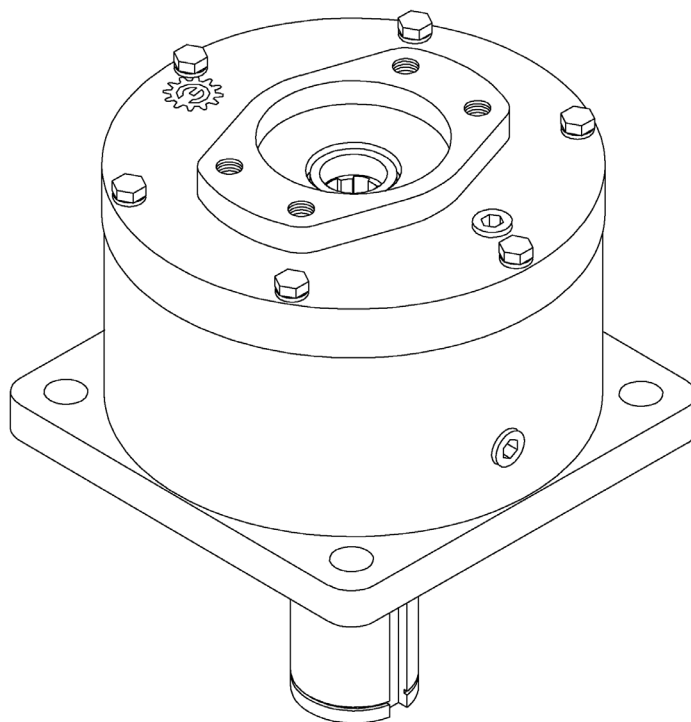




Example Part Number

28	B	D1	A	3	16	–	Z
Model	Gear Drive Mounting	Output Shaft	Input Mounting	Input Spline	Ratio		Options

THIS SERVICE MANUAL IS EFFECTIVE
FROM:..... S/N 16401, JULY 1993
TO: CURRENT
REF: SM28BPD2-C

A Ramsey Industries Brand

28B & 28P MODEL SERVICE MANUAL

SINGLE & DOUBLE STAGE PLANETARY GEAR DRIVE

This manual will assist in disassembly and assembly of the 28B and 28P Model planetary gear drives. Item numbers, indicated in parentheses throughout this manual, refer to the exploded parts breakdown drawing. Individual customer specifications (mounting case, output shaft, brake assembly, etc.) may vary from exploded drawing and standard part numbers shown; if applicable, refer to individual customer drawing for details.

For any spare or replacement parts, contact your distributor or equipment manufacturer. Always try to have available the gear drive unit part number, serial number and date code on the serial tag; this information may be necessary for verification of any component part numbers. Component part numbers and/or manufacturing lot numbers may be stamped on individual parts; this information may also be helpful in identifying replacement components.

LUBRICATION & MAINTENANCE

Change the oil after the first 50 hours of operation. Oil should be changed at 500 hour intervals thereafter. Use a GL-5 grade EP 89/90 gear oil (EP = "Extreme Pressure"). The gear drive should be partially disassembled to inspect gears and bearings at 1000 hour intervals.

If your unit was specified "shaft up" or with a "-Z" option, a grease zerk was provided in the base housing. For shaft-up operation, the output bearing will not run in oil and must be grease lubricated. Use a lithium base or general purpose bearing grease sparingly every 50 operating hours or at regular maintenance intervals. Over-greasing the output bearing tends to fill the housing with grease and thicken the oil.

<u>Operating Position</u>	<u>Ratio</u>	<u>Oil Capacity</u>	<u>Oil Level</u>
Horizontal Shaft	Single	1.0 pint / 0.5 liters	To horizontal centerline of gear drive
Vertical Shaft	Single	1.75 pints / 0.9 liters	To midway on upper/primary gear set
Horizontal Shaft	Double	1.25 pints/ 0.6 liters	To horizontal centerline of gear drive
Vertical Shaft	Double	2.25 pints/ 1.1 liters	To midway on upper/primary gear set



WARNING: While working on this equipment, use safe lifting procedures, wear adequate clothing and wear hearing, eye and respiratory protection.

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Example Part Number	1
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Unit Disassembly Procedure

(Refer to exploded view drawings on Pages 6–9)

There are two unit types in the B28/P28 series: single planetaries without a primary carrier and double planetaries with a primary carrier. Steps marked with an asterisk (*) apply only to the double planetary model.

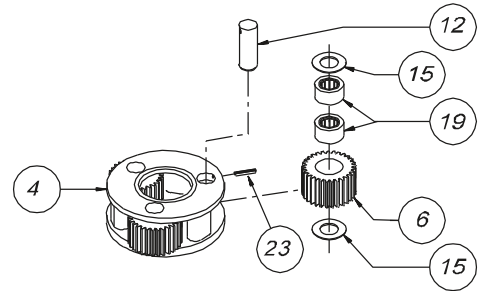
All parts should be carefully inspected as they are removed from unit. Scribe across mounting case (1) and cover (2) joint on outside of gear drive to assure proper orientation of oil fill and drain plugs, motor mounting, etc., as unit is reassembled.

- 1) Remove hydraulic motor and Eskridge brake from gear drive; drain oil.
- 2) Remove the six 5/16 hex cap screws (22) and 5/16 lockwashers (26), which retain cover (2) to mounting case (1).
- 3) Lift cover (2) off unit and remove input gear (11), input thrust-washer (21) and *thrust bearing (33).
- *4) Primary ring gear (31) and planetary assembly is now ready for removal (includes Items 5, 7, 13, 16, 20 & 24). Secondary sun gear (10) is splined to primary carrier (5) and may come out when removing planetary assembly; if not, remove sun gear.
- 5) The secondary planetary assembly (includes Items 4, 6, 12, 14, 15, 19 & 23) is splined to the output shaft (3). It may now be lifted by hand from the output shaft spline.

The unit is now disassembled into groups of parts and/or sub-assemblies. The area(s) requiring repair or service should be identified by thorough inspection of the parts after they have been washed in solvent. If repair is necessary, refer to the individual repair section to follow.

Secondary Planet Carrier Subassembly

(Items 4, 6, 12, 15, 19 & 23)



Disassembly

Rotate planet gears (6) to check for any abnormal noises or roughness in the planet bearings (19). At the same time, inspect planet gears for any damage or worn teeth. If replacement or further inspection is required, proceed as follows.

- 1) Drive the roll pins (23) completely into the planet shafts (12) using a 3/16" diameter punch. Press planet shafts out of carrier (4).

NOTE: Support only the carrier (4) while pressing out planet shafts.

- 2) Remove planet gears (6) and planet washers (15) from carrier (4).
- 3) If any of the planet bearings (19) need replacing, press them out of the planet gears.
- 4) Check planet shafts (12) for any abnormal wear, especially ones in which bearings needed to be replaced. If any abnormal wear is found, replace planet shaft.
- 5) Using a 3/16" diameter punch, drive roll pins out of planet shafts.
- 6) If required, press new planet bearings (19) into planet gears.
- 7) With a planet washer (15) on both sides of planet gear (6) and bearing (19) installed, slide gear into carrier (4). Insert planet shaft (12) through the carrier, planet gear and washers. During planet shaft installation, align roll pin hole in planet shaft with chamfered edge facing out, to the roll pin hole in outside diameter of carrier.

NOTE: Inserting a 3/16" diameter punch in the planet shaft roll pin hole will help in the alignment of holes between planet shaft and carrier during Step 7.

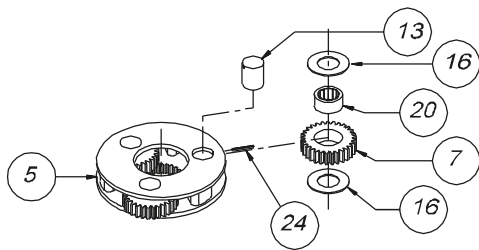
- 8) Once holes are properly aligned, drive a roll pin (23) through primary carrier and into planet shaft to retain parts. Use a drift to drive roll pin flush to carrier and to prevent striking planet gear teeth.

Repeat the same procedure for remaining gears.

*Step applies only to double planetary models.

*Primary Planet Carrier Subassembly

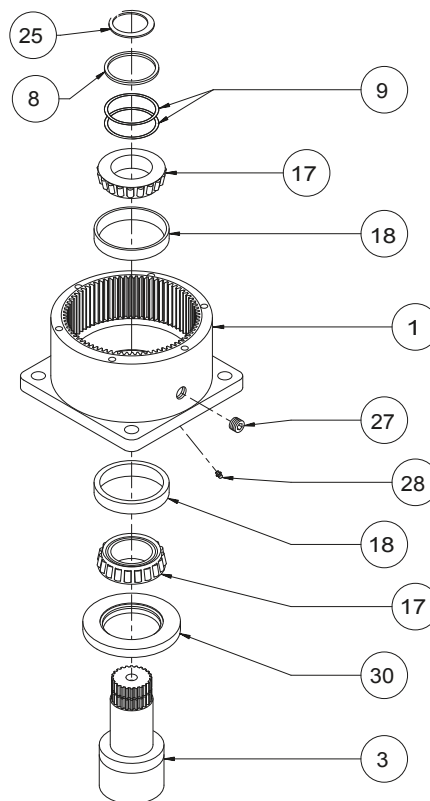
(Items 5, 7, 13, 16, 20 & 24)



Follow the same procedure as that for the Secondary Planet Carrier Subassembly, except substitute item numbers as indicated: primary carrier (5), primary planet gear (7), primary planet shaft (13), primary planet washer (16), primary planet bearing (20) and primary roll pin (24). Note that roll pins are 1/8" in diameter.

Case Subassembly

(Items 1, 3, 17, 18, 27, 28 & 30)



Disassembly

- 1) Place unit on a press table with the output shaft (3) protruding downward through a hole in the table. Unit should be supported only by mounting case (1). The only thing retaining output shaft (3) is the retaining ring (25). Remove retaining ring from output shaft, followed by support washer (8) and bearing shims (9).

CAUTION: Retaining ring is no longer retaining output shaft. Take precautions if moving unit: shaft may fall out.

- 2) With output shaft down through center hole in press table and unit supported by case, press shaft out by applying press load to top end of shaft (internal end) until it passes through inner bearing cone (17). Outer bearing cone (17) will come out of unit attached to shaft.

CAUTION: Care should be taken not to injure feet or damage output shaft during this procedure. Once shaft has been pressed through inner shaft bearing, it will drop from unit.

- 3) If outer bearing cone (17) needs replacing, it will need to be pressed off of output shaft (3). Also inspect inner bearing cone (17), which can be found in mounting case seated inside the inner bearing cup (18). In some instances, outer bearing cone (17) may need to be removed if shaft seal (1) is to be replaced. If outside diameter of output shaft (external end opposite bearing) is smaller than inside diameter of seal, then shaft seal may be replaced without removing bearing cone.
- 4) Lubricate inner lip of new shaft seal (3) and turn so that open side of seal (30) is up. Slide seal onto output shaft until it fits snug over shaft seal diameter.
- 5) With small end of bearing cone pointing upward, place outer bearing cone (17) onto the internal end of the output shaft

*Step applies only to double planetary models.

(3). Press until bearing is seated tightly against shoulder. If the original bearing was removed only to replace shaft seal, it may be reused.

NOTE: Press only on inner race of bearing cone. Do not press on outer roller cage, or it will damage bearing.

- 6) Inspect inner and outer bearing cups (18). If cups are damaged, the cups and case (1) may need replacement. Contact Eskridge for further details.
- 7) Clean all foreign material from magnetic oil plug (27) located in side of mounting case (1). Add a small amount of pipe thread compound to pipe plug before installing back into case.

Reassembly

- 1) Start with case assembly (1). Turn case upside down and position it so that the side with the threaded holes is resting on the press table. Case pilot diameter should be pointing upward with outer bearing cup (18) exposed. Apply a layer of lithium bearing grease to outer bearing cup surface.
- 2) Invert the output shaft assembly (3) (retaining ring groove down) and carefully lower into the case (1) until the shaft's outer bearing cone (17) is seated against the outer bearing cup (18).
- 3) Press shaft seal (30) into case until it is flush with bottom of pilot diameter. Use a press fixture, if possible, to eliminate distorting seal. If press fixture is not available, a hammer and flat-ended drift may be used by tapping outer edge of seal lightly and alternating sides.

CAUTION: The only thing retaining output shaft and case together at this point is the tightness in fit of the shaft seal. Securely and cautiously turn unit upright, not allowing case and shaft to separate.

- 4) Stand unit assembly upright on output shaft (3).
- 5) While holding output shaft (3) with one hand, rotate case (1) to be certain it turns freely and smoothly. The slight resistance felt, if any, is due to shaft seal load (drag) on output shaft.
- 6) Apply a layer of lithium grease to inner bearing cup (18) and surface.
- 7) Install inner bearing cone (17, small end down) over internal end of output shaft. Press bearing down slowly until it is just seated against inner bearing cup (18). With a slight press load still applied, rotate case (1) by hand to ensure that the roller bearings are rotating evenly and smoothly. Slide bearing shims (9) over output shaft and down onto inner bearing cone (17). The same number of shims that were removed from unit during disassembly should be returned. Follow shims with support washer (8). Install a new retaining ring (25) above support washer into groove provided in output shaft. Inner bearing cone (17) may require additional press load to expose retaining ring groove. Apply only enough press load to allow retaining ring to engage into groove.

NOTE: Quantity of shims (9) may vary from unit to unit. Always use the same quantity of shims when reassembling.

Unit Reassembly

(Refer to exploded drawings on Pages 6–9)

- 1) Start with case assembly positioned shaft down.
 - 2) Place thrust bearing (32) on internal end of the shaft. Install secondary carrier (4) assembly into unit; carrier assembly should be installed with hub side down (24 tooth spline). Rotate carrier assembly back and forth to mesh secondary planet gear teeth (6) with case (1) teeth. Once teeth mesh, let secondary carrier slide down until it makes contact with the output shaft spline. The carrier splined hub (4) should spline onto output shaft (3). Carrier hub will rest on top of retaining ring (25) when splines are fully engaged. Install carrier thrust washer (14).
 - *3) Install sun gear (10) in secondary carrier. Install primary carrier assembly in unit so that its splined hub meshes with sun gear.
 - 4) Install input gear (11) in unit. Refer to the exploded view drawing for proper orientation.
 - *5) Place thrust bearing (33) over input gear (11).
 - 6) Place input thrust washer (21) over input gear (11).
 - *7) Grease a new o-ring (29) and install in bottom (internal stepped) end of ring gear (31). Refer back to scribe marks made across external joint prior to Disassembly Procedure. Line up scribe marks between cover and case (1) so that orientation of motor mount holes and oil plugs are back to their original positions. Place ring gear over primary carrier onto top of case (1) so that it meshes with planet gears (7).
 - 8) Fill unit with proper level of a GL-5 grade EP 80-90 gear oil; see Page 2 for details. Proper oil level will measure to middle of primary planet gears.
 - 9) Grease new o-ring (29) and install into bottom of cover (2). Refer back to scribe marks made across external joint prior to Disassembly Procedure. Line up scribe marks between cover and case (1) so that orientation of motor mount holes and oil plugs are back to their original positions.
- NOTE: Be certain o-ring (29) stays seated in cover during Step 9.**
- 10) Install all six of the 5/16 lockwashers (26) and the 5-/16 hex capscrews (22) and torque them to 20 ft-lbs.

THE GEARBOX IS NOW READY TO USE.

***Step applies only to double planetary models.**

Exploded View Drawing – 28B, Single Stage

RATIO'S	
4:1	5:1
4.08	5.05

MODEL B28

SINGLE PLANETARY

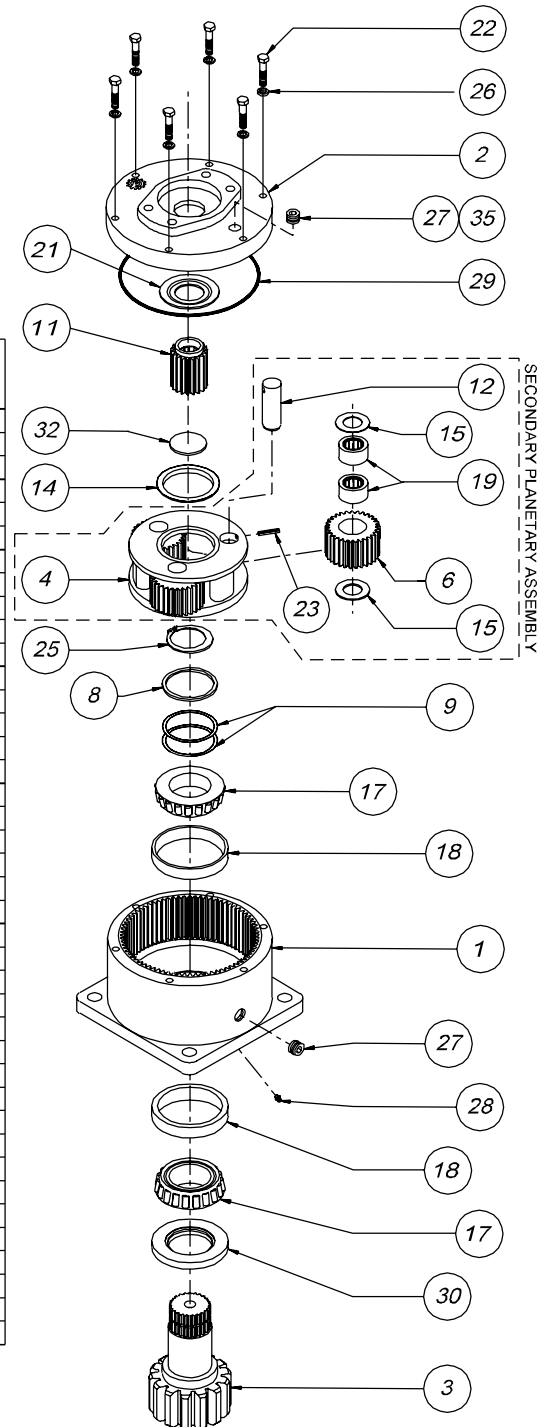


EFFECTIVE
FROM: S/N 16401 07-01-93
TO: (CURRENT)

PART NUMBER	PART NUMBER	QTY.	ITEM	C O D E	DESCRIPTION
← 28-004-3504		1	1		B28 CASE-SQUARE- (NO ZERK)
← 28-004-3504Z					B28 CASE-SQUARE- W/ZERK
← -	-				C28 CASE-CUST.MTG PER CUSTOMER SPECS.
← 85-004-1513		1	2	A	COVER-SAE 'A'
← 85-004-1503				B	COVER-SAE 'B' 2-BOLT
← 28-004-1013				C	COVER-SAE 'C' 4-BOLT
← 20-004-4022		1	3	D1	2"DIA SHAFT-3/8" KEYWAY
← 20-004-4032				D2	SHAFT 23T, 12/24 D.P. SPLINE
← 20-004-4042				D3	2" DIA.SHAFT-1/2"KEYWAY
← 28-004-4202				D4	2.25"D.SHAFT-1/2"KEYWAY
← -	-			C1	SHAFT-CUSTOM PER CUSTOMER SPECS.
50-004-1062	50-004-1052	1	4		CARRIER-SECONDARY
85-004-1051	85-004-1041	3	6		PLANET GEAR-SEC.
← -	-	-	7		PLANET GEAR-PRI.
← 20-004-1031		1	8		SUPPORT WASHER
← 20-004-1091		★	9		SHIM
85-004-1552	N/A			1	INPUT GEAR 21T,20/40 D.P.SPLINE
85-004-1382	85-004-1392			2	INPUT GEAR 13T,16/32 D.P.SPLINE
85-004-1272	85-004-1262			3	INPUT GEAR SAE 1"-6B SPLINE
85-004-1292	N/A			4	INPUT GEAR 14T,12/24 D.P.SPLINE
85-004-1562	85-004-1572			5	INPUT GEAR 15T,16/32 D.P.SPLINE
85-004-1592	N/A			6	INPUT GEAR 1"DIA X .25" KEY
← 71-004-0121		3	12		PLANET SHAFT-SECONDARY
← 50-004-1011		1	14		THRUST WASHER-SEC.CUP
← 85-004-1181		6	15		THRUST WASHER-(SEC.PLANET GEAR)
← 01-102-0160		2	17		BEARING CONE
← 01-103-0160		2	18		BEARING CUP
← 01-105-0010		6	19		BEARING-SEC.PLANET
← 50-004-1091		1	21		THRUST WASHER-INPUT
← 01-150-1400		6	22		HEX CAPSCREW 5/16-18 X 1.5 GR8
← 01-153-0210		3	23		ROLLPIN-SECONDARY 3/16 X 7/8
← 01-160-0250		1	25		RETAINING RING
← 01-166-0110		6	26		LOCKWASHER 5/16 MED
← 01-207-0070		2	27		PIPE PLUG-MAG. 3/8 NPT-SOC HD
← 01-215-0050		(1)	28		GREASE FITTING (OPTIONAL)
← 01-402-0560		1	29		O-RING 167 MM X 3 MM
← 01-405-0550		1	30		SEAL-SHAFT
← 28-004-1021		1	32		THRUST BEARING
← 01-216-0070		(1)	35		AIR VENT 3/8 NPT (OPTIONAL)
← -	-	-	-		-

NOTE ★ BEARING PRELOAD DETERMINES QUANTITY OF SHIMS.

SEAL KIT; P/N 20-016-0501; INCLUDES ITEMS 29 AND 30.



E.C.N. 2197
X28BD1-BD DATE: 04-15-04

Exploded View Drawing – 28B, Double Stage

MODEL B28

DOUBLE PLANETARY



EFFECTIVE
FROM: S/N 16401 07-01-93
TO: (CURRENT)

RATIO'S

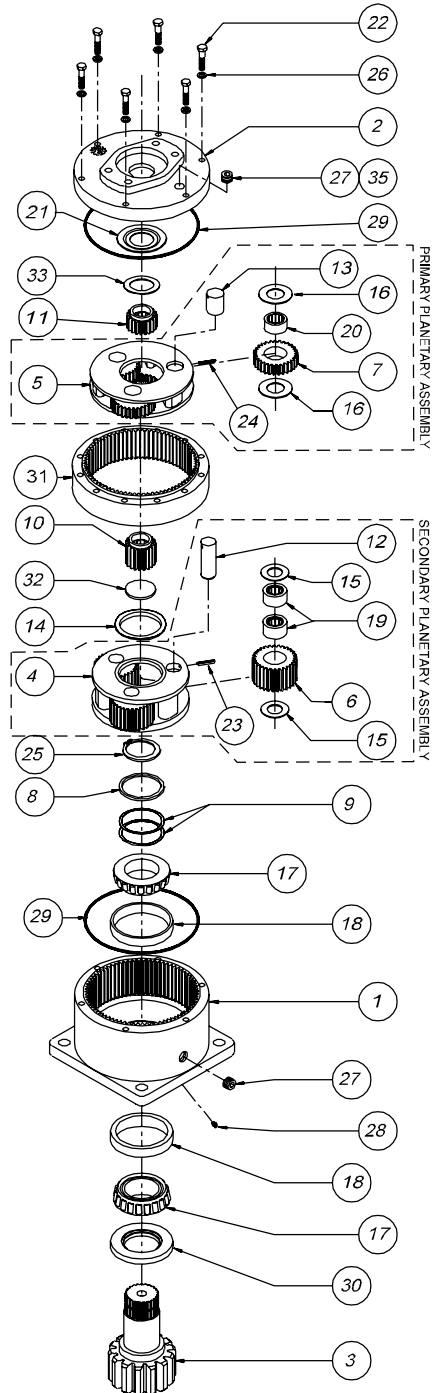
16.65:1 4.08 4.08	20.62:1 5.05 4.08	20.62:1 4.08 5.05 INVERTED	25.53:1 5.05 5.05
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C O D E	DESCRIPTION	ITEM	QTY.	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER
	B28 CASE-SQUARE- (NO ZERK)	1	1	28-004-3504			
	B28 CASE-SQUARE- W/ZERK			28-004-3504Z			
	C28 CASE-CUST.MTG PER CUSTOMER SPECS.			-	-	-	-
A	COVER-SAE 'A'			85-004-1513			
B	COVER-SAE 'B' 2-BOLT	2	1	85-004-1503			
C	COVER-SAE 'C' 4-BOLT			28-004-1013			
D1	2"DIA SHAFT-3/8" KEYWAY			20-004-4022			
D2	SHAFT 23T, 12/24 D.P. SPLINE			20-004-4032			
D3	2" DIA. SHAFT-1/2" KEYWAY			20-004-4042			
D4	2.25"D.SHAFT-1/2" KEYWAY			28-004-4202			
C1	SHAFT-CUSTOM PER CUSTOMER SPECS.			-			
	CARRIER-SECONDARY	4	1	50-004-1062	50-004-1062	50-004-1052	50-004-1052
	CARRIER-PRIMARY	5	1	50-004-1082	50-004-1072	50-004-1082	50-004-1072
	PLANET GEAR-SEC.	6	3	85-004-1051	85-004-1051	85-004-1041	85-004-1041
	PLANET GEAR-PRI.	7	3	85-004-1031	85-004-1021	85-004-1031	85-004-1021
	SUPPORT WASHER	8	1	20-004-1031			
	SHIM	9	★	20-004-1091			
	SUN GEAR-SECONDARY	10	1	85-004-1412	85-004-1092	85-004-1072	85-004-1072
1	INPUT GEAR 21T, 20/40 D.P. SPLINE			85-004-1402		85-004-1402	N/A
2	INPUT GEAR 13T, 16/32 D.P. SPLINE			85-004-1102	85-004-1062		85-004-1062
3	INPUT GEAR SAE 1"-8B SPLINE			85-004-1122	85-004-1112		85-004-1112
4	INPUT GEAR 14T, 12/24 D.P. SPLINE			85-004-1533		85-004-1533	N/A
5	INPUT GEAR 15T, 16/32 D.P. SPLINE			85-004-1542	85-004-1422		85-004-1422
6	INPUT GEAR 1"DIA X .25" KEY			85-004-1582		85-004-1582	N/A
	PLANET SHAFT-SECONDARY	12	3	71-004-0121			
	PLANET SHAFT-PRIMARY	13	3	81-004-0071			
	THRUST WASHER-SEC.CUP	14	1	50-004-1011			
	THRUST WASHER-(SEC.PLANET GEAR)	15	6	85-004-1181			
	THRUST WASHER-(PRI.PLANET GEAR)	16	6	81-004-1561			
	BEARING CONE	17	2	01-102-0160			
	BEARING CUP	18	2	01-103-0160			
	BEARING-SEC.PLANET	19	6	01-105-0010			
	BEARING-PRI.PLANET	20	3	01-105-0410			
	THRUST WASHER-INPUT	21	1	50-004-1091			
	HEX CAPSCREW 5/16-18 X 2.75 GR8	22	6	01-150-1490			
	ROLLPIN-SECONDARY 3/16 X 7/8	23	3	01-153-0210			
	ROLLPIN-PRIMARY 1/8 X 1	24	3	01-153-0080			
	RETAINING RING	25	1	01-160-0250			
	LOCKWASHER 5/16 MED	26	6	01-166-0110			
	PIPE PLUG-MAG. 3/8 NPT-SOC HD	27	2	01-207-0070			
	GREASE FITTING (OPTIONAL)	28	(1)	01-215-0050			
	O-RING 167 MM X 3 MM	29	2	01-402-0560			
	SEAL-SHAFT	30	1	01-405-0550			
	RING GEAR	31	1	85-004-1313			
	THRUST BEARING	32	1	28-004-1021			
	THRUST BEARING	33	1	01-112-0230			
	AIR VENT 3/8 NPT (OPTIONAL)	35	(1)	01-216-0070			
-	-	-	-	-	-	-	-

NOTE ★ BEARING PRELOAD DETERMINES QUANTITY OF SHIMS.

SEAL KIT; P/N 20-016-0521; INCLUDES(2) ITEM 29 AND (1) ITEM 30.

► FOR 20:1 RATIO, INPUT CODES 1, 4 AND 6 REQUIRE "INVERTED" RATIO CARRIER ASSEMBLIES.



ECN 2197
X28B02-BF

DATE: 04-15-04

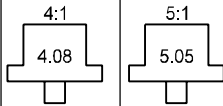
Exploded View Drawing – 28P, Single Stage

MODEL P28 SINGLE PLANETARY



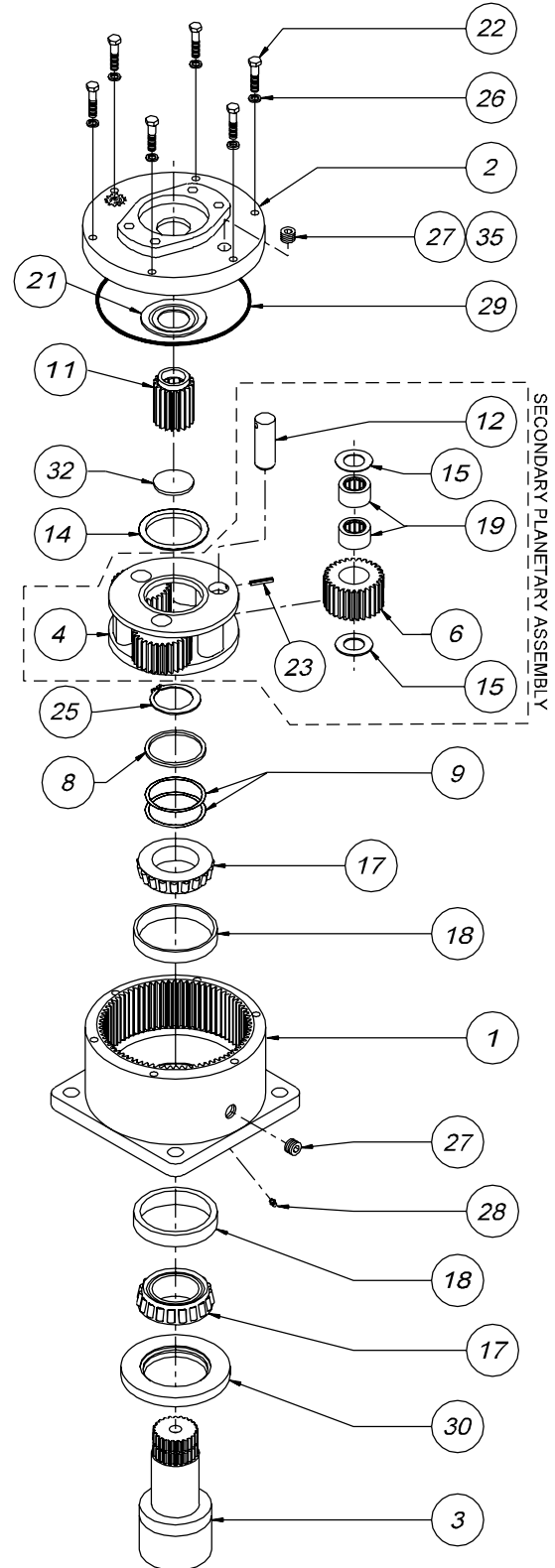
EFFECTIVE
FROM: S/N 16401 07-01-93
TO: (CURRENT)

RATIO'S



PART NUMBER	PART NUMBER	QTY.	ITEM	CODE	DESCRIPTION
28-004-3524		1	1		P28 CASE-SQUARE-SINGLE PLT.(NO ZERK)
28-004-3524Z					P28 CASE-SQUARE-SINGLE PLT. W/ZERK
-	-				C28 CASE-CUST.MTG PER CUSTOMER SPECS.
85-004-1513		1	2	A	COVER-SAE 'A'
85-004-1503				B	COVER-SAE 'B' 2-BOLT
28-004-1013				C	COVER-SAE 'C' 4-BOLT
20-004-4122		1	3	F1	SHAFT-1.5" KEYED
20-004-4112				F2	SHAFT-2" KEYED
-	-			C1	SHAFT-CUSTOM PER CUSTOMER SPECS.
50-004-1062	50-004-1052	1	4		CARRIER-SECONDARY
85-004-1051	85-004-1041	3	6		PLANET GEAR-SEC.
20-004-1031		1	8		SUPPORT WASHER
20-004-1091		*	9		SHIM
85-004-1552	N/A			1	INPUT GEAR 21T,20/40 D.P.SPLINE
85-004-1382	85-004-1392			2	INPUT GEAR 13T,16/32 D.P.SPLINE
85-004-1272	85-004-1262			3	INPUT GEAR SAE 1"-6B SPLINE
85-004-1292	N/A	1	11	4	INPUT GEAR 14T,12/24 D.P.SPLINE
85-004-1562	85-004-1572			5	INPUT GEAR 15T,16/32 D.P.SPLINE
85-004-1592	N/A			6	INPUT GEAR 1"DIA X .25" KEY
71-004-0121		3	12		PLANET SHAFT-SECONDARY
50-004-1011		1	14		THRUST WASHER-SEC.CUP
85-004-1181		6	15		THRUST WASHER-(SEC.PLANET GEAR)
01-102-0160		2	17		BEARING CONE
01-103-0160		2	18		BEARING CUP
01-105-0010		3	19		BEARING-SEC.PLANET
50-004-1091		1	21		THRUST WASHER-INPUT
01-150-1400		6	22		HEX CAPSCREW 5/16-18 X 2.75 GR8
01-153-0210		3	23		ROLLPIN-SECONDARY 3/16 X 7/8
01-160-0250		1	25		RETAINING RING
01-166-0110		6	26		LOCKWASHER 5/16 MED
01-207-0070		2	27		PIPE PLUG-MAG. 3/8 NPT-SOC HD
01-215-0050		(1)	28		GREASE FITTING (OPTIONAL)
01-402-0560		1	29		O-RING 167 MM X 3 MM
01-405-0610		1	30		SEAL-SHAFT
28-004-1021		1	32		THRUST BEARING
01-216-0070		(1)	35		AIR VENT 3/8 NPT (OPTIONAL)
-	-	-	-	-	-

NOTE * BEARING PRELOAD DETERMINES QUANTITY OF SHIMS.
SEAL KIT; P/N 20-016-0511; INCLUDES ITEMS 29 AND 30.



E.C.N. NO. 2197
X28PD1-BE DATE: 04-15-04

Exploded View Drawing – 28P, Double Stage

MODEL P28

DOUBLE PLANETARY



EFFECTIVE
FROM: S/N 16549 07-28-93
TO: (CURRENT)

RATIO'S

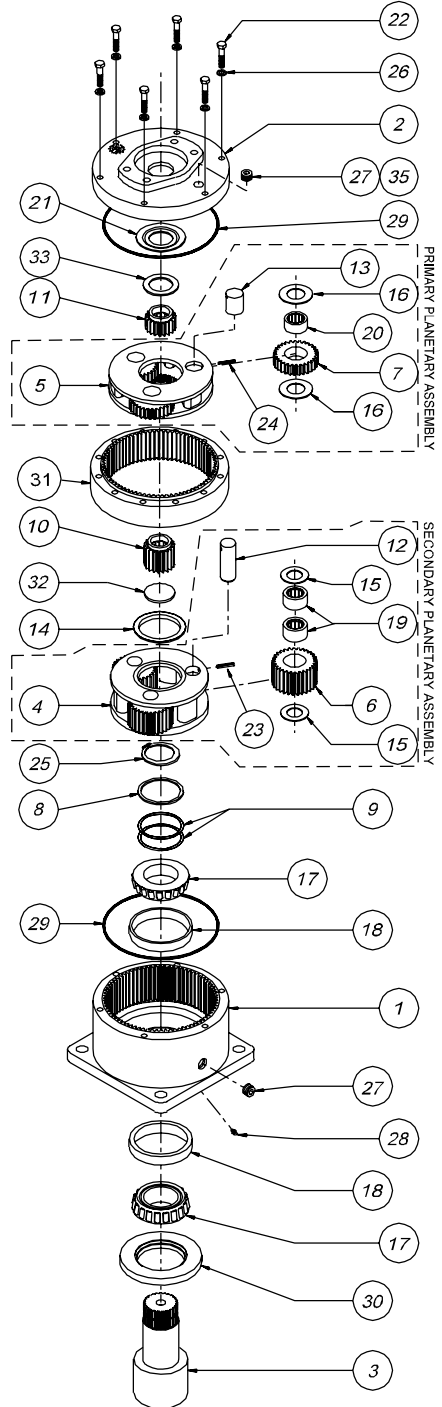


CODE	DESCRIPTION	ITEM	QTY.	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER
	P28 CASE-SQUARE- (NO ZERK)			28-004-3524			
	P28 CASE-SQUARE- W/ZERK	1	1	28-004-3524Z			
	C28 CASE-CUST.MTG PER CUSTOMER SPECS.			-	-	-	-
A	COVER-SAE 'A'			85-004-1513			
B	COVER-SAE 'B' 2-BOLT	2	1	85-004-1503			
C	COVER-SAE 'C' 4-BOLT			28-004-1013			
F1	SHAFT-1.5" KEYED			20-004-4122			
F2	SHAFT-2" KEYED			20-004-4112			
C1	SHAFT-CUSTOM PER CUSTOMER SPECS.			-	-	-	-
	CARRIER-SECONDARY	4	1	50-004-1062	50-004-1062	50-004-1052	50-004-1052
	CARRIER-PRIMARY	5	1	50-004-1082	50-004-1072	50-004-1082	50-004-1072
	PLANET GEAR-SEC.	6	3	85-004-1051	85-004-1051	85-004-1041	85-004-1041
	PLANET GEAR-PRI.	7	3	85-004-1031	85-004-1021	85-004-1031	85-004-1021
	SUPPORT WASHER	8	1	20-004-1031			
	SHIM	9	*	20-004-1091			
	SUN GEAR-SECONDARY	10	1	85-004-1412	85-004-1092	85-004-1072	85-004-1072
1	INPUT GEAR 21T, 20/40 D.P. SPLINE			85-004-1402		85-004-1402	N/A
2	INPUT GEAR 13T, 16/32 D.P. SPLINE			85-004-1102	85-004-1062		85-004-1062
3	INPUT GEAR SAE 1"-6B SPLINE			85-004-1122	85-004-1112		85-004-1112
4	INPUT GEAR 14T, 12/24 D.P. SPLINE			85-004-1533		85-004-1533	N/A
5	INPUT GEAR 15T, 16/32 D.P. SPLINE			85-004-1542	85-004-1422		85-004-1422
6	INPUT GEAR 1" DIA X .25" KEY			85-004-1582		85-004-1582	N/A
	PLANET SHAFT-SECONDARY	12	3	71-004-0121			
	PLANET SHAFT-PRIMARY	13	3	81-004-0071			
	THRUST WASHER-SEC.CUP	14	1	50-004-1011			
	THRUST WASHER-(SEC.PLANET GEAR)	15	6	85-004-1181			
	THRUST WASHER-(PRI.PLANET GEAR)	16	6	81-004-1561			
	BEARING CONE	17	2	01-102-0160			
	BEARING CUP	18	2	01-103-0160			
	BEARING-SEC.PLANET	19	6	01-105-0010			
	BEARING-PRI.PLANET	20	3	01-105-0410			
	THRUST WASHER-INPUT	21	1	50-004-1091			
	HEX CAPSCREW 5/16-18 X 2.75 GR8	22	6	01-150-1490			
	ROLLPIN-SECONDARY 3/16 X 7/8	23	3	01-153-0210			
	ROLLPIN-PRIMARY 1/8 X 1	24	3	01-153-0080			
	RETAINING RING	25	1	01-160-0250			
	LOCKWASHER 5/16 MED	26	6	01-166-0110			
	PIPE PLUG-MAG. 3/8 NPT-SOC HD	27	2	01-207-0070			
	GREASE FITTING (OPTIONAL)	28	(1)	01-215-0050			
	O-RING 167 MM X 3 MM	29	2	01-402-0560			
	SEAL-SHAFT	30	1	01-405-0610			
	RING GEAR	31	1	85-004-1313			
	THRUST BEARING	32	1	28-004-1021			
	THRUST BEARING	33	1	01-112-0230			
	AIR VENT 3/8 NPT (OPTIONAL)	35	(1)	01-216-0070			
-		-	-	-	-	-	-

NOTE * BEARING PRELOAD DETERMINES QUANTITY OF SHIMS.

SEAL KIT (P/N 20-016-0511) INCLUDES (1 EA.) O-RINGS AND (1 EA.) SEAL. PLUS ADD (ONE EXTRA) O-RING.

▷ FOR 20:1 RATIO, INPUT CODES 1, 4 AND 6 REQUIRE "INVERTED" RATIO CARRIER ASSEMBLIES.



ECN 2197
X28PD2-BF DATE: 04-15-04

ESKRIDGE FINISHED PRODUCT LIMITED WARRANTY

1.1 Scope of Warranty Coverage. Upon the terms and subject to the conditions set forth in this limited warranty:

(a) ESKRIDGE (referred to herein as “**ESKRIDGE**” or the “**Manufacturer**”) warrants to each initial end user customer (a “**Purchaser**”) of a new finished product together with any accessories manufactured and sold directly from ESKRIDGE (the “**Product**”) that the Product shall be free from defects in material and workmanship, under normal working and service conditions, for a period of eighteen (18) months from the date the Product is shipped from ESKRIDGE. (the “**Warranty Term**”). A Purchaser shall be eligible for an additional eighteen (18) months of coverage in addition to the Warranty Term (also referred to as the “**Standard (+) PLUS benefit**”) only if the Purchaser (i) complies with Section 1.2(a) and (ii) registers the Product during the Warranty Term at myproduct.eskridgeinc.com.

(b) Notwithstanding the foregoing, this warranty does not cover components damaged by accident, abuse, misuse, neglect, untrained operators, collision, overloading, modification, disassembly, rework, misapplication, improper installation, lack of lubrication or maintenance, or improper service. This warranty does not cover the paint or material finish, removal or reinstallation of the Product, or normal wear and tear and loss of functionality due to aging of the Product (which may include but is not limited to bearings, bushings, seals, O-rings, gaskets, brake material, motor brushes, electrical cables and more).

1.2 Eligibility of Warranty Coverage.

(a) A Purchaser shall be eligible for warranty coverage under this Limited Warranty during the Warranty Term only if:

(i) Prior to placing a Product in service, and throughout use of the Product during the Warranty Term, the Purchaser provides (or causes to be provided) proper storage such that foreign objects (e.g. rain or debris) cannot enter any Product through entry ports which are normally closed during operation.; and

(ii) The Purchaser maintains, or causes to be maintained, the Product according to commercially reasonable standards and utilizes the Product for the purposes for which it was created; and

(iii) No repairs or alterations have been made by any party other than ESKRIDGE, including Purchaser, unless otherwise authorized in writing by ESKRIDGE.

1.3 Transferability of Warranty.

(a) This warranty is transferable only from the Purchaser to the first subsequent transferee (the “**Transferee**”) of the Product from Purchaser upon (i) written notification to ESKRIDGE and (ii) registration of the transfer, both within 30 days of such Product transfer.

(b) Upon satisfaction of transfer requirements set forth in Section 1.3(a), the Transferee shall succeed to all the rights and obligations of the Purchaser set forth in this Limited Warranty.

1.4 Certain Limitations on Scope of Warranty Service.

(a) Any obligation of ESKRIDGE under this warranty, statutory or otherwise, is limited to the repair of the Product, at its factory or Authorized Service Centers. Notwithstanding the foregoing, if field service or repair is performed by ESKRIDGE at the request of the Purchaser and no defect is found with material or workmanship of the Product, the Purchaser shall compensate ESKRIDGE for its time and expenses within thirty (30) days of delivery of an invoice relating to the same. If repair is determined by ESKRIDGE in its sole, absolute and uncontrolled discretion to be impossible or impractical, then ESKRIDGE may satisfy this warranty by replacing the Product. ESKRIDGE will not provide any cash payment or credits for defective materials or workmanship.

(b) Purchaser shall be responsible for any and all freight charges for any Product receiving warranty service under this limited warranty. Any travel time, transportation charges, freight charges, or similar costs incurred by ESKRIDGE in connection with the replacement or repair of defective parts, shall, be the responsibility of the Purchaser. If applicable, ESKRIDGE shall invoice Purchaser for the total amount of such charges within sixty (60) days of fulfilling its duties under this warranty, payable within thirty (30) days of delivery of such invoice. In no event shall ESKRIDGE be liable for bills for service, labor or other expenses that have been incurred by the Purchaser without approval or prior authorization by ESKRIDGE for inspection, maintenance, or repair of the Product.

(c) If a Product is found to be operable upon inspection, the Product, at Purchaser's election, may be either (1) returned to the Purchaser with a service charge from ESKRIDGE for inspection, cleaning, and routine replacement of all rubber components and any other parts that show wear; or (2) ESKRIDGE can dispose of the product safely.

1.5 Limitations of Liability. ESKRIDGE shall in no event be liable for punitive, special or consequential damages relating to the Product or this Warranty. ESKRIDGE makes no warranty in respect to third-party accessories, upgrades, or additions to the Product.

1.6 Improving Product. ESKRIDGE reserves the right to improve the Product through changes in design or materials as it may deem desirable or necessary without being obligated to incorporate, upgrade, or otherwise modify previously manufactured products.

1.7 Limitations of Warranty.

(a) THE WARRANTY SET FORTH ABOVE IS THE ONLY EXPRESS WARRANTY. ESKRIDGE HEREBY DISCLAIMS AND EXCLUDES ANY OTHER EXPRESS, IMPLIED, OR STATUTORY WARRANTIES, ARISING BY OPERATION OF LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE, OF TRADE, OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY.

(b) ANY IMPLIED WARRANTY WHICH BY LAW MAY NOT BE EXCLUDED IS LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF ORIGINAL RETAIL PURCHASE OF THE PRODUCT.

(c) This warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

(d) This warranty is valid only in the U.S.A. and Canada. For warranty outside the U.S.A. and Canada contact your nearest Eskridge Distributor.

1.8 No Modifications to Warranty. No ESKRIDGE dealer, distributor, agent or employee is authorized to make any modification, extension or addition to this warranty.

1.9 How to Apply for Warranty Coverage.

All claims are handled by contacting your nearest Eskridge Distributor. For questions, please contact customer support: eskcustomersupport@ramseyindustries.com.

Visit [Dealer Locator - Eskridge](#) for Eskridge Distributor locations and contact information.

Additional warranty, service support, product information, and parts information can be found on www.eskridgeinc.com.