

# POWERMMASTER™ CAPSTAN DRIVE

By **RAMSEY**



## 16K HYDRAULIC PLANETARY CAPSTAN DRIVE



**CAUTION: READ AND UNDERSTAND THIS MANUAL BEFORE INSTALLATION AND OPERATION OF CAPSTAN DRIVE. SEE WARNINGS!**

# TABLE OF CONTENTS

FORWORD.....	1
WARRANTY INFORMATION.....	1
SPECIFICATIONS.....	1
WARNINGS.....	1
MOUNTING INSTRUCTION.....	2
CAPSTAN SAFEGUARD INFORMATION.....	2
MAINTENANCE.....	2
HYDRAULIC SYSTEM REQUIREMENTS.....	3
HYDRAULIC CIRCUIT.....	3
TROUBLE SHOOTING.....	4
OVERHAUL INSTRUCTIONS.....	5-9
CARRIER ASSEMBLY INSTRUCTION.....	10
DIMENSIONAL DRAWING.....	11
PARTS DRAWING AND PARTS LIST.....	12-13
LIMITED WARRANTY.....	BACK COVER

## RAMSEY HYDRAULIC PLANETARY CAPSTAN DRIVE 16K

### **PLEASE READ THIS MANUAL CAREFULLY**

This manual contains useful ideas for obtaining the most efficient operation from your Ramsey Capstan Drive, and safety procedures one needs to know before operating a Ramsey Winch. Do not operate this winch until you have carefully read and understand the "WARNING" and "OPERATION" sections of this manual.

### **WARRANTY INFORMATION**

Ramsey products are designed and built to exacting specifications. Great care and skill go into every product we make. If the need should arise, warranty procedure is outlined on the back of your self-addressed postage paid warranty card. Please read and fill out the enclosed warranty card and send it to Ramsey Winch Company. If you have any problems with your product, please follow instructions for prompt service on all warranty claims. Refer to back page for limited warranty.

### **SPECIFICATIONS\***

Rated Line Pull (lbs.).....	4,000
(On 7" Dia. Drum) (kgs.).....	1,813
Torque Output (in $\diamond$ lbs.).....	16,000
(N $\diamond$ m).....	1,808
Gear Reduction.....	6:1
Weight .....	110 lbs. (50 kgs.)
Line speed .....	140 FPM (42.6MPM)
(at 20 GPM)	

These specifications are based on a 9.8 Cu. In/Rev. motor.

### **WARNINGS:**

**STAY OUT FROM UNDER AND AWAY FROM RAISED LOADS. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.**

**DO NOT EXCEED MAXIMUM LINE PULL. RATINGS SHOWN IN TABLE.**

**DO NOT USE CAPSTAN TO LIFT, SUPPORT, OR OTHERWISE TRANSPORT PEOPLE.**

## **CAPSTAN DRIVE MOUNTING**

The drive housing has six (6) through drilled holes for 5/8 in. capscrews and four (4) holes drilled and tapped to  $\frac{3}{4}$  - 10UNC that can be used for mounting. The drive can be either flange mounted using the four holes in the face of the housing, or surface mounted using the four tapped holes. A minimum of four (4) grade 5 or better fasteners should be used.

## **CAPSTAN SAFEGUARDS AND OPERATION**

The capstan drive is equipped with a dual brake valve cartridge; therefore, the capstan may be operated in either direction. The rope can be wrapped around the capstan in either direction.

To install the bayonet type capstan, push the capstan onto the extension shaft, against spring tension, then turn counter-clockwise (viewed from the outside) to the stop. Release the capstan and verify that the spring has pushed the capstan outward into the lock position.

## **MAINTENANCE**

Adhering to the following maintenance schedule will keep your capstan in top condition and performing as it should with a minimum of repair.

### **A. WEEKLY**

1. Check the oil level and maintain it to the oil level plug. If oil is leaking out, determine location and repair.
2. Check the pressure relief plug in top of the gear housing. Be sure that it is not plugged.

### **B. MONTHLY**

1. Check the capstan mounting bolts. If any are missing, replace them and securely tighten any that are loose. Use grade 5 or better bolts.
2. Inspect the cable. If the cable has become frayed with broken strands, replace immediately.

### **C. ANNUALLY**

1. Drain the oil from the capstan annually or more often if winch is used frequently.
2. Fill the capstan to the oil level plug with clean kerosene. Run the capstan a few seconds with no load in the reel in direction. Drain the kerosene from the capstan.
3. Refill the capstan to the oil level plug with all purpose SAE 80W-140 gear oil.

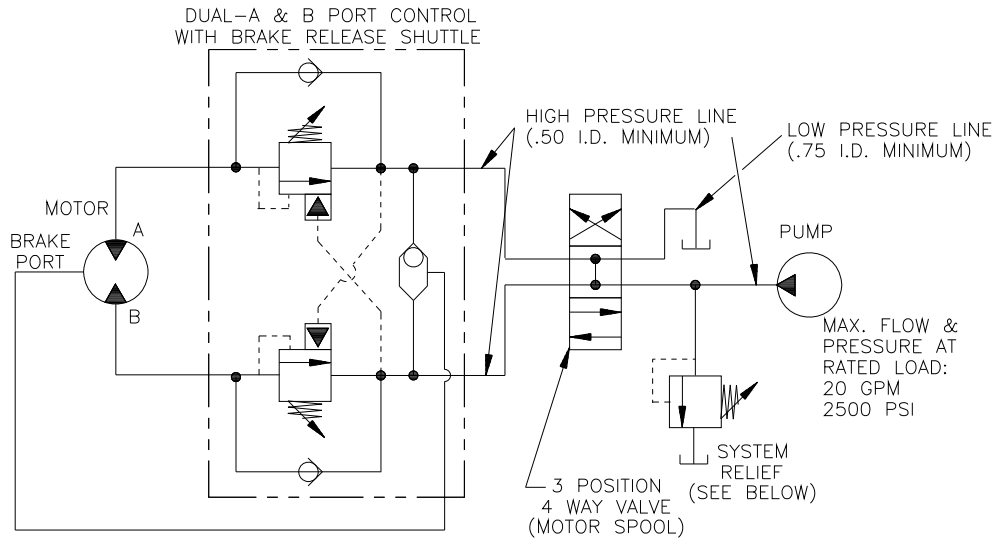
# HYDRAULIC SYSTEM REQUIREMENTS

Refer to the performance charts below to properly match your hydraulic system to the capstan performance. The charts consist of: (1) first layer line pull (LB) vs. working pressure (PSI), (2) first layer line speed (FPM) vs. flow (GPM), and (3) relief valve setting (PSI) vs. flow (GPM). A motor spool directional control valve is required.

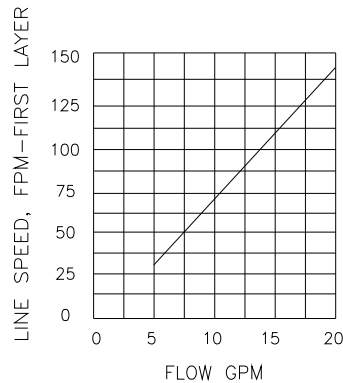
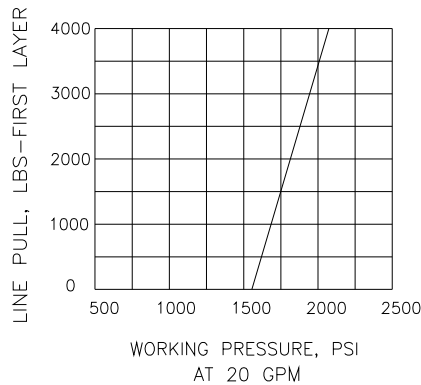
**SYSTEM REQUIREMENTS:**  
**2500 PSI RELIEF VALVE SETTING**  
**20 GPM FLOW RATE\***  
**10 MICRON NOMINAL FILTRATION**

**\*CAUTION: DO NOT EXCEED 20 G.P.M. IF EXCEEDED, MOTOR AND WINCH MAY BE DAMAGED**

## TYPICAL LAYOUT



## PERFORMANCE CHARTS



### PERFORMANCE WITH 9.8 CU. IN. HYDRAULIC MOTOR

# TROUBLE SHOOTING GUIDE

CONDITIONS	POSSIBLE CAUSE	CORRECTION
<b>CAPSTAN WILL NOT PULL MAXIMUM LOAD</b>	<ol style="list-style-type: none"> <li>1. System relief valve may be set too low</li> <li>2. Low Hydraulic Oil</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase relief valve setting until recommended pressure is obtained.</li> <li>2. Check/Fill oil in reservoir</li> </ol>
<b>SLOW LINE SPEED</b>	<ol style="list-style-type: none"> <li>1. Relief valve may be clogged</li> <li>2. Low Hydraulic Oil</li> <li>3. Low Hydraulic System Flow rate.</li> <li>4. Motor worn out</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove/Clean relief valve. Re-Install valve and reset pressure</li> <li>2. Check/Fill reservoir</li> <li>3. Check flow rate. Refer to Page 3 Hydraulic system requirements.</li> <li>4. Replace motor</li> </ol>
<b>EXCESSIVE NOISE</b>	<ol style="list-style-type: none"> <li>1. Hydraulic system flow too high</li> </ol>	<ol style="list-style-type: none"> <li>1. Check flow rate. Refer to Page 3 Hydraulic system requirements.</li> </ol>

## INSTRUCTIONS FOR OVERHAUL 16K CAPSTAN

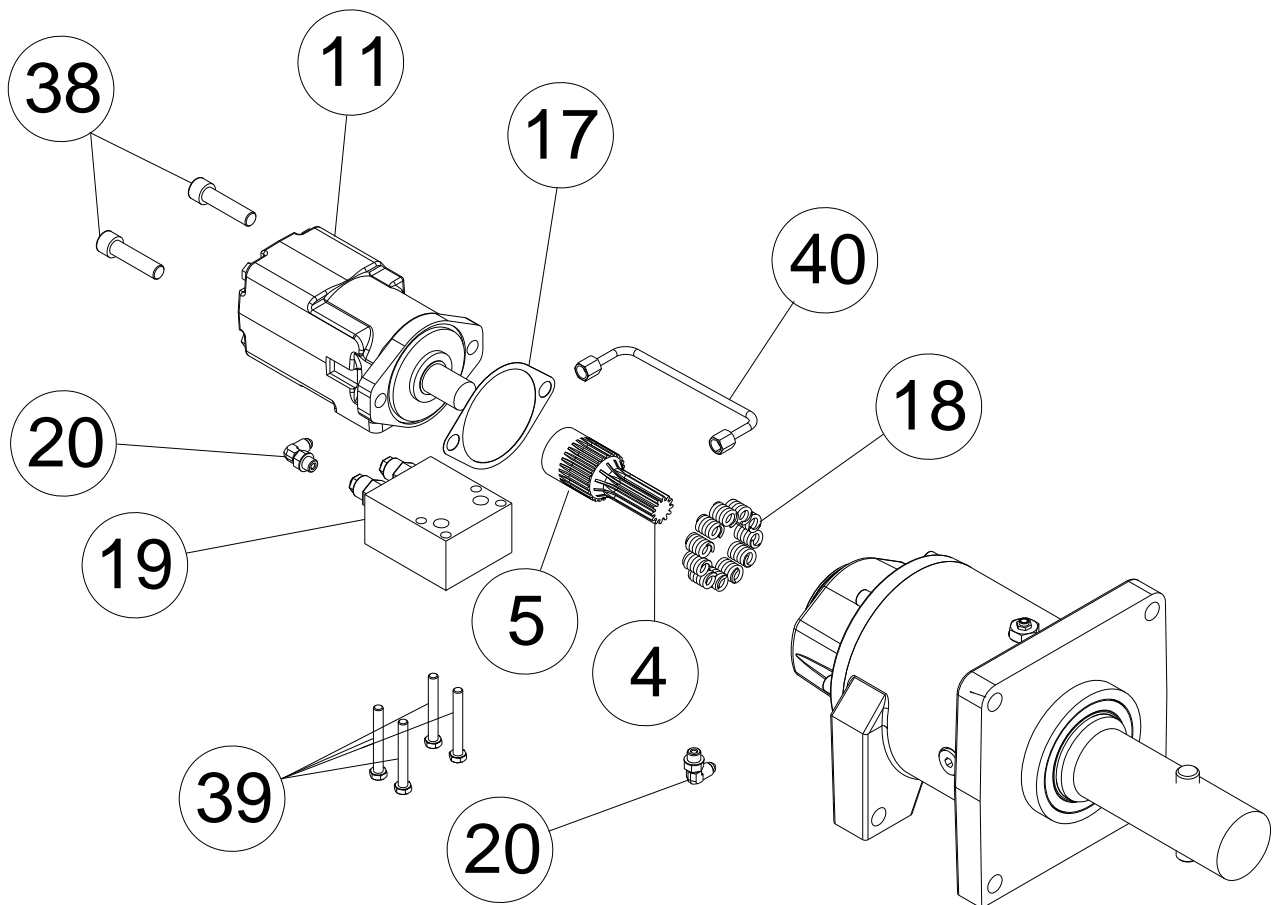
Take note of mounting configurations for proper mounting of parts during re-assembly. Replace all gaskets, o-rings, and seals during re-assembly.

Disconnect tube (item #40) from elbow fittings (items #20) on bottom of end bearing and counterbalance valve (item #19). Remove motor (item #11) from end bearing by slowly unscrewing capscrews (items #38). **CAUTION: MOTOR IS UNDER SPRING PRESSURE.**

Remove springs (items #18) from pockets and inspect for damage.

Replace gasket (item #17).

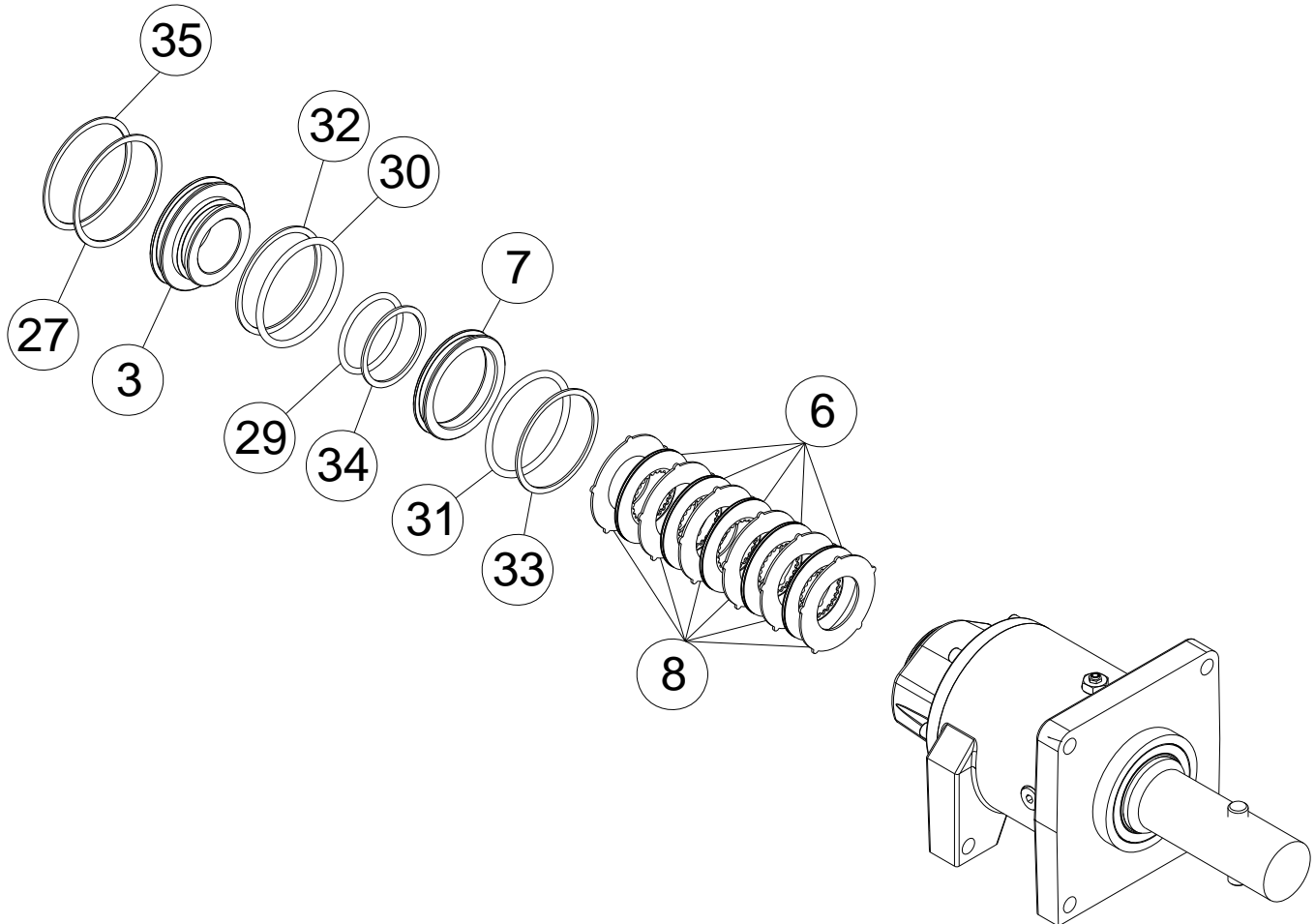
Remove coupling and input shaft (item #4 and #5) from end bearing. Examine coupling for signs of wear, replace if necessary. If necessary, remove counterbalance valve from motor by removing capscrews (items #39).



Remove retaining rings (items #27 and 35) with screwdriver.

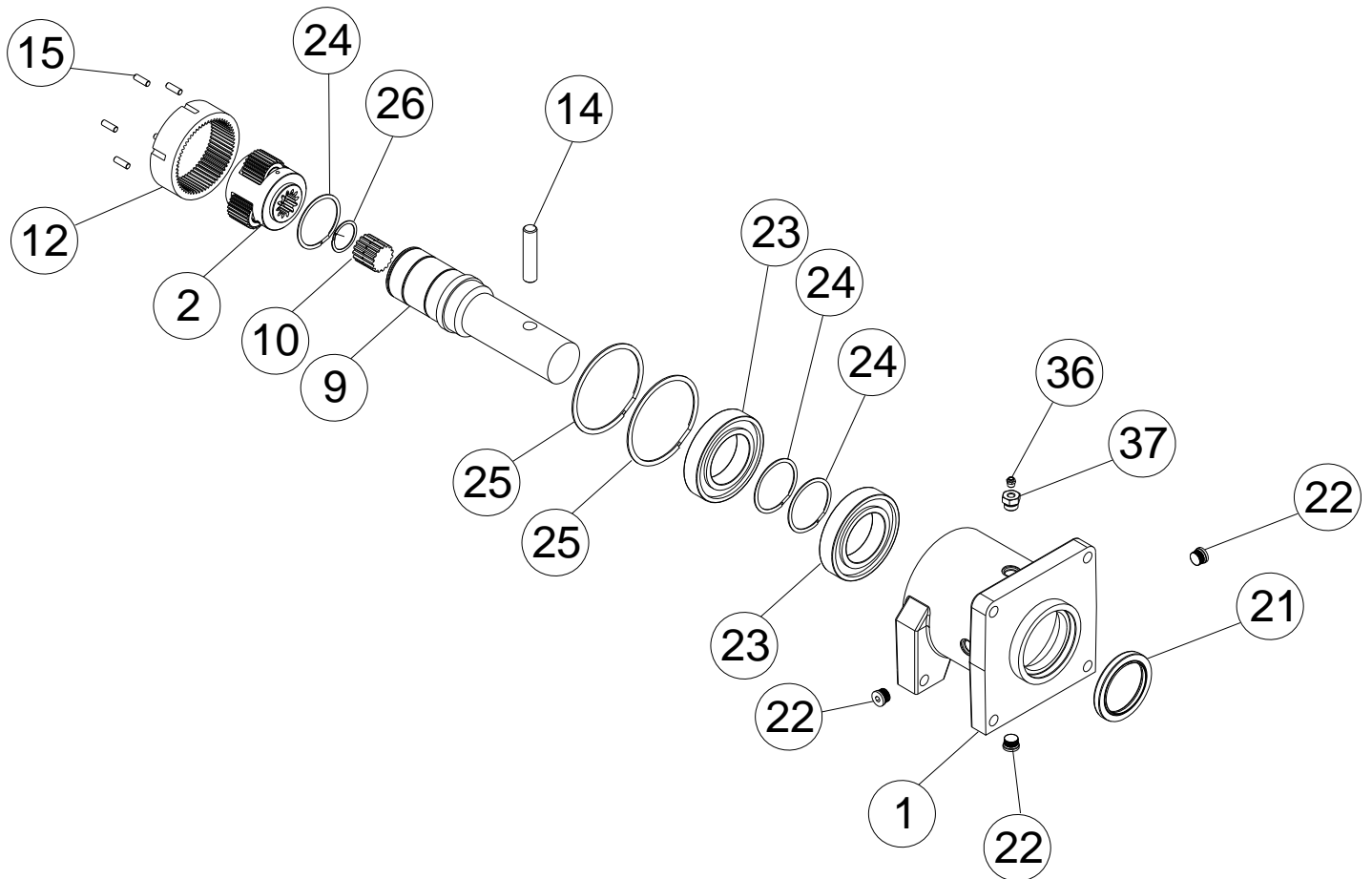
Remove brake parts from end bearing. NOTE POSITION OF O-RINGS AND BACKUP RINGS BEFORE REMOVAL. Examine brake discs (items #6) and stators (items #8) for signs of wear, and replace if necessary.

Examine o-rings (items #29 and 30) and backup rings (items #32 and 34) in brake piston (item #3), as well as o-ring (item #31) and backup ring (item #33) in backup brake piston (item #7) for signs of wear. Remove o-rings and backup rings from grooves in brake piston or backup brake piston and replace if necessary.





Remove the carrier assembly (item #2), input coupling (item #10), and retaining ring (item #26).  
 Remove ring gear (item #12) and dowel pins (item #15).  
 Using a screwdriver, remove the retaining rings (item#25) from the gear housing (item #1)  
 Remove pin (item #14) from output shaft (item#9)  
 Using a soft hammer, gently tap the output shaft (item#9) from housing (item #1).  
 Bearings (item #23) can be removed from output shaft (item #9) by removing retaining rings (item #24)  
 Oil seal (item #21) should be inspected and replaced if necessary.



Set winch with gear housing end down on work surface.

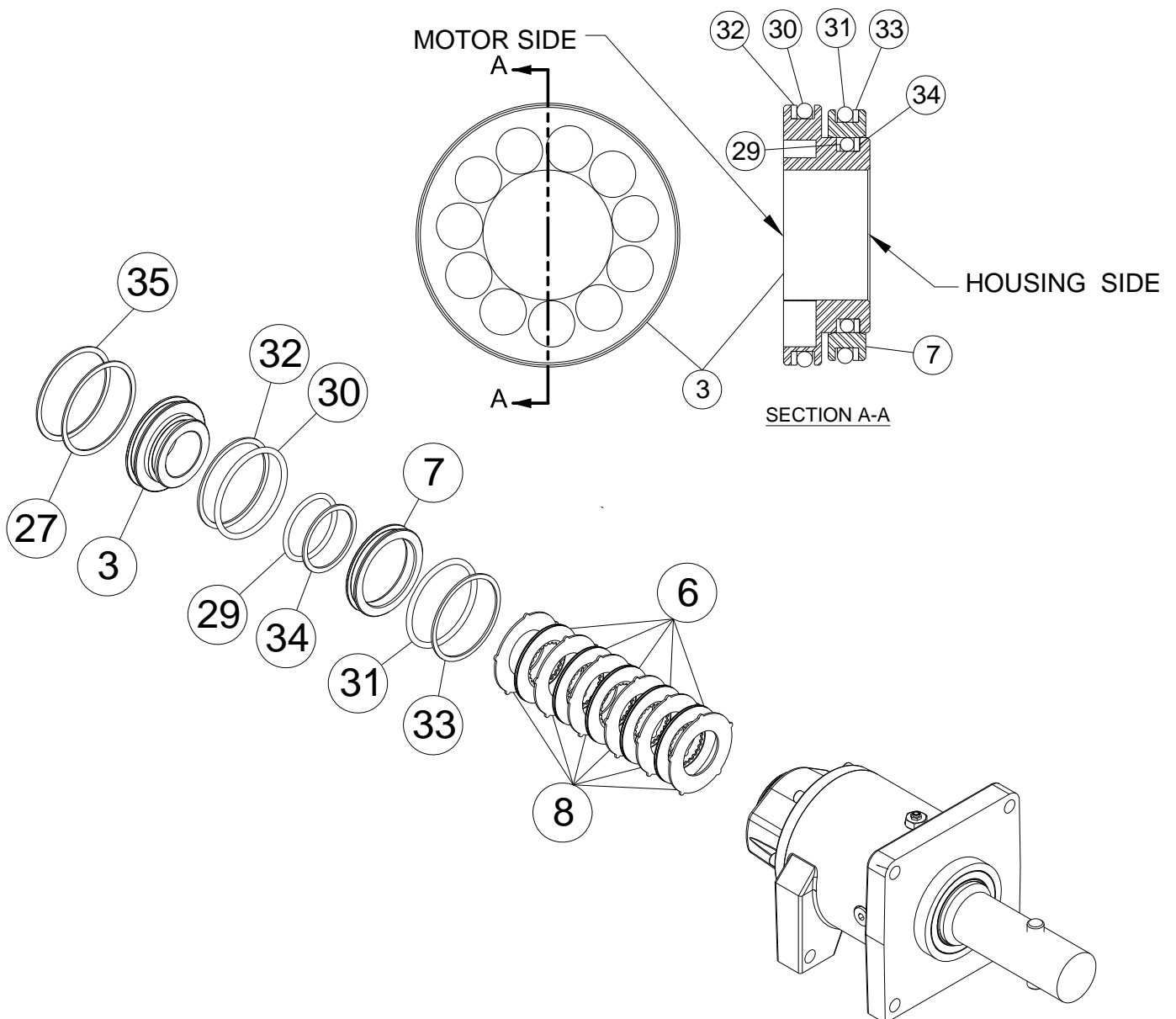
Install well-oiled o-rings and backup rings into grooves on outside of brake piston and backup brake piston as shown in cross-section A-A below.

Piston, backup piston, brake discs and stators must be clean and free of grease and oil.

Insert brake discs (item #6) and stators (item #8) into gear end alternating, with stators first and last.

Insert backup brake piston (item #7) into motor end and insert brake piston (item #3) into it. **Apply even pressure on piston when installing.**

Install retaining rings (item #27 and 35) into grooves in motor end housing. **NOTE: (Item #27) is thicker than (item #35)**



Insert springs (item #18) into pockets in back of brake piston.

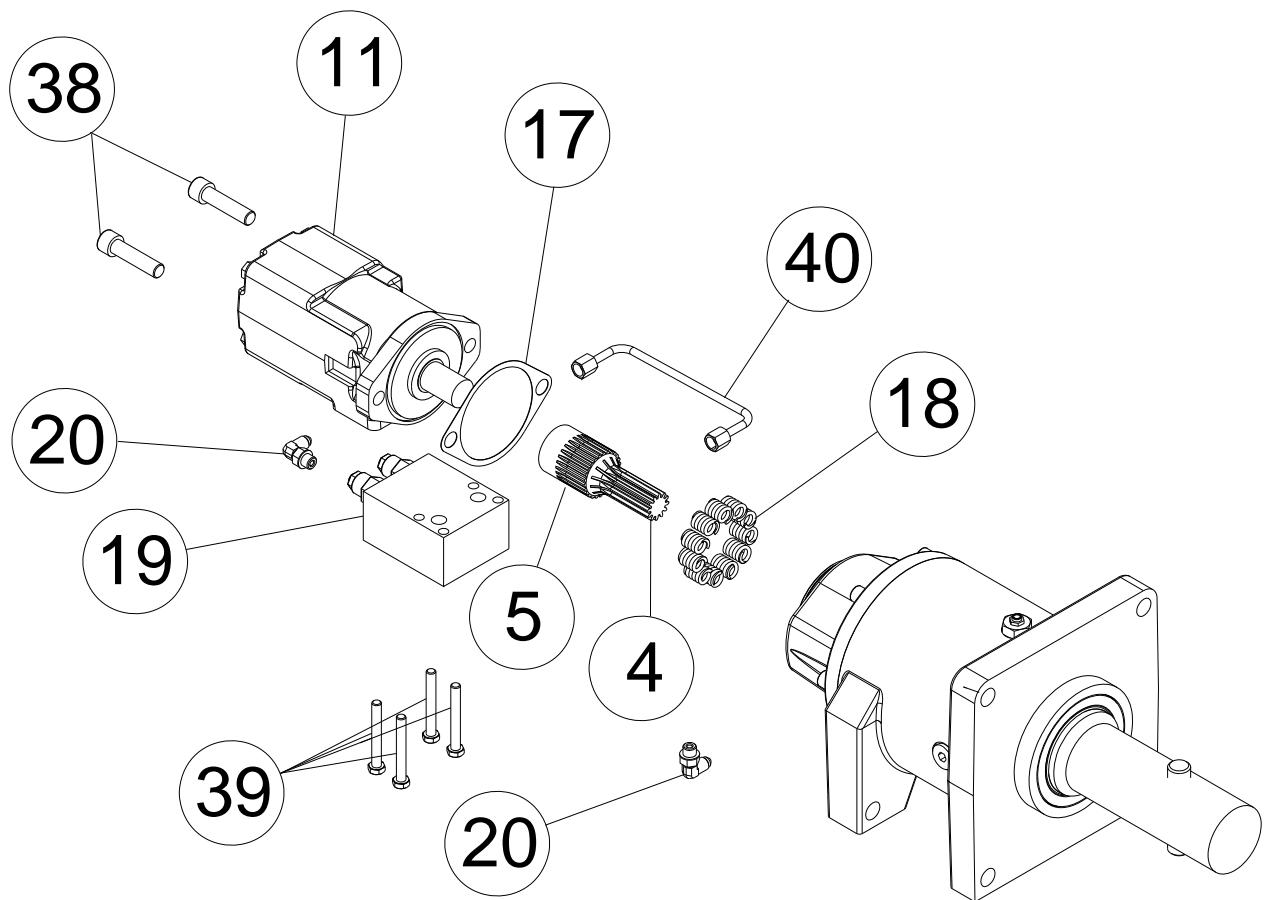
Insert motor coupling (item #4) , engaging it with input shaft (item #5).

Place gasket (item #17) on mounting surface of motor (item #11). Slide motor shaft into coupling. Attach motor to motor end bearing housing using (2) capscrews (item #38). Evenly tighten to 49 ftlbs. (66 Nm) torque.

Install the counterbalance valve (item #19) to the motor using (4) capscrews (item #38). Tighten to 17 ft-lbs (23 Nm).

Securely connect fittings (item #20) to motor end housing and counterbalance valve, and connect tube assembly (item #40) to fittings.

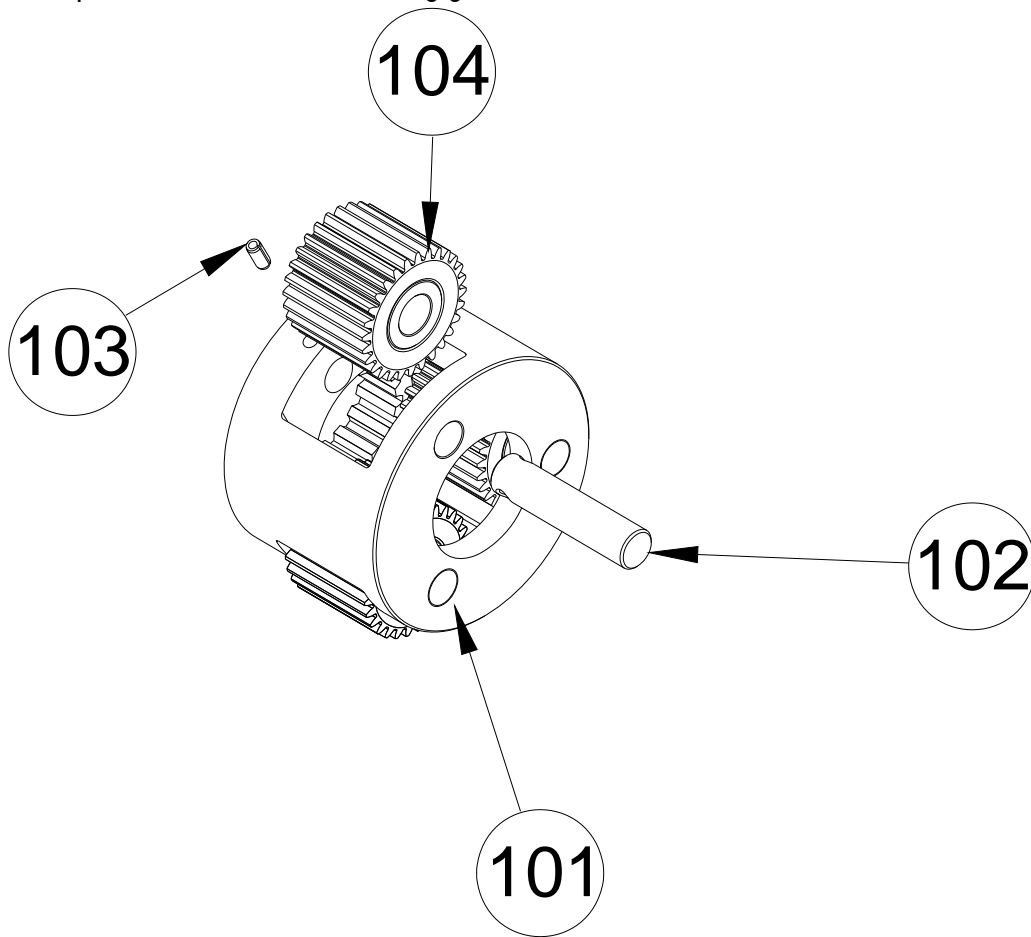
Apply at least 550 PSI hydraulic system pressure to brake and verify that brake releases.



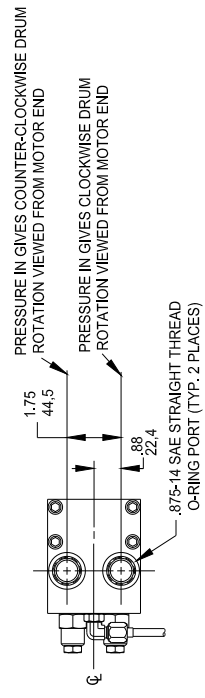
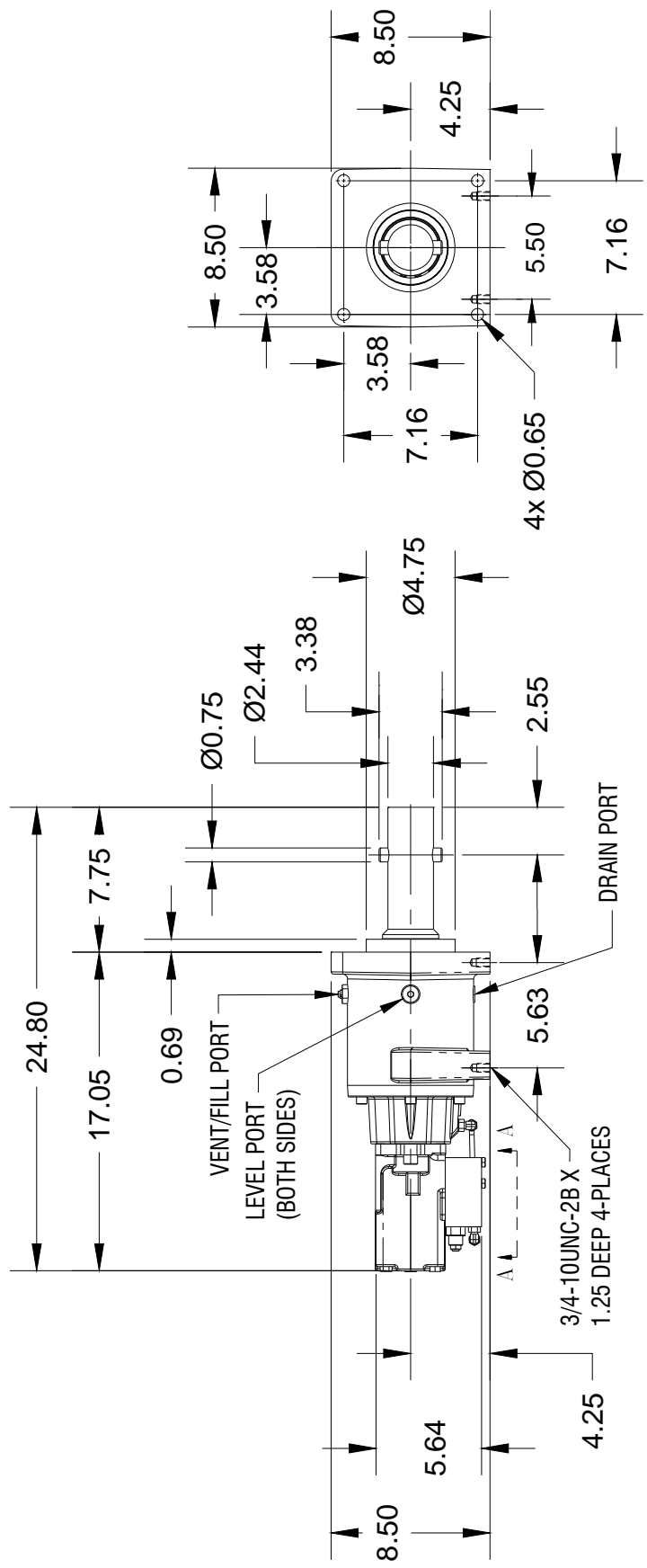
# DISASSEMBLY OF CARRIER ASSEMBLY

Carrier assemblies may be purchased as a complete assembly (see pg.16 ) or parts may be purchased individually (see pg 13). If purchasing individual parts, it will be necessary to disassemble the gear carrier as outlined below.

1. Carefully drive roll pin #103 into carrier pin #102 so that it is captured within carrier pin #102 but not touching the opposite side of the carrier #101.
2. Tap carrier pin #102 to remove it from the carrier #101.
3. Remove planet gear assembly#104 from the carrier #101.
4. Remove the roll pin #103 from the carrier pin #102.
5. Repeat this process for the two remaining gears in the carrier.



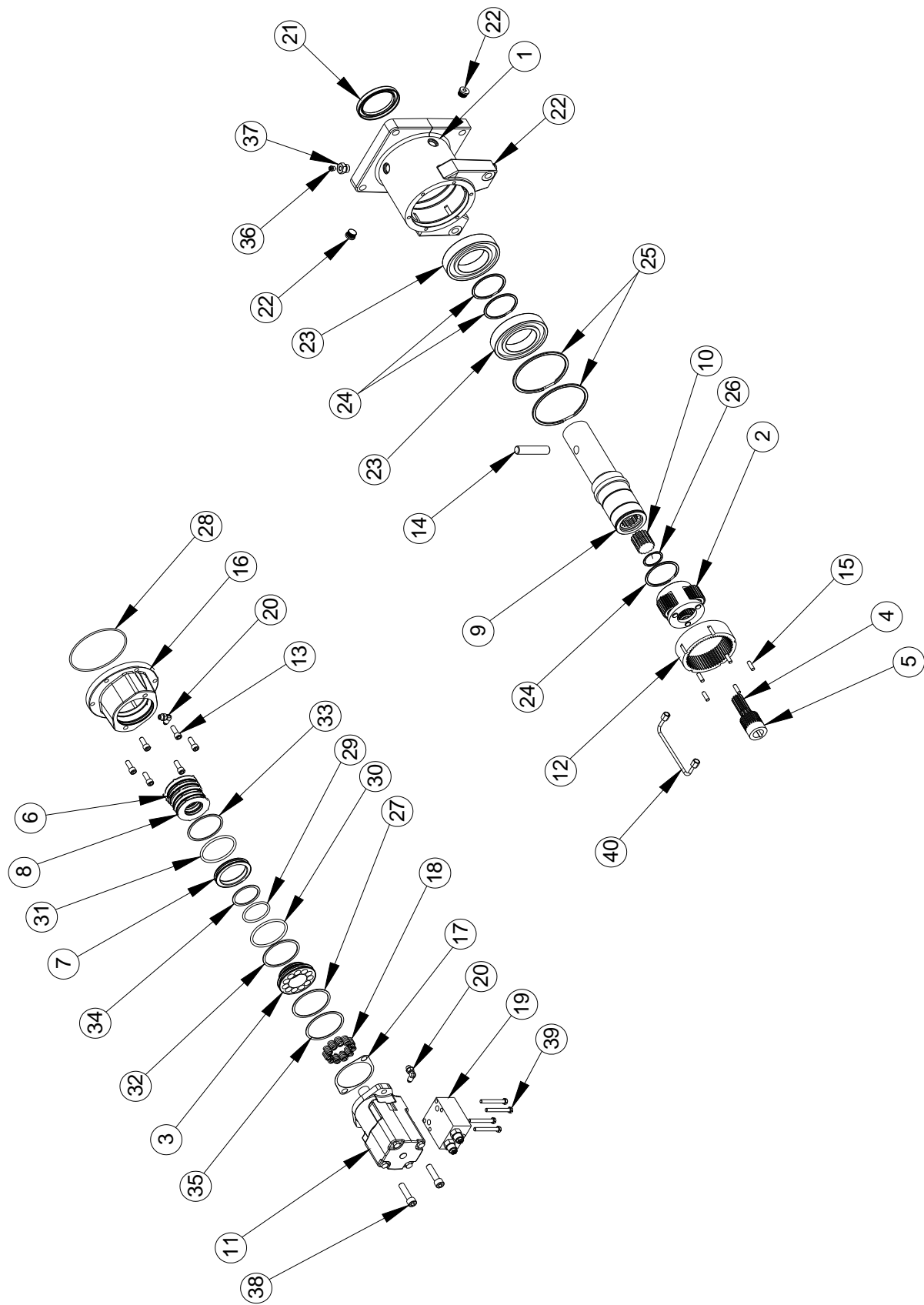
ITEM	QTY	PART NO	DESCRIPTION
101	1	317024	CARRIER-INPUT MACHINED CAPSTAN
102	3	470134	PIN INPUT PLANET CARRIER 16K CAPSTAN
103	3	470060	ROLL PIN 3/16 DIA. X 7/16 LG
104	3	296706	GEAR INPUT PLANET ASSEMBLY 16K CAPSTAN



VIEW A-A  
MOTOR CONTROL VALVE DETAIL

**DIMENSIONS SHOWN ARE INCHES OVER MILLIMETERS**  
 CAPSTAN MOUNTING CAPSCREWS MUST MEET OR EXCEED SAE GRADE 5 SPECIFICATION  
 \*NOTE: THESE HOLE LOCATIONS MUST BE HELD WITHIN ±.03" (0.8 MM) OF TRUE POSITION. RECOMMENDED MOUNTING HOLE DIAMETER IS .78" (13.5 MM).

# MODEL 16K CAPSTAN



# PARTS LIST

ITEM	QTY	PART NO	DESCRIPTION	ITEM	QTY	PART NO	DESCRIPTION
1	1	338376	HOUSING-GEAR, MACHINED,	23	2	402130	BEARING-BALL, 6215-SKF
2	1	247044	CARRIER ASSEMBLY-INPUT	24	3	490064	RING-RETAINING, DNH-130
3	1	330013	PISTON-BRAKE, MACHINED,	25	2	490063	RING-RETAINING, DNS-75
4	1	355146	SHAFT-INPUT 1	26	1	490055	RING-RETAINING, DNS-42
5	1	431034	COUPLING-MOTOR	27	1	490066	RING-INTERNAL RETAINING
6	5	330012	DISC-BRAKE	28	1	462079	O-RING-5.234 ID X .139 DIA
7	1	330014	PISTON-BACKUP BRAKE, MACHINED	29	1	462067	O-RING-2.225 ID X .210 THK
8	6	330011	STATOR-BRAKE,	30	1	462068	O-RING-3.10 ID X .210 THK
9	1	355143	SHAFT-OUTPUT,	31	1	462069	O-RING-2.975 ID X .210 THK
10	1	431025	COUPLING-INPUT CARRIER	32	1	462070	RING-BACKUP, 3.143 ID X .076 THK
11	1	458178	MOTOR-HYD 9.8 C.U.IN.	33	1	462071	RING-BACKUP, 3.018 ID X .076 THK
12	1	334827	RING GEAR	34	1	462072	RING-BACKUP, 2.268 ID X .076 THK
13	6	414897	CAPSCREW-3/8-16NC X 1LG, SOCKET HEAD	35	1	490049	RING-INTERNAL RETAINING
14	1	470106	PIN-CAPSTAN SHAFT	36	1	456008	RELIEF FIT-1/8-27PFT,BALL CHECK,Z/P
15	5	424035	PIN-DRUM DRIVE	37	1	468042	REDUCER-3/4-16 O-RING X 1/8NPTF
16	1	338375	HOUSING-BRAKE, MACHINED	38	2	414511	CAPSCREW-1/2-13 X 2.0 LG SOC HD
17	1	442223	GASKET-MOTOR FLANGE	39	4	414159	CS-5/16-18UNCX2.50,HXHD,GR5,ZP,N/P
18	11	494124	SPRING-BRAKE	40	1	509134	ASSEMBLY-TUBE, HYD BRAKE RELEASE
19	1	516013	VALVE-MTR CONTROL				
20	2	432018	FITTING Parker#4-C5OX-S T-LOK, 7/16-20 90 degree				
21	1	486086	SEAL-OIL				
22	3	468041	PLUG-3/4-16 (-8 SAE) WITH O-RING, SOC HD				

RAMSEY WINCH warrants each new RAMSEY Winch to be free from defects in material and workmanship for a period of one (1) year from date of purchase.

The obligation under this warranty, statutory or otherwise, is limited to the replacement or repair at the Manufacturer's factory, or at a point designated by the Manufacturer, of such part that shall appear to the Manufacturer, upon inspection of such part, to have been defective in material or workmanship.

This warranty does not obligate RAMSEY WINCH to bear the cost of labor or transportation charges in connection with the replacement or repair of defective parts, nor shall it apply to a product upon which repair or alterations have been made, unless authorized by Manufacturer, or for equipment misused, neglected or which has not been installed correctly.

RAMSEY WINCH shall in no event be liable for special or consequential damages. RAMSEY WINCH makes no warranty in respect to accessories such as being subject to the warranties of their respective manufacturers.

RAMSEY WINCH, whose policy is one of continuous improvement, reserves the right to improve its products through changes in design or materials as it may deem desirable without being obligated to incorporate such changes in products of prior manufacture.

If field service at the request of the Buyer is rendered and the fault is found not to be with RAMSEY WINCH's product, the Buyer shall pay the time and expense to the field representative. Bills for service, labor or other expenses that have been incurred by the Buyer without approval or authorization by RAMSEY WINCH will not be accepted

*See warranty card for details.*



## **RAMSEY WINCH COMPANY**

PO BOX 581510

Tulsa OK 74158-1510

Telephone: (918) 438-2760

FAX: (918) 438-6688

Visit us at [www.ramsey.com](http://www.ramsey.com)