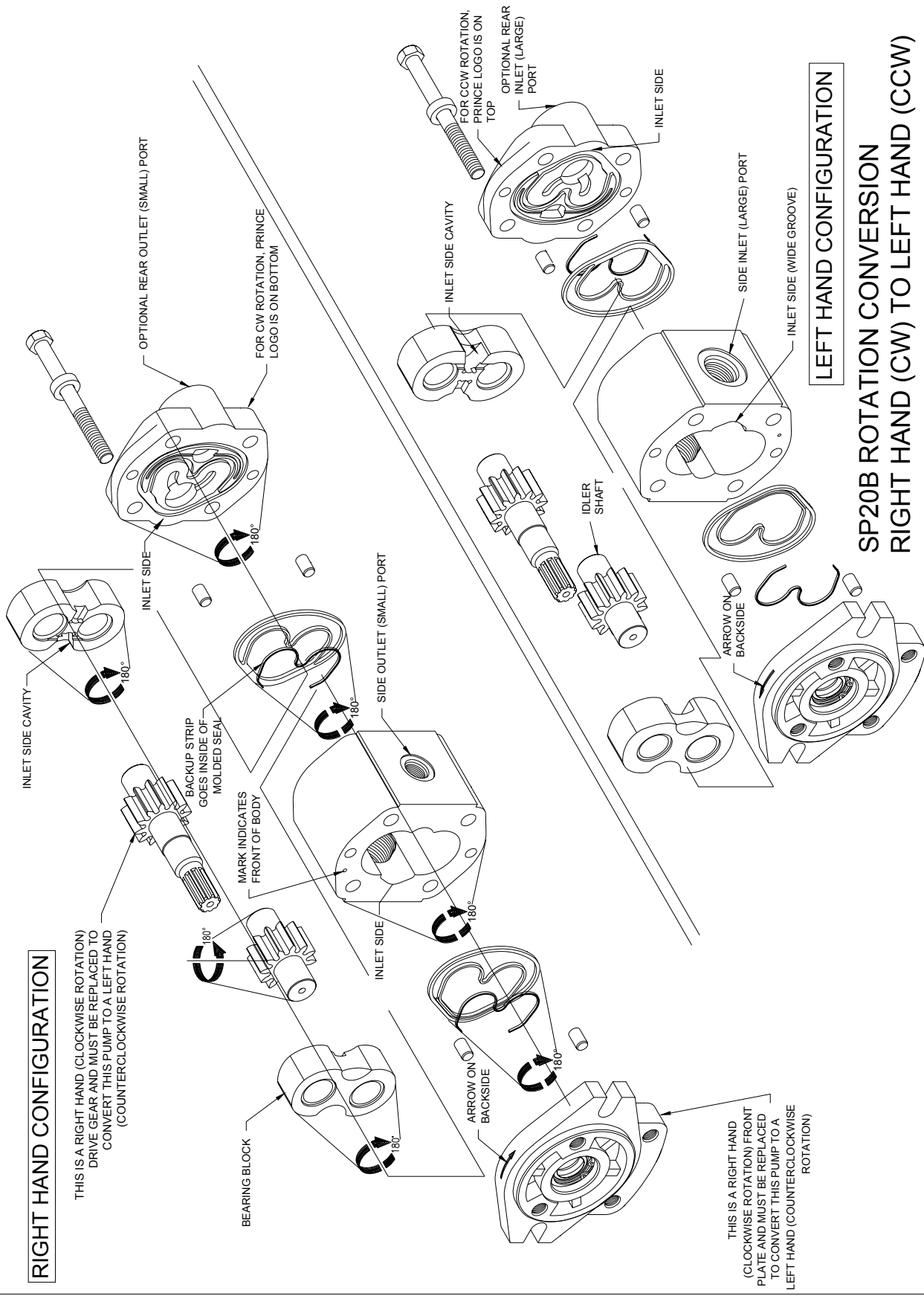
## REASSEMBLY:

1. Remove molded seal and backup strip from the old front cover and insert them into the new (opposite rotation) front cover. The white backup strip goes to the inside of the black molded seal and the groove on the molded seal goes to the bottom of the seal groove. Note: Insure that the shaft seal and snap ring are also installed in the front cover.
2. Rotate the body about the pump axis (centerline), keeping the front surface mark on the body to the front of the pump. The lengthwise inlet and outlet grooves on the inside of the body will have moved to the opposite sides.
3. Rotate the rear cover about the axis (centerline) of the pump, the inlet area will have gone to the opposite side of pump.
4. Slide the gear assembly into the body. As per the standard orientation, the drive end of the drive shaft should be farthest away from you and on the left. You will need to carefully align the bearing carriers to be able to insert them into the body. As the assembly is inserted into the body, insure that the bearing carrier inlet cavity is towards the inlet (wide groove) side of the body (see drawing). Again at this point the gears should rotate relatively freely in the body.
5. Align the front and rear covers with the dowel pins and assemble them onto the body. As they are put in place, it should be noted that the inlet side of the body, the inlet side of the rear cover and the side of the front cover with "IN" embossed on the flange are all on the same side (see drawing). Care should also be taken to insure that the seals and backups are in place and not out of their grooves.
6. Insert the bolts and washers through the pump. Torque the bolts (lubricated threads) to 24FT-LB  $\pm$  2FT-LB.
7. For keyed shafts, the tape on the shaft should be removed and the key put back into place.
8. The pump should be tested for flow and pressure before being put into service.



**RIGHT HAND CONFIGURATION**

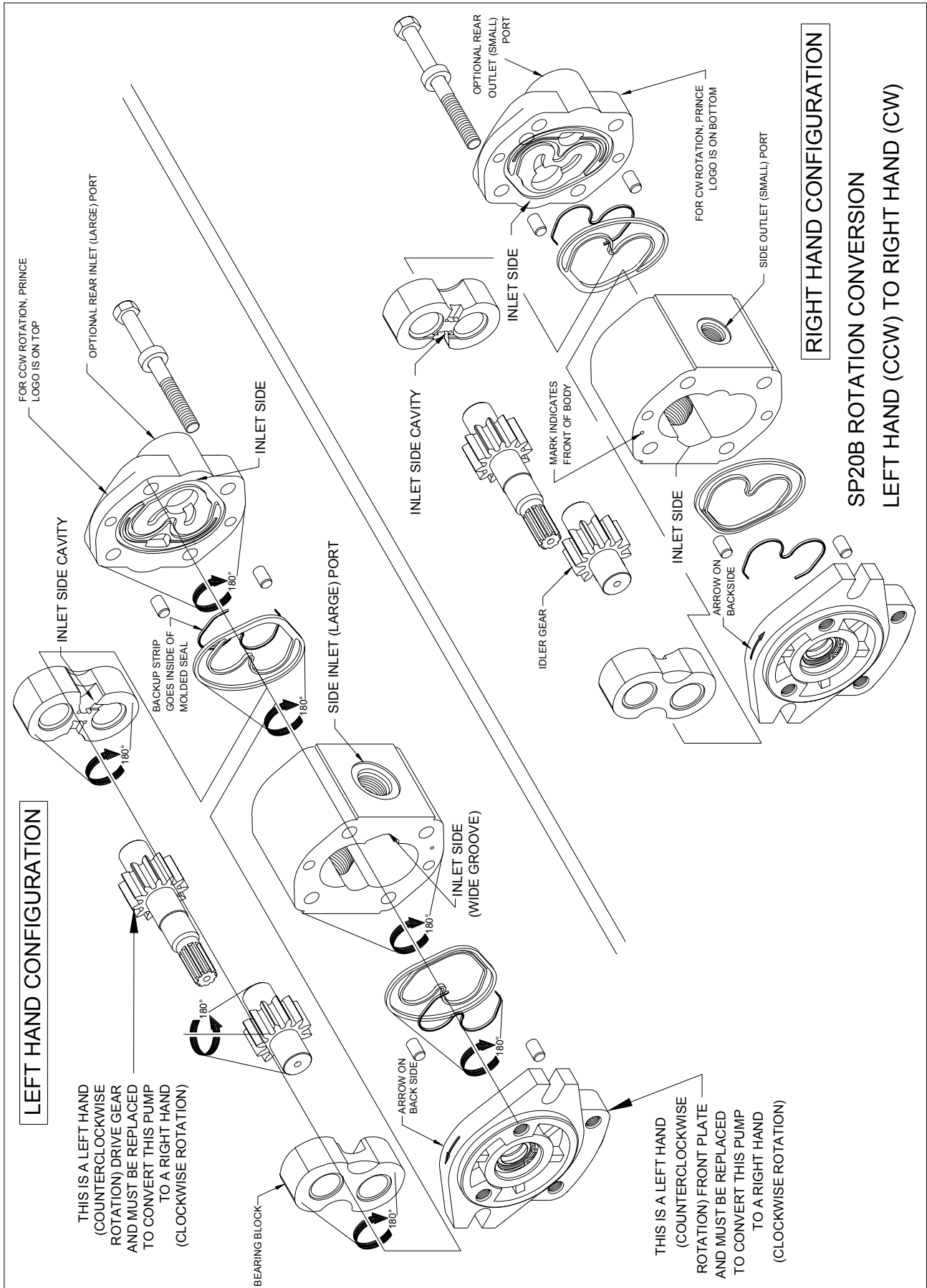
THIS IS A RIGHT HAND (CLOCKWISE ROTATION) DRIVE GEAR AND MUST BE REPLACED TO CONVERT THIS PUMP TO A LEFT HAND (COUNTERCLOCKWISE ROTATION)



**LEFT HAND CONFIGURATION**

**SP20B ROTATION CONVERSION  
RIGHT HAND (CW) TO LEFT HAND (CCW)**

THIS IS A RIGHT HAND (CLOCKWISE ROTATION) FRONT PLATE AND MUST BE REPLACED TO CONVERT THIS PUMP TO A LEFT HAND (COUNTERCLOCKWISE ROTATION)



**LEFT HAND CONFIGURATION**

THIS IS A LEFT HAND (COUNTERCLOCKWISE ROTATION) DRIVE GEAR AND MUST BE REPLACED TO CONVERT THIS PUMP TO A RIGHT HAND (CLOCKWISE ROTATION)

THIS IS A LEFT HAND (COUNTERCLOCKWISE ROTATION) FRONT PLATE AND MUST BE REPLACED TO CONVERT THIS PUMP TO A RIGHT HAND (CLOCKWISE ROTATION)

**RIGHT HAND CONFIGURATION**

SP20B ROTATION CONVERSION  
LEFT HAND (CCW) TO RIGHT HAND (CW)

# SP25 ROTATION CHANGE INSTRUCTIONS

NOTE: Maintaining proper orientation of the pump and pump parts is critical when changing rotation. In order to maintain a reference, lay pump on its side and orient as shown in the exploded view, so that the drive shaft is farthest away from you and the drive end is on the left. For reference purposes, use drawing in conjunction with instructions.

## PUMP DISASSEMBLY:

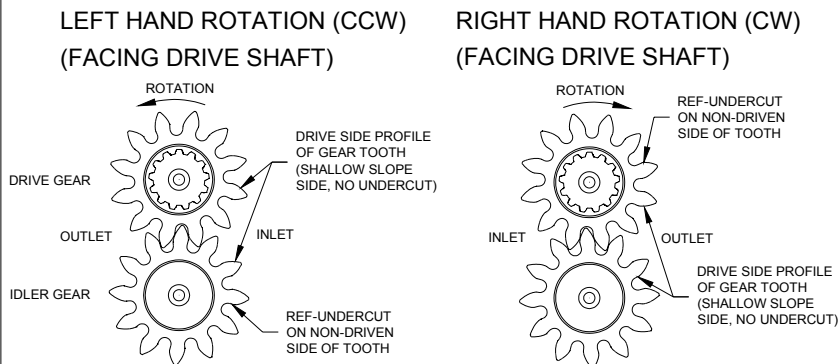
1. Remove the through bolts and washers holding the pump together.
2. Remove the rear cover. If the seals and backup strip come out of the seal grooves, replace them keeping the white figure "3" shaped backup strip to the inside of the thinner black seal and the thinner black seal to the inside of the thicker one.
3. If the pump has a keyed shaft, remove the key and, to avoid cutting the seal, place tape over the shaft keyway slot (If the new shaft has a keyway, place tape over it also).
4. Remove the front cover, leaving the gear assembly inside the body
5. Slide the complete gear assembly including: drive gear, idler gear, two wear plates and two bearing blocks, out of the body as one unit. You may have to slide the assembly back and forth a few times within the body to remove ridges formed when the pump was first broke in.
6. If dowel pins have remained in either of the covers, take them out and place them in the body.

## CONVERTING THE ROTATION OF THE GEAR ASSEMBLY:

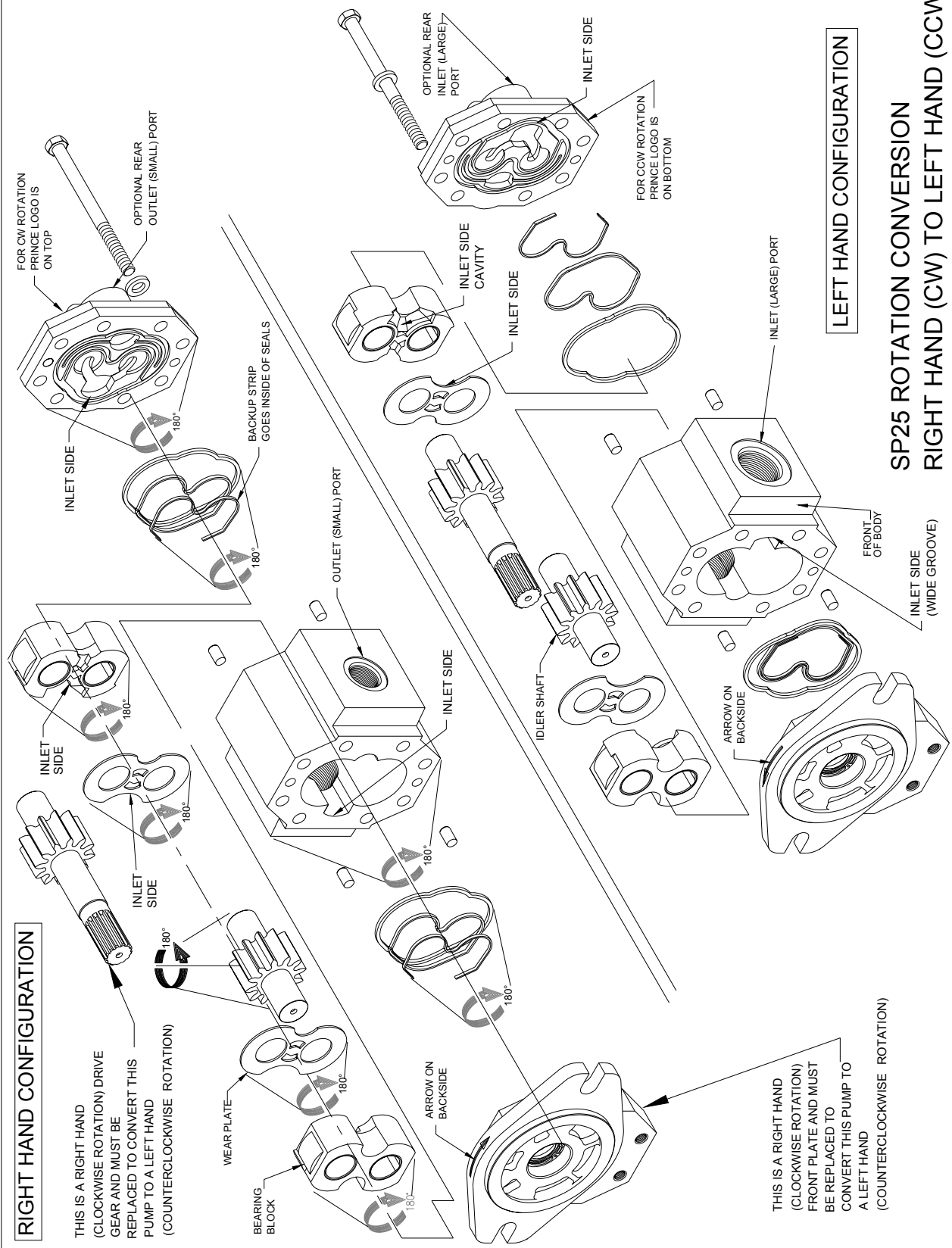
1. Orient the gear assembly that was just removed from the body on its side so that the drive shaft is farthest away from you and the drive end is on the left side.
2. Slide both bearing blocks and wear plates off of the shafts without changing their orientation.
3. Replace the drive gear with the new drive gear of the opposite rotation (keeping drive end on the left).
4. Rotate the idler gear "end for end" so that the shaft area that was on the left side is now on the right side.
5. Bring the gears back together.
6. Rotate the bearing blocks and the wear plates so that the bearing that went over the drive shaft now goes over the idler shaft. Keep the same side closest to the gear during rotation. Insure that the inlet cavity and larger cutout area of the wear plate are on the same side (see drawing) and next to gear. Also insure bronze side of wear plate is next to gear.
7. Slide both bearing blocks and wear plates back onto the shafts. If the correct gears are in place and correctly orientated, the bearing blocks will slide on the shafts easily and the gears will rotate relatively freely within the bearing blocks. (See drawing for gear mesh detail.)

## REASSEMBLY:

1. Remove black seals and backup strip from the old front cover and insert them into the new (opposite rotation) front cover. The white figure "3" shaped backup strip goes to the inside of the thinner black seal and the thinner black seal goes inside the thicker black seal. Note: Insure that the shaft seal and snap ring are also installed in the front cover.
2. Rotate the body about the pump axis (centerline), keeping the front surface, indicated by notches on the side, to the front of the pump. The lengthwise inlet and outlet grooves on the inside of the body will have rotated to the opposite side.
3. Rotate the rear cover about the axis (centerline) of the pump, the inlet area will have gone to the opposite side of pump.
4. Slide the gear assembly into the body. As per the standard orientation, the drive end of the drive shaft should be farthest away from you and on the left. You will need to carefully align the bearing blocks to be able to insert them into the body. You may also have to adjust the wear plate slightly as it enters the body. As the assembly is inserted into the body, insure that the bearing block inlet cavity and larger cutout area of wear plate are towards the inlet (wide groove) side of the body (see drawing). Again at this point the gears should rotate relatively freely in the body.
5. Align the front and rear covers with the dowel pins and assemble them onto the body. As they are put in place, it should be noted that the inlet side of the body, the inlet side of the rear cover and the side of the front cover with "IN" embossed on the flange are all on the same side (see drawing). Care should also be taken to insure that the seals and backups are in place and not out of their grooves.
6. Insert the bolts and washers through the pump. Torque the bolts to 28-32 FT-LB.
7. For keyed shafts, the tape on the shaft should be removed and the key put back into place.
8. The pump should be tested for flow and pressure before being put into service.



The pump gears have non-symmetrical teeth, with different profiles on each side. The idler gear is turned by the drive gear through contact on the drive side profile of the tooth (shallow slope side with no undercut). Like profiles are touching and gears rotate freely when assembled in the bearing case. Rotating in the correct rotation, the teeth come out of mesh on the inlet side of the pump.



**RIGHT HAND CONFIGURATION**

THIS IS A RIGHT HAND (CLOCKWISE ROTATION) DRIVE GEAR AND MUST BE REPLACED TO CONVERT THIS PUMP TO A LEFT HAND (COUNTERCLOCKWISE ROTATION)

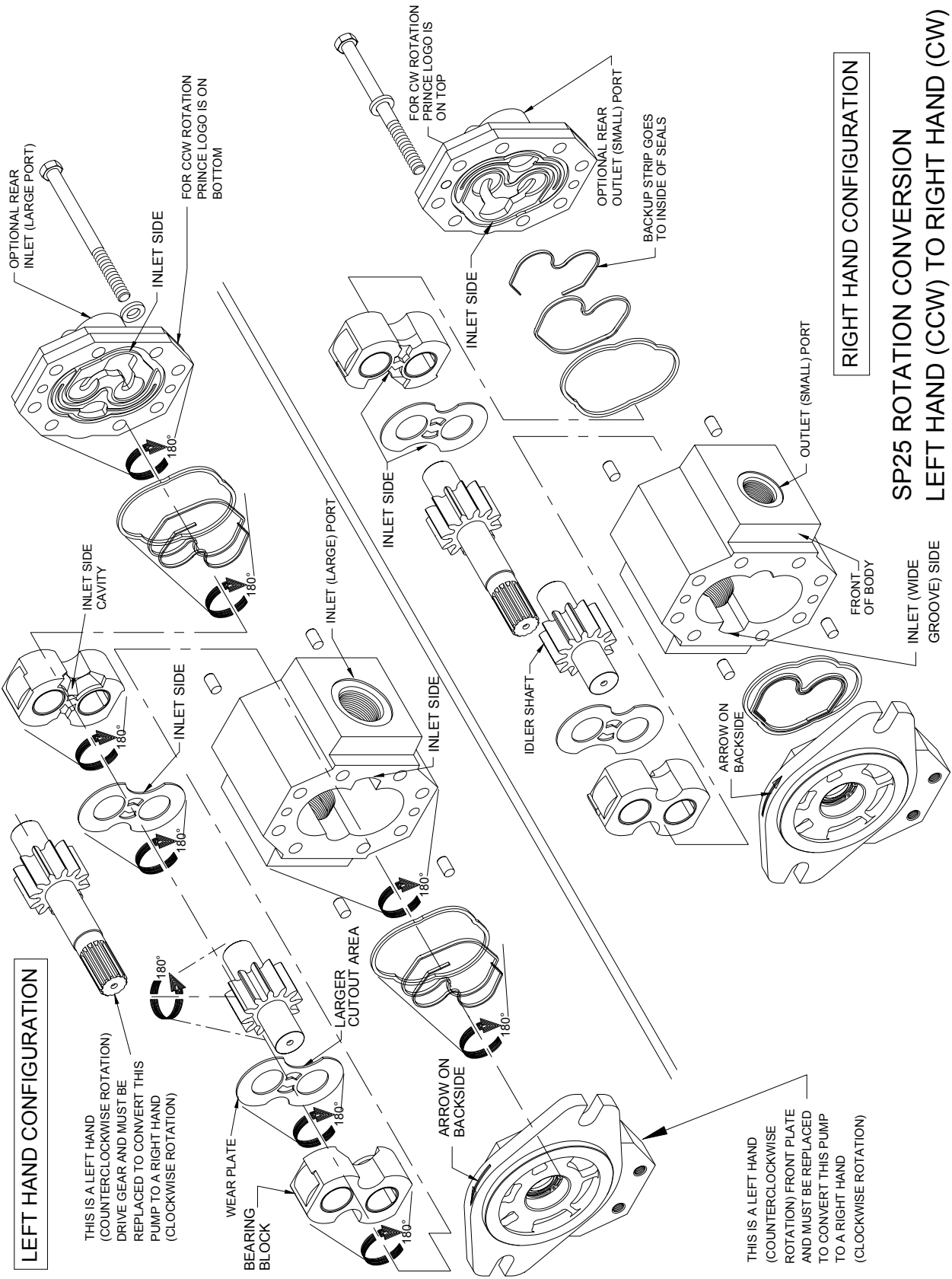
THIS IS A RIGHT HAND (CLOCKWISE ROTATION) FRONT PLATE AND MUST BE REPLACED TO CONVERT THIS PUMP TO A LEFT HAND (COUNTERCLOCKWISE ROTATION)

**SP25 ROTATION CONVERSION**

**RIGHT HAND (CW) TO LEFT HAND (CCW)**

**LEFT HAND CONFIGURATION**

**LEFT HAND CONFIGURATION**



THIS IS A LEFT HAND (COUNTERCLOCKWISE ROTATION) DRIVE GEAR AND MUST BE REPLACED TO CONVERT THIS PUMP TO A RIGHT HAND (CLOCKWISE ROTATION)

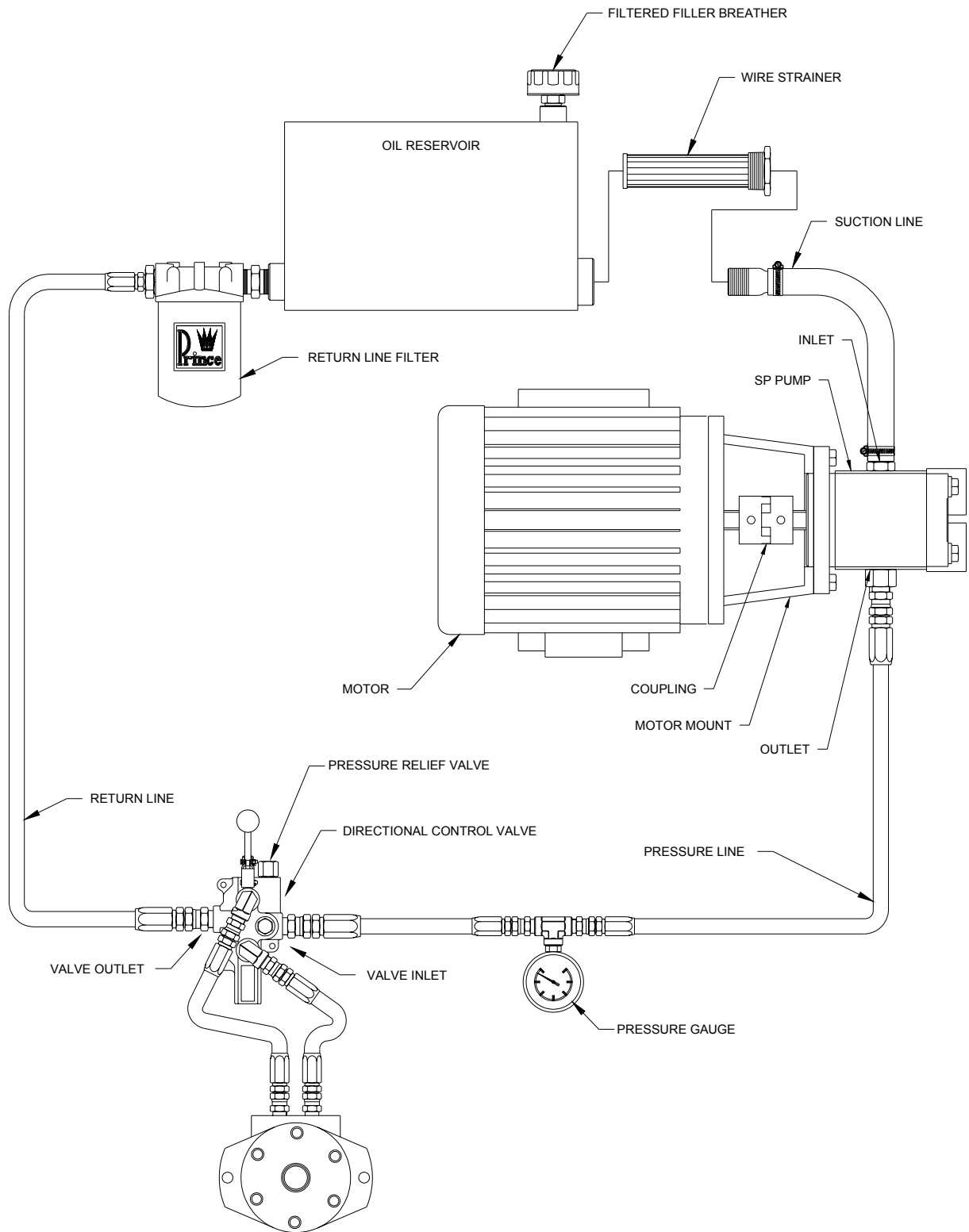
THIS IS A LEFT HAND (COUNTERCLOCKWISE ROTATION) FRONT PLATE AND MUST BE REPLACED TO CONVERT THIS PUMP TO A RIGHT HAND (CLOCKWISE ROTATION)

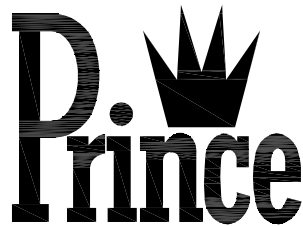
**RIGHT HAND CONFIGURATION**

**SP25 ROTATION CONVERSION  
LEFT HAND (CCW) TO RIGHT HAND (CW)**



# EXAMPLE HYDRAULIC CIRCUIT





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