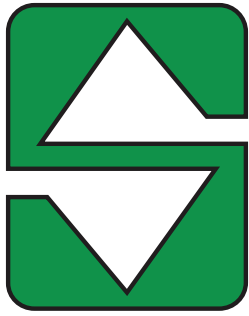


ROCK PICKER MODEL 700

ROCK PICKER MODEL 700



# **SUMMERS<sup>®</sup>**

## **Operator's Manual**

### **RP6700**

### **(MODEL 700)**

### **Rotary Rockpicker, Hyd. Direct Drive**

#### **IMPORTANT**

THE OPERATOR IS RESPONSIBLE FOR ADJUSTING THE MACHINE SINCE MACHINE DOES NOT COME "FIELD READY" FROM FACTORY.



#### **CAUTION**

READ & UNDERSTAND OPERATOR'S MANUAL BEFORE USING MACHINE.

*See [www.summersmfg.com](http://www.summersmfg.com) for the latest version of all Summers Operator's Manuals*

**SUMMERS MANUFACTURING CO., INC.**

**WEB SITE: [www.summersmfg.com](http://www.summersmfg.com)**

DEVILS LAKE, NORTH DAKOTA 58301 ..... (701) 662-5391

# Warranty

Summers warrants only products of its manufacture against operational failure caused by defective materials or workmanship which occur during normal use within 36 months from the date of purchase by the end user from Summers' dealer.

Summers' obligation is to replace free of charge any part of any product that Summers inspection shows to be defective excluding transportation charges to Devils Lake, ND and return and also excluding all transportation costs from Summers' dealer to the dealer's customer and all other costs such as removal and installation expense.

Summers shall not be liable for loss of time, manufacturing costs, labor, material, loss of profits, consequential damages, direct or indirect, because of defective products whether due to rights arising under the contract of sale or independently thereof, and whether or not such claim is based on contract, tort or warranty.

Written permission for any warranty claim return must be first obtained from authorized Summers' personnel. All returns must be accompanied with a complete written explanation of claimed defects and the circumstances of operational failure.

Written warranty for all component parts used in the manufacture of Summers products is available upon request. Warranty of such component parts will be determined by said component manufacturer upon their inspection of the claimed defective part.

This express warranty is the sole warranty of Summers. There are no warranties, which extend beyond the warranty herein expressly set forth. The sales for products of Summers under any other warranty or guarantee express or implied is not authorized. This warranty voids all previous issues.

**SUMMERS MANUFACTURING CO. INC.**  
**DEVILS LAKE, NORTH DAKOTA 58301**

01/16

# GENERAL INFORMATION

This book is composed of three basic sections: Safety, Operation and Parts.

The Operation Section provides information for proper operation and maintenance of your Summers Rockpicker. The Parts Section provides a complete parts breakdown for the Model 700 Rockpicker.

Reference to “Right” and “Left” in this book is determined when the machine is viewed from the rear.

Parts are referenced in each drawing with the Summers Manufacturing Part Number. Use this Part Number when ordering replacement parts from your Summers dealer.

It is the policy of this company to improve its products whenever possible and practical to do so. We reserve the right to make changes or improvements in the design or construction of parts at any time without incurring the obligation to install such changes on products previously delivered.

**Summers Manufacturing Company, Inc. strongly recommends that each Rockpicker Operator READ and UNDERSTAND the Operator’s Manual before using the machine. In addition, this Operator’s Manual should be REVIEWED at least ANNUALLY thereafter.**

Scan code to the right for the latest version of all Summers Operator’s Manuals.



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### OWNER REGISTER

Name _____	Size _____
Address _____	Serial Number _____
City _____	
State/Prov. _____	Date Purchased _____
Mail Code _____	Dealer _____

# TRANSPORT SAFETY

1. Road speed should not exceed 20 mph (32 km/hr).



2. Do not tow if the implement's towing vehicle ratio is greater than 1.5:1. See Specifications Section for implement weights.
3. If more than one implement is to be pulled by a towing vehicle, it is recommended that each implement is to be a maximum of 50% of the weight of the preceding implement. If it is not possible to reach this weight limit, transport the implements separately.
4. When approaching rough roads/ground (such as entering a road), slow down to a safe driving speed.
5. Check all lights and reflectors to ensure ALL regulations are met. Make sure the SMV emblem is attached to the implement and is clearly visible from the rear.



SMV emblems are only attached to vehicles traveling slower than 25 mph (40 km/hr). The most hazardous conditions to drive in are a daybreak and dusk. The use of a pilot car is recommended.

6. Always install ALL safety locks before transporting an implement.
7. Always park implements on a firm, level surface.

## NOTES

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## SECTION 1 - SAFETY

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### SAFETY-ALERT SYMBOL



This symbol is used to denote possible danger and care should be taken to prevent bodily injury. This symbol means:

### ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Definition of each **Signal Word** used in conjunction with the Safety-Alert symbol.



indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.



indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

### GENERAL SAFETY PRACTICES

1. READ AND UNDERSTAND Operator's Manual before using machine. Review at least annually thereafter.
2. VERIFY all safety devices and shields are in place before using machine.
3. KEEP hands, feet, hair and clothing away from moving parts.
4. STOP engine, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, maintaining or unplugging.
5. BE CAREFUL when working around high pressure hydraulic system.
6. DO NOT ALLOW RIDERS.
7. ALWAYS, make sure that pressure is relieved from hydraulic circuits before servicing or disconnecting from tractor.

### SAFETY DURING TRANSPORT

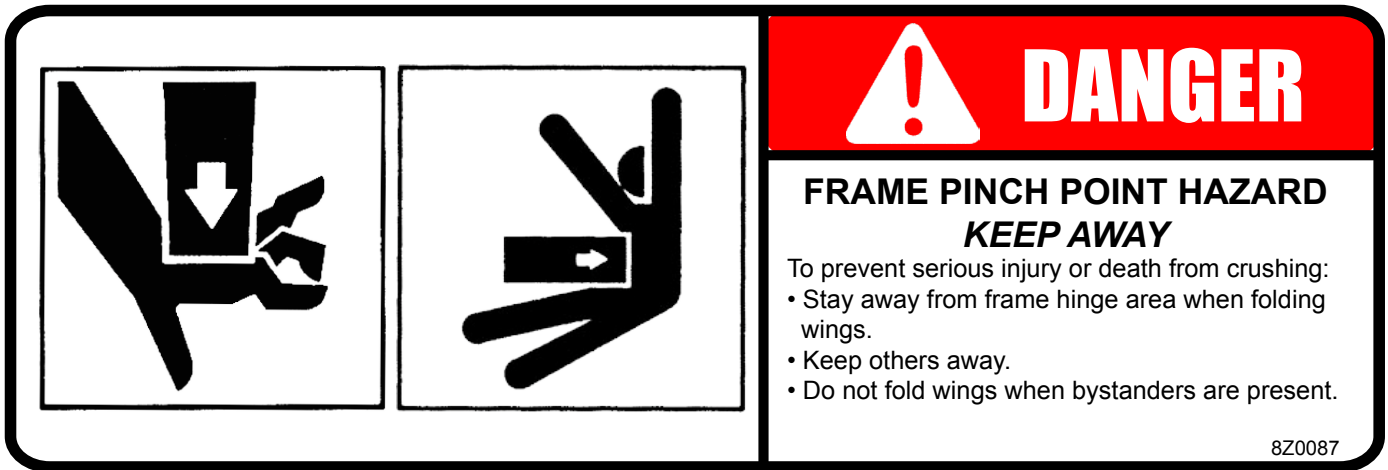
1. ONLY TOW at a safe speed. Use caution when making corners and meeting traffic.
2. USE transport lock and safety chain between tractor drawbar and rockpicker hitch when transporting on public roads.
3. If rockpicker is towed on public roadways, hydraulically swing hitch so rockpicker trails directly behind towing vehicle. Install Transport Lock (8R7890) to prevent cylinder from retracting. The optional solid hitch can be reversed so rockpicker trails directly behind towing vehicle.
4. COMPLY with local lighting, marking and oversize regulations when transporting on highways.

## SECTION 1 - SAFETY

### SAFETY DECALS

1. KEEP SAFETY DECALS AND REFLECTORS CLEAN.
2. REPLACE missing or unreadable decals. New decals are available from your Summers dealer by ordering correct part number (PN) located in lower right hand corner.

#### 1. PINCH POINT HAZARD DECAL (PN 8Z0087)



#### 2. MODEL 700 ROCKPICKER DECAL (PN 8Z0158)

# RP6700

#### 3. SUMMERS DECAL (PN 8Z0204)



SECTION 1 - SAFETY

4. GENERAL INFORMATION DECAL (PN 8Z0220)


**IMPORTANT**

GREASE REGULARLY.  
CHECK WHEEL BOLTS  
DAILY FOR TIGHTNESS.  
REEL SPEED MUST NOT  
EXCEED 35 RPM.

8Z0220

5. ROCKPICKER BATT WARNING DECAL (PN 8Z0230)

**! DANGER**

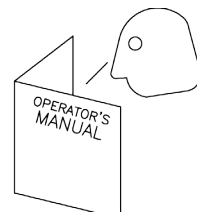


DO NOT ATTEMPT TO FREE ANY  
ROCKS OR MAKE ANY  
ADJUSTMENTS ON ROCK  
PICKER UNLESS TRACTOR  
ENGINE HAS BEEN STOPPED.  
STAND CLEAR OF SPRING  
LOADED BATTS AT ALL TIMES.

ROCKPICKER 8Z0230

6. GENERAL CAUTION DECAL (PN 8Z0276)

**! CAUTION**



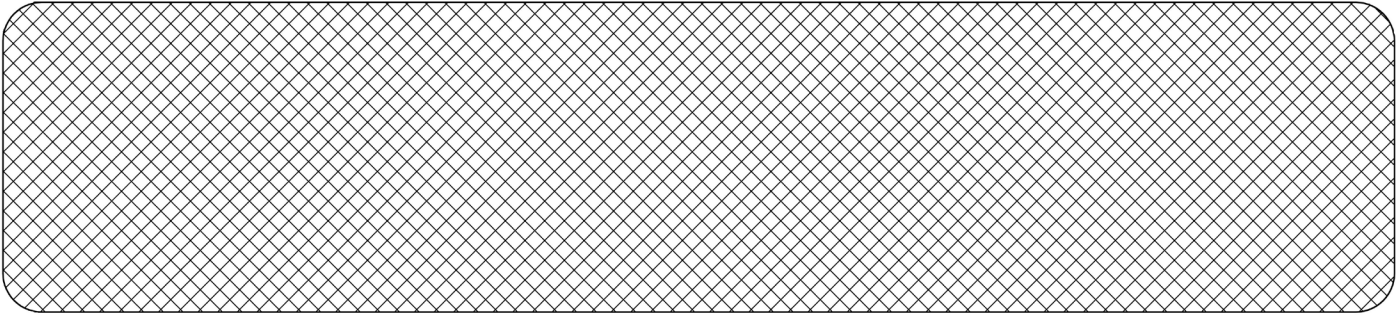
1. Read and understand Operator's Manual before using machine.  
2. For Sprayers:  
a. Read and follow chemical manufacturers' WARNINGS, instructions and procedures before using.  
b. Use recommended personal protective equipment to reduce or eliminate chemical contact.  
c. Never run pump dry.  
3. Verify all safety devices and shields are in place before using machine.  
4. Keep hands, feet, hair and clothing away from moving parts.  
5. Stop engine, place all controls in neutral, set parking brakes, remove ignition key and wait for all moving parts to stop before servicing, adjusting, maintaining or unplugging.  
6. Be careful when working around high pressure hydraulic system.  
7. Do not allow riders.  
8. Check all wheel bolts DAILY for tightness.  
9. Refer to Operator's Manual for periodic and annual maintenance.  
10. For Towed Implements, DO NOT EXCEED 20 MPH.

8Z0276

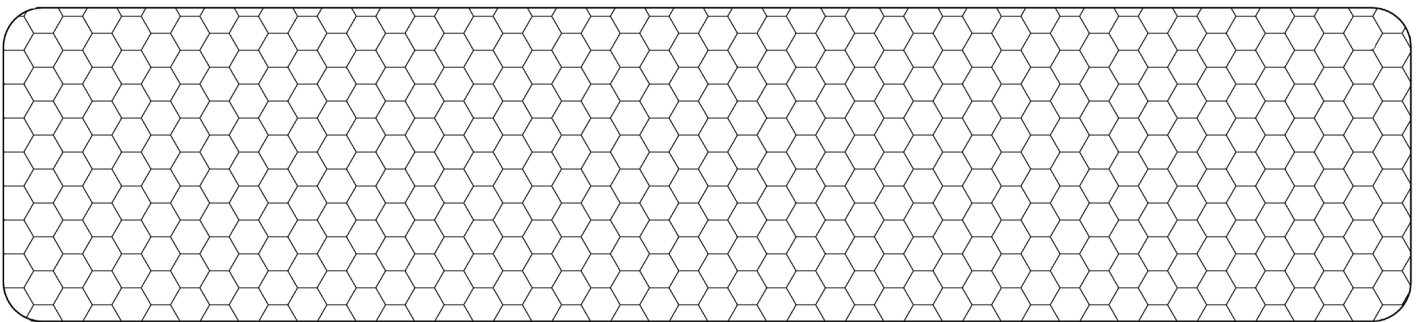
## SECTION 1 - SAFETY

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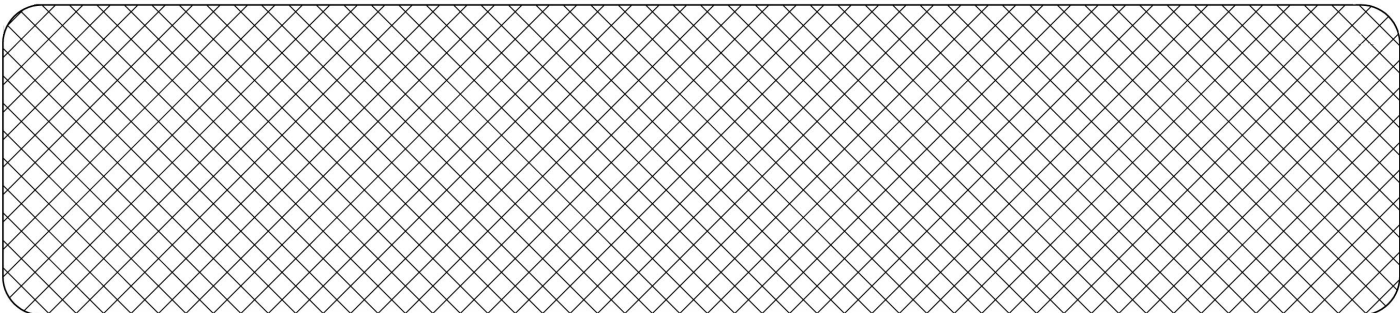
### 7. AMBER REFLECTOR (PN 8Z0800)



### 8. RED-ORANGE REFLECTOR (PN 8Z0805)



### 9. RED REFLECTOR (PN 8Z0810)



## MAINTENANCE SAFETY

1. STOP engine, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting or maintaining.
2. BE CAREFUL when working around high pressure hydraulic system.
3. ALWAYS make sure that pressure is relieved from hydraulic circuits before serving or disconnecting from tractor.
4. USE EXTREME CARE when making adjustments.
5. KEEP CHILDREN AWAY from machinery at all times.
6. STAND CLEAR of spring loaded batts at all times.
7. **BE SAFE!**

## SECTION 2 - OPERATION AND MAINTENANCE

---

### INITIAL SETUP

#### HITCH AND SPINDLE SETUP

Install hitch with hydraulic cylinder on left side, attach hitch jack, safety chain, hydraulic hose stand and tip holder. Use appropriate lifting device, hitch assembly weighs 410 lbs.

16.5L X 16.1 Tire: Attach receiver tube with plate (8R6206) to frame with tube on top. See Page 3-8.

**NOTE:** Remove safety transport lock pin located under rake AFTER hydraulic lines and cylinders have been filled with oil.

#### BEFORE INITIAL OPERATION

1. After receiving your rockpicker, it is a good idea to double check the entire machine so that all bolts are securely tightened. Recheck after first 2 and 8 hours of operation.
2. Make sure all grease fittings are in place and greased properly.
3. Inflate tires to recommended inflation pressure (see spec. chart on page 2-3) and check wheel bolts for tightness.

#### ROAD TOWING

If rockpicker is towed on public roadways, hydraulically swing hitch so rockpicker trails directly behind towing vehicle. Install Transport Lock (8R7890) to prevent cylinder from retracting. Use transport lock and safety chain when transporting. Check wheel nuts before road transport, after first 20 miles and every 60 miles thereafter. Also, before road transport check wheel bearings for tightness and that wheel bearings are well greased.

### IMPORTANT

#### HYDRAULIC REQUIREMENTS FOR MODEL 700 ROTARY ROCKPICKER

1. Closed center hydraulic systems usually work very well.
2. Open center hydraulic systems require sufficient oil flow to operate both the hydraulic reel motor and rake lift cylinders simultaneously. Because open center systems vary greatly in performance, it is difficult to specify a minimum flow requirement. For example, some open center systems work perfectly. On others, the reel will slow or even pause while the rake is being raised. On still other open center systems, the rake can be raised only after stopping the reel.

Therefore, when purchasing a rockpicker to be used on either a closed or open center hydraulic system, we strongly recommend the tractor or tractors to be used on the rockpicker be tested for acceptable operation before the machine is put into field use. It is the responsibility of the dealer and purchaser to make this determination.

If tractor hydraulic pressure and flow are adequate but reel and rake cannot be operated simultaneously, installation of the Electric Solenoid Lift Option will improve performance. See following page for option installation and operating instructions.

## SECTION 2 - OPERATION AND MAINTENANCE

### INSTALLATION INSTRUCTIONS FOR ELECTRIC SOLENOID LIFT OPTION

#### 1. When installing an Electric Solenoid Lift Option refer to following instructions and see breakdown on page 3-6. Mounting the switch.

Mount switch to a secure support in a convenient location on the tractor. Route the red and white battery wires to a 12-volt battery. Attach the white battery wire to the NEGATIVE (-) terminal and the red battery wire to the POSITIVE (+) battery terminal. A 20-amp in-line fuse is installed in the red battery wire to protect the system.

#### 2. Mounting the solenoid valve (if not factory installed).

- a. Disconnect the 1/2" X 60" hydraulic hose from the tee on the flow control valve on the rockpicker. Route hose between rockpicker frame and connect fitting on opposite side of the 1/2" X 16" hydraulic hose on the valve.
- b. Remove two tees from top of solenoid valve.
- c. Lift valve up between the rockpicker frame tubes directly behind the flow control valve and secure with two plates and four 7/16" X 7-1/4" bolts, washers, lockwashers and nuts.
- d. Connect the 1/2" X 16" hose on solenoid valve to tee on the flow control valve.
- e. Replace fittings on top of solenoid valve removed in step "b".
- f. Remove two 3/8" X 228" hydraulic hoses from rockpicker and discard (tractor to cylinder tee hoses). Replace the 228" hoses with 48" and 180" hoses. Connect front of 48" and rear of 180" hoses to fittings on top of solenoid valve as shown on page 3-6. Route the 180" hoses along reel drive hoses on rockpicker hitch.
- g. Route wire harness from the valve to tractor along hydraulic hoses. Connect to switch assembly. Secure wire harness with nylon ties.

### OPERATING INSTRUCTIONS FOR ELECTRIC SOLENOID LIFT OPTION

1. Read installation instructions thoroughly before operating electric solenoid lift option.  
CAUTION: Follow operating instructions and warning decals whenever operating the rockpicker.
2. With reel turning, rake may be raised and lowered by moving the switch up or down. If switch movement doesn't correspond to rake movement, rotate switch 1/2 turn.
3. Rake may be raised or lowered the conventional way or by using switch.
4. Reel must be turning in order to raise or lower the rake with switch. When raising the rake with the switch, the reel will stop when the rake cylinders have reached the end of their travel (until the switch is returned to its neutral position).



## SECTION 2 - OPERATION AND MAINTENANCE

---

### FIELD OPERATION

**CAUTION:** **NEVER** run machine into a buried rock in an effort to dig rocks. Pry rock loose first. This machine is not designed to dig rocks. To do so will void the warranty.

#### ADJUSTMENTS FOR PICKING: MODEL 700 ROTARY ROCKPICKER

In typical field conditions, lower picking rake and check that frame is level. Adjust by resetting hitch piece (8D0720) height. The picking rake should be set at a depth to skim rocks off the ground. Adjust Depth Bolts (8R6300, Page 3-3) to set picking depth. Tractor and reel speed should be such that rocks are thrown to the upper rear section of bucket. Field conditions should be reasonably dry and firm.

**IMPORTANT:** Reel speed should not exceed 35 RPM.

### MAINTENANCE AND SERVICE

#### MODEL 700 ROTARY ROCKPICKER

1. Grease 16 grease fittings on rockpicker DAILY.
2. Seasonally, disassemble, clean and repack wheel hub bearings.
3. Check set screws on reel periodically for tightness.
4. The gear case is filled at the factory with 90 weight gear lube. Maintain gear lube at approximately 2/3 full (to top plug when level) with 90 weight gear lube. Change gear lube after first 50 hours and every 1000 hours of operation thereafter.
5. Tighten nuts of rake retaining rods if rake tines become loose.

#### TIRE INFLATION / WHEEL BOLT / NUT TORQUE

Recommended tire inflation pressures and wheel bolt/nut torque are as follows:

TIRE	PRESSURE	HUB	WHEEL NUT TORQUE
16.5L X 16.1 Tire	35 psi	812 - 8 Bolt	240 ft. lb.

#### ADJUSTING CUSHION VALVE RELIEF PRESSURE ON MODEL 700 HYDRAULIC DRIVE ROCKPICKER

The cushion valve relief pressure is set at the factory at 2000 psi on all hydraulic drive rockpickers. A setting lower than this can cause inadequate reel torque. To check, follow this procedure:

1. Determine tractor hydraulic system relief pressure by installing pressure gauge at remote outlet.
2. Next, install a tee in the hydraulic line leading from the right side of the flow control valve to the left side of the cushion block. Referring to the illustration on page 3-4, install tee between left fitting 8J6030 of cushion block and hydraulic hose 8N4060.
3. Install pressure gauge into tee. Activate tractor hydraulic system so reel turns in picking direction, and check pressure with reel stalled. To stall reel insert a large post between a batt and rake.

**WARNING:** Stand clear of reel at all times while tractor engine is running.

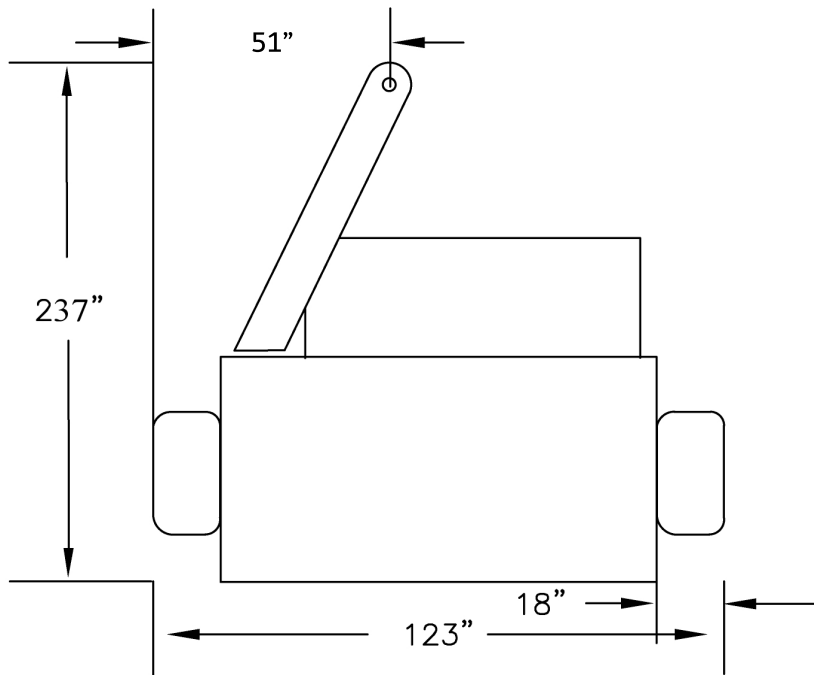
4. Pressure should read about 2000 psi, however, pressure here will never be higher than tractor pressure read in step #1. If stalled reel pressure is less than pressure in step #1 and less than 2000 psi contact your Summers dealer.

## SECTION 2 - OPERATION AND MAINTENANCE

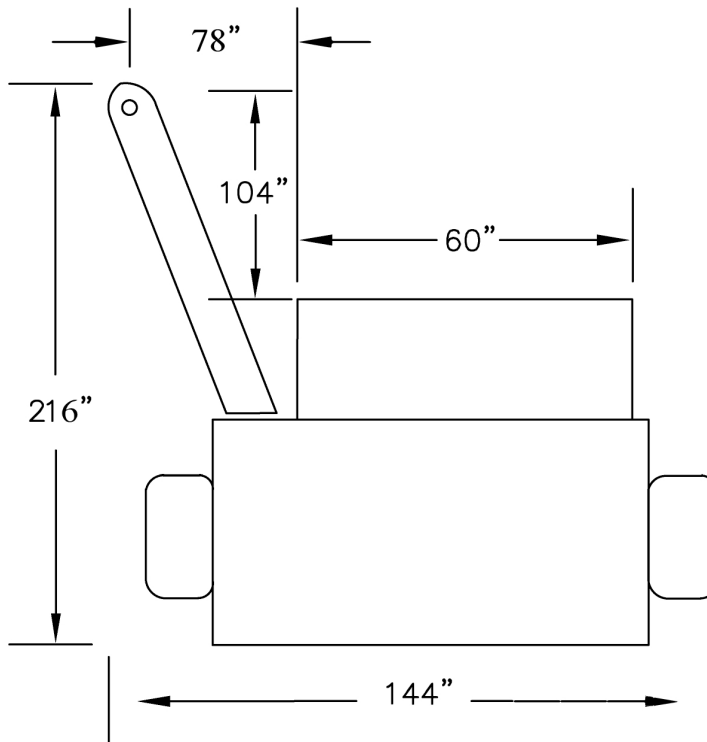
NO.	PROBLEM	CAUSE	CORRECTION	PAGE
1.	Reel runs too fast or too slow.  NOTE: Reel speed should not exceed 35 RPM.	Flow control valve improperly adjusted.	Adjust flow control valve on rockpicker for desired reel speed. Flow control valve adjusts speed of reel only on the picking direction of rotation - not in reverse.	Page 2-3  Adjustments for picking.
2.	Rake raises slowly while reel is turning.	Insufficient oil flow to rake lift cylinders.	Inherent problem with certain model tractors - see Hydraulic Requirements on Page 2.1. On tractors with adjustable flow controls for each hydraulic circuit (IE: JD Tortoise-Hare control), set rockpicker flow control to a maximum setting and adjust reel speed with tractor flow control. This should divert extra oil to hydraulic circuit used for lifting rake.  Installation of optional electric solenoid lift solves problem by using oil from hydraulic motor to power rake lift cylinders. See installation & operation instructions on page 2-2 for more details.	Page 2-1  Page 2-2 Page 3-6
3.	Inadequate reel torque.	Tractor hydraulic system pressure or rockpicker cushion valve relief pressure set too low.	Check oil level, oil filter & tractor hydraulic pressure. See Adjusting cushion Valve Relief Pressure on page 2-3.	Page 2-3
4.	Leaking seal on planetary gear box.	Almost always caused by leaking shaft seal on hyd. motor. Oil from tractor hyd. system enters gear box through motor and this pressure forces seal out.	Remove hydraulic motor from planetary gear box and replace shaft seal (Order Summers PN 8R7407 for complete kit).	Page 3-4
5.	Reel moves sideways.	Severe side loads.	Center reel and retighten set screws and retaining collar on reel. If problem continues install shaft collar. Order Summers PN 8R6830.	Page 3-3

SECTION 3- PARTS

TRANSPORT POSITION



FIELD POSITION

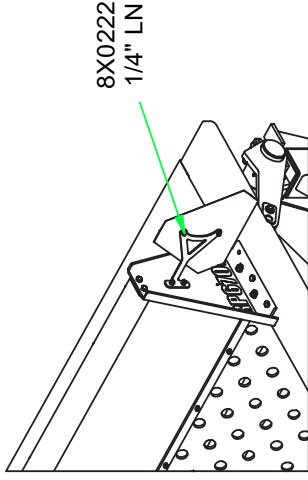
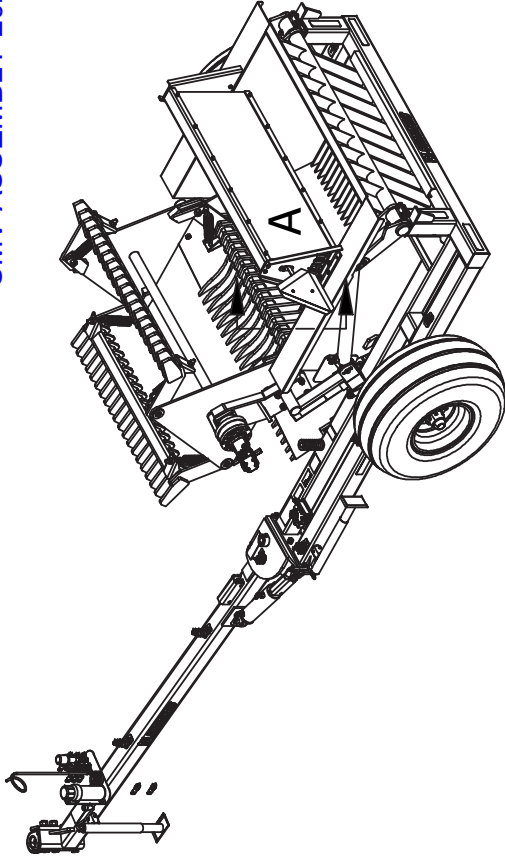


DUMP HEIGHT 38"

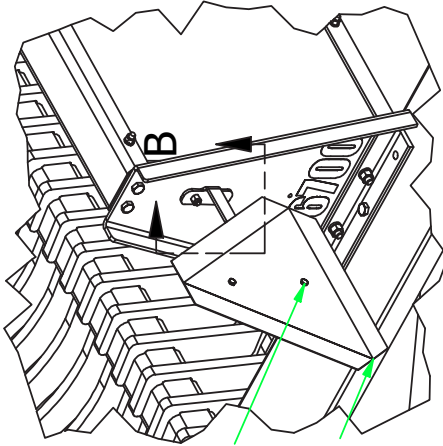
3/30/10 RPPOSITION

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SMV ASSEMBLY 2024 AND NEWER

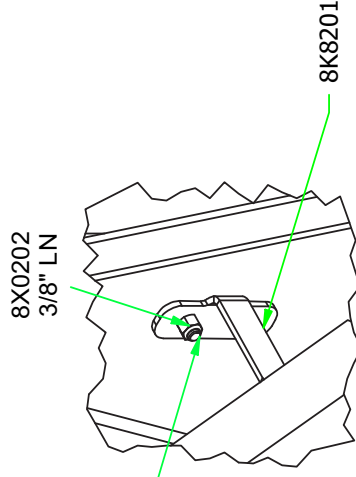


8X0222  
1/4" LN



8X0000  
1/4 X 3/4"

8S1120



8X1110  
CRG 3/8"x1"

8X0202  
3/8" LN

8K8201

DETAIL B  
SCALE 1/5

DETAIL A  
SCALE 1/12

DESIGNER CCV	ENGINEER	DRAWING DATE 4/14/2009	MASS 5359.340 lbmass	SHEET SIZE A	SHEET 1	OF 1	MATERIAL
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED			TOLERANCE (IN INCHES) UNLESS OTHERWISE NOTED FRACTIONAL ±1/32" XX ±.005" XXX ±.005"		PART NUMBER 9R0700		DESCRIPTION ROCK RICKER SMV ASSEMBLY

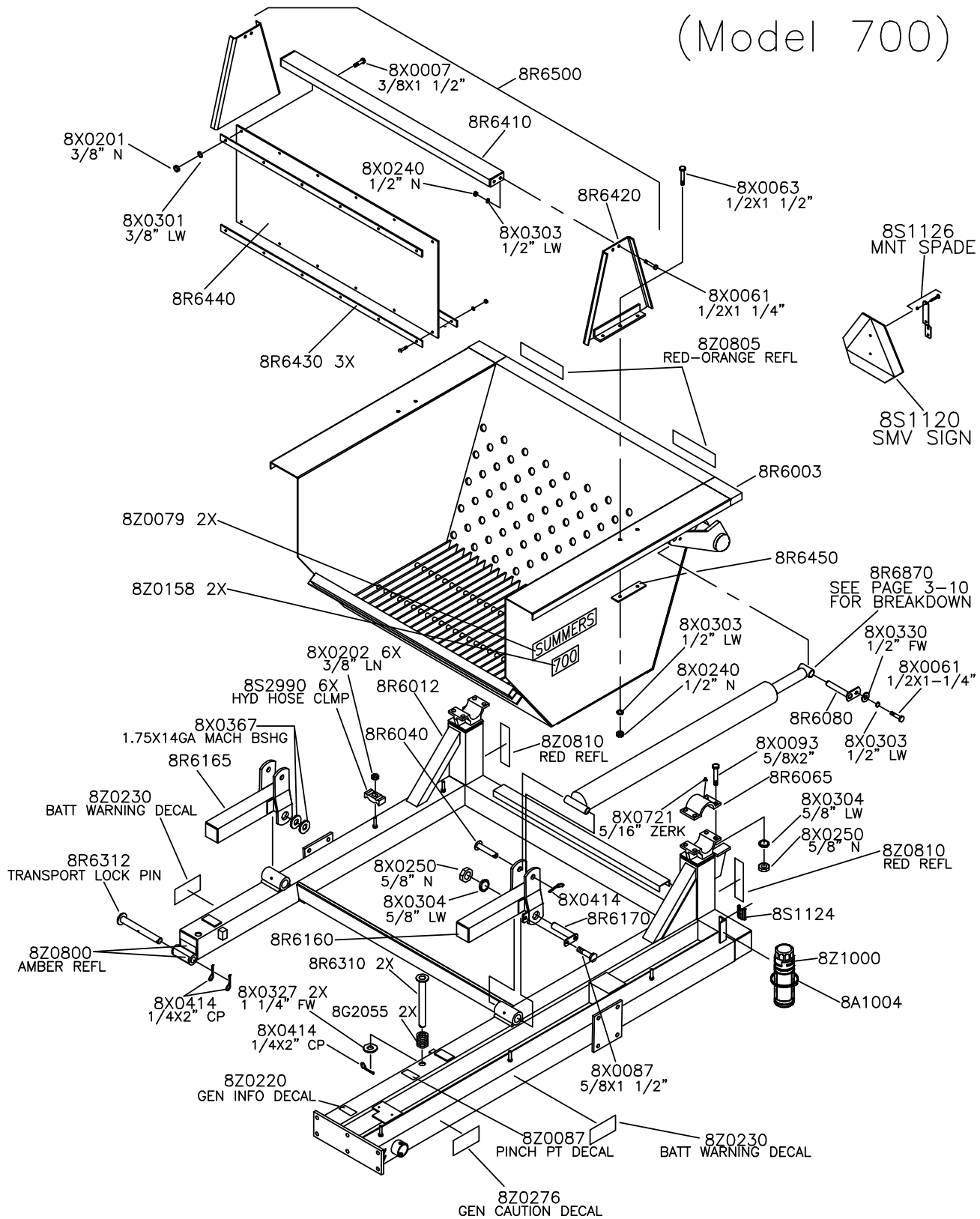
REV {%03%}	DESIGNER {%06%}	CHECKED BY {%08%}	CHECKED DATE {%09%}
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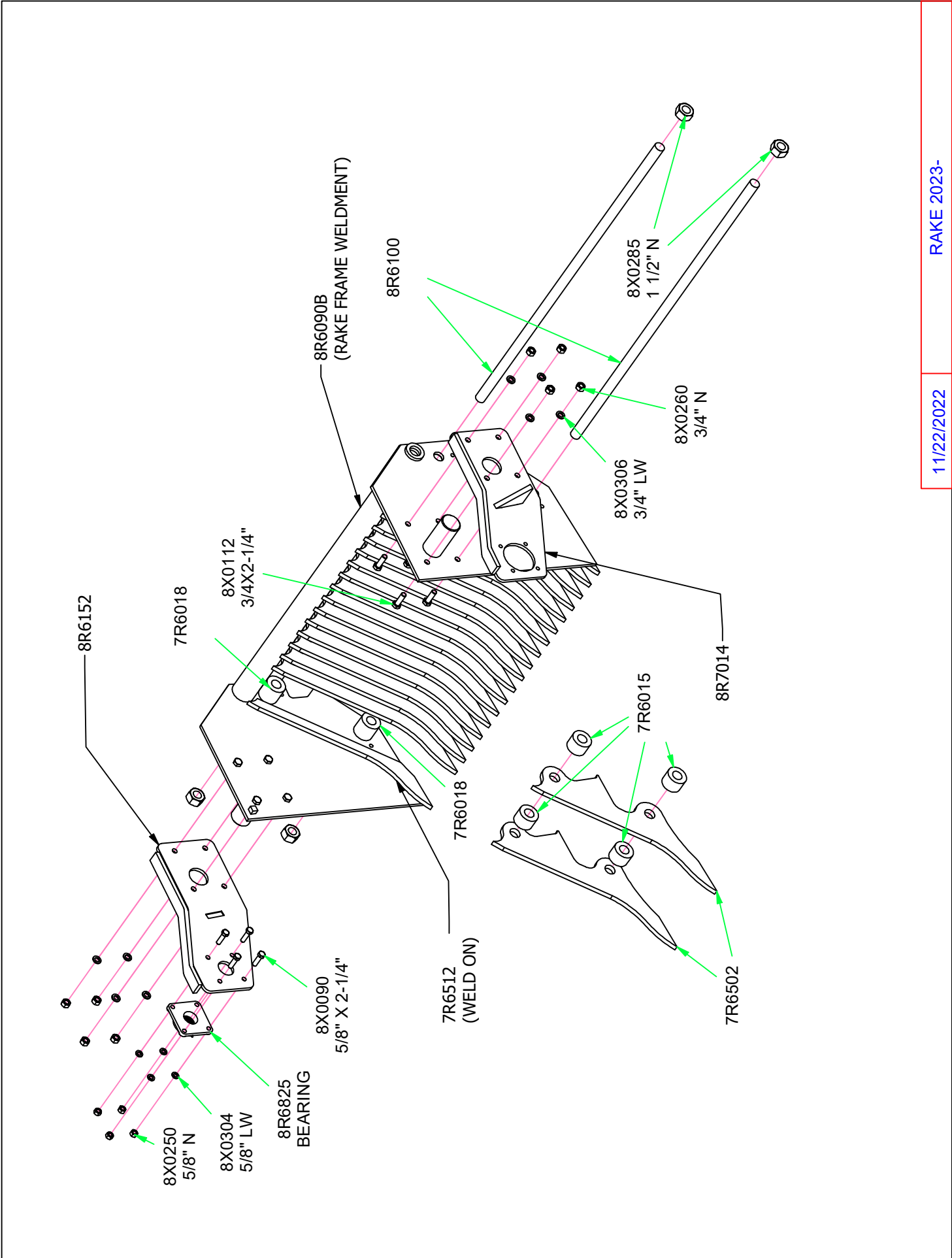
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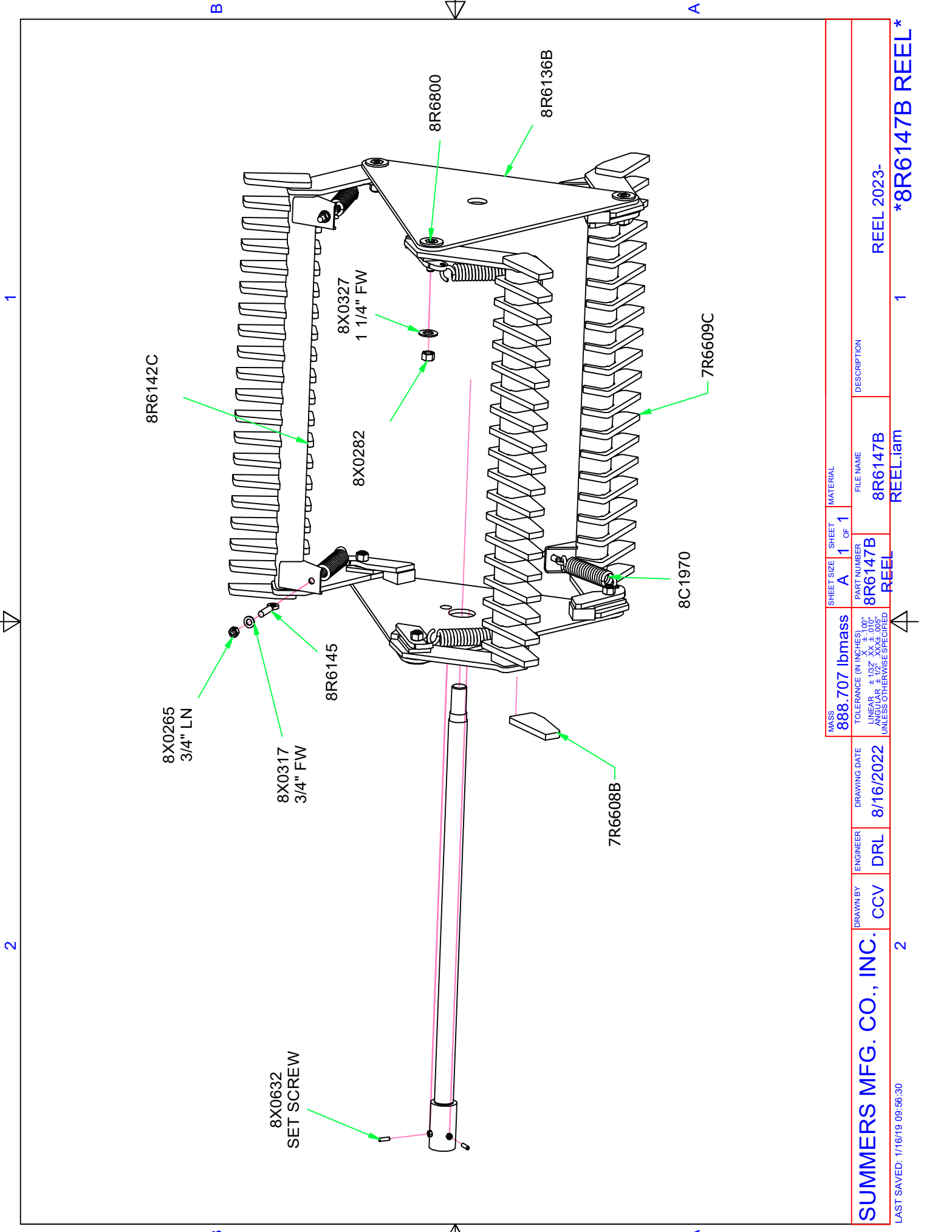
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SECTION 3- PARTS

MAIN FRAME  
(Model 700)



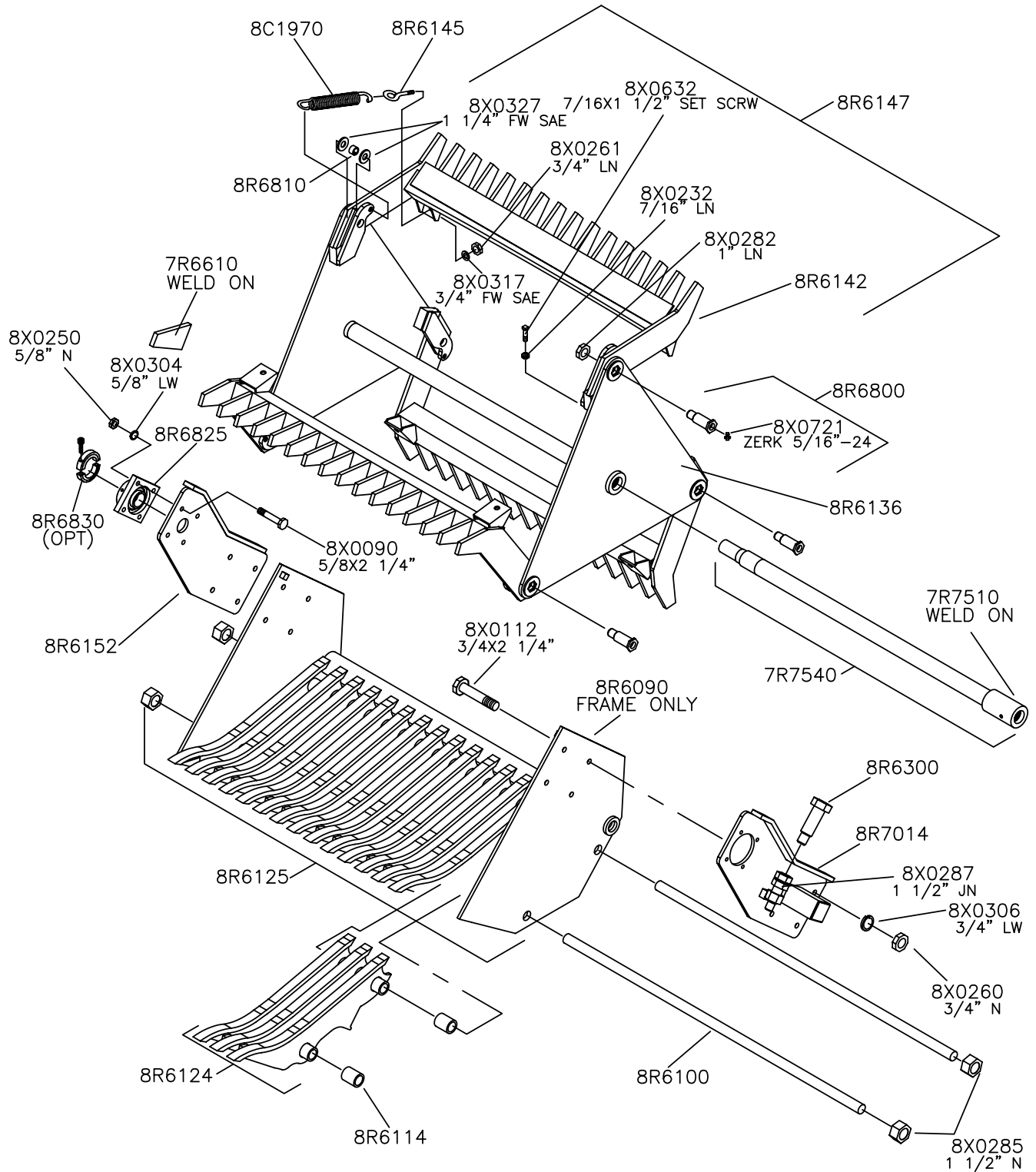




<b>888.707 lbmass</b>		SHEET SIZE		SHEET		MATERIAL	
TOLERANCE (IN INCHES)		A		1		OF 1	
LINEAR ±.132" XX ±.010"		PART NUMBER		FILE NAME		DESCRIPTION	
ANGULAR ±.12% XXX±.005"		8R6147B		8R6147B		REEL 2023-	
UNLESS OTHERWISE SPECIFIED		REEL		REEL.iam		*8R6147B REEL*	
DRAWING DATE		ENGINEER		DRAWN BY		LAST SAVED: 1/16/19 09:56:30	
8/16/2022		DRL		CCV		2	
SUMMERS MFG. CO., INC.		DRAFTER		DRAWN BY		2	
		DRL		CCV		2	

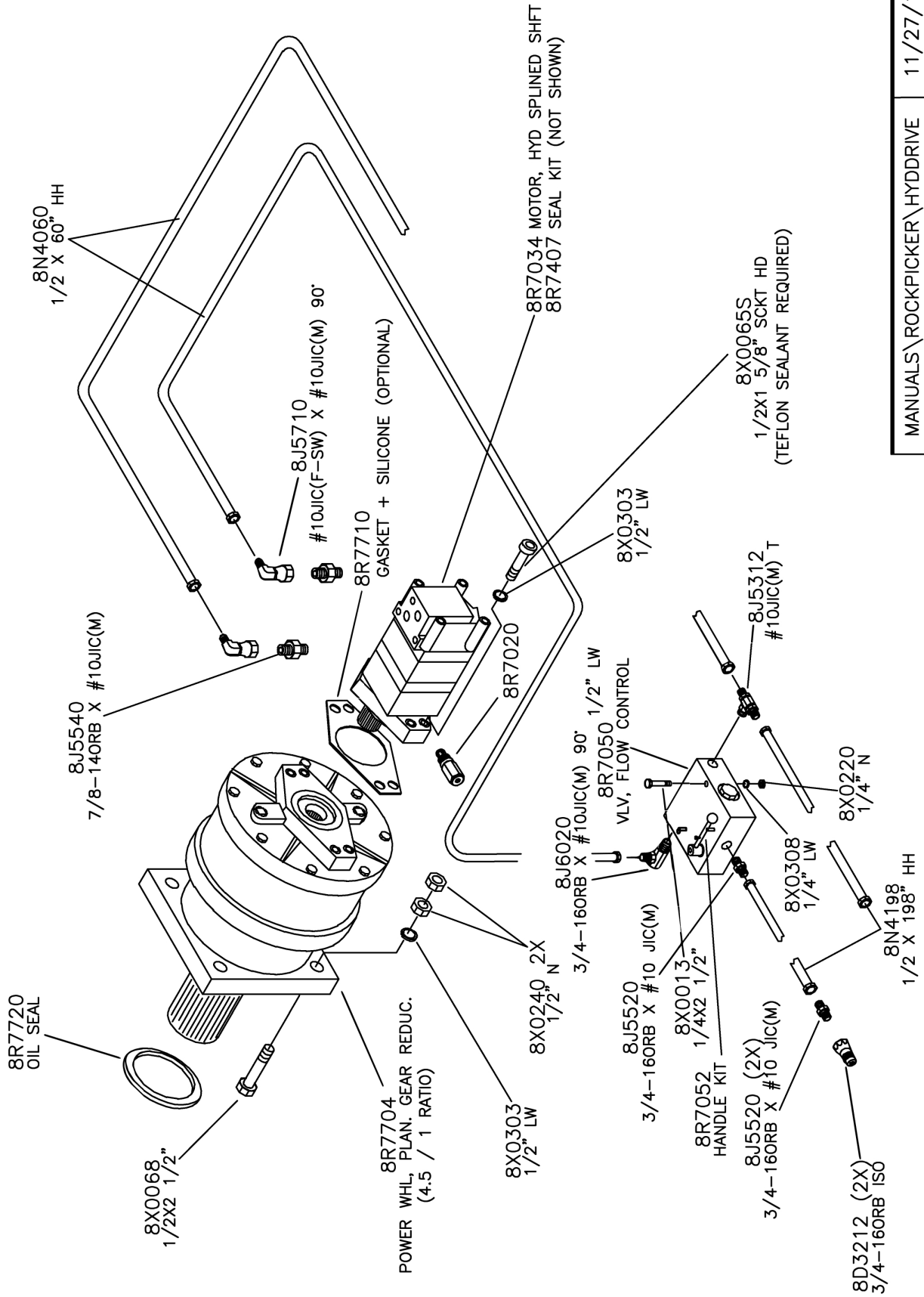
SECTION 3- PARTS

RAKE AND REEL ASSEMBLY  
(Model 700)



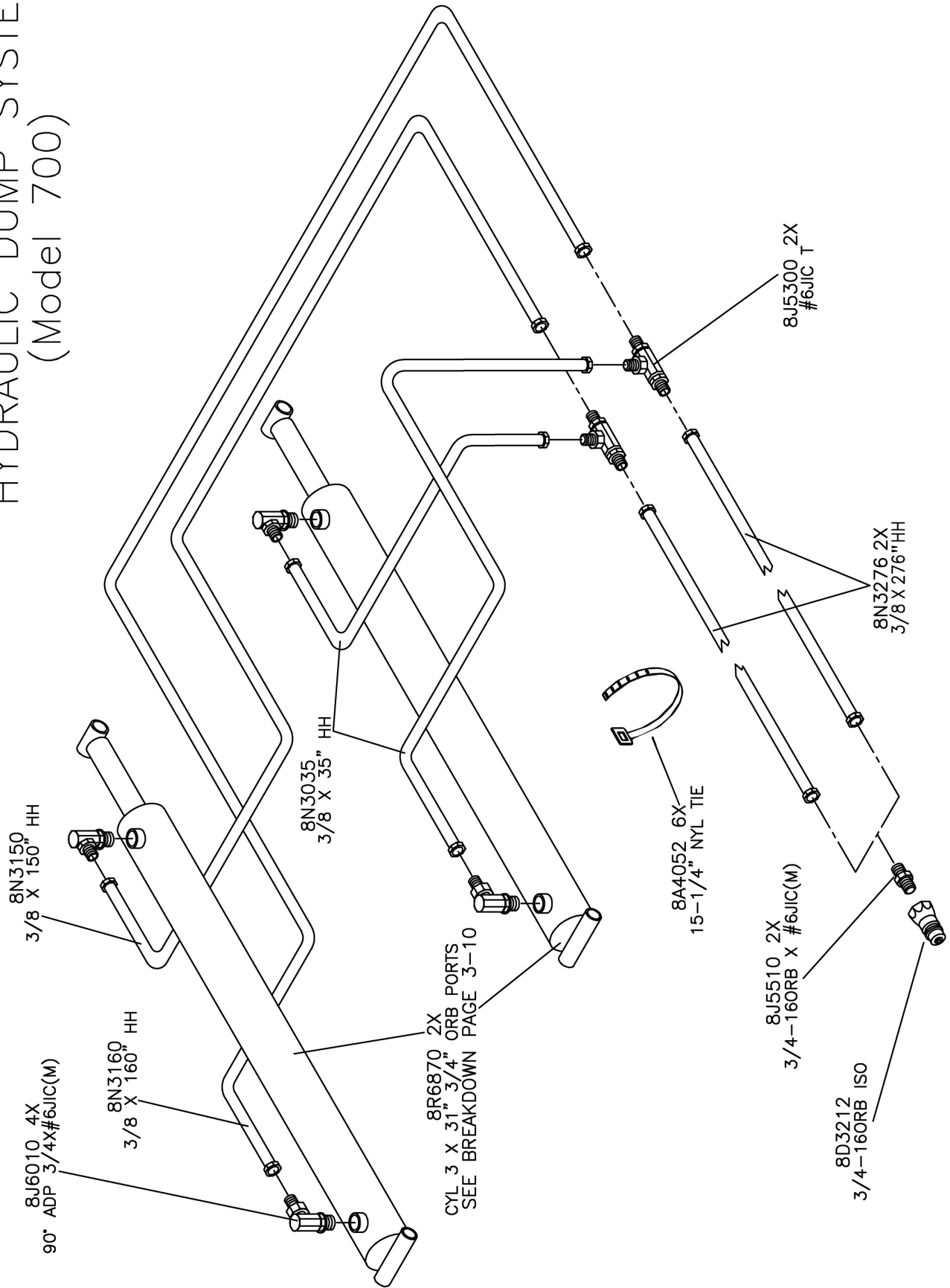
SECTION 3- PARTS

HYDRAULIC DRIVE SYSTEM  
(Model 700 Direct Drive)



MANUALS \ ROCKPICKER \ HYDRIVE 11/27/12

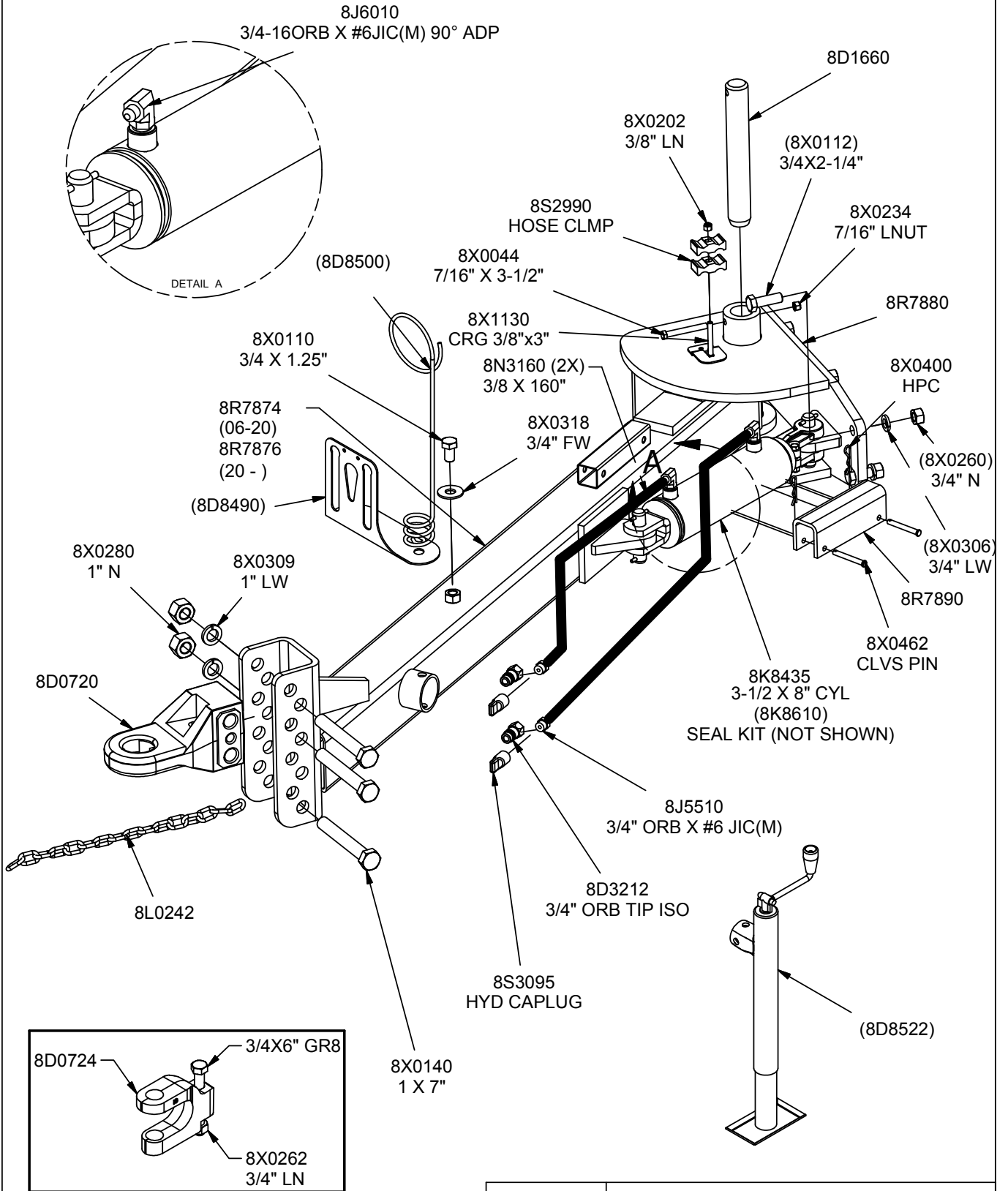
HYDRAULIC DUMP SYSTEM  
(Model 700)





SECTION 3- PARTS

# HYDRAULIC SWING HITCH (Model 700)

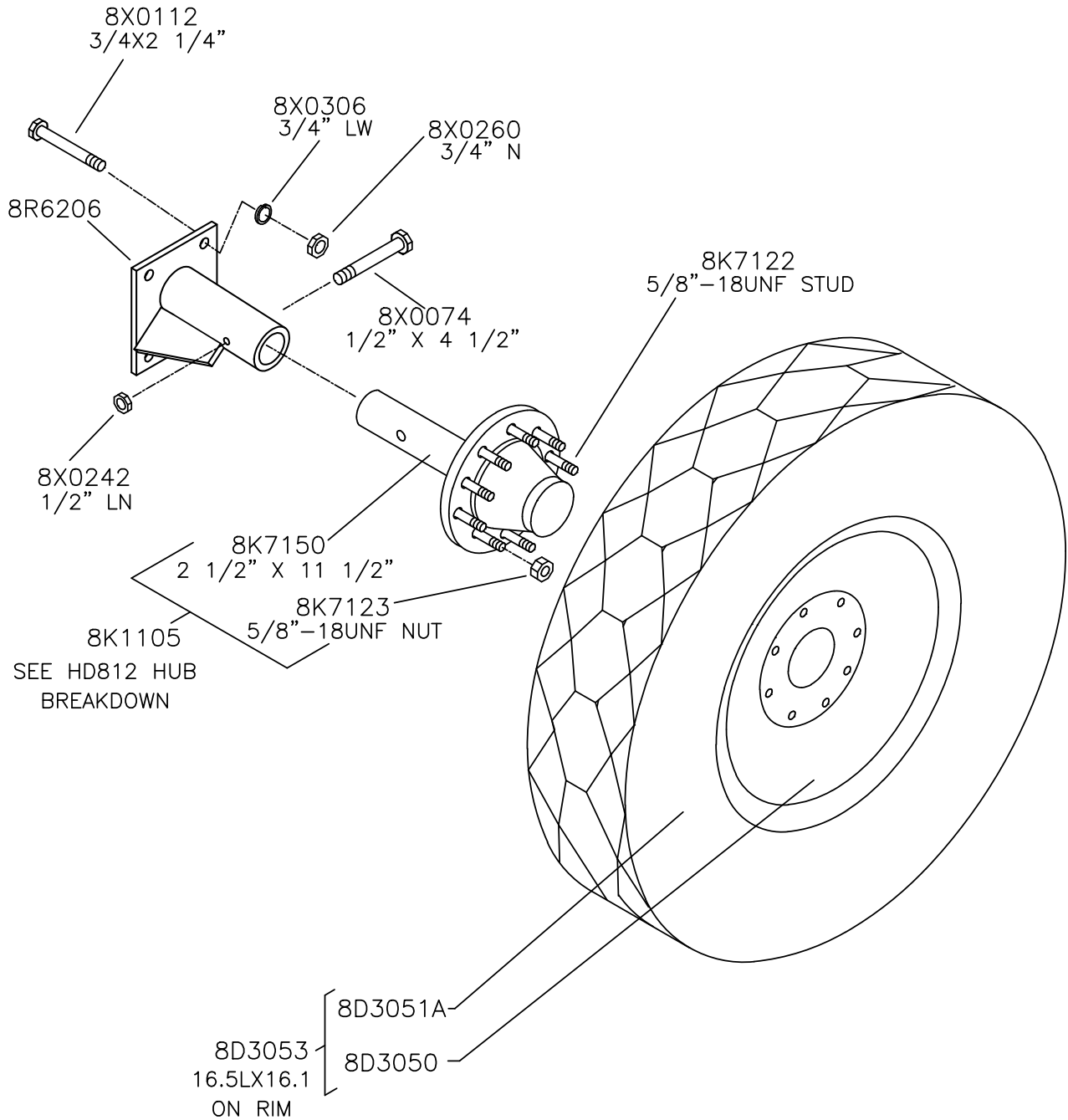


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8R7900.iam/HYD SWING HITCH

SECTION 3- PARTS

16.5L X 16.1 ON 8 BOLT HUB  
8R7920



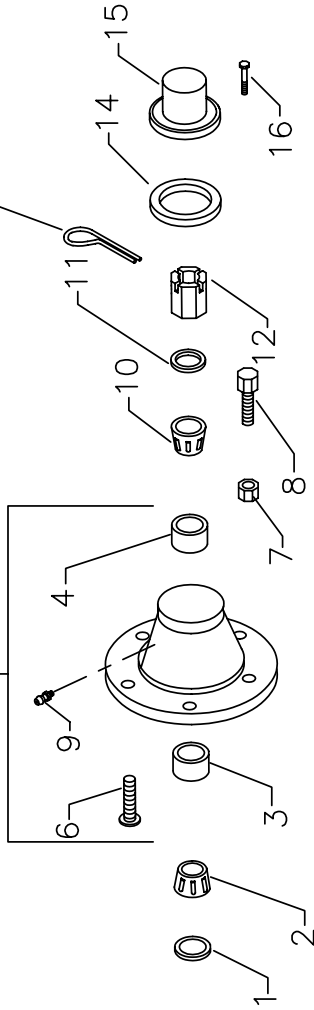
5/4/09

RPTIRE

## SECTION 3- PARTS

# HUB AND AXLE COMPONENTS

MANUALS/HUB/AXLE 2/02/00



### Assembly Notes:

A. Before towing machine, pack wheel bearings and fill 1/2 of hub cavity with high quality bearing grease.

B. Tighten axle nut to 45 ft.-lbs, loosen nut until first slot is aligned with hole in axle, install cotter pin and bend to retain.

Legend:

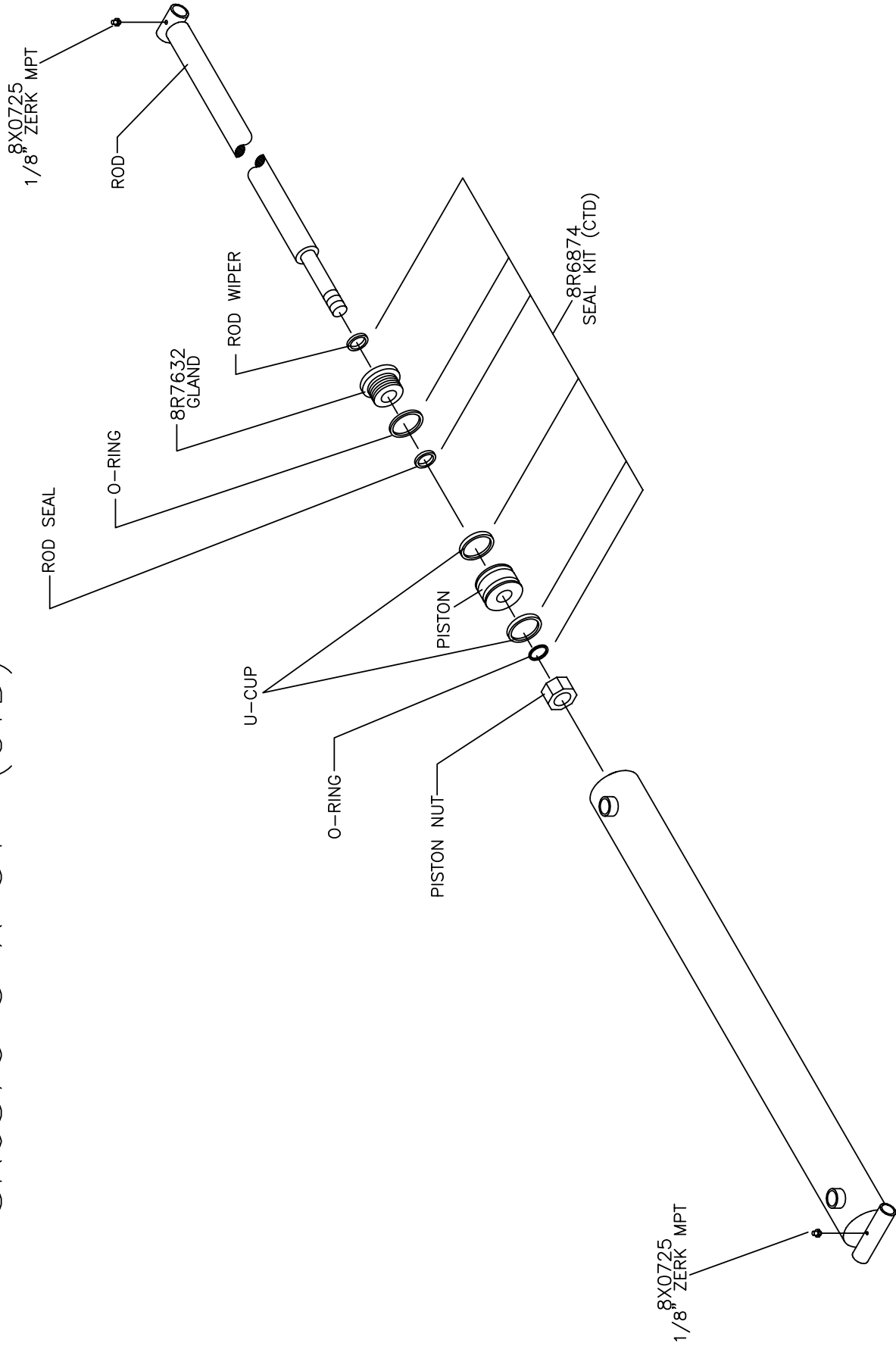
SMC	Part Number
INDUSTRY	Part Number or Size

HUB	1. SEAL	2. INNER BEARING	3. INNER RACE	4. OUTER RACE	5. HUB ASSY	6. WHEEL STUD	7. WHEEL NUT	8. WHEEL BOLT	9. HUB ZERK	10. OUTER BEARING	11. AXLE WASHER	12. AXLE NUT	13. COTTER PIN	14. HUB CAP GASKET	15. HUB CAP	16. HUB BOLT
H211	8G8220	8G8217	8G8230	8G8230	8G8211	N/A	N/A	8D5114	8X0708	8G8217	8D5119	8D5112	8X0410	N/A	8G8213	N/A
	SE10	L44643	8L44610	L44610	HDA211	N/A	N/A	WB10	1/4-28NF	L44643	3/4" I.D.	3/4"-16	3/16X1"	N/A	DC11	
H517	8D5234	8D5217	8D5332	8D5336	8D5210	8D5215	8D5214	N/A	8X0708	8D5117	8S5219	8D5212	8X0415	N/A	8D5213	N/A
	8D5236	LM48548	LM48510	LM67010	H517	WB16	1/2-20UNF	N/A	1/4-28NF	LM67048	7/8" I.D.	7/8"-14	3/16X1-1/2"	N/A	DC13	
H611	8D5221	8D5317	8D5334	8D5336	8D5311-09	N/A	N/A	8D5114	8X0708	8D5117	8D5319	8D5312	8X0415	N/A	8D5213	N/A
	SE13	LM29749	LM29710	LM67010	8D5316 10-	N/A	N/A	WB12 10-	1/4-28NF	LM67048	1" I.D.	1"-14	3/16X1-1/2"	N/A	DC13	
H614	8R6922**	8R6917	8R6925	8D5332	8R6911	N/A	N/A	8R6914	8X0708	8D5217	8D5319	8D5312	8X0415	N/A	8R6913	N/A
	SEE GBGI INSTRUCTIONS	LM603049	LM603011	LM48510	H614	N/A	N/A	WB12	1/4-28NF	LM48548	1" I.D.	1"-14	3/16X1-1/2"	N/A	DC15	
HD812	8K7127***	8K7117	8K7130	8K7132	8K7111	8K7115-9/16**	8K7116-9/16**	N/A	8X0708	8K7118	8D5319	8D5312	8X0415	N/A	8K7113	N/A
	8K7128***	LM3780	LM3720	LM2720	HD812	8K7122-5/8"	8K7123-5/8"	N/A	1/4-28NF	LM2790	1" I.D.	1"-14	3/16X1-1/2"	N/A	DC17	N/A
HD817	8K7344	8K7342	8K7346	8K7347	8K7340	WB41	WB40	N/A	8X0708	8K7343	8X0328	8D5314	8X0414	N/A	8K7341	N/A
	SE42	LM387AS	382A	LM501310	HD817	WB46	WB18	N/A	1/4-28NF	LM501349	1.312 I.D.	1-1/4"-12	1/4X2"	N/A	DC26	
H1010 LT	8K7220	8K7217	8K7230	8K7232	8K7211	8K7215	8K7216	N/A	8X0708	8K7218	8X0328	8D5314	8X0414	8K7212	8K7213	8K7214
	SE48	39585	39520	453A	H1010-9	WB51	WB52	N/A	1/4-28NF	460	1.312 I.D.	1-1/4"-12	1/4X2"	SE49	DC27	WB53
H1010 HVY	8K7221	8K7219	8K7231	8K7232	8K7210	8K7215	8K7216	N/A	8X0708	8K7218	8X0328	8D5314	8X0414	8K7212	8K7213	8K7214
	SE67	33275	33462	453A	H1010-11	WB51	WB52	N/A	1/4-28NF	460	1.312 I.D.	1-1/4"-12	1/4X2"	SE49	DC27	WB53
H1020	8K7320	8K7317	8K7330	8K7332	8K7209	8K7215	8K7216	N/A	8X0708	8K7318	8X0366	N/A	8X0418	8K7312	8K7313	8K7214
	SE55	HM218248	HM218210	HM212010	HDA1020	WB51	WB52	N/A	1/4-28NF	HM212049	2.03" ID	2"- 160	5/16 X 2-1/2"	SE59	DC28	WB53

ROCKPICKER

SECTION 3- PARTS

HYDRAULIC CYLINDER BREAKDOWN  
8R6870 3 X 31" (CTD)



MANUALS\ROCKPICKER\HYDCYL 10/13/06

**Disc Valve Motors**  
Integral Cross Over Relief Valve  
Technical Manual

2000 Series



**Char-Lynn®**

# Introduction



Eaton Char-Lynn®, your proven low speed high torque motor supplier, now offers the Char-Lynn® 2000 Series motor with our proven Eaton Vickers® Screw-in Cartridge Valves integral to the motor. This compact and efficient package offers increased value and cost effectiveness to designing Eaton into your applications. Minimizing the use of hoses, tubing, and fittings will reduce production and assembly time significantly.

## 2000 Series

Geroler® Element .....	9 Displacements
Flow LPM [GPM].....	75 [20] Cont.** 115 [30] Inter.*
Speed .....	Up to 924 RPM
Pressure Bar [PSI] .....	200 [3000] Cont. 300 [4500] Inter.
Torque Nm [lb-in].....	845 [7470] Cont. 930 [8225] Inter.

\*\* Continuous—(Cont.) Continuous rating, motor may be run continuously at these ratings.

\* Intermittent—(Inter.) Intermittent operation, 10% of every minute.

## Features and Benefits

- Complete packaged system solution, single source for motor with relief valve capability
- Relief valves as close to the Geroler® as possible, providing added protection.
- Eliminate leak points from in-line or bolt-on relief's
- Valves capable of full motor flow and full motor pressure.
- Provides added flexibility to system design by allowing motors to have individual relief valve settings.
- Simplifies assembly, purchasing, and system design requirements

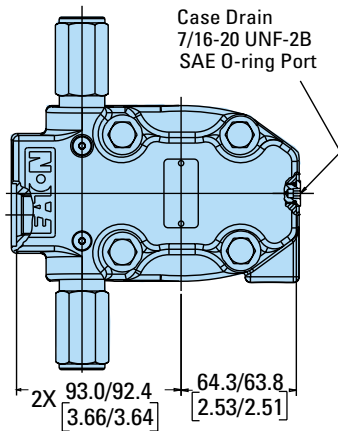
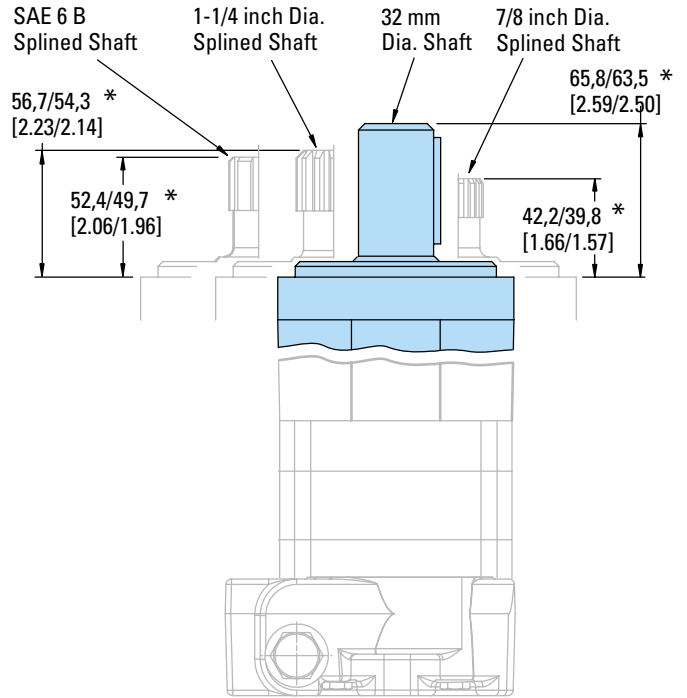
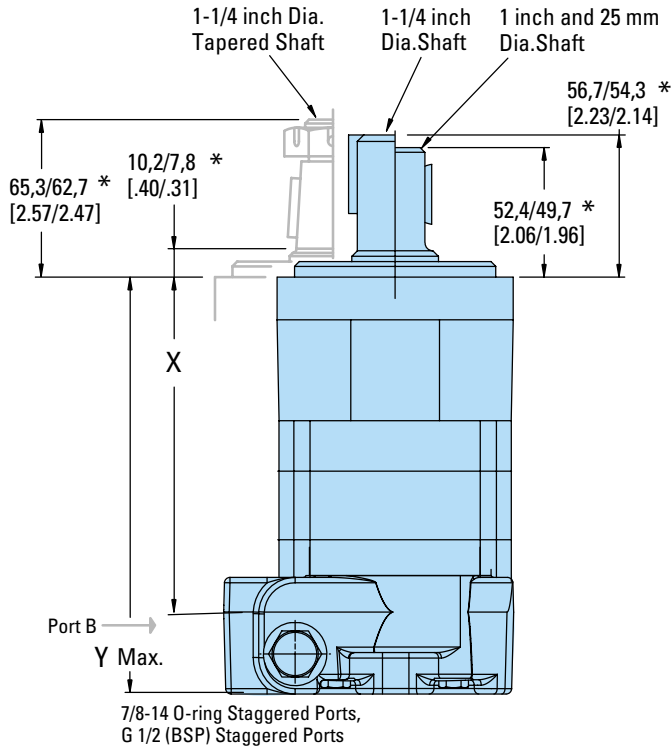
## Applications

- Skid Steer Attachments
  - Swing Motor
  - Brush Cutters & Mowers
  - Harvesting Equipment
  - Directional Boring
- Any place pressure relief protection is optimal for system or motor performance and life

Replacement cartridges can be obtained by ordering the Item Part Number as listed below.

ITEM PART #	ITEM DESC.	RELIEF VALVE SETTING
02-199291	RV5A-10-F-0-35/15	1500 PSI
02-199292	RV5A-10-F-0-35/17.5	1750 PSI
02-199293	RV5A-10-F-0-35/20	2000 PSI
02-199295	RV5A-10-F-0-35/22.5	2250 PSI
02-198563	RV5A-10-F-0-35/25	2500 PSI
02-199294	RV5A-10-F-0-35/27.5	2750 PSI
02-199296	RV5A-10-F-0-35/30	3000 PSI

# Standard Mount Motors



Standard Rotation  
Viewed from Shaft End  
Port A Pressurized — CW  
Port B Pressurized — CCW

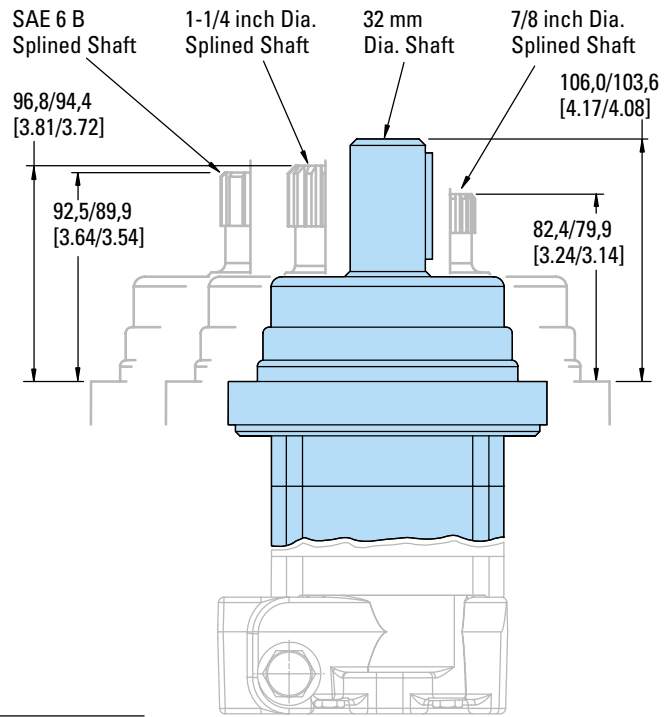
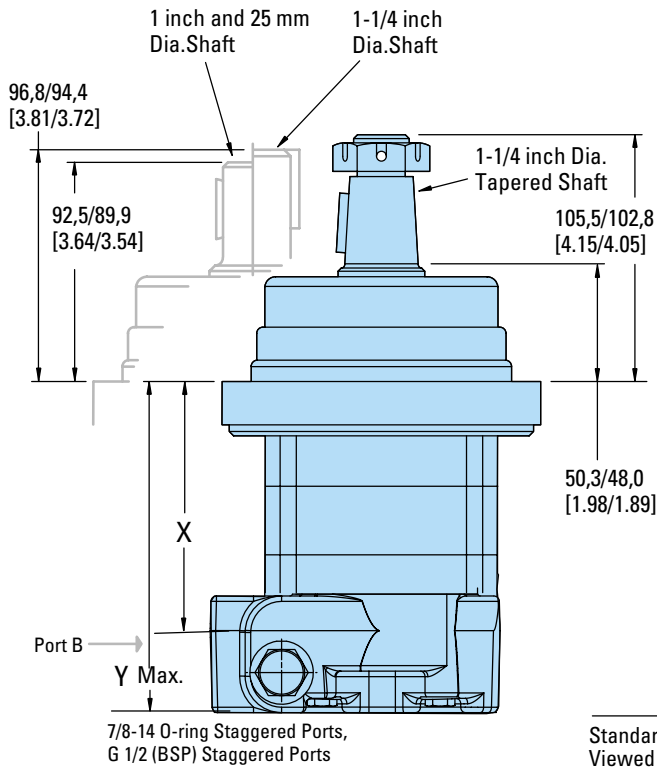
\*Subtract 4,1/3,6 [1.16/1.14] when ordering motor with 4-bolt magneto flange

2000 Series Standard Motor  
with 7/8-14 O-Ring Staggered  
Ports or G1/2 (BSP)  
Staggered Ports

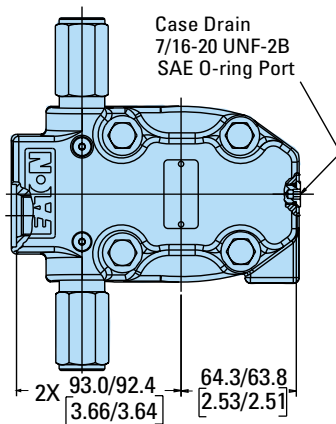
## DISPLACEMENT

cm <sup>3</sup> /r [in <sup>3</sup> /r]	80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
Dim. X mm [in]	137,0 [ 5.40]	141,6 [ 5.58]	147,9 [ 5.83]	147,9 [ 5.83]	154,8 [ 6.10]	163,7 [ 6.45]	175,1 [ 6.90]	191,1 [ 7.53]	208,4 [ 8.21]
Dim. Y mm [in]	184,5 [ 7.26]	189,0 [ 7.44]	195,4 [ 7.69]	195,4 [ 7.69]	202,2 [ 7.96]	211,1 [ 8.31]	222,6 [ 8.76]	238,6 [ 9.39]	255,8 [10.07]

# Wheel Mount Motors



Standard Rotation  
Viewed from Shaft End  
Port A Pressurized — CW  
Port B Pressurized — CCW

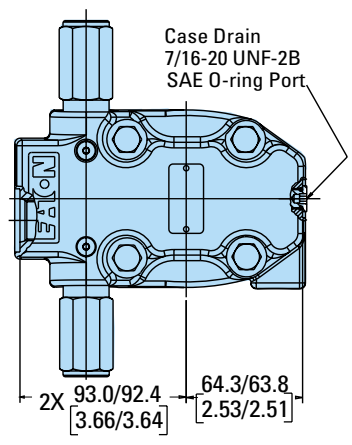
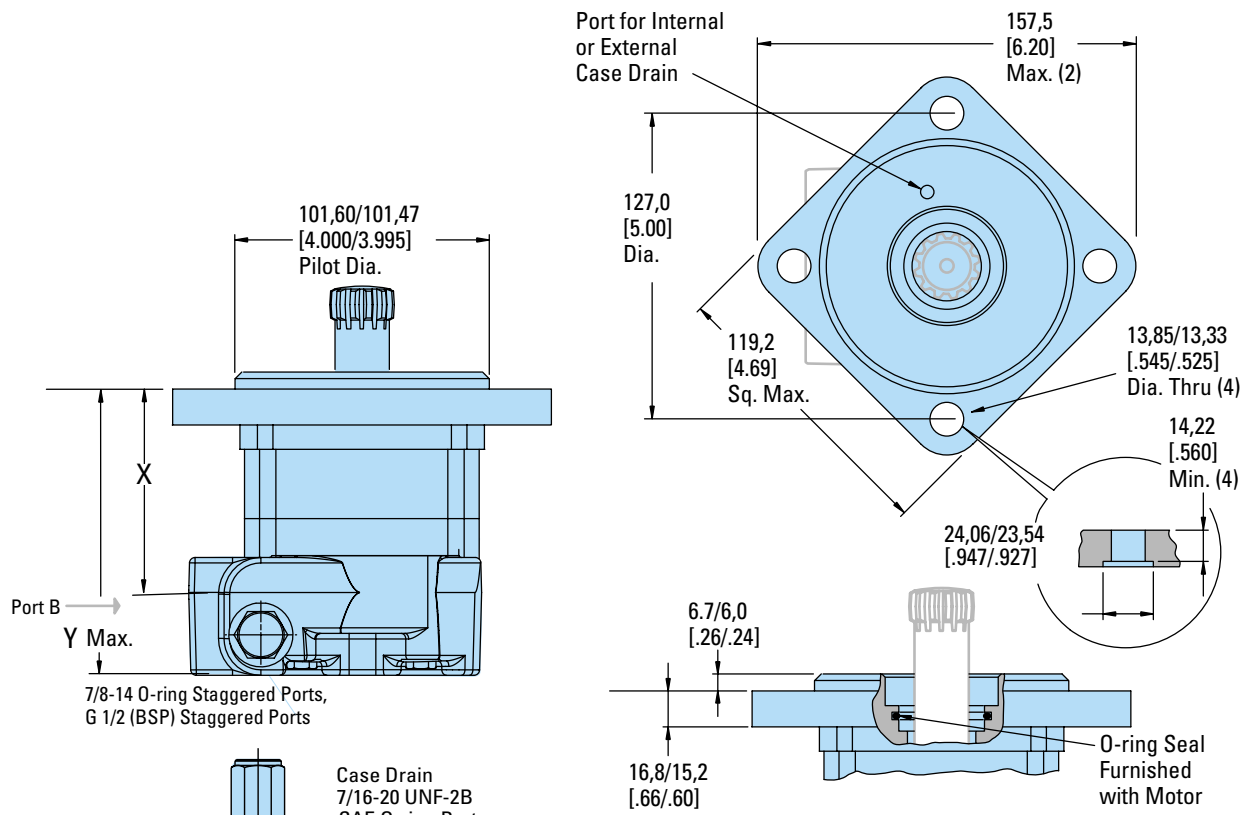


2000 Series Wheel Motor  
with 7/8-14 O-Ring Staggered  
Ports or G1/2 (BSP)  
Staggered Ports

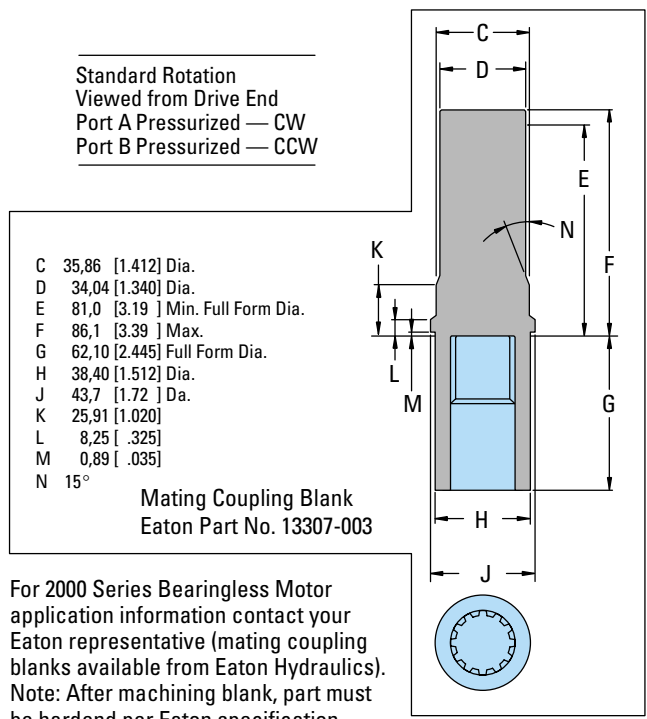
## DISPLACEMENT

cm <sup>3</sup> /r [in <sup>3</sup> /r]	80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
Dim. X mm [in]	96,9 [3.82]	101,4 [4.00]	107,8 [4.25]	107,8 [4.25]	114,6 [4.52]	123,5 [4.87]	135,0 [5.32]	151,0 [5.95]	168,2 [6.63]
Dim. Y mm [in]	144,3 [5.68]	148,9 [5.86]	155,2 [6.11]	155,2 [6.11]	162,1 [6.38]	171,0 [6.73]	182,4 [7.18]	198,4 [7.81]	215,7 [8.49]

# Bearingless Motors



Standard Rotation  
Viewed from Drive End  
Port A Pressurized — CW  
Port B Pressurized — CCW



For 2000 Series Bearingless Motor application information contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics). Note: After machining blank, part must be hardened per Eaton specification.

2000 Series Bearingless Motor with 7/8-14 O-Ring Staggered Ports or G1/2 (BSP) Staggered Ports

## DISPLACEMENT

cm <sup>3</sup> /r [in <sup>3</sup> /r]	80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
Dim. X mm [in]	79,0 [3.11]	83,5 [3.29]	89,9 [3.54]	89,9 [3.54]	96,8 [3.81]	105,6 [4.16]	117,1 [4.61]	133,1 [5.24]	150,3 [5.92]
Dim. Y mm [in]	126,8 [4.99]	131,4 [5.17]	137,7 [5.42]	137,7 [5.42]	144,6 [5.69]	153,5 [6.04]	164,9 [6.49]	180,9 [7.12]	198,2 [7.80]





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**Char-Lynn®**



**Char-Lynn**

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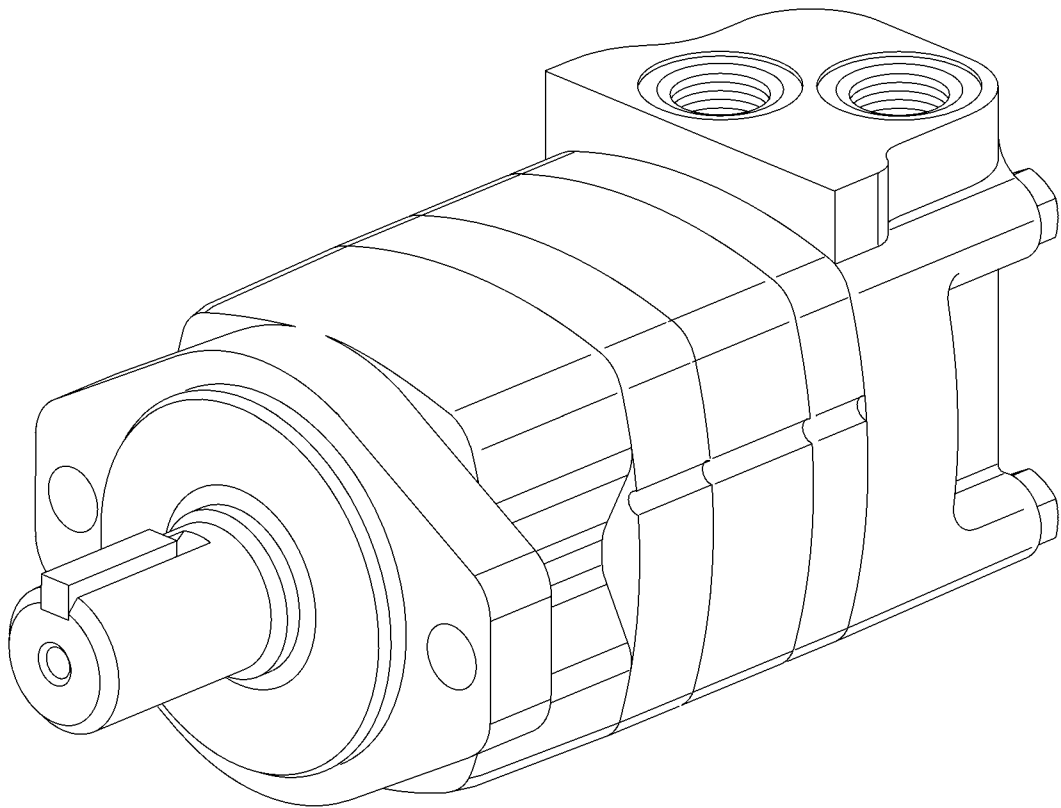
**EATON**

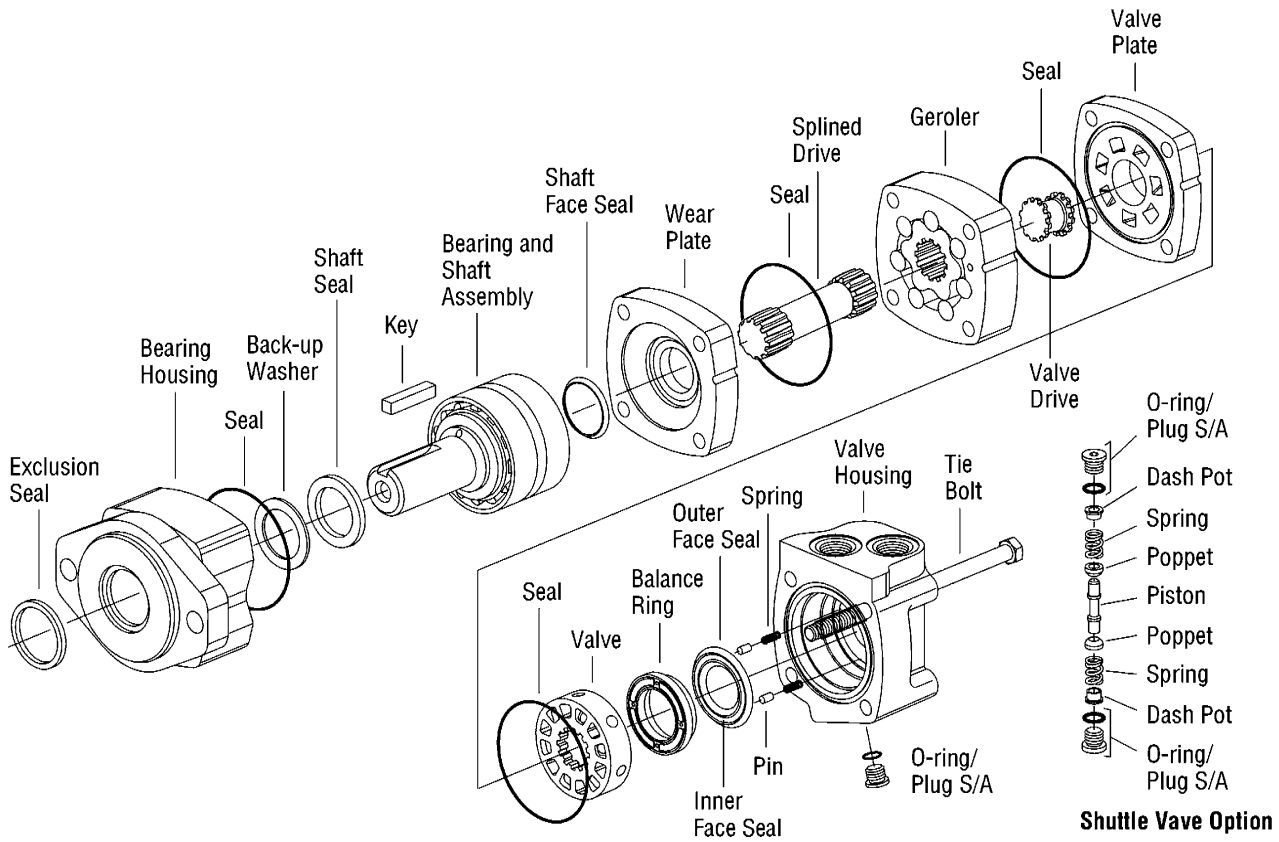
**Char-Lynn<sup>®</sup>**

**Hydraulic Motor**

**2000 Series  
Disc Valve Geroler Motor**

**006**





**Shuttle Vave Option**

**Tools required for disassembly and reassembly.**

- Torque wrench 57Nm [500 lb-in] capacity
- 300-450 [12-16]\* breaker bar
- 9/16 socket
- Small screwdriver 150-200 x 6,5 [6-8 x 1/4] blade
- 3/16 Allen wrench
- Press

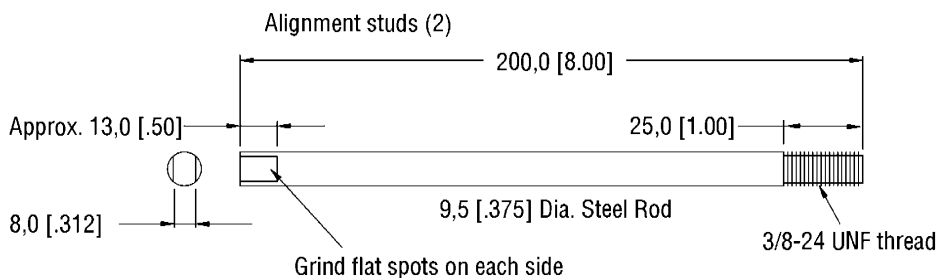
\* Unless indicated otherwise, measurements are given in mm [inches]

\*\* Shaft seal installation tool (600496)

\*\* Bullet (600465) for 1 diameter shafts

**The following tools are not necessary for disassembly and reassembly, but are extremely helpful.**

**Alignment studs (2)**



# Disassembly

Cleanliness is extremely important when repairing a hydraulic motor. Work in a clean area. Before disconnecting the lines, clean the port area of the motor thoroughly. Use a wire brush to remove foreign material and debris from around the exterior joints of the motor. Check the shaft and key slot, remove all nicks, burrs or sharp edges that might damage the bearing housing seals when installing the shaft and bearing assembly. Before starting the disassembly procedures, drain the oil from inside the motor.

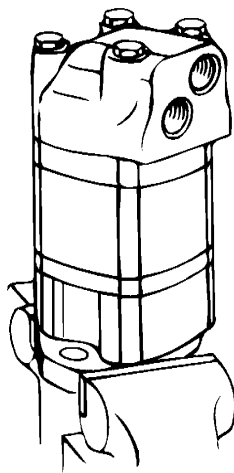


Figure 1

1 Place the motor in a vise with the output shaft down. Clamp across the mounting flange of the motor not the housing. Excessive clamping pressure will cause distortion. When clamping, use some protective device on the vise, such as special soft jaws, pieces of hard rubber or board.

Although not all drawings show the motor in a vise, we recommend that you keep the motor in the vise during disassembly and reassembly. Follow the clamping procedures explained throughout the manual.

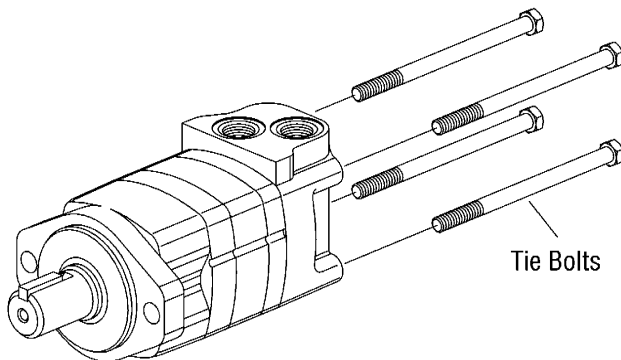


Figure 2

2 Remove 4 bolts from motor.

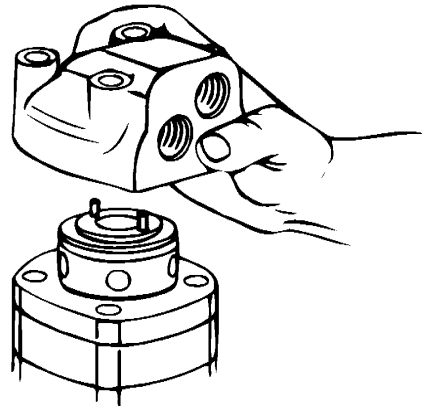


Figure 3

3 Lift valve housing straight up. If done carefully the pins, springs, balance ring assembly, and valve will remain on the valve plate.

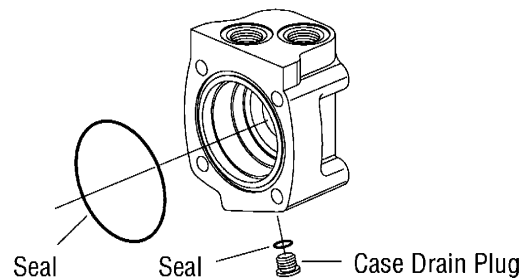


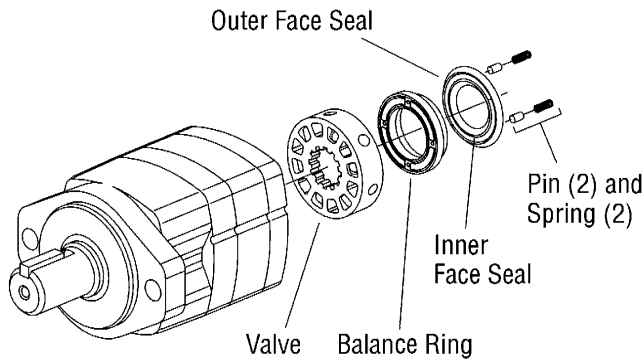
Figure 4

4 Carefully remove 76,0 [3.00] diameter seal from valve housing.

5 Remove case drain plug—with seal, from valve housing.

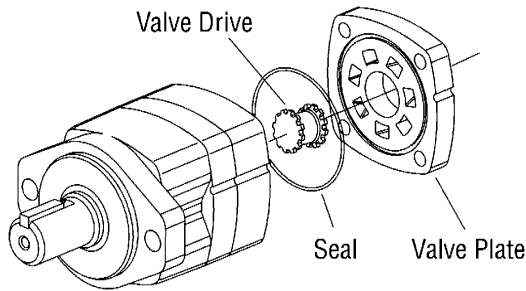
6 Remove 2 pins and 2 springs from balance ring assembly, see Figure 5.

# Disassembly



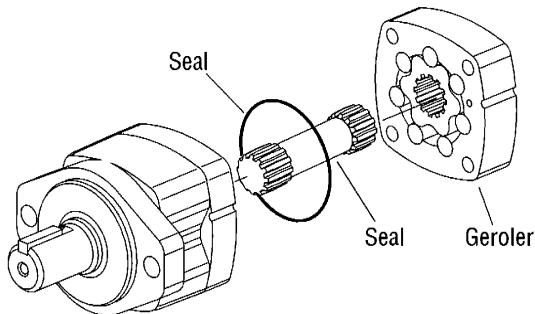
**Figure 5**

- 7 Remove balance ring assembly.
- 8 Remove inner and outer face seals from balance ring.
- 9 Remove the valve.



**Figure 6**

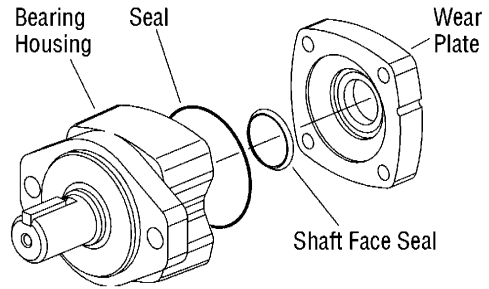
- 10 Remove the valve plate.
- 11 Remove the 76,0 [3.00] diameter seal from valve plate.
- 12 Remove the valve drive.



**Figure 7**

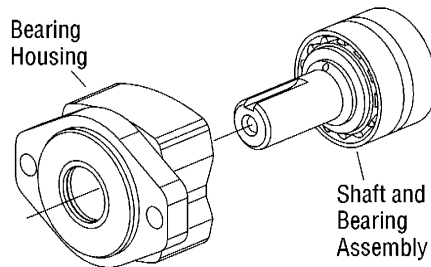
- 13 Remove the Geroler. Be sure to retain the rollers in the outer ring if they are loose.
- 14 Remove the drive.

- 15 Remove the 76,0 [3.00] diameter seal from wear plate, see Figure 7.



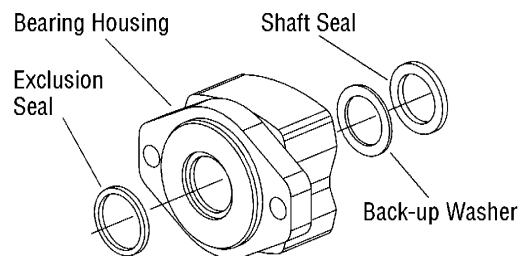
**Figure 8**

- 16 Remove the wear plate.
- 17 Remove the shaft face seal from the wear plate.
- 18 Remove the 76,0 [3.00] diameter seal from bearing housing.



**Figure 9**

- 19 You may need a press to remove shaft and bearing assembly from bearing housing. (Key must be removed before removing shaft.)



**Figure 10**

- 20 Use a small screwdriver to remove shaft seal, back-up washer and exclusion seal from bearing housing, see Figure 10. Do not damage bore of housing.

Note: Individual parts of shaft and bearing assembly are not sold separately. Replace as a unit.

# Reassembly

Check all mating surfaces. Replace any parts that have scratches or burrs that could cause leakage. Clean all metal parts in clean solvent. Blow dry with air. Do not wipe dry with cloth or paper towel because lint or other matter can get in the hydraulic system and cause damage. Do not use a coarse grit or try to file or grind these parts. Check around the keyway and chamfered area of the shaft for burrs, nicks or sharp edges that can damage the seals when reassembling the bearing housing.

**Note:** Lubricate all seals (prior to installation) with petroleum jelly such as Vaseline. Use new seals when reassembling this motor. Refer to parts list (6-129) for proper seal kit number.

**21** Use a press to install exclusion seal in outer bore of bearing housing. Lip of seal must face outward. See Figure 11. If a press is not available use a plastic or rubber hammer, being careful not to damage or cock seal in the bore.

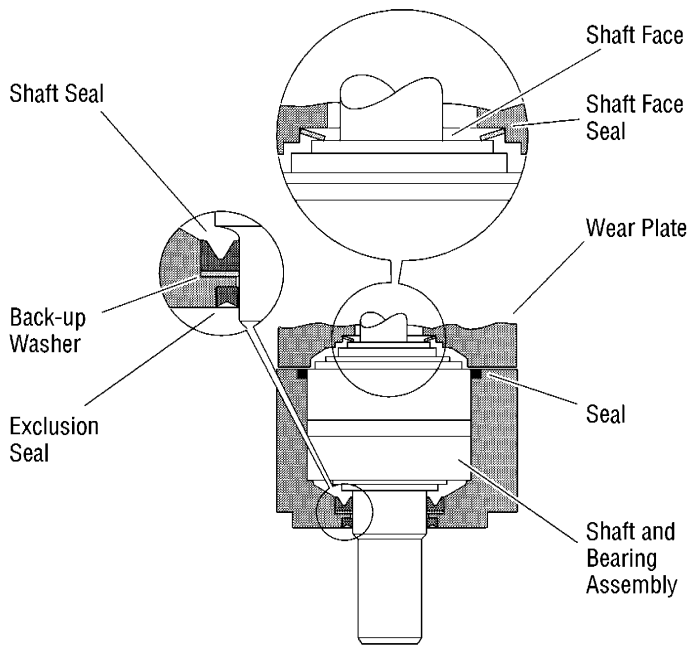


Figure 11

**22** Place back-up washer into seal bore. Place shaft seal onto installation tool (600496) and press seal into seal bore of the housing.

**23** Clamp housing in vise, see Figure 1.

**24** Place protective bullet (see note below) over shaft. Apply petroleum jelly to inside diameter of dust and shaft seal. You may need a press to install shaft and bearing assembly. Do not distort shaft seal. Damage to this seal will cause leakage.

**Note:** Bullet (600465), for 1 inch dia. shafts, available— by special order. Use tape over other shafts to prevent cutting the seals.

**25** Apply petroleum jelly to the 76,0 [3.00] diameter seal. Install seal into the bearing housing.

**26** Alignment studs can be very helpful in reassembly of the motor. See special tool listing page 2. If you use studs, install 2 studs diagonally opposed in the bearing housing.

**27** Install the shaft face seal in the wear plate as shown in Figure 11. Do not distort seal.

**28** Install the wear plate, see Figure 11.

**29** Apply a light film of petroleum jelly to the 76,0 [3.00] diameter seal and install seal in the wear plate.

**30** Install the drive into the output shaft.

**31** Align the notch on the outside of the Geroler with the notch on the wear plate. Install the Geroler against the wear plate. Be sure to retain the rollers in the outer ring if they are loose.

**32** Install the valve drive in the Geroler.

**Note:** Installation at this time involves 3 steps in the timing of the motor. Timing determines the direction of rotation of the output shaft. Timing parts include:

1. Geroler
2. Valve Drive
3. Valve Plate
4. Valve

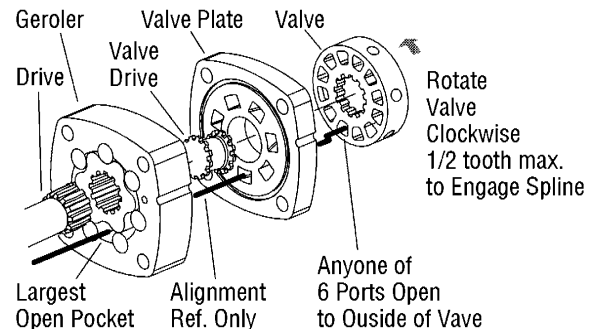


Figure 12 Timing Alignment

**Timing Step # 1** — Locate the largest open pocket in the Geroler and mark it on the outside edge of the Geroler.

**33** Apply a light film of petroleum jelly to the 76,0 [3.00] diameter seal. Install seal in groove of valve plate.

# Reassembly

**34** Align the notch on the outside of the valve plate with the notch on the Geroler as shown in Figure 12.

**Timing Step # 2** — Locate the slot opening in the valve plate which is in line with the largest open pocket of the Geroler.

**Timing Step # 3** — Locate any one of the side openings of the valve and align this opening with the open slot of the valve plate that is in line with the largest open pocket of the Geroler. Install the valve by rotating it clockwise until the spine teeth engage (1/2 spine tooth max.). This will provide the proper rotation when pressurized as shown in Figure 13.

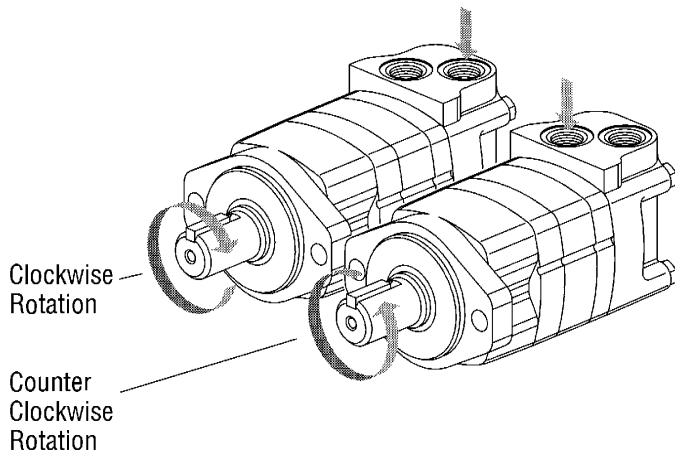


Figure 13

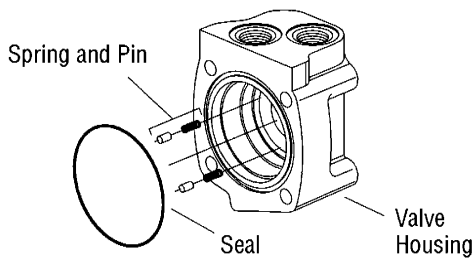


Figure 14

**35** Install 2 springs and 2 pins in the holes located in the bore of the valve housing, as shown in Figure 14.

**36** Apply a light film of petroleum jelly to the 76,0 [3.00] diameter seal. Install seal in the valve housing.

**37** Apply petroleum jelly to inner and outer face seals. Install seals on balance ring as shown in Figure 15.

**Important:** Install face seals in the positions shown in Figure 15, or the motor will not operate properly. Do not force or bend the face seals. Any damage to these seals will affect the operation of the motor.

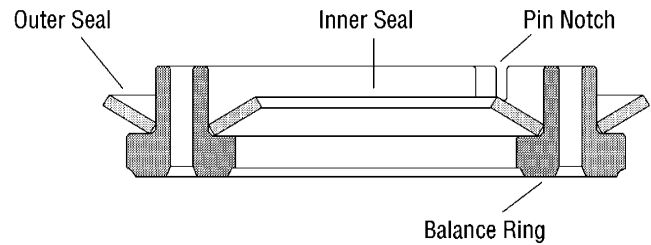


Figure 15

**38** Align pin notches in balance ring with pins in bore of valve housing. Install balance ring assembly in valve housing.

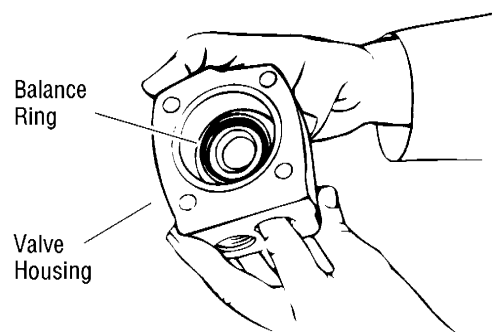


Figure 16

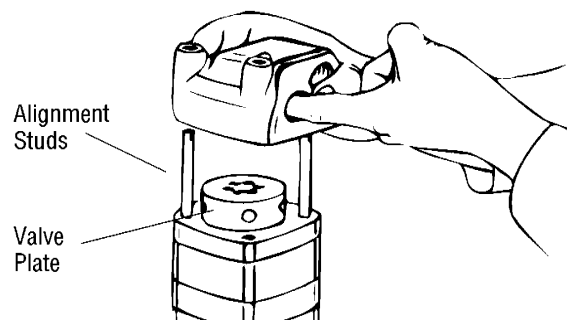


Figure 17

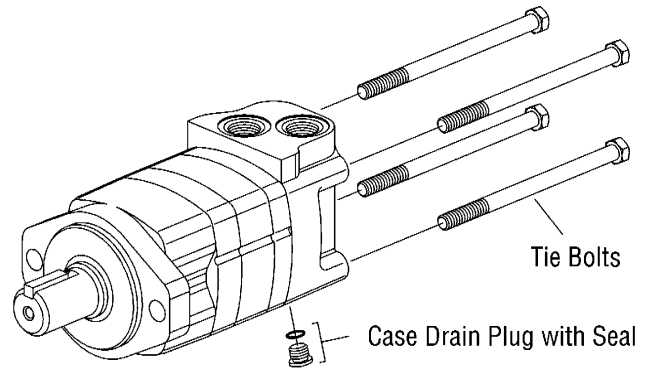
**39** Insert your finger through port of valve housing. Apply pressure to side of balance ring as shown in Figure 16. Hold ring in position until valve housing is in place against valve plate (see Figure 17).

**Note:** After installing the valve housing on the valve plate check for proper placement. Push down on the valve housing. You should get a slight spring action.

# Reassembly

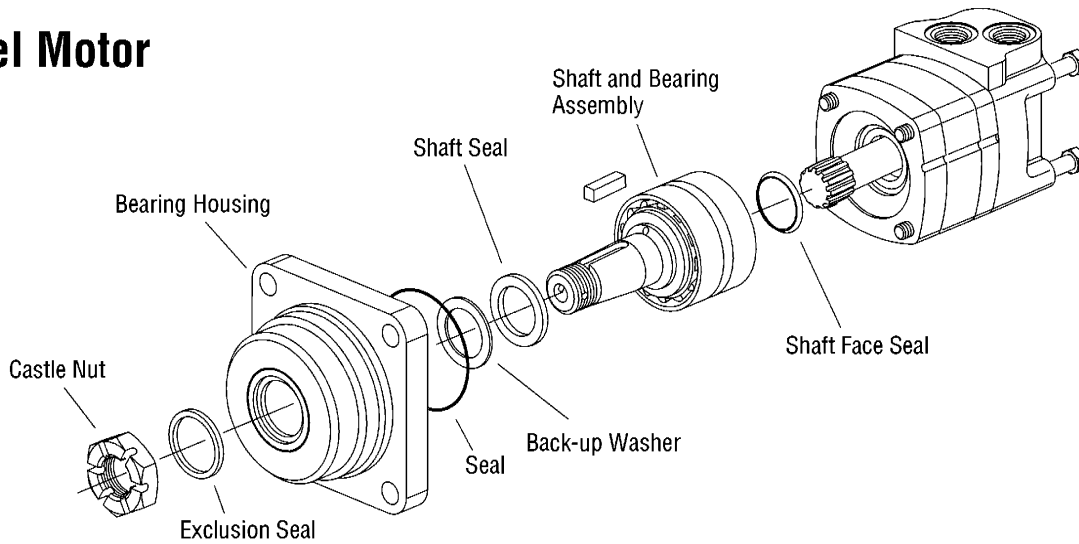
**40** Install tie bolts. If you use alignment Studs, install 2 bolts opposite the studs. Finger tighten the bolts. Remove the alignment studs and replace with the two remaining bolts. Torque all four bolts alternately to 50 Nm [450 lb-in].

**41** Install seal on case drain plug then install in valve housing. Torque to 6 Nm [50 lb-in.]



**Figure 18**

# Wheel Motor



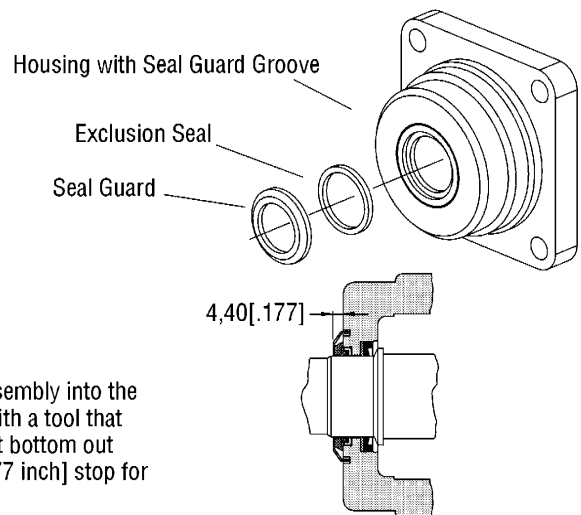
**Figure 19**

On wheel motors, a different bearing housing is used, see Figure 19. Other than this the parts are the same as the standard motor and the same disassembly and reassembly procedures apply.

# Wheel Motor with Seal Guard

**Installation of Seal Guard:**

After completing assembly of the shaft and bearing assembly into the bearing housing, press the seal guard onto the shaft with a tool that will provide an even push over the seal. This tool must bottom out against the bearing housing and provide a 4,5 mm [.177 inch] stop for the seal guard.



## Bearingless Motor

This motor is the same as the standard motor without the shaft/bearing assembly, and bearing housing. The mounting flange replaces the bearing housing, see Figure 20. Follow same disassembly and reassembly procedures as rear section of standard motor.

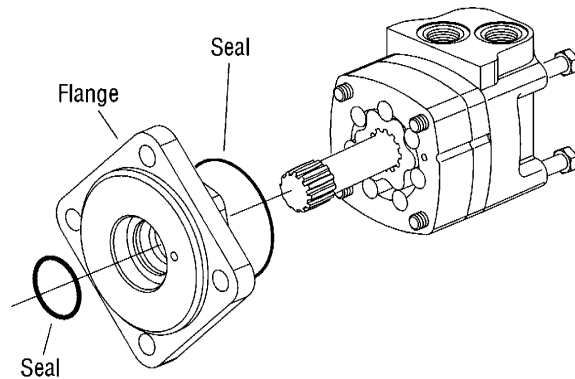


Figure 20

## Disassembly Reassembly Shuttle Valve Option

Disassembly of shuttle valve option, this valve is located in the valve housing. Clean and inspect shuttle valve parts and reassemble with new seals, torque plugs to 8-11 Nm [75-100 lb-in].

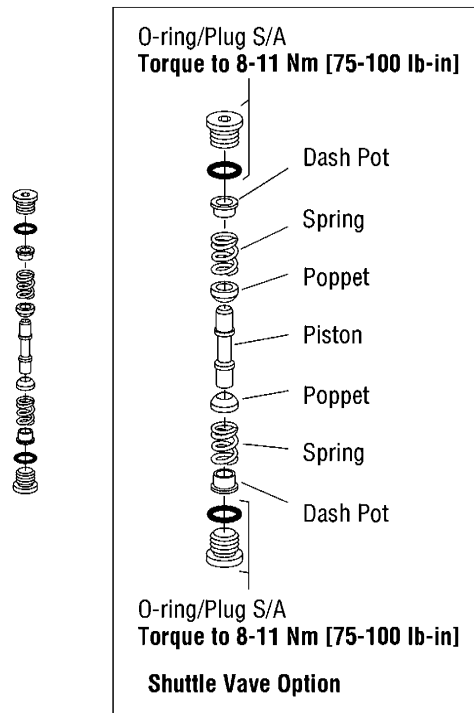
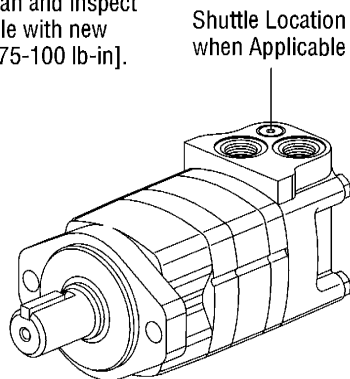


Figure 21

# Reassembly — Speed Sensor

**1** Rotate the motor shaft until a (gear/target) tooth is centered in the speed sensor port. If this is not done, the sensor may be damaged during the operation of the motor.

**2** Make sure the lock nut and its threads are clean and dry for the proper torque. Position the lock nut against the alignment nut as shown in Figure 22.

**3** Move the washer and the o-ring up against the speed sensor body threads as shown in Figure 22.

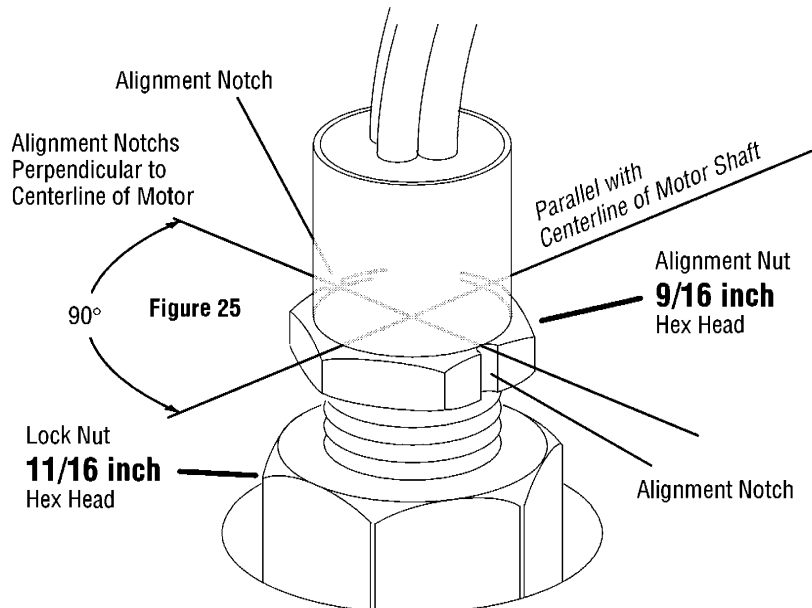
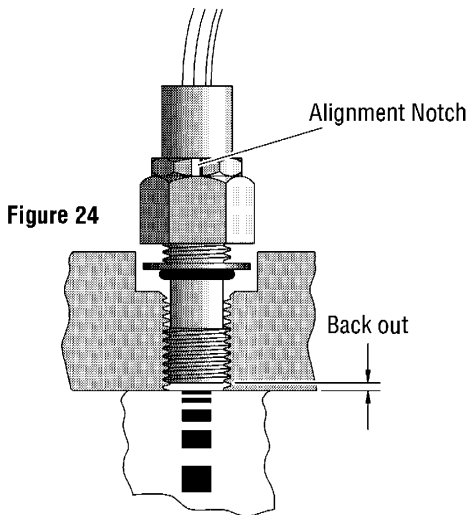
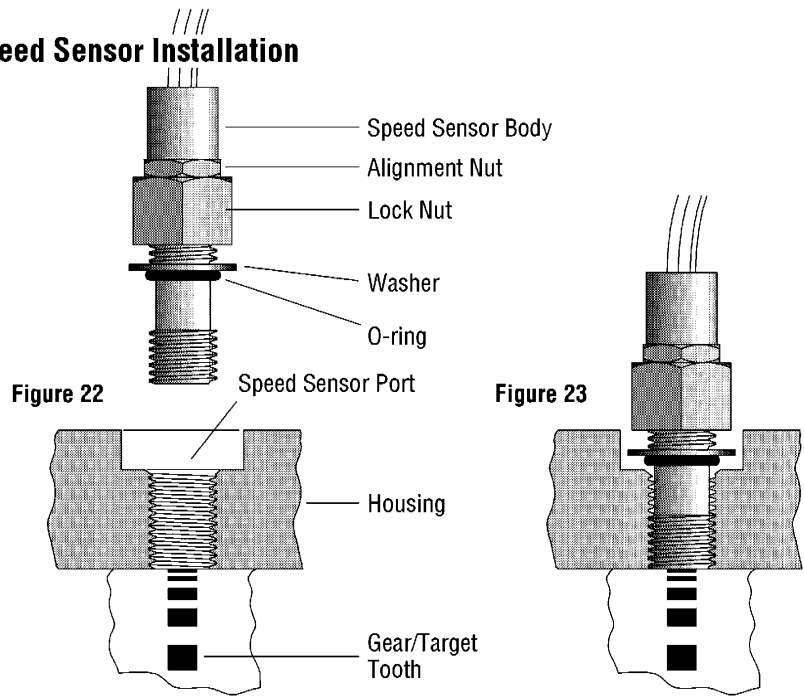
**4** By hand, lightly thread the speed sensor body into the housing until the sensor touches against the motor (gear/target) tooth. **Do not force the sensor against the (gear/target) tooth, damage may occur.** Make sure the o-ring or the washer do not touch the housing — see Figure 23.

**5** Turn the speed sensor body out one quarter turn (CCW) plus the additional amount (CCW) needed to make the alignment notches perpendicular to the motor shaft centerline (90° +/-5 degrees from the motor shaft centerline — Figure 24 and 25).

**6** Maintain the speed sensor body alignment (Figure 25), and tighten the lock nut to 8,5-14 Nm [75-125 lb-in.] (torque values are for clean dry threads).

**7** Check the speed sensor body for correct alignment (Figure 25), reinstall the sensor if it is not correct.

## Speed Sensor Installation



# Product Identification

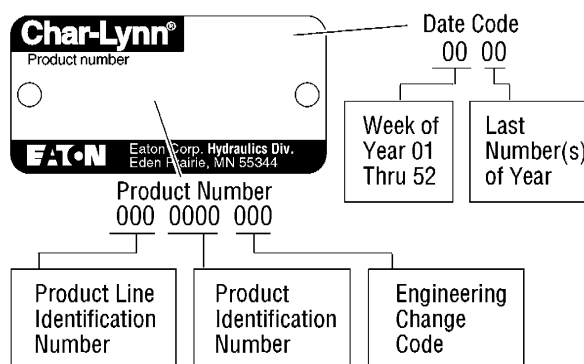
For Additional Literature Contact Eaton Corp. Hydraulics Division 15151 Highway 5 Eden Prairie, MN 55344.

- Specifications and performance data, Catalog No. 11-878
- Replacement part numbers and kit information — Parts Information No. 6-129

## How to Order Replacement Parts

### Each Order Must Include the Following:

1. Product Number
2. Date Code
3. Part Name
4. Part Number
5. Quantity of Parts



## Product Numbers—2000 Series

Use digit prefix —104-, 105-, or 106- plus four digit number from charts for complete product number—Example 106-1039.

104-1007

Mounting	Shaft	Ports	Displacement $\text{cm}^3/\text{r}$ [ $\text{in}^3/\text{r}$ ] and Product Number								
			80 [ 4.9]	100 [ 6.2]	130 [ 8.0]	160 [ 9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
2 Bolt SAE A Flange	1 inch Straight	7/8-14 O-ring Staggered	104-1001	-1002	-1003	-1004	-1005	-1006	-1007	-1143	—
		1-1/16—12 O-ring 180° Apart	104-1037	-1038	-1039	-1040	-1041	-1042	-1043	-1044	—
	1-1/4 Inch Straight	7/8-14 O-ring Staggered	104-1022	-1023	-1024	-1025	-1026	-1027	-1028	-1228	-1420
		1-1/16—12 O-ring 180° Apart	104-1061	-1062	-1063	-1064	-1065	-1066	-1067	-1068	-1421
2 Bolt SAE B Flange	1-1/4 Inch 14 T Splined	7/8-14 O-ring Staggered	104-1029	-1030	-1031	-1032	-1033	-1034	-1035	-1229	-1422
		1-1/16—12 O-ring 180° Apart	104-1087	-1088	-1089	-1090	-1091	-1092	-1093	-1094	-1423
	1-1/4 Inch Straight	7/8-14 O-ring Staggered	104-1200	-1201	-1202	-1203	-1204	-1205	-1206	-1207	—
	1-1/4 In. Involute SAE C Splined	7/8-14 O-ring Staggered	104-1208	-1209	-1210	-1211	-1212	-1213	-1214	-1215	—
Standard with 4 Bolt Square Flange	32 mm Straight	G 1/2 (BSP)	104-1384	-1385	-1386	-1387	-1388	-1389	-1390	-1391	—
		1-1/4 Inch 14 T Splined	G 1/2 (BSP)	104-1376	-1377	-1378	-1379	-1380	-1381	-1382	-1383
Wheel Motor	1-1/4 Inch Straight	7/8-14 O-ring Staggered	105- —	—	—	—	—	—	—	—	-1148
		1-1/16—12 O-ring 180° Apart	105- —	—	—	—	—	—	—	—	-1149
	32 mm Straight	G 1/2 (BSP)	105-1134	-1135	-1136	-1137	-1138	-1139	-1140	-1141	—
		1-1/4 Inch Tapered	7/8-14 O-ring Staggered	105-1001	-1002	-1003	-1004	-1005	-1006	-1007	-1060
Bearingless	1-1/4 Inch 14 T Splined	1-1/16—12 O-ring 180° Apart	105-1071	-1072	-1073	-1074	-1075	-1076	-1077	-1078	—
		7/8-14 O-ring Staggered	105-1029	-1030	-1031	-1032	-1033	-1034	-1035	-1096	—
Bearingless	32 mm Straight	1-1/16—12 O-ring 180° Apart	105-1079	-1080	-1081	-1082	-1083	-1084	-1085	-1086	—
		7/8-14 O-ring Staggered	106-1008	-1009	-1010	-1011	-1012	-1013	-1014	-1015	-1047
Bearingless	32 mm Straight	G 1/2 (BSP)	106-1038	-1039	-1040	-1041	-1042	-1043	-1044	-1045	—



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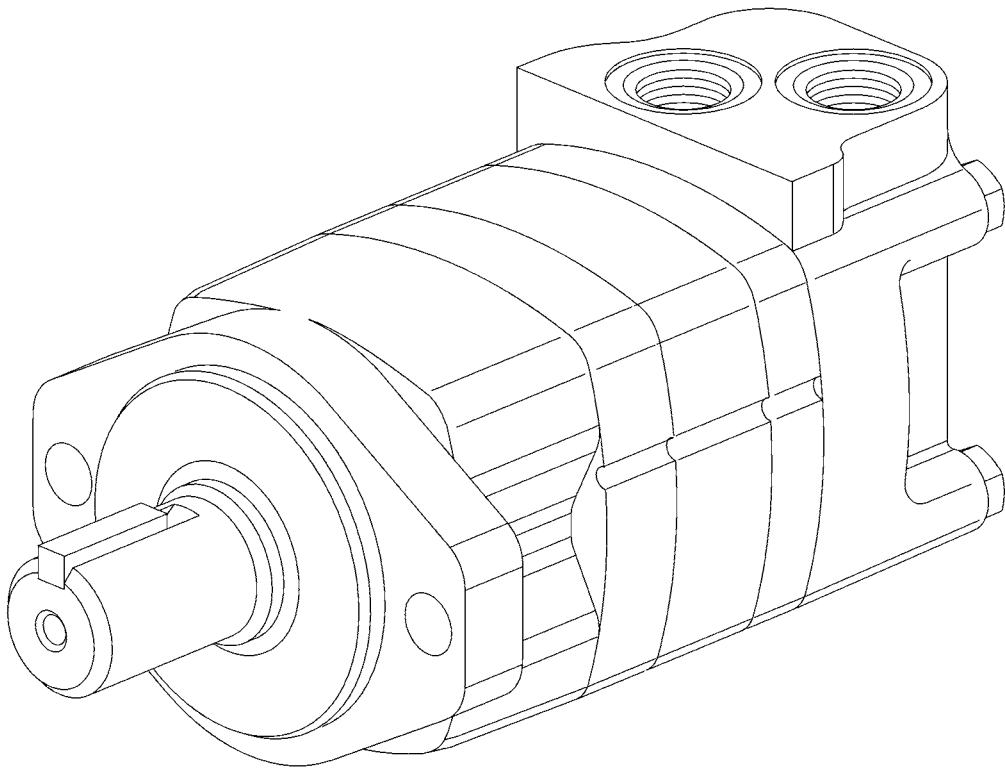
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December 2008

**EAT•N**

**Char-Lynn®**

2000 Series  
Geroler® Motors

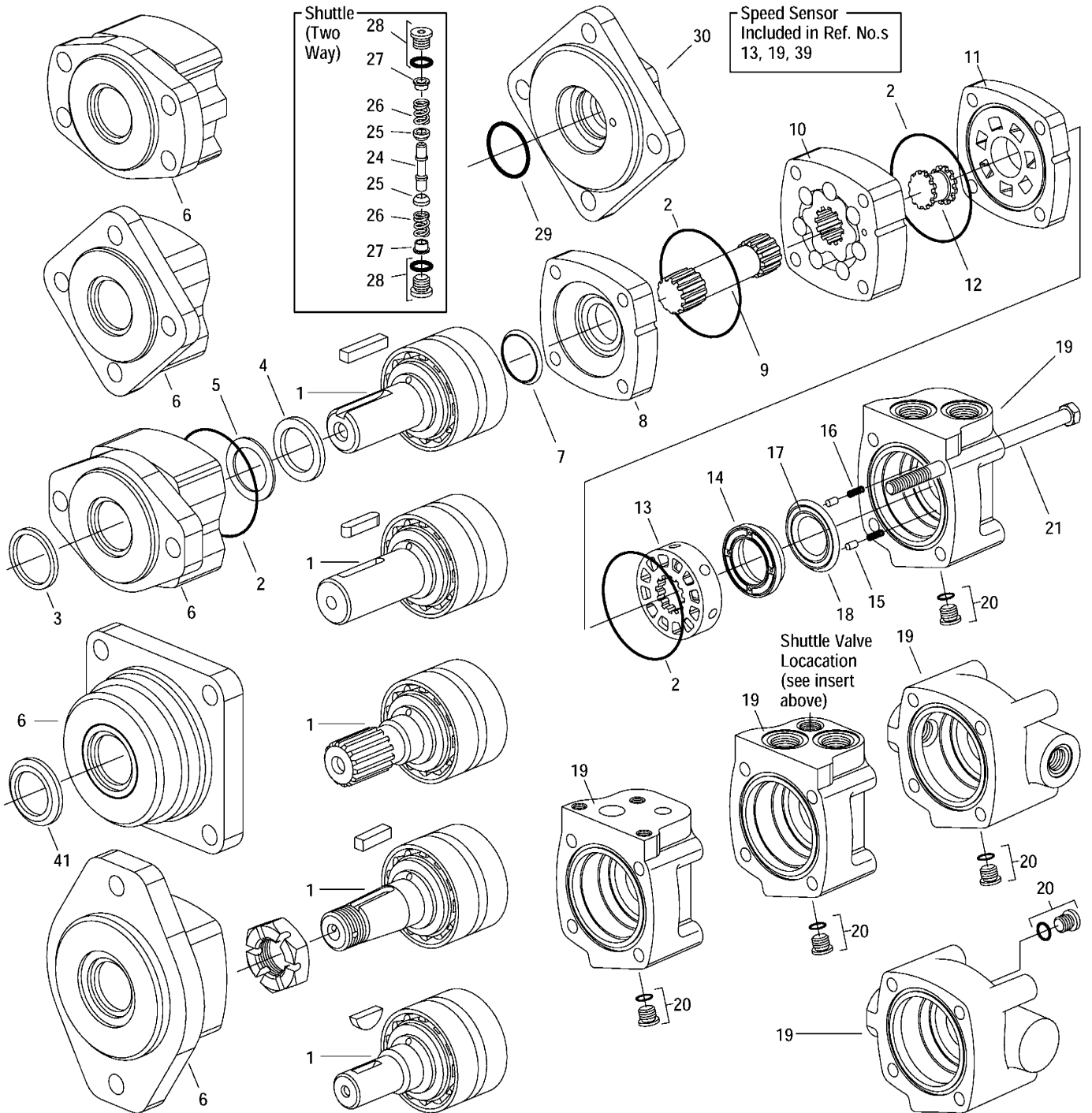
006



# Disc Valve Motors — 2000 Series



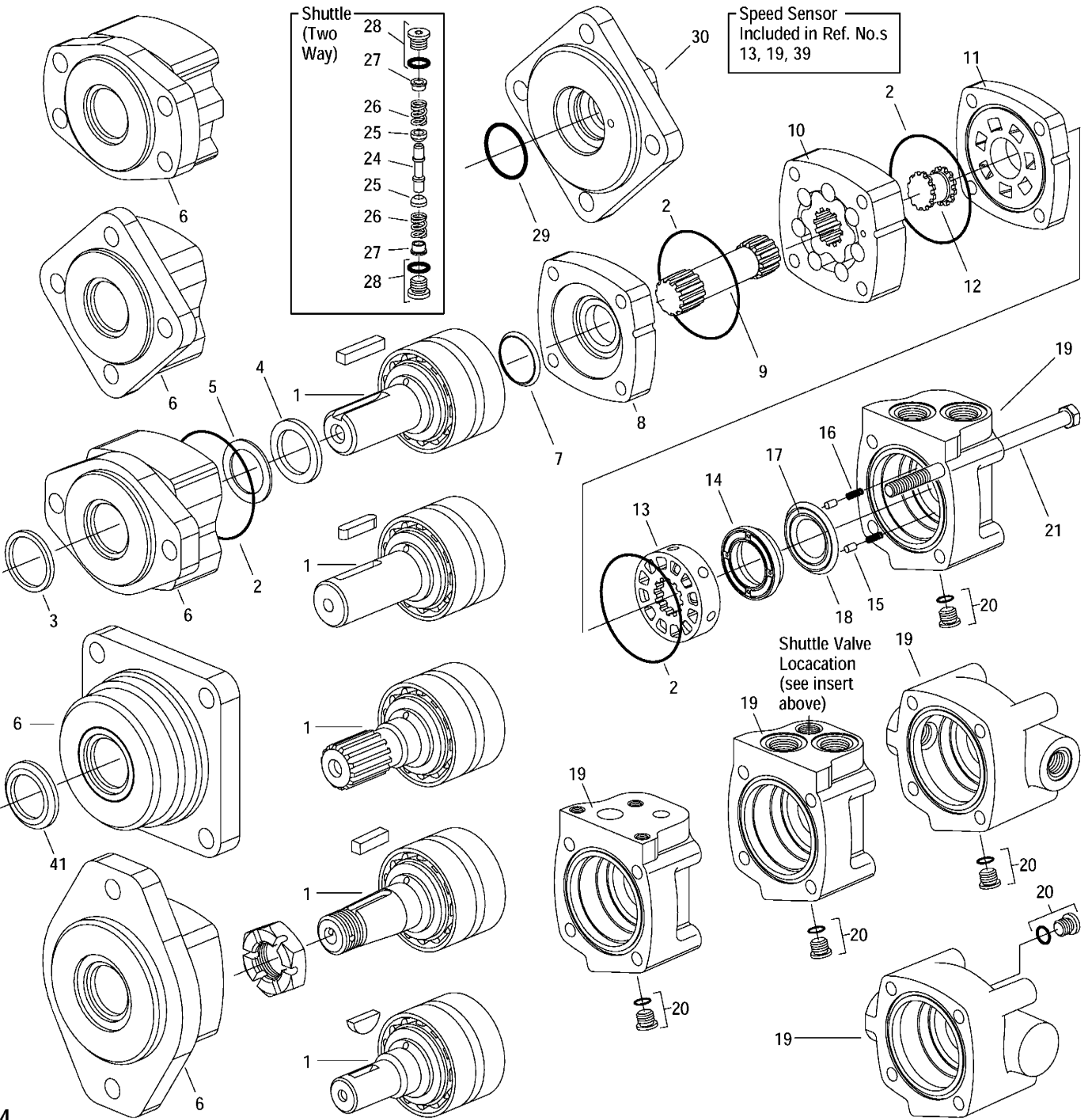
Displacement cm <sup>3</sup> /r [in <sup>3</sup> /r]	Drive, Main Item No. 9 —Part No./Length		Geroler® Item No. 10 —Part No./Width		Screw, Cap (Standard/Wheel) Item No. 21 —Part No./Length		Screw, Cap ( Bearingless) Item No. 21 —Part No./Length	
	Part No.	mm [inch]	Part No.	mm [inch]	Part No.	mm [in.]	Part No.	mm [in.]
80 [ 4.9]	21371-009	76,2 [3.00]	21625-001	17,8 [ .70]	14384-004	127,3 [5.01]	14384-001	108,2 [4.26]
100 [ 6.2]	21371-010	80,8 [3.18]	21625-002	22,5 [ .88]	14384-006	135,4 [5.33]	14384-002	113,0 [4.45]
130 [ 8.0]	21371-004	87,2 [3.43]	21625-003	28,9 [1.14]	14384-007	138,4 [5.45]	14384-003	121,1 [4.77]
160 [ 9.6]	21371-004	87,2 [3.43]	21625-004	28,9 [1.14]	14384-007	138,4 [5.45]	14384-003	121,1 [4.77]
195 [11.9]	21371-005	94,0 [3.70]	21625-005	35,6 [1.40]	14384-008	144,8 [5.70]	14384-004	127,3 [5.01]
245 [14.9]	21371-006	103,1 [4.06]	21625-006	44,7 [1.76]	14384-010	154,9 [6.10]	14384-007	138,4 [5.45]
305 [18.7]	21371-007	114,4 [4.51]	21625-007	56,0 [2.21]	14384-012	164,5 [6.48]	14384-008	144,8 [5.70]
395 [24.0]	21371-008	130,4 [5.13]	21625-008	72,0 [2.83]	14384-014	182,4 [7.18]	14384-012	164,5 [6.48]
490 [29.8]	21371-012	147,9 [5.82]	21625-010	89,4 [3.52]	14384-019	199,6 [7.86]	14384-014	182,4 [7.18]



Item No.	Part Number	Description	Quantity per Unit		
			Std.	Whl.	Brgl.
1	21618-001	Shaft and Bearing Kit (1 inch Straight)	1	1	
	14193-000	Key (for 1 Straight Shaft)	1	1	
	21618-002	Shaft and Bearing Kit (1-1/4 inch Straight)	1	1	
	14392-008	Key (for 1-1/4 Straight Shaft)	1	1	
	21618-003	Shaft and Bearing Kit (1-1/4 in. Tapered)	1	1	
	21618-032	Shaft and Bearing Kit (1-1/4 in. Tapered — <i>Special shaft for Seal Guard</i> )		1	
	14163-000	Nut, Hex (1-1/4 in. Tapered Shaft)	1	1	
	14392-006	Key (for 1-1/4 in. Tapered Shaft)	1	1	
	21618-004	Shaft and Bearing Kit (1-1/4 in. Splined 14T)	1	1	
	21618-005	Shaft and Bearing Kit (1 in. 6B Splined)	1	1	
	21618-007	Shaft and Bearing Kit (7/8 Splined 13T)	1	1	
	21618-023	Shaft and Bearing Kit (32 mm Straight)	1	1	
	14460-005	Key (for 32 mm Straight Shaft)	1	1	
	21618-026	Shaft and Bearing Kit (25 mm Straight)	1	1	
		14462-006	Key (for 25 mm Straight Shaft)	1	1
O† 2	14559-006	Seal	4	4	3
† 3	9121-001	Seal, Exclusion	1	1	
† 4	9057-009	Seal, Shaft	1	1	
† 5	7382-000	Ring, Back-up	1	1	1
6	21578-004	Housing, Bearing, SAE A (Two Bolt)	1		
	21578-003	Housing, Bearing, Wheel Mount (Four Bolt)		1	
	21578-015	Housing, Bearing, Wheel Mount (Four Bolt) — <i>Compatible for HAYES Brake</i>		1	
	21578-001	Housing, Bearing, SAE B (Two Bolt)	1		
	21578-005	Housing, Bearing, Diagonal (Four Bolt)	1		
	21578-008	Housing, Bearing, Magneto (Four Bolt)	1		
	21578-016	Housing, Bearing, Wheel Mount (Four Bolt) — <i>with Seal Guard Groove</i>		1	
† 7	9050-000	Seal, Shaft Face	1	1	
8	22102-000	Plate, Wear	1	1	
9	*	Drive, Main	1	1	1
10	*	Geroler®	1	1	1
11	22134-000	Plate, Valve	1	1	1
12	8433-000	Drive, Valve	1	1	1
13	21466-000	Valve	1	1	1
	201307-002	Valve — <i>Speed Sensor Valve</i>	1	1	1
14	8915-000	Balance Ring	1	1	1
15	14351-000	Pin, Balance Ring	2	2	2
16	7383-000	Spring, Compression	2	2	2
O† 17	9049-001	Seal, Face, Inner	1	1	1
O† 18	9135-002	Seal, Face, Outer	1	1	1
19	21564-001	Housing, Valve (7/8-14 Str. Thrd. O-ring Ports — 7/16-20 Case Drain Port)	1	1	1
	21564-012	Housing, Valve (7/8-14 Str. Thrd. O-ring Ports — 7/16-20 Case Drain Port) — <i>Speed Sensor Housing</i>	1	1	1
	21564-002	Housing, Valve (1 - 1/16-12 180° Apart — 7/16-20 Case Drain Port)	1	1	1
	21564-016	Housing, Valve (1 - 1/16-12 180° Apart — 7/16-20 Case Drain Port) — <i>Speed Sensor Housing</i>	1	1	1
	21564-007	Housing, Valve (G 1/2 (BSP) Ports — G 1/4 (BSP) Case Drain Port)	1	1	1
	21564-015	Housing, Valve (G 1/2 (BSP) Ports — G 1/4 (BSP) Case Drain Port) — <i>Speed Sensor Housing</i>	1	1	1
	21564-010	Housing, Valve (7/8-14 Str. Thrd. O-ring Ports — 7/16-20 Case Drain Port) — <i>Shuttle Valve Housing</i>	1	1	1
	21564-004	Housing, Valve (Manifold Mount — 7/16-20 Case Drain Port)	1	1	1
	21564-008	Housing, Valve (Manifold Mount — G 1/4 (BSP) Case Drain Port)	1	1	1
	21564-006	Housing, Valve (7/8-14 Str. Thrd. O-ring End Ports — 7/16-20 Case Drain Port)	1	1	1

Continued on Page 5

Displacement cm <sup>3</sup> /r [in <sup>3</sup> /r]	Drive, Main Item No. 9 —Part No./Length		Geroler® Item No. 10 —Part No./Width		Screw, Cap (Standard/Wheel) Item No. 21 —Part No./Length		Screw, Cap ( Bearingless) Item No. 21 —Part No./Length	
	Part No.	mm [inch]	Part No.	mm [inch]	Part No.	mm [in.]	Part No.	mm [in.]
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305 [18.7]	21371-007	114,4 [4.51]	21625-007	56,0 [2.21]	14384-012	164,5 [6.48]	14384-008	144,8 [5.70]
395 [24.0]	21371-008	130,4 [5.13]	21625-008	72,0 [2.83]	14384-014	182,4 [7.18]	14384-012	164,5 [6.48]
490 [29.8]	21371-012	147,9 [5.82]	21625-010	89,4 [3.52]	14384-019	199,6 [7.86]	14384-014	182,4 [7.18]



Continued from Page 3

Item No.	Part Number	Description	Quantity per Unit		
			Std.	Whl.	Brgl.
20	9072-003	Plug Assembly (7/16-20 Case Drain Plug)	1	1	1
0†	250003-904	O-ring	1	1	1
	9170-002	Plug Assembly (G 1/4 (BSP) Case Drain Plug)	1	1	1
0†	250003-904	O-ring	1	1	1
21	*	Screw, Cap	4	4	4
24	8566-000	Piston Shuttle	1	1	1
25	8567-000	Poppet	2	2	2
26	230079-000	Spring	2	2	2
27	8755-000	Sleeve, Dash Pot	2	2	2
28	9072-005	Plug Assembly (9/16-18 Shuttle Valve End)	2	2	2
	250003-906	O-ring	2	2	2
0 29	15127-000	Seal			1
30	21569-000	Seal, Flange, Mounting			1
39	201137-001	Sensor, Speed — 127mm [5.0 in.] Lead Wire		1	
41	14628-002	Guard, Seal		1	
	61258-000	Seal Kit (Std. and Whl. Motors)—Contains Parts Indicated by †			
	61259-000	Seal Kit (Bearingless Motor Only)—Contains Parts Indicated by 0			
	61263-000	Seal Kit, Viton* *(Std. and Whl. Motors)—Contains Parts Indicated by †			
	61261-000	Seal Kit, Viton* *(Bearingless Motor Only)—Contains Parts Indicated by 0			
	61289-000	Seal Kit, Wheel Motor with Seal Guard—Contains Parts Indicated by † and Seal Guard (Item No. 41)			

Viton® is a Registered Trade Name of Dupont Corporation.

\*—See Chart on Opposite Page.

\* \*—Viton Seal Part Numbers Differ from Part Numbers Shown above. Note: Backup Ring Item 5 is not used with Viton Shaft Seal Item 4.

Product Numbers—2000 Series

Use digit prefix —104-, 105-, or 106- plus four digit number from charts for complete product number—Example 106-1043.

Mounting	Shaft	Ports	Displacement cm <sup>3</sup> /r [ in <sup>3</sup> /r ] and Product Number								
			80 [ 4.9]	100 [ 6.2]	130 [ 8.0]	160 [ 9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
2 Bolt SAE A Flange	1 inch Straight	7/8-14 O-ring Staggered	104-1001	-1002	-1003	-1004	-1005	-1006	-1007	-1143	—
		1-1/16—12 O-ring 180° Apart	104-1037	-1038	-1039	-1040	-1041	-1042	-1043	-1044	—
	1-1/4 Inch Straight	7/8-14 O-ring Staggered	104-1022	-1023	-1024	-1025	-1026	-1027	-1028	-1228	-1420
		1-1/16—12 O-ring 180° Apart	104-1061	-1062	-1063	-1064	-1065	-1066	-1067	-1068	-1421
	1-1/4 Inch 14 T Splined	7/8-14 O-ring Staggered	104-1029	-1030	-1031	-1032	-1033	-1034	-1035	-1229	-1422
		1-1/16—12 O-ring 180° Apart	104-1087	-1088	-1089	-1090	-1091	-1092	-1093	-1094	-1423
2 Bolt SAE B Flange	1-1/4 Inch Straight	7/8-14 O-ring Staggered	104-1200	-1201	-1202	-1203	-1204	-1205	-1206	-1207	—
	1-1/4 Inch 14 T Splined	7/8-14 O-ring Staggered	104-1208	-1209	-1210	-1211	-1212	-1213	-1214	-1215	—
	1 Inch SAE 6B Splined	7/8-14 O-ring Staggered	104-1193	-1194	-1195	-1196	-1197	-1198	-1199	—	—
	7/8 Inch SAE B Splined	7/8-14 O-ring Staggered	104-1216	-1217	-1218	-1219	-1220	-1455	—	—	—
Standard with 4 Bolt Square Flange	32 mm Straight	G 1/2 (BSP)	104-1384	-1385	-1386	-1387	-1388	-1389	-1390	-1391	-1546
	1-1/4 Inch 14 T Splined	G 1/2 (BSP)	104-1376	-1377	-1378	-1379	-1380	-1381	-1382	-1383	-1660
Wheel Motor	1-1/4 Inch Straight	7/8-14 O-ring Staggered	105-1022	1023	1024	1025	1026	1027	1028	1063	-1148
		1-1/16—12 O-ring 180° Apart	105-1052	1053	1054	1055	1056	1057	1058	1059	-1149
	32 mm Straight	G 1/2 (BSP)	105-1134	-1135	-1136	-1137	-1138	-1139	-1140	-1141	1177
	1-1/4 Inch Tapered	7/8-14 O-ring Staggered	105-1001	-1002	-1003	-1004	-1005	-1006	-1007	-1060	-1152
		1-1/16—12 O-ring 180° Apart	105-1071	-1072	-1073	-1074	-1075	-1076	-1077	-1078	—
	1-1/4 Inch 14 T Splined	7/8-14 O-ring Staggered	105-1029	-1030	-1031	-1032	-1033	-1034	-1035	-1096	—
1-1/16—12 O-ring 180° Apart		105-1079	-1080	-1081	-1082	-1083	-1084	-1085	-1086	—	
Bearingless		7/8-14 O-ring Staggered	106-1008	-1009	-1010	-1011	-1012	-1013	-1014	-1015	-1047
		G 1/2 (BSP)	106-1038	-1039	-1040	-1041	-1042	-1043	-1044	-1045	1063

106-1043



## Disc Valve Motors — 2000 Series

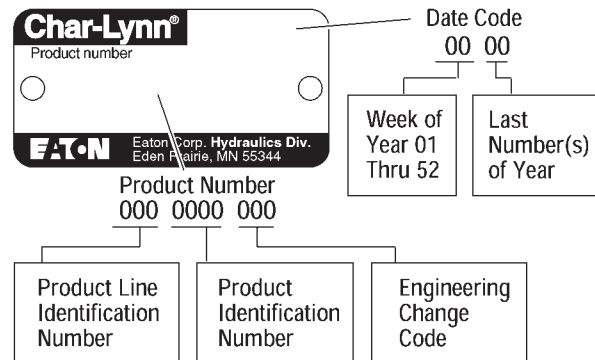
For Additional Literature Contact Eaton Corp. Hydraulics Division 15151 Highway 5 Eden Prairie, MN 55344.

- Specifications and performance data, Catalog No. 11-878.
- When servicing 2000 Series Motors refer to Repair Information No. 7-124. This repair manual lists tools required, and step by step disassembly and reassembly procedures.

### How to Order Replacement Parts

#### Each Order Must Include the Following:

1. Product Number
2. Date Code
3. Part Name
4. Part Number
5. Quantity of Parts



Eaton  
Fluid Power Group  
Hydraulics Business USA  
14615 Lone Oak Road  
Eden Prairie, MN 55344  
USA  
Tel: 952-937-9800  
Fax: 952-294-7722  
[www.eaton.com/hydraulics](http://www.eaton.com/hydraulics)

Eaton  
Fluid Power Group  
Hydraulics Business Europe  
Route de la Longeraie 7  
1110 Morges  
Switzerland  
Tel: +41 (0) 21 811 4600  
Fax: +41 (0) 21 811 4601

Eaton  
Fluid Power Group  
Hydraulics Business Asia Pacific  
11th Floor Hong Kong New World Tower  
300 Huaihai Zhong Road  
Shanghai 200021  
China  
Tel: 86-21-6387-9988  
Fax: 86-21-6335-3912



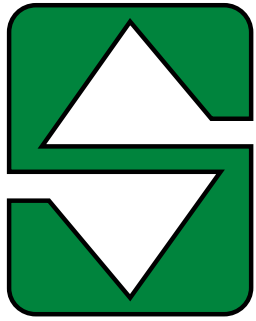
Powering Business Worldwide

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Supersedes 06-129  
January 2009

# History of Summers Manufacturing Co., Inc.

- 1965 – Summers Manufacturing is founded by Harley Summers, who purchases patent rights for Goebel truck and pickup hoists from the Goebel Brothers of Lehr, ND. These hoists, produced in Harley Summers' blacksmith shop the first year, were distributed nationwide by a Cincinnati, Ohio, dealer. With increasing sales, the company soon outgrows the small shop. Summers wins the Herman harrow contract, beginning the company's Herman culti-harrow line. Summers builds a 7,200 square-foot factory in Maddock to meet the demand for truck and pickup hoists, as well as Herman harrows.
- 1969 – Firm incorporates and becomes officially known as Summers Manufacturing Company, Inc.
- 1970 – Summers purchases rights to manufacture/market the Herman Harrow.
- 1973 – Company builds new 20,000 square-foot plant and offices in Maddock, adding a 20,000 square-foot assembly plant in the fall of 1975 (completed in January 1976), bringing total square footage of Maddock factories to 47,000.
- 1977 – Summers introduces the Agri-sprayer, used in conjunction with the Herman culti-harrow to incorporate herbicides and liquid fertilizer.
- 1980 – Company purchases manufacturing and distributing rights to Crown rockpickers from Crown Manufacturers of Regina, Saskatchewan. This forces another expansion project – a 26,000 square foot factory on a 24 acre site in Devils Lake, ND Industrial Park.
- 1981 – Company establishes a branch facility in Regina, Saskatchewan.
- 1982 – Devils Lake plant begins operations in January, manufacturing supersprayers and rockpickers. The Maddock factory begins producing the Superweeder, a combination cultivator and harrow.
- 1983 – Summers buys manufacturing and distributing rights to the Fargo Field Sprayer line from Mid America Steel (formerly Fargo Foundry), Fargo. This field sprayer line is manufactured at the Devils Lake plant. Harley Summers is selected North Dakota's small-businessman of the year by the Small Business Administration.
- 1984 – Herman Diamond Disk, a disk harrow made in a diamond shape to reduce blade breakage from rocks, comes off the assembly line.
- 1985 – Summers signs a contract with Melroe Company of Bismarck to obtain exclusive manufacturing rights to the Melroe harrow line.
- 1989 – Summers purchases TorMaster Company of Hordean, Manitoba, giving the company a line of rolling packer equipment, comprised of harrow packers and hydraulic fold coil packers.
- 1992 – A new engineering office/parts department is added to the Devils Lake factory.
- 1993 – Company adds two new products: a pickup-mounted sprayer with booms of 80 and 90 feet, and the Summers Superharrow, an extra-heavy-duty residue-management tool designed for the minimum and no-till farmer.
- 1994 – a 50 by 125 foot addition to the Maddock factory is completed. Construction begins on a 24,576 square-foot addition to the Devils Lake factory, which enables the company to increase production of truck-mounted and pull-type supersprayers and rockpickers.
- 1996 – 1500 square foot office area added to the Maddock plant. Company introduces Chisel Plow with floating hitch and 700# trip assembly.
- 1997 – 16,800 square foot warehouse in Maddock purchased from local business.
- 1999 - Company introduces the Ultimate suspended boom trailer sprayer with hydraulic folding booms. Additional sizes added to the Chisel Plow line, now ranging from 28' to 54'.
- 2000 - Company introduces the Supercoultter, the innovative solution for excessive field residue management on no-till, minimum-till, and conventional-till farming operations.
- 2001 - Cold storage building completed at Devils Lake. Company extends boom lengths up to 110 feet on the Ultimate Supersprayer.
- 2002 - Company adds a warehouse and service man in Aberdeen, SD.
- 2003 - Company introduces the Ultimate NT Supersprayer featuring a bolt on axle for easier adjustment, and a new family of tanks that feature a drainable sump and a common width dimension.
- 2004 - A 124 ft. x 310 ft. addition is added onto the current Devils Lake plant.
- 2005 - The Summers Superroller is added to the "Field Tested Tough" product line. Additional sizes of 56', 58' and 60' are added to the Superchisel line. Ultimate-Ultra NT Supersprayer introduced featuring 120' & 133' booms.
- 2006 - The Summers Coulter-Chisel, Rolling Choppers and 30' Superroller were included in product line.
- 2007 - 62' & 84' 5 Section Landrollers and a 20' Coulter-Chisel were introduced.
- 2008 - Disk-Chisels, ranging from 16' to 40' widths, are added to product line.
- 2009 – M105 and M108 Mounted Harrows added to selection of Mounted Attachments. SuperHarrow 2650, 50' SuperCoulter, Hydraulic Fold Rolling Chopper and 36" diameter Landrollers introduced.
- 2010 – Rolling Basket and 47' Diamond Disk added to product line. A 124 ft. x 310 ft. addition to Devils Lake factory built for a state of the art paint system.
- 2011 – Additional Supercoulter sizes were added along with larger tires for tillage implements. Ultimate and Ultra Supersprayers received an additional tank size of 1650 gallons. Front Caster Wheel option was made available for chisel implements.
- 2012 – 41', 46' & 53' Trail Type Landroller added to product line. Additional Superchisel sizes of 16' & 20' were added.
- 2013 – DT9530 added to product line. Internal Scraper in Rolling Baskets introduced. Finishing Coulter Gang becomes standard on the Diamond Disk and 2510 DT. Corporate offices opened at Devils Lake plant. New building and location for the Aberdeen warehouse.
- 2014 – Introduced the VRT2530 (Variable Rate Tillage).
- 2015 – Introduced the VT Flex Applicator and Spray Fill Xpress.

Summers distributes on a wholesale level to dealers and distributors throughout markets in North Dakota, South Dakota, Minnesota, Montana, Iowa, Washington, Idaho, Oregon, Utah, Colorado, Kansas, Nebraska, Oklahoma, Texas, Manitoba, Saskatchewan, Alberta, British Columbia, Kazakhstan, Russia and Australia, making it an international company.



# SUMMERS®

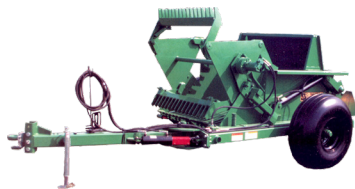
... Field Tested TOUGH!



## Tillage



## Rock Picker



## Land Rollers/Packers



## Cultivators/Harrows



## Mounted Attachments



## Sprayers



1-800-732-4347 • [www.summersmfg.com](http://www.summersmfg.com)