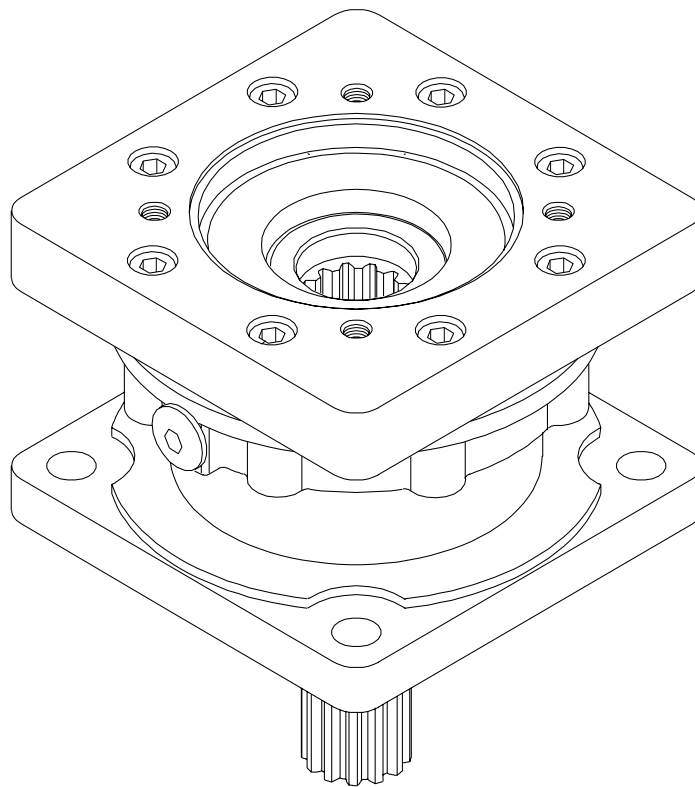




98D MULTIPLE DISC BRAKE SERVICE AND REPAIR MANUAL



Example Part Number

98	D	9	C	4	B0608	D
Series	Output Pilot	Output Shaft	Input Pilot	Input Spline	Torque Code	Options

THIS SERVICE MANUAL IS EFFECTIVE
FROM:..... S/N 36992, SEPT 1994
TO: CURRENT
REF: SM98D-AF

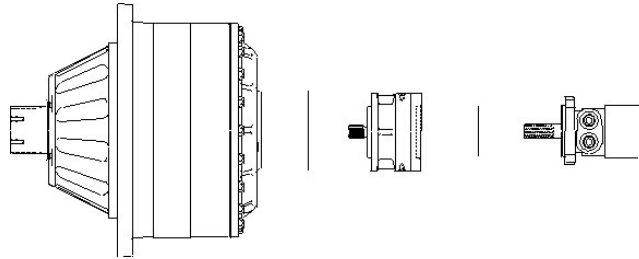
98D BRAKE SERVICE MANUAL

This manual will assist in disassembly and assembly of major components for all Model 98D Brakes. Item numbers, indicated in parentheses throughout this manual, refer to the Eskridge Model 98D exploded parts drawing. Individual customer specifications (mounting case, output shaft, brake assembly and other items) may vary from exploded drawing and standard part numbers shown. If applicable, refer to individual customer drawings for details.

The model 98D series Eskridge brake is manufactured for two specific types of holding torque requirements: the standard “fail-safe” requirement and the “slip protection” requirement. Both types are spring loaded (normally applied) with a hydraulic pressure required for release. All brakes are individually tested at the factory for function, leaks and static breakaway torque. Fail-safe brakes are tested to be assured they are in excess of 110% of the fail-safe torque rating for the unit. A fail-safe brake should be used when the only requirement is a minimum static holding torque. A slip protection brake should be used where an accurate specified torque is required, such as a side load protection on a crane or overload protection in a drivetrain. These brakes are tested to be within +/- 10% of the slip protection rating for the unit.

SPECIFICATIONS

Maximum Pressure	3,000 PSI	Maximum Operative Temperature	170° F
Maximum Continuous Pressure	3,000 PSI	Volume of Oil to Release Brake	0.50 cu. in.
Maximum Speed	3, 900 RPM	Approximate Weight	59 lbs
Shaft Splines	30° involute, flat root side fit per ANSI B92.1	Breakaway torque may vary +/- 10% from specified ratings.	
	Internal Class - 7, External Class - 5	Use only mineral base hydraulic oil to release brake.	



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Installation

Note: Before beginning installation procedures, visually inspect brake mounting flanges and shaft splines for damage during shipping.

- 1) Position brake and motor for mounting and to orient the bleed and release ports as required. If mounted with shaft horizontal, the bleed port should be at top. It might be necessary to release brake before it can be rotated to align mounting holes. If so, follow instructions in Steps 4 and 5 prior to applying release pressure.
- 2) Use only SAE Grade 5 (or better) fasteners for mounting brake and motor.
- 3) Allow at least one thread diameter of thread engagement when selecting fastener lengths. Be sure fasteners will not bottom out when fully tightened. See Torque Chart below for torque values.
- 4) Remove plug from pressure port of brake and attach a hydraulic pressure line with a 7/16-20UNF-2A straight-thread o-ring fitting. Use only mineral based hydraulic oil to test and operate the brake.
- 6) Apply low pressure (20-30 PSI) to brake release port. Loosen hollow hex plug (1) opposite pressure port just enough to allow air to bleed from between piston o-rings. After air has been bled from brake, remove pressure and tighten plug.

Torque in FT-LBS				
Thread	SAE Grade 5		SAE Grade 8	
Size	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	220	380	280

Disassembly

- 1) Remove any plugs and fittings from the brake pressure and bleed ports. Drain, or blow out, as much hydraulic oil as possible from the brake into a suitable container for proper disposal.
 - 2) Place brake on stable work platform, shaft down. Support the brake so it won't fall over.
 - 3) Remove the eight socket head capscrews (7) from input end of brake. The capscrews and cover (2) are under spring load. The capscrews should be loosened gradually and uniformly.
 - 4) Remove cover; this will expose the internal components of the brake. The case seal o-ring (18) will be attached to the cover pilot. Inspect the o-ring and replace with a new one if damaged or worn.
 - 5) Note the color, number and spacing of the springs (11), then remove them from piston (3). Inspect springs and replace with new ones if damaged, broken or discolored from heat.
 - 6) Support the brake, with shaft up, in such a way that the piston can be pushed out of the bottom. Two pairs of stacked 2x6 wood blocks works well.
 - 7) Remove retaining ring (8) from the shaft (4).
 - 8) Using a soft-faced hammer, drive the shaft and piston down out of case.
 - 9) Note arrangement of friction discs (12), separator plates (13) and spacers (5), if provided.
 - 10) Remove friction discs, separator plates and spacers. Friction discs should be replaced with new ones if oil soaked (dry brakes only). Any friction discs or separator plates that are damaged, warped or excessively worn should be replaced with new ones.
- NOTE:** Clean contamination from the friction disks using liquid Ether or liquid Freon. If these chemicals are not available replace the friction disks! Cleaning the sintered bronze material with any other media can affect the brakes torque rating!
- 11) Friction discs should be replaced if less than .080 inches thick. Separator plates should be replaced if less than .081 inches thick. The stack of friction discs, separator plates and spacers (if provided) should have a measured height of not less than 1.690 inches.
 - 12) Inspect brake shaft spines and bearing journals for abnormal wear or damage.
 - 13) Remove o-rings and back-up rings (Items 14, 15, 16, 17 & 18) from piston. Replace with new ones if worn or damaged.
 - 14) If damaged, the oil seal (19) and bearing (6) can be removed and replaced. Check for wear spots or nicks on the sealing lip of the oil seal. Rotate inner race of bearing; rotation should be smooth and without excess drag. Remove retaining ring (9) before attempting bearing removal.

Assembly

NOTE: Parts must be clean and dry before assembly. Visually inspect components for damage and abnormal wear. Do not use damaged or worn parts.

- 1) Place brake case (1) on a stable work platform, bearing side down. If the oil seal (19) and bearing (6) are not being replaced, skip to Step 5.
- 2) Install seal from inside case, pressing until top of seal is flush with case. Open side of seal should be toward inside of brake. A seal installation tool is recommended.
- 3) Press bearing (6) from outside. Press against the bearing outer race until the bearing is fully seated in the case. A bearing installation tool is recommended.
- 4) Install retaining ring (9) into case.
- 5) Supporting the case in such a way that allows room for the shaft (4) to protrude out the bottom. Two pairs of stacked 2x6 wood blocks works well.
- 6) Push the shaft downward through oil seal and bearing until shaft shoulder is seated against bearing.
- 7) Install retaining ring (8) on shaft.
- 8) If the brake uses spacers (5), install them.
- 9) Install separator plates (13) and friction discs (12) in exactly the same order as they were removed. There should be a friction disc on the top and bottom of the stack. Do not place a separator plate next to the piston. Be careful not to contaminate the friction disc or separator plate surfaces with dirt, grease or fluids other than the brake was designed to use.
- 10) If replacing piston o-rings (16 & 17) and piston back-up rings (14 & 15), be sure o-rings are nearest each other with back-up rings to the outside of the piston (3). Lightly lubricate piston bores and o-rings; take care not to get lubricant onto friction pack.
- 11) Gently slide piston into case until larger o-ring touches case. Using a light to medium duty press, push piston completely into bore. This will squeeze the o-rings and back-up rings and set piston against friction pack.
- 12) Place springs (11) into spring pockets in piston. Arrange springs in a symmetrical pattern.
- 13) For optional double bearing brakes, install bearing into cover (2).
- 14) Install case seal o-ring (18) onto pilot of cover.
- 15) Set cover on top of piston, springs and input end of shaft.

- 16) Apply a removable (blue) thread-locking compound to each cover capscrew (7) and start each one into the case by hand. Tighten cover capscrews 1/2 turn at a time in a crisscross pattern until cover is tight against the case. Tighten to the torque shown on the chart on Page 3. A light to medium duty press can be used to push the cover down onto the case so the cover bolts can be installed more easily.
- 17) The brake is now ready for minor testing of fit, function and release pressure. Use only mineral based hydraulic oil to test and operate Eskridge multiple disc brakes. **Bleed brake before pressurizing.**

To test release pressure, place the hollow hex plug (10) in one of the brake ports. Connect a hydraulic power source (either a hand pump or a port-a-power) to the other brake port. Bleed air from brake, then pressurize the brake slowly to the advertised release pressure, both initial and full. As you pressurize the brake, rotate the brake shaft at the output end. The brake shaft should be able to turn at the advertised initial release pressure (+/- 25 PSI). There will be drag on the shaft. Increase the pressure slowly until the shaft spins freely: this is the full release pressure. As you pressurize the brake, look for signs of leaks, which would indicate that the o-rings or back-up rings were damaged during assembly.

Repair Kits, Model 98D

Due to the many torque and release pressure combinations available for the 98D brake, it is impossible to detail each style or supply a repair kit for each individual model. The information listed in this manual is representative of all 98D brakes. The repair kits listed below will work with all combinations of torque vs. release pressure, input mountings and friction plates; you may have "extra" parts leftover from the repair kits after you have completed repair or maintenance. If you are unsure which is the required kit for your brake's configuration, please contact the Eskridge sales department.

**Repair kits listed below are for use with the
Model 98D multiple disc brake.**

Friction Disc Kit, 98D	98-016-2001
<i>01-288-0102 Friction Disc, Stator</i>	<i>(11)</i>
Separator Plate Kit, 98D	98-016-2021
<i>01-288-0112, Separator Plate (10)</i>	
Seal Kit, 98D	98-016-1061
<i>01-440-0210, Back-up Ring, Piston</i>	<i>(1)</i>
<i>01-400-0220, Back-Up Ring, Piston</i>	<i>(1)</i>
<i>01-402-0010, O-Ring, Mtr., "C"</i>	<i>(1)</i>
<i>01-402-0030, O-Ring, Piston</i>	<i>(1)</i>
<i>01-402-0690, O-Ring, Piston</i>	<i>(1)</i>
<i>01-402-0700, O-Ring, Case Seal</i>	<i>(1)</i>
<i>01-405-0640, Shaft Seal</i>	<i>(1)</i>
<i>90-004-1391, Gasket, SAE "C", 4 bolt</i>	<i>(1)</i>
<i>90-004-1112, Gasket, SAE "D", 4 bolt</i>	<i>(2)</i>
Master Rebuild Kit, 98D	98-015-3001
<i>01-100-0231, Bearing</i>	<i>(1)</i>
<i>98-016-1061, Seal Kit, 98D</i>	<i>(1)</i>
<i>98-016-2001, Friction Disc Kit, 98D</i>	<i>(1)</i>

Exploded View Drawing



EFFECTIVE:
FROM: S/N 36992 9-13-94
TO: CURRENT

Model 98D

ITEM	QTY	PART NO.	DESCRIPTION
1	1	98-004-1014	CASE - 98D
		98-004-1154	CASE - 98D FLOW THRU PORTS
2	1	98-004-1074	COVER - SAE 'C' 4-BOLT (SINGLE BEARING)
		98-004-1024	COVER - SAE 'D' 4-BOLT (SINGLE BEARING)
		98-004-1174	COVER - SAE 'C' 4-BOLT (DOUBLE BEARING)
		98-004-1164	COVER - SAE 'D' 4-BOLT (DOUBLE BEARING)
3	1	98-004-1032	PISTON - 98D
4	1	98-004-1043	SHAFT - (13T/13T) 8/16 D.P.
5	*	98-004-1121	SPACER - 98D
6	1	01-100-0231	BEARING -
7	8	01-150-0030	SOC.HD. CAP SCR. (1/2-13 X 1.25 GR8)
8	1	01-160-0050	RETAINING RING
9	1	01-160-0060	RETAINING RING
10	1	01-208-0020	HOLLOW HEX PLUG -
11	*	01-261-0501	SPRING - COMPRESSION (3/4 X 1 BLUE)
12	*	01-288-0102	FRICTION DISC - STATOR 98D
13	*	01-288-0112	SEPARATOR PLATE - ROTOR 98D
14	1	01-400-0210	BACKUP RING -
15	1	01-400-0220	BACKUP RING -
16	1	01-402-0030	O-RING -
17	1	01-402-0690	O-RING -
18	1	01-402-0700	O-RING -
19	1	01-405-0640	SEAL -
20	1	98-005-1141	INPUT SPLINE ADAPTER 14T 12/24 D.P. (OPTIONAL)
21	1	01-100-0290	BEARING - (USE ONLY WITH DBL BRG UNIT)
22	1	01-402-0890	O-RING - (SAE 'D' OUTPUT)
23	1	01-402-0010	O-RING - (SAE 'C' INPUT)
		01-402-0621	O-RING - #50 4 BOLT (SAE 'D' INPUT)

OPTIONAL KITS	PART NO.	ITEMS INCLUDED
SEAL KIT	98-016-1061	14, 15, 16, 17, 18, 19, 22 01-402-0010 01-402-0890
FRICTION DISC KIT	98-016-2001	12 (11 PCS)
SEPARATOR PLATE KIT	98-016-2021	13 (10 PCS)
MASTER REBUILD KIT (SINGLE BRG)	98-015-3001	6, SEAL & FRICTION KITS
MASTER REBUILD KIT (DOUBLE BRG)	98-015-3011	6, 21 SEAL & FRICTION KITS

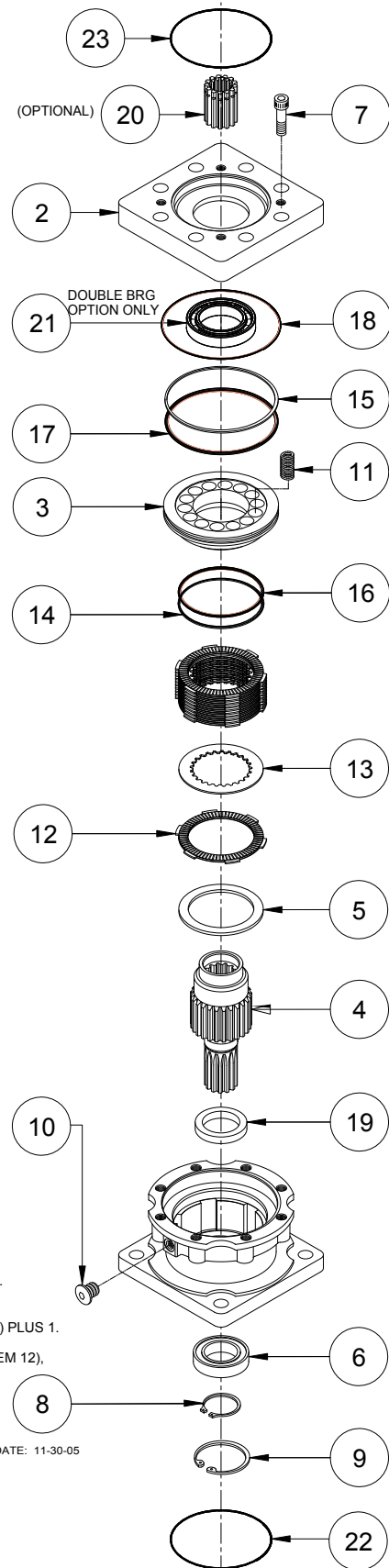
NOTES:

- * 1. QUANTITY OF SPRINGS MUST BE 2, 4, 6, 7, 8, 10, 12 OR 14 AND MUST BE SYMMETRICALLY SPACED.
- * 2. TOTAL QUANTITY OF SEPARATORS (ITEM 13) AND SPACERS (ITEM 5) MUST EQUAL 10.
QUANTITY OF FRICTION DISCS (ITEM 12) MUST EQUAL QUANTITY OF SEPARATOR PLATES (ITEM 13) PLUS 1.
- 3. A FULL-COMPLEMENT BRAKE INCLUDES 10 SEPARATOR PLATES (ITEM 13), 11 FRICTION DISCS (ITEM 12), ZERO (0) SPACERS (ITEM 5), AND 14 SPRINGS (ITEM 11).
- 4. CASE WITH FLOW THRU COOLING PORTS REQUIRES TWO (2) ADDITIONAL PLUGS (ITEM 10).

X98D-AD

ECN 2412

DATE: 11-30-05



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.