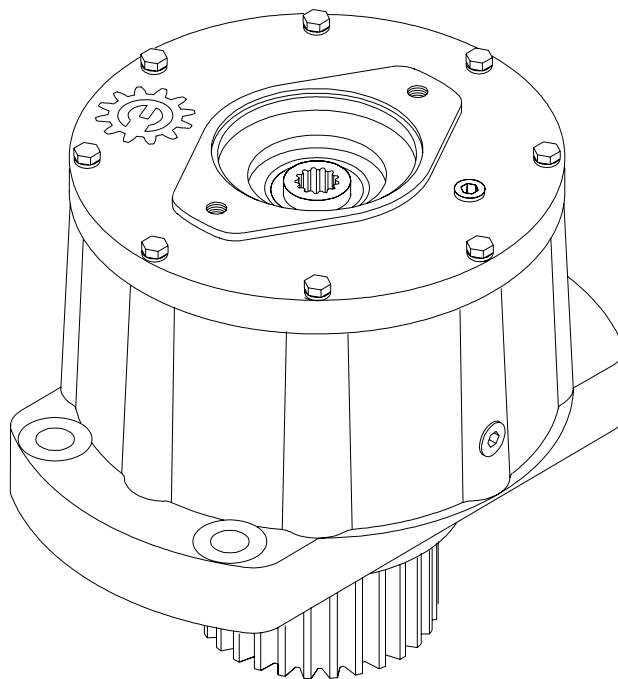




105 PLANETARY GEAR DRIVE SERVICE AND REPAIR MANUAL



Example Part Number

105	E	D2	C	4	—	36	Z
Model	Gear Drive Mounting	Output Shaft	Input Mounting	Input Spline		Ratio	Options

THIS SERVICE MANUAL IS EFFECTIVE
FROM:..... S/N 55013, JUNE 2002
TO: CURRENT
REF: SM105ED2-AB

A Ramsey Industries Brand

105E MODEL SERVICE MANUAL

SINGLE/DOUBLE STAGE PLANETARY GEAR DRIVE

This manual will assist in disassembly and assembly of the above model planetary geardrives. 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 geardrive 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 geardrive should be partially disassembled to inspect gears and bearings at 1000 hour intervals.

If your unit was specified "shaft up" or with a "-Z" after the part number, a grease zerk was provided in the base housing. For output 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 per below schedule. Over-greasing the output bearing in a output shaft pinion-up operation tends to fill the housing with grease and thicken the oil.

Operating Position	Oil Capacity	Oil Level
Horizontal Shaft	2.25 pints (1.10 liters)	To horizontal centerline of gear drive
Vertical Shaft	2.50 pints (1.20 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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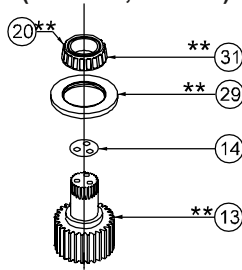
Unit Disassembly Procedure

(Refer to exploded view drawing)

- 1) Scribe a diagonal line across the outside of the unit from cover (6) to case (1) before disassembly to assure proper positioning of pieces during reassembly.
- 2) Remove magnetic pipe plug (30) and drain oil from unit. Maximum drainage occurs when oil is warm.
- 3) Remove eight cover bolts (23) and lockwashers (25).
- 4) Lift off cover (6). The input gear (12) and input thrust washer (17) may be lifted out of carrier assembly.
- 5) Lift primary planet carrier assembly (3, 8, 10, 15, 18 & 27) out of case.
- 6) The output shaft (13) and secondary planet carrier assembly may now be removed as follows:
 - a) The secondary planet carrier (2) spline is a press fit onto output shaft (13) spline. Case (1) should be set on a plate or table with output shaft protruding downward through hole in table.
 - b) Loosen but do not remove shaft retaining capscrews (24).
- 7) Secondary planet carrier assembly (2, 5, 7, 9, 15, 19, 21 & 26) may now be lifted out of case.

Output Shaft Subassembly

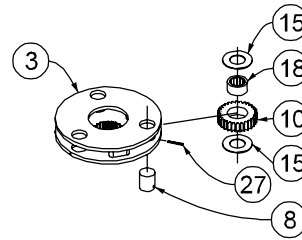
(Items 13, 29 & 31)



- 1) Outer tapered bearing cone (20) may be removed using a gear puller. If reusing old bearing cone, do not damage roller cage by pulling on it.
 - 2) To replace shaft seal (29) lubricate inner lip of new seal and turn so that open side is facing upward. Slide seal down output shaft (13) all the way to gear teeth or until it fits snug over seal diameter.
- NOTE: Press bearing onto shaft by pressing on inner race only. Do not press on roller cage or bearing will be damaged.**
- 3) With large end down, press outer bearing cone (20) onto output shaft (13). Be sure it is seated tightly against shoulder of shaft. If old outer bearing cone (20) was removed only to replace shaft seal, it may be reused.

Primary Planetary Carrier Subassembly

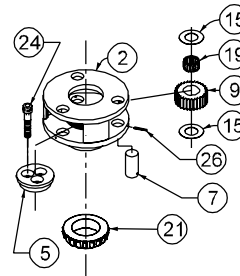
(Items 3, 8, 10, 15, 18 & 27)



- 1) Drive roll pins (27) into planet shafts (8).
- 2) Press or drive planet shafts out of carrier (3).
- 3) Slide planet gears (10) along with planet washers (15) out of primary carrier (3).
- 4) If planet bearings (18) must be replaced, they may now be pressed out of primary planet gears (10).
- 5) Use 1/8 inch pin punch to remove roll pins (27) from planet shafts.
- 6) Rebuild primary planet carrier assembly in reverse order using any needed new parts. Planet shafts (8) should be installed with chamfered end of 1/8 inch hole toward outside diameter of carrier. This will aid in alignment of holes while inserting roll pins.

Secondary Planetary Carrier Subassembly

(Items 2, 5, 7, 9, 15, 19, 21 & 26)

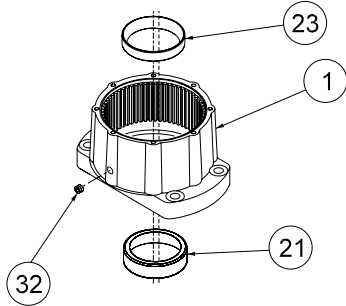


- 1) Disassembly procedure is the same as previous section on primary planet carrier subassembly (steps 1-4) except that the secondary planet bearings are not a press fit. Substitute these parts: secondary carrier (2), secondary planet gears (9), planet bearings (19), secondary planet shafts (7) and roll pins (26).
- 2) Place carrier (2) with hub down as shown above. Place bearing retainer plate (5) in bottom of carrier. Insert secondary planet gears (9).
- 3) Turn carrier (2) over while using the planet gears (9) to hold retainer plate (5) in place.
- 4) Remove one planet gear (9) and insert a cageless bearing (19). Install two washers (15) (one on either side of the planet gear). Place in carrier and install planet shaft (7) and roll pin (26). Repeat for two remaining gears.

NOTE: Press bearing onto hub by pressing on inner race only. DO NOT press on roller cage or it may damage bearing.

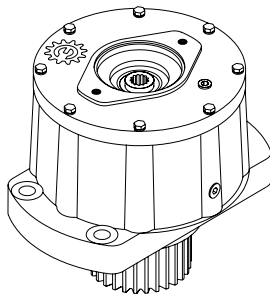
- 5) If tapered inner bearing cone (21) on hub of secondary carrier (2) must be replaced, it may be removed using a gear puller. Then, press a new bearing cone onto hub making sure bearing shoulder is tight against hub shoulder.

Case Subassembly (Items 1, 20, 22 & 30)



- 1) Inspect inner and outer bearing cups (22 & 20) and replace if necessary.
- 2) Clean all foreign material from magnetic drain and fill plug (30).

Unit Reassembly



(Refer to exploded view drawing)

- 1) Turn case pinion side up (opposite shown above). Apply a layer of lithium grease to outer bearing cup. Place the shaft (13) into case (1) so that the shaft's outer tapered bearing cone (20) is seated in case's outer bearing cup (20). Tap shaft seal (29) into place.

CAUTION: Shaft is not retained at this time.

- 2) Turn case pinion side down (standing on shaft as shown above).
- 3) Apply a layer of lithium grease to inner bearing cup (22).
- 4) Carefully place shim(s) (14) over shaft, making sure the 3 holes in shim are properly aligned with those on the shaft (13). Use the same number of shims that came out of unit to allow for correct shaft bearing preload.
- 5) Rotate bearing retainer plate (5) inside secondary carrier assembly so that counter-bored holes are centered between planet gears (9).

NOTE: It is important that the holes in the retainer plate remain centered between planet gears. A certain amount of tool clearance will be necessary in order to install and torque the capscrews (24).

- 6) Install secondary carrier assembly (2) into case (1) as follows: Rotate secondary carrier assembly back and forth until planet gear teeth (9) mesh with gear teeth in case (1). Let carrier assembly down until carrier spline touches output shaft (13) spline. Rotate carrier by hand until you are certain

carrier spline has started cleanly and squarely onto shaft spline. View down through top of secondary carrier assembly through counter-bored holes in retainer plate (5). If needed, align holes in retainer plate directly over holes in the shaft and shim(s) (14).

- 7) Counter-bored holes should be centered between planet gears (9). Slowly press secondary carrier assembly down tightly against output shaft (13).

NOTE 1: Torque at proper bearing preload will vary according to the application. At output speeds of greater than 25 RPM, preload torque (including seal drag) should be in the range of 20 to 50 in-lbs. At less than 25 RPM, torque should be 50 to 80 in-lbs.

NOTE 2: Bearing preload is achieved by adjusting the number of shims (14) under the bearing retainer plate (5).

NOTE 3: Bearing preload will be determined by measuring bearing rolling resistance which is the torque required to turn shaft (or to turn base with shaft stationary). Torque can be measured with a spring scale attached to the base. For example, with shaft stationary, if a scale is attached to the base, measuring 5 inches from the center of the gearbox and it takes 10 pounds of force to rotate base, then preload torque is 5 inch x 10 lb = 50 in-lbs.

- 8) While secondary carrier (2) assembly is under press load (approx. 2 tons), measure preload torque between case (1) and shaft (13). If torque is not correct, add or remove 1 shim as required and try again.
- 9) Remove press load from secondary carrier (2). Install capscrews (24) and torque to 90 ft-lbs.
- 10) Place secondary thrust washer (4) onto center of secondary planet carrier assembly.
- 11) Install sun gear (11) into center of secondary planet carrier.
- 12) To install primary planet carrier assembly hold inside diameter of carrier (3) and rotate until planet gears line up with case gear teeth and sun gear. Assembly will drop into place.

NOTE: A simple planetary such as this does not require a gear timing procedure.

- 13) Insert input gear (12) into unit so that teeth mesh with primary planet gears (10).
- 14) Place input thrust washer (17) over input gear.
- 15) Place a new o-ring (28) on bottom of cover (6).
- 16) Set cover (6) on top of unit and refer to scribed line for proper orientation. Install and torque eight cover bolts (23) with lockwashers (25) to 32 ft-lbs.
- 17) Check to be sure magnetic plug (30) is securely installed into side of case (1).
- 18) Add gear oil as specified on page 2. Correct oil level will measure to middle of primary planet gears (10) when in the vertical operating position.
- 19) Put pipe sealant on magnetic plug (30) and install into oil fill hole in cover (6).
- 20) Insert a shaft, such as an output shaft from a hydraulic motor, into input gear (12) and rotate by hand to be sure unit turns smoothly and easily.

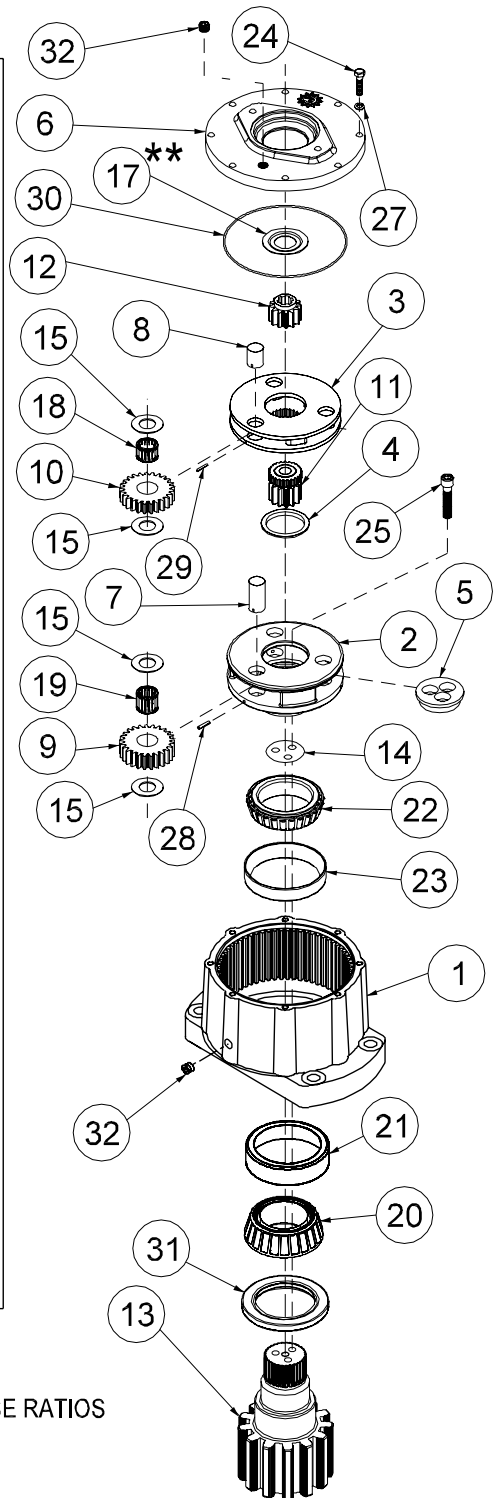
THE GEAR DRIVE IS NOW READY FOR USE.

105E Double Stage Exploded View Drawing

MODEL E 105 RATIO →			DOUBLE PLANETARY					
			19.54:1 4.42 4.42	26.52:1 4.42 6.00	** 33.16:1 7.50 4.42	** 36.00:1 6.00 6.00 W/CODE 4	36.00:1 6.00 6.00 W/O CODE 4	** 45.00:1 7.50 6.00
ITEM	QTY	DESCRIPTION	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.
1	1	CASE-E100 (STD)	86-004-3602	86-004-3602	86-004-3602	86-004-3602	86-004-3602	86-004-3602
2	1	CARRIER (SEC)	83-004-1262	83-004-1232	83-004-1262	83-004-1232	83-004-1232	83-004-1232
3	1	CARRIER (PRI)	13-004-1032	13-004-1032	13-004-1032	13-004-1032	13-004-1032	13-004-1032
4	1	THRUST WASHER- SECONDARY	81-004-2711	81-004-2711	-	-	81-004-2711	-
4	2	THRUST WASHER- SECONDARY	-	-	81-004-2711	81-004-2711	-	81-004-2711
5	1	PLATE- BEARING RETAINER	86-004-1002	86-004-1002	86-004-1002	86-004-1002	86-004-1002	86-004-1002
COVER	6	SAE 'A' 2 AND MOD 4 BOLT	13-004-1192	13-004-1192	13-004-1222	13-004-1222	13-004-1192	13-004-1222
		SAE 'A' 2 AND MOD 4 BOLT W/ CODE 4	13-004-1252	13-004-1252	13-004-1222	13-004-1222	13-004-1252	13-004-1222
		SAE 'B' 2 BOLT	13-004-1182	13-004-1182	13-004-1232	13-004-1232	13-004-1182	13-004-1232
		SAE 'B' 2 & 4 BOLT W/ CODE 4	13-004-1202	13-004-1202	13-004-1232	13-004-1232	13-004-1202	13-004-1232
		SAE 'C' 2 AND 4 BOLT	13-004-1212	13-004-1212	13-004-1242	13-004-1242	13-004-1212	13-004-1242
INPUT GEAR	12	SAE 'C' 2 AND 4 BOLT W/ CODE 4	13-004-1212	13-004-1212	13-004-1242	13-004-1242	13-004-1212	13-004-1242
		PLANET SHAFT (SEC)	83-004-1031	83-004-1031	83-004-1031	83-004-1031	83-004-1031	83-004-1031
		PLANET SHAFT (PRI)	13-004-1021	13-004-1021	13-004-1021	13-004-1021	13-004-1021	13-004-1021
		PLANET GEAR (SEC)	83-004-1272	83-004-1242	83-004-1272	83-004-1242	83-004-1272	83-004-1242
		PLANET GEAR (PRI)	13-004-1102	13-004-1102	13-004-1122	13-004-1112	13-004-1102	13-004-1122
11	1	SUN GEAR	83-004-1282	83-004-1252	83-004-1282	83-004-1252	83-004-1282	83-004-1252
12	1	CODE 2 - INPUT - 13T 16/32 DP	13-004-1292	13-004-1292	13-004-1312	13-004-1302	13-004-1292	13-004-1312
		CODE 3 - INPUT - SAE 1" 6B	13-004-1322	13-004-1322	13-004-1472	13-004-1332	13-004-1322	13-004-1472
		CODE 4 - INPUT 14T 12/24 DP	13-004-1342	13-004-1342	13-004-1362	13-004-1352	13-004-1342	13-004-1362
		CODE 5 - INPUT -15T 16/32 DP	13-004-1452	13-004-1452	-	-	13-004-1442	-
13	1	SHAFT- PER CUSTOMER SPEC	-	-	-	-	-	-
14	*	SHIMS	83-004-1101	83-004-1101	83-004-1101	83-004-1101	83-004-1101	83-004-1101
15	12	THRUST WASHER- PLANET	81-004-1561	81-004-1561	81-004-1561	81-004-1561	81-004-1561	81-004-1561
17	1	THRUST WASHER-INPUT	81-004-2701	81-004-2701	-	-	81-004-2701	-
18	3	BEARING - PRI. PL.	01-105-0590	01-105-0590	01-105-0590	01-105-0590	01-105-0590	01-105-0590
19	3	BEARING - SEC. PL.	01-105-0500	01-105-0500	01-105-0500	01-105-0500	01-105-0500	01-105-0500
20	1	BEARING CONE	01-102-0200	01-102-0200	01-102-0200	01-102-0200	01-102-0200	01-102-0200
21	1	BEARING CUP	01-103-0200	01-103-0200	01-103-0200	01-103-0200	01-103-0200	01-103-0200
22	1	BEARING CONE	01-102-0100	01-102-0100	01-102-0100	01-102-0100	01-102-0100	01-102-0100
23	1	BEARING CUP	01-103-0090	01-103-0090	01-103-0090	01-103-0090	01-103-0090	01-103-0090
24	8	H.H.C.S. 3/8-16-1 1/2 GR8	01-150-1670	01-150-1670	01-150-1670	01-150-1670	01-150-1670	01-150-1670
25	3	S.H.C.S. 1/2-20 2 1/2 GR8	01-150-1480	01-150-1480	01-150-1480	01-150-1480	01-150-1480	01-150-1480
27	8	LOCKWASHER 3/8 MED	01-166-0010	01-166-0010	01-166-0010	01-166-0010	01-166-0010	01-166-0010
28	3	ROLL PIN - SEC. PL. 3/16 X 7/8	01-153-0210	01-153-0210	01-153-0210	01-153-0210	01-153-0210	01-153-0210
29	3	ROLL PIN - PRI. PL. 1/8 X 7/8	01-153-0180	01-153-0180	01-153-0180	01-153-0180	01-153-0180	01-153-0180
30	1	O-RING	01-402-0420	01-402-0420	01-402-0420	01-402-0420	01-402-0420	01-402-0420
31	1	SHAFT SEAL	01-405-0660	01-405-0660	01-405-0660	01-405-0660	01-405-0660	01-405-0660
32	2	PIPE PLUG 3/8 NPT MAGNETIC	01-207-0070	01-207-0070	01-207-0070	01-207-0070	01-207-0070	01-207-0070
36	1	BEARING	-	-	01-112-0220	01-112-0220	-	01-112-0220
37	1	THRUST RACE-USED WITH "BLIND SPLINE" INPUTS	-	-	01-112-0230	01-112-0230	-	01-112-0230

* QUANTITY OF SHIMS DETERMINED BY PRELOAD DESIRED AND PART STACK-UP
SEAL KIT P/N 86-016-0621 (INCLUDES 1 EACH OF ITEMS 30 & 31).

** REPLACE ITEM 17 WITH 1 EACH OF ITEM 36 & ITEM 4 AND 2 OF ITEM 37 FOR THESE RATIOS
FILENAME X105ED2-AA



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.