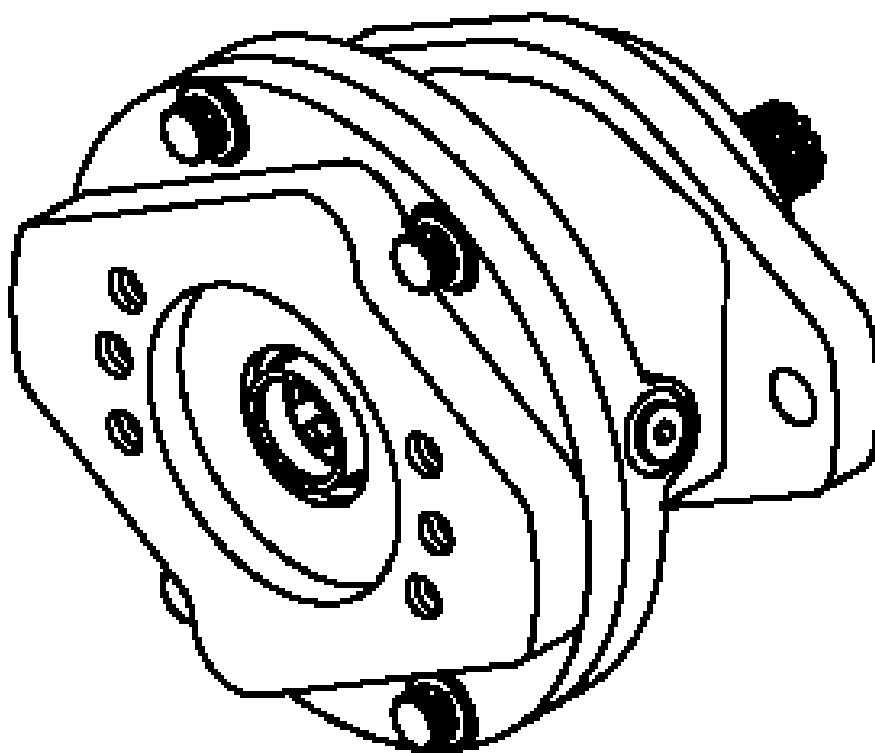




90B MULTIPLE DISC BRAKE SERVICE AND REPAIR MANUAL



Example Part Number

90	B	2	A	3	G047	F
Series	Output Pilot	Output Spline	Input Pilot	Input Spline	Torque Code	Options

THIS SERVICE MANUAL IS EFFECTIVE
FROM:..... S/N 00001, OCT. 1981
TO: CURRENT
REF: SM90B-CF

90B MODEL SERVICE MANUAL

SPRING-APPLIED, HYDRAULICALLY-RELEASED, MULTIPLE-DISC BRAKE

This manual will assist in disassembly and assembly of the above model brakes. Item numbers, indicated in parentheses through this manual, refer to the exploded parts breakdown drawing. Individual customer specifications may vary from exploded drawing and standard part numbers shown. If applicable, refer to individual customer drawing for details.

The Model 90B Series Eskridge brake is a spring applied, hydraulically released, multiple disc parking brake. The 90B is designed for "failsafe" type operations. Temperature, wear, and contamination of the friction surfaces will affect the performance of the brake and should be taken into consideration when specifying a required torque rating. Care should be taken to avoid damaging the splines or mounting surfaces during installation. The model 90B is not intended for use in dynamic applications. Please contact Eskridge Sales Dept. about any flow through applications. Brake operation should be tested during normal service operation. Brake inspection and service should be part of the normal service and maintenance schedule of the equipment or vehicle on which it is used. Any loss of holding torque requires the removal, inspection and replacement of suspect components.

SPECIFICATIONS

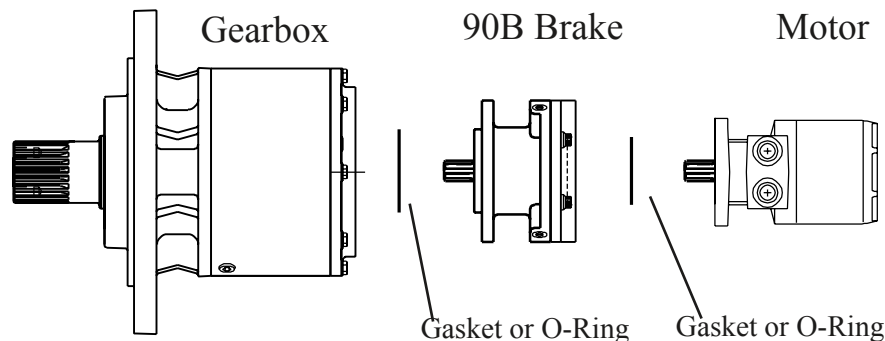
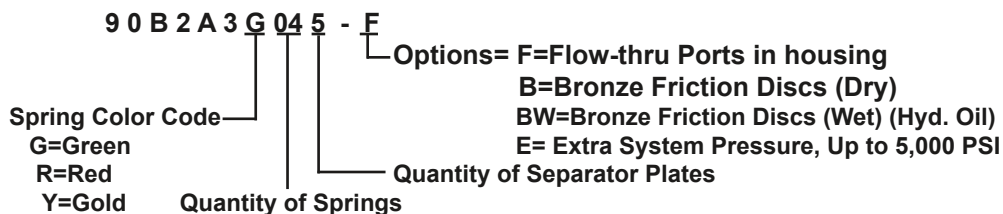
Maximum pressure	3,000 PSI (Unless 'E'-high pressure option is specified)
Maximum continuous pressure.....	3,000 PSI (Unless 'E'-high pressure option is specified)
Maximum speed	3,900 RPM
Shaft splines.....	30° involute, flat root side fit per ANSI B92.1a-1976 internal-class 7,external-class 5
Maximum output spline torque	4000 lb-in for code 2, 13T 16/32 8000 lb-in for code 3, 1-6B
Maximum operating temperature.....	170°F
Volume of oil to release brake	.3 cu. in.
Approximate weight	25 lbs.

Torque ratings are based on standard friction material in ATF-F fluid media or dry bronze at (0) PSI back pressure. Break away torque may vary +/-10% from specified ratings. The "W" wet option applies to bronze friction discs only and is furnished with mineral base hydraulic oil. Torque rating for wet bronze brakes will vary depending upon the type of oil used. Use only mineral base hydraulic oil for release of brake. For flow-thru option "F", use only fluids that are compatible with internal seals. Use of fluids other than specified above will alter torque values.



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

TORQUE CODE AND OPTIONS



Installation

NOTE: Before beginning installation procedures, visually inspect brake mounting flanges and shaft splines for damage due to poor handling during shipping. If damage is excessive, do not use brake.

- 1) The 90B brake is supplied with the necessary o-rings and/or gaskets for mounting the brake to a gearbox and a motor to the brake.
- 2) Mount 90B brake with (2) 1/2-13x1 capscrews through brake mounting flange. On horizontal shaft mountings, one o-ring port should be oriented as close to top as practical (bleeder port). Some installations require that brake be "released" so it can be rotated to align bolt holes (see step 6 of installation instructions)
- 3) Attach motor to input end of brake with appropriate sized capscrews through motor flange and gasket to give approximately 1/2" thread engagement. Make sure capscrews do not bottom out when fully tightened.
- 4) Torque all capscrews to approximately 75% of their yield strength. Refer to the chart below for appropriate thread size and torque loads:

TORQUE IN FT-LBS

THREAD SIZE	SAE GRADE 5		SAE GRADE 8	
	DRY	LUBED	DRY	LUBED
3/8-16	30	23	45	35
1/2-13	75	55	110	80
5/8-11	150	110	220	170
3/4-10	260	200	380	280

- 5) Remove plastic protective plug from pressure port of brake and attach a pressure line with 7/16-20 UNF-2B straight thread ring fitting.
- 6) Apply low pressure (20-30 PSI) to brake release port. Loosen Hollow Hex Plug, opposite of pressure port. Just enough to allow hydraulic fluid to bleed from cavity. After air has been bled from brake, tighten plug.

Disassembly

- 1) Remove motor from brake.
- 2) Loosen four 1/2-13x1 12-Point Capscrews (8). Alternately unscrew capscrews 1 turn at a time until all internal spring force is relieved. Remove cover (2) and springs (10).

CAUTION: Do not clamp or otherwise restrain cover (2) while removing cover bolts (8) since the brake is under high compressive spring load.

- 3) Apply low pressure air (20-30 PSI) to brake release port while holding one hand on top of piston (3). The air will force piston out of case. If friction discs (11) will be reused, turn brake upside down so that hydraulic oil cannot run down into case (1) as piston is forced out.
- 4) Remove shaft (4).
- 5) Friction discs (11), separator plates (12), and spacers (5) may now be removed from case (1). If your brake has a full compliment of friction discs (11) and separator plates (12), it will not have any spacers (5).
- 6) Remove seal (18) and bearing (6).

Inspection

- 1) Friction discs (11) should be replaced when overall height of stack of spacers (5), friction discs (11) and separator plates (12) is less than 1.230". This overall height represents an approximate 10% decrease in holding torque from that of a new brake.
- 2) Inspect piston rings (13, 14, 15 & 16) for signs of abrasion, extrusion or other damage.

NOTE: Standard o-rings for 3,000 PSI are black nitrile. Option 'E' Extra Pressure o-rings for 5,000 PSI system presurre are light yellow or cream colored urethane.

Assembly

Assembly should be in reverse order of disassembly with the following additional instructions.

- 1) Install shaft (4) by pushing shaft downward through bearing (7) and Seal (18) until bearing shoulder on shaft is seated against bearing.
- 2) Friction pack [Spacer (5), Friction Disc (11), and Separator Plate (12)] must be installed in exactly the same order as they were removed. There must always be a Friction Disc (11) above and below each Separator Plate (12). If a Separator Plate (12) is placed next to the Piston (3) or Spacer (5), the unit will overheat and sieze up. Be careful not to contaminate the friction surfaces with dirt, grease or fluid media* other than what is specified by your particular brake.

NOTE: If installing new friction discs (11), soak all discs in specified fluid media * before installation.

- 3) Pour appropriate fluid media, approximately 1 1/2 oz. over the friction plates or until the fluid level is even with top friction disc (11). See Fluid Media Table below.
- 4) If replacing piston o-rings, be sure o-rings (15&16) are nearest each other with backup rings (13&14) to the outside after installing onto Piston (3). Flat side of back-up-ring must be placed next to piston groove wall, curved face toward o-ring. Lubricate o-rings and bores with silicone based lube or with mineral base oil. Gently slide Piston (3) into case (1) until large o-ring (16) touches case. Press down firmly on piston using heel of both hands. This will squeeze o-rings into case and set piston (3) against friction plates. Do not use a hammer or mallot to install piston.
- 5) Insert springs (10) into piston (3) evenly or symmetrically spaced.
- 6) Install cover o-ring (17) around lip on case (1).
- 7) If item (7) is a ball bearing, install it in cover (2). If item (7) is a thrust washer, install it on shaft (4).
- 8) Set cover (2) on top of springs (10) over input end of shaft (4). Start four capscrews (8) through cover and into case with your fingers. Alternately tighten cover bolts 1 turn at a time until cover is tight against case. Torque bolts to 80 ft-lbs.

NOTE: Maximum operating pressure is 3,000 PSI with standard nitrile o-rings on piston and 5,000 PSI with 'E' option urethane o-rings. Operation above this pressure is detrimental to the life of the brake and could be dangerous.

THE BRAKE IS NOW READY FOR USE.

Fluid Media Table

<u>Option Code</u>	<u>Friction Disc Lining</u>	<u>Fluid Media</u>
None (Standard)	Paper Composite	Automatic Transmission Fluid, ATF-Type F*
B	Bronze (Dry)	None
BW	Bronze (Wet)	Mineral Base Hydraulic Oil

*Other fluids such as Dextron III will deliver lower holding torque. Contamination of ATF-F with hydraulic or other oils will also lower holding torque.

It is recommended that spring holes in piston be filled with fluid (1/2 oz.) after piston is installed. This will prevent fluid that is below piston from being trapped above it when brake is turned to horizontal position and back to vertical.

Repair Kits for the Model 90B Multiple Disc Brake

Due to the many combinations of torques and release pressures available , it is impossible to detail each style and supply a repair kit for each individual model. The repair kits listed below will work with all combinations of torque vs. release pressure, input mountings and friction plates. It is entirely possible to have "extra" parts left over from the repair kits after you have complete the repair or maintenance. If you are not sure about what is required for your brake and its configuration, please contact Eskridge, Inc. sales or engineering department.

<u>Kit Description</u>	<u>Kit P/N</u>	<u>Components Included & Quantity</u>
Friction Disc Kit (Paper)	90-016-2131	01-288-0010 Paper Friction Disc (8)
Friction Disc Kit (Bronze)	90-016-3051	90-004-1742 Bronze Friction Disc (8)
Separator Plate Kit	90-016-2141	01-288-0020 Separator Plate (7)
Seal Kit - Standard	90-016-2011	01-400-0120 Back-up Ring, Piston (1) 01-400-0140 Back-up Ring, Piston (1) 01-402-0450 O-Ring, Piston (1) 01-402-0470 O-Ring, Piston (1) 01-402-0580 O-Ring, Case Seal (1) 01-405-0340 Shaft Seal (1) 90-004-1061 Gasket, Mtr., SAE"A" 4 Bolt (1) 90-004-1091 Gasket, Mtr., SAE"B" 2 Bolt (1) 90-004-1111 Gasket, Base (1)
Master Rebuild Kit (Paper) - Standard	90-015-3021	90-016-2131 Friction Disc Kit, (Paper) (1) 90-016-2011 Seal Kit (1) 01-100-0110 Bearing, Output (1) 01-100-0120 Bearing, Input (1)
Master Rebuild Kit (Bronze) - Standard	90-015-3071	90-016-3051 Friction Disc Kit (Bronze) (1) 90-016-2011 Seal Kit (1) 01-100-0110 Bearing, Output (1) 01-100-0120 Bearing, Input (1)

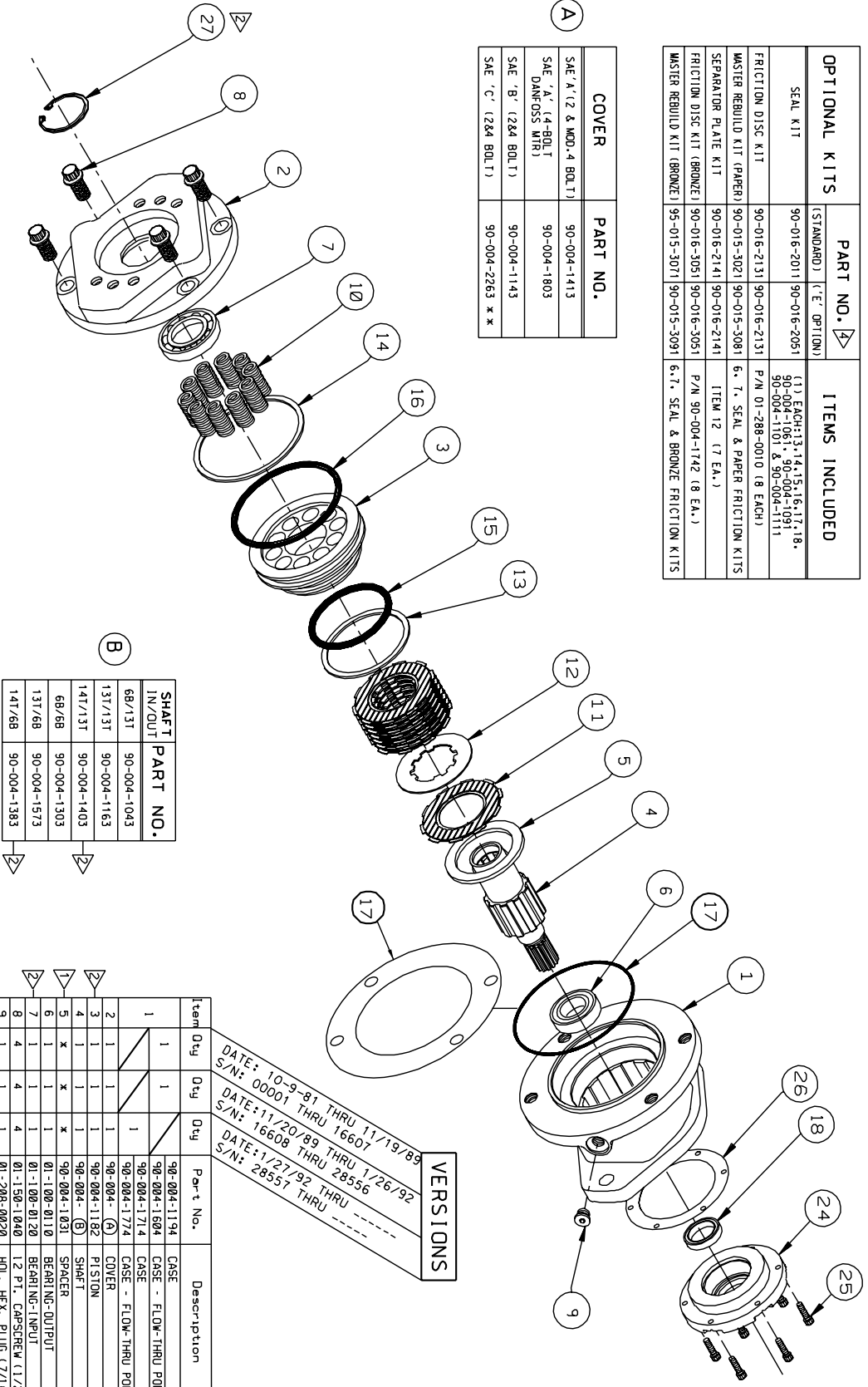
Seal Kit and Master Rebuild Kits for Brakes with 'E' Extra Pressure Option (5,000 PSI)

Seal Kit - High Pressure	90-016-2051	Same as Standard Seal Kit, but Substitute: 01-402-0850 for 01-402-0450 O-Ring, Piston 01-402-0860 for 01-402-0470 O-Ring, Piston
Master Rebuild Kit (Paper) - High Pressure	90-015-3081	Same as Standard Master Rebuild Kit (Paper), but substitute: 90-016-2051 for 90-016-2011 Seal Kit
Master Rebuild Kit (Bronze) - High Pressure	90-015-3091	Same as Standard Master Rebuild Kit (Bronze) but substitute: 90-016-2051 for 90-016-2011 Seal Kit

90B Multiple Disc Brake Exploded View Drawing

OPTIONAL KITS	PART NO. (4)		ITEMS INCLUDED
	(STANDARD)	(E' OPTION)	
SEAL KIT	90-016-2011	90-016-2051	(1) EACH: 13, 14, 15, 16, 17, 18, 90-004-1061, 90-004-1091, 90-004-1101 & 90-004-1111
FRICITION DISC KIT	90-016-2131	90-016-2131	P/N 01-288-0010 (8 EACH)
MASTER REBUILD KIT (PAPER)	90-015-3021	90-015-3081	6, 7, SEAL & PAPER FRICITION KITS
SEPARATOR PLATE KIT	90-016-2141	90-016-2141	ITEM 12 (7 EA.)
FRICITION DISC KIT (BRONZE)	90-016-3051	90-016-3051	P/N 90-004-1142 (8 EA.)
MASTER REBUILD KIT (BRONZE)	95-015-3071	90-015-3091	6, 7, SEAL & BRONZE FRICITION KITS

COVER	PART NO.
SAE 'A' (2 & MOD. 4 BOLT)	90-004-1413
SAE 'A' (4 BOLT DANCESS MTR)	90-004-1803
SAE 'B' (2&4 BOLT)	90-004-1143
SAE 'C' (2&4 BOLT)	90-004-2263 **



1. QTY. OF SPRINGS MUST BE 2, 4, 5, 6, 8 OR 10 SYMMETRICALLY SPACED.
2. QTY. OF SPACERS (ITEM 12) AND SEPARATORS (ITEM 5) MUST BE EQUAL.
3. QTY. OF PISTONS (ITEM 3) AND PISTON WASHERS (ITEM 7) MUST BE EQUAL.
4. QTY. OF FRICTION DISCS (ITEM 11) AND SEPARATORS (ITEM 12) MUST BE EQUAL.
5. A FULL COMPLEMENT BRAKE INCLUDES 8 FRICTION DISCS (ITEM 11), 7 SEPARATORS (ITEM 12), AND 0 SPACERS (ITEM 5). THE QTY OF ALL ITEMS ABOVE IS DETERMINED BY TORQUE AND RELEASE PRESSURE REQUIREMENTS.
6. BRAKE WITH 14T INPUT SPLINE REQUIRES THE FOLLOWING:
- | ITEM | DESCRIPTION | SAE 'A' / 'B' | SAE 'C' / 'X' |
|------|----------------|---------------|---------------|
| 3 | PISTON | 90-004-1632 | 90-004-1632 |
| 7 | THRUST WASHER | 01-112-0280 | 01-112-0390 |
| 27 | RETAINING RING | ----- | 01-160-0620 |
7. SAE 'C' COVER 90-004-2263 IS NOT AVAILABLE WITH OTHER THAN 14T INPUT SPLINE.
8. CASE (ITEM 1) WITH FLOW-THRU PORTS REQUIRES (4) 1/8 NPT PLUGS P/N 01-207-0300 (NOT SHOWN).
9. STANDARD PISTON O-RINGS FOR 3,000 PSI ARE BLACK NITRILE. OPTION 'E' EXTRA PRESSURE O-RINGS FOR 5,000 PSI SYSTEM PRESSURE ARE LIGHT YELLOW OR CREAM COLORED URETHANE.
- ECN 2196
X90B-CE
DATE: 04-20-04

Item	Qty	Qty	Qty	Part No.	Description
1	1	1	1	90-004-1194	CASE
2	1	1	1	90-004-1604	CASE - FLOW-THRU PORTS
3	1	1	1	90-004-1714	CASE
4	1	1	1	90-004-1774	CASE - FLOW-THRU PORTS
5	1	1	1	90-004-1803	COVER
6	1	1	1	90-004-182	PISTON
7	1	1	1	90-004-1831	SPACER
8	1	1	1	01-100-0110	BEARING-OUTPUT
9	1	1	1	01-100-0120	BEARING-INPUT
10	1	1	1	01-150-1040	12 P.I. CAPSCREW (1/2-13X1)
11	1	1	1	01-200-0020	HOL. HEX. PLUG (7/16-20)
12	1	1	1	01-261-0290	SPRING - (GREEN)
13	1	1	1	01-261-0300	SPRING - (RED)
14	1	1	1	01-261-0310	SPRING - (E' OPTION)
15	1	1	1	01-288-0010	FRICITION DISC (PAPER)
16	1	1	1	90-004-1742	FRICITION DISC (BRONZE)
17	1	1	1	01-200-0020	SEPARATOR PLATE
18	1	1	1	01-400-0120	BACK-UP RING
19	1	1	1	01-402-0450	O-RING (STANDARD)
20	1	1	1	01-402-0850	O-RING (E' OPTION)
21	1	1	1	01-402-0470	O-RING (STANDARD)
22	1	1	1	01-402-0560	O-RING (E' OPTION)
23	1	1	1	90-004-1101	O-RING
24	1	1	1	01-405-0340	O-RING
25	1	1	1	90-004-1052	BASE
26	1	1	1	01-150-1030	SOC. HD. CAPSCREW (10-24X3/4)
27	1	1	1	90-004-1111	GASKET - BASE

DATE: 10-9-81 THRU 11/19/89
S/N: 00001 THRU 16607
DATE: 11/20/89 THRU 1/26/92
S/N: 16608 THRU 28556
DATE: 1/27/92 THRU
S/N: 28557 THRU

VERSIONS

ESKRIDGE Model 90B

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.