RUFNEK 45

AND

MODEL 64

SERVICE MANUAL

DESIGN SERIES 001

GENERAL INFORMATION 4

INTRODUCTION AND THEORY OF OPERATION 4
ASSEMBLY NUMBER EXPLANATION 4
WINCH BREAK-IN 4

MODEL CODES 5
MAINTENANCE 6

OIL LEVELS 7
BRAKE IDENTIFICATION AND ADJUSTMENT 8

DISASSEMBLY 10

DRUM BRAKE DISASSEMBLY 10
ADJUSTABLE OIL BRAKE DISASSEMBLY 11
NON-ADJUSTABLE OIL BRAKE DISASSEMBLY 12
RUFNEK OIL BRAKE DISASSEMBLY 13
CLUTCH AND DRUM DISASSEMBLY 14
GEARBOX DISASSEMBLY 15
GEAR INSPECTION INSTRUCTIONS 16

ASSEMBLY 17

GEARBOX ASSEMBLY 17
DRUM BRAKE ASSEMBLY 18
ADJUSTABLE OIL BRAKE ASSEMBLY 19
NON-ADJUSTABLE OIL BRAKE ASSEMBLY 20
RUFNEK OIL BRAKE ASSEMBLY 21
CLUTCH AND DRUM ASSEMBLY 22

TROUBLESHOOTING 23
TORQUE SPECIFICATIONS CHART 24
CLUTCH INSPECTION 25
BILL OF MATERIAL ..... Error! Bookmark not defined.
ADJUSTABLE OIL BRAKE BILL OF MATERIAL 29
NON ADJUSTABLE OIL BRAKE BILL OF MATERIAL 29
RUFNEK OIL BRAKE BILL OF MATERIAL 30
ISOMETRIC VIEW 31
HYDRAULIC MOTOR, ADJUSTABLE OIL BRAKE, & CLUTCH POSITION INDICATOR 32

WARNING

FAILURE TO HEED THE FOLLOWING WARNINGS
MAY RESULT IN SERIOUS INJURY OR DEATH.

The safety of the winch operator and ground personnel should always be of great concern, and all necessary precautions to insure their safety must be taken. The primary mover and the winch must be operated with care and concern for the equipment and the environment and with a thorough knowledge of the equipment and its performance capabilities must be understood. These general safety guidelines are offered, however local rules and regulations or national standards may also apply. Recommended references are, but not limited to, ANSI B30, OSHA 1910, AWS D 14.3, and SAE J706.

Additional information can be found at http://www.team-twg.com/TulsaWinch/

DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.
NOTICE	Indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

Mounting:

Winch mounting must be secure and able to withstand the applied loads.

- The stability of the mounting system must be approved by a qualified person.
- All welding should also be done by a qualified person.
- Winch mount must be flat so as not to induce binding.
- The flatness must not exceed 1/16 inch across the mounting surface of the winch itself.

Guards must be placed on all open drives in the case of mechanical winches.
Insure that all hydraulic hoses, valves and fittings are rated to winch manufacturer's operating pressures.

Relief valves should be set to winch manufacturer's specifications.
Insure that all PTO's and drivelines are sized appropriately for the winch manufactures speed and torque specifications.

Operator:

Must read and understand the operating and service manual.
Both the **SERVICE MANUAL** and **OPERATING AND MAINTENANCE MANUAL** are available online at http://www.team-twg.com/TulsaWinch/
Must never lift or move people with this winch.
This winch is not designed or intended for any use that involves moving people.
Must stay clear of the load at all times.
Ground personnel should remain a safe distance from the load and winch cable at least 1 ½ times the length of cable measured from the winch to the load.
Must stay clear of the cable at all times.
A broken cable can cause serious injury or death.
Must avoid shock loads.
Shock loads can impose a strain on the winch that can be many times the design rating.
Must be aware of the fleet angle of the winch.
All loads should only be pulled with the load line perpendicular to the drum shaft, this is to avoid excessive stresses on the winch and will help prevent the cable from building on one side of the drum flange.
Must wear personnel protective equipment (PPE) if required.
Check the local, state and federal regulations for compliance.
Must insure that the drum clutch is fully engaged before hoisting.
A visual inspection of the drum clutch engagement is required before each winching operation.
Must rig all loads secure before winching.
Pull the load line taut and inspect the condition of load for stability.
Must inspect the drum brake if equipped.
The drum brake is not a load holding device it is design to prevent over spooling of the drum and causing bird nesting of the cable on the drum. Inspect the brake for wear of the lining and the actuation method.
Must inspect the load control brake.
These winches can be equipped with two (2) forms of dynamic braking. The worm brake is one method and is adjustable for pay-out load control. Before a load is handled the load should be pulled tight and stopped to check this brake. The second method is a hydraulic lowering control that is not field adjustable. The same method should be used to check this brake.

Operation:

- All winch controls must be well marked for function to avoid confusion.
- Insure that the PTO is disengaged when the winch is not in use.
- All winch controls must be located to provide the operator with a clear view of the load.
- The clutch must be inspected daily for proper operation.
- The winch cable should be inspected daily for serviceability.
- A minimum of five wraps of tightly wound cable must remain on the drum.

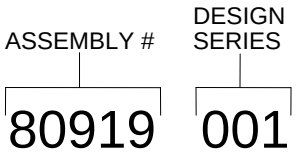
GENERAL INFORMATION

INTRODUCTION AND THEORY OF OPERATION

The Tulsa worm gear winch is operated by turning the input of the worm using a hydraulic motor or PTO driven sprocket and chain. The winch utilizes a brake that activates only during pay-out to provide maximum efficiency during pay-in. The torque is transferred from the gearbox through the drum shaft which is keyed to a mechanically actuated sliding clutch that, when engaged, transfers the torque to the drum.

ASSEMBLY NUMBER EXPLANATION

This manual is for design series 001. In the case of a major design change implementation, a new design series designation number will be issued for the winch. A new manual will also be created for that specific design series.



WINCH BREAK-IN

Winches, like any other kind of machinery, require a “break-in” to perform well and to maximize their life. The following guidelines should be used in the break-in of Tulsa Winches.

Use extreme care when first spooling cable onto the winch. DO NOT run the winch at high speeds when performing this operation. Make sure that the cable is unrolled in a line (to prevent kinks) and SLOWLY inhaul the winch to install the cable.

DO NOT exceed one half rated load or one half rated line speed for the first thirty minutes of operation. This will insure that the worm and gear have an opportunity to wear in properly. Periodically, check the gearbox for temperature rises and allow the winch to cool down between pulls. Worm gear winches are designed and intended for intermittent duty application only; using them in extremely long pulls may generate excessive heat and shorten the life of the winch.

MODEL CODES

NOTICE

THE RUFNEK 45 SERIES WINCHES ARE ONLY AVAILABLE WITH LEFT HAND GEARS.

RN45 W M R F O M X

Gear Type
W=Worm
P=Planetary

Drive Type
H=Hydraulic
M=Mechanical

Gearbox Position
L=Left
R=Right
(viewed from rear of truck)

Input Shaft Location
F=Front
R=Rear
X=Does not apply
(viewed from rear of truck)

Cable Spooling
O=Over Drum
U=Under Drum
(viewed from rear of truck)

Clutch Device
M=Mechanical
A=Air

Motor Type
1. Single Speed Gear Motor
2. Two Speed Gear Motor
3. Single Speed Geroler Motor
4. Two Speed Geroler Motor
5. Piston
6. Vane
X. No Motor

M64 S L R F O D CL

Winch Type
M=Mechanical
H=Hydraulic
G=Speed Reducer

No. of Worm Starts
S=Single
D=Double
T=Triple

Worm Angle
L=Left
R=Right

Gearbox Location
L=Left
R=Right
(viewed from rear of truck)

Input Shaft Location
F=Front
R=Rear
X=Does not apply
(viewed from rear of truck)

Cable Spooling
O=Over Drum
U=Under Drum
(viewed from rear of truck)

Motor Mount
D=Direct Mount
X=No Motor

Motor Type
CL-CharLynn

MAINTENANCE

Tulsa Winch worm gear driven winches require regular maintenance to ensure safe and reliable operation. Regular oil changes with the correct oil for the ambient temperature conditions and an annual inspection of the wear components are strongly recommended.

Maintenance Scheduling

The owner is to ensure proper inspection intervals, in compliance with the API RP 2D Section 4, ANSI B30.5, 5-2.3, or ANSI B30.7, 7-2.1, and will review winch usage categories on a periodic basis. A qualified inspector should perform all maintenance and inspections.

USE (HRS PER MONTH)	API RP 2D RECOMMENDED INSPECTION SCHEDULE
0-10	PRE-USE, ANNUAL
11-50	PRE-USE, QUARTERLY
51+	PRE-USE, MONTHLY

Oil Maintenance

The oil in the gear section and the brake section should be changed every **1000 hrs** or **6 months** of normal usage. If your winch is mounted with a drum brake, do not fill brake with oil.

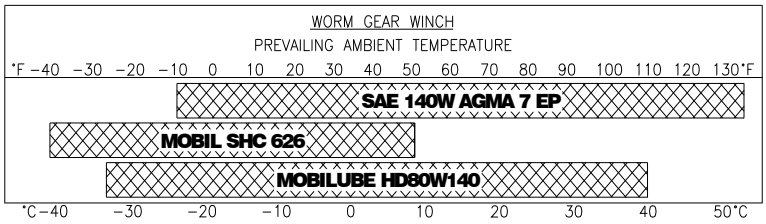
- Tulsa Winch recommends that the oil level in the gearbox be checked and adjusted as part of the pre-use inspection. If the oil level drops frequently or oil leakage is detected during an inspection, maintenance should be performed to correct any problems.

Oil Capacity

	AMOUNT	OIL TYPE
GEARBOX SECTION	5.00 QTS	SEE CHART BELOW
BRAKE SECTION	TO LEVEL	LIGHTWEIGHT NON-EP*

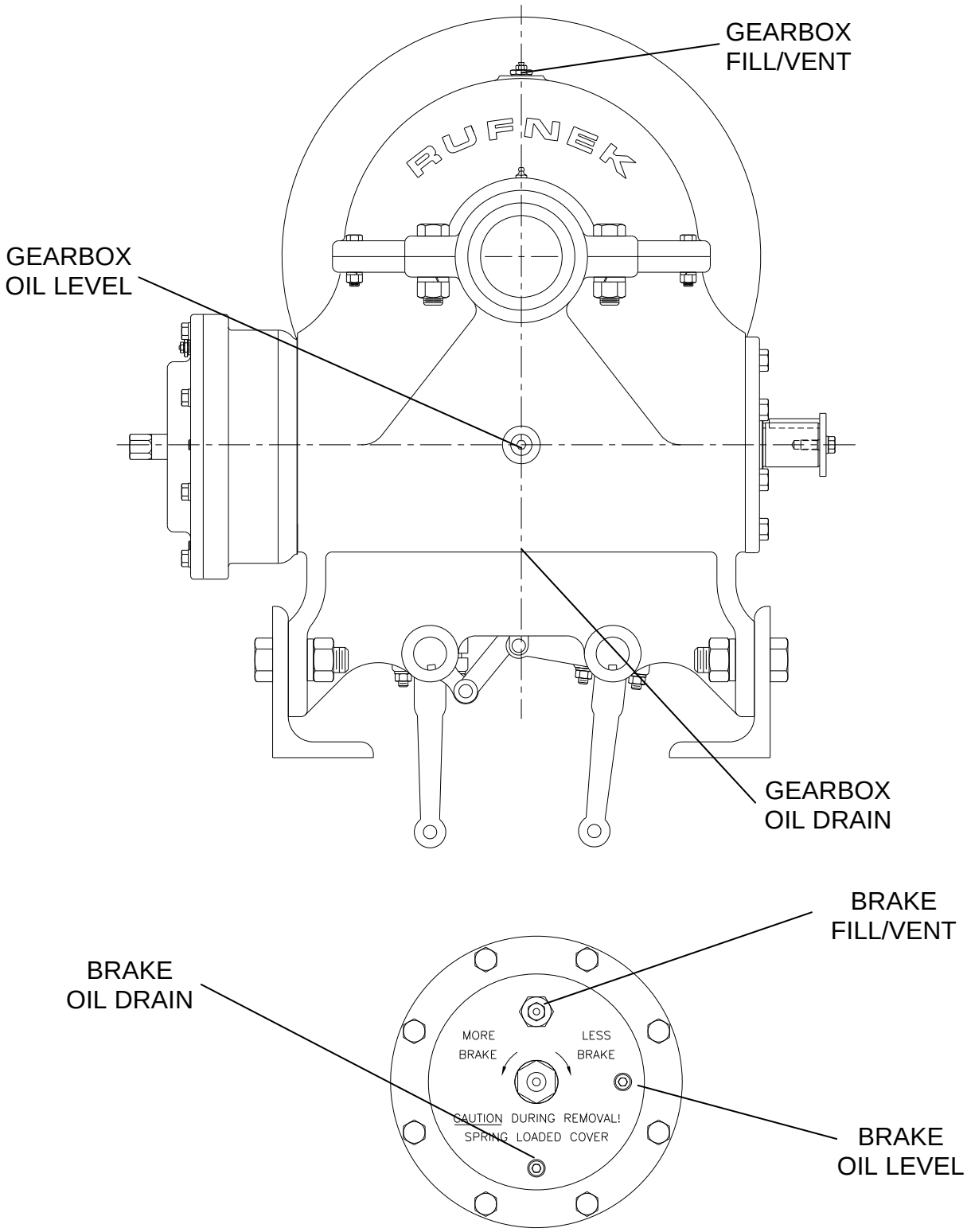
**SAE 20W, AUTOMATIC TRANSMISSION FLUID, OR MOST HYDRAULIC OILS.*

- Gearbox oil level inspection is achieved by removing the oil level inspection plug and visually inspecting the oil level. Minimum oil level is to the bottom of the threads of the inspection hole. Refer to the chart below for the recommended oil type and grade for your application.



All oils must meet MIL-PRF2105E standards. Substitution from a reputable manufacturer is allowed as long as type and grade are maintained.

OIL LEVELS

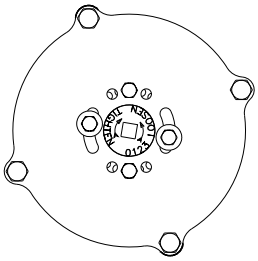

GEARBOX
FILL/VENT
RUFNEK
GEARBOX
OIL LEVEL
GEARBOX
OIL DRAIN
BRAKE
FILL/VENT
BRAKE
OIL DRAIN
MORE
BRAKE
LESS
BRAKE
CAUTION DURING REMOVAL!
SPRING LOADED COVER
BRAKE
OIL LEVEL

BRAKE IDENTIFICATION AND ADJUSTMENT

In general, worm brakes on Tulsa winches should be set to hold the load you are currently working with. Excessive brake torque will result in excessive heat generation and brake wear. The best way to insure proper brake adjustment is to pull the cable tight against the load and stop to ensure the brake holds. If it doesn't, tighten the brake slightly and try it again. If the brake doesn't respond to adjustment the brake must be serviced.

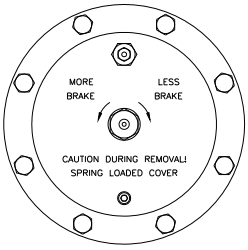
If the input to the winch is accessible and a torque wrench can be adapted to it, the brake can be set with a torque wrench. The Model 64 brake is shipped from the factory pre-set at 120 Ft.-Lbs.

ADJUSTABLE DRUM BRAKE



To tighten the brake, remove the two capscrews located in the set of holes in the top and bottom of the brake cover. Loosen the two capscrews in the slotted holes and rotate the brake clockwise. The direction of braking can be changed by replacing the cam with the opposite version. For detailed service instructions, contact your Tulsa Winch distributor or the factory.

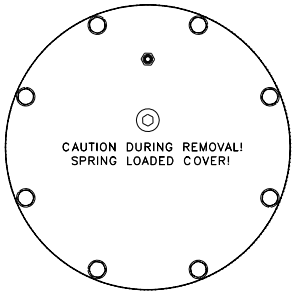
ADJUSTABLE MULTIPLE DISC OIL BRAKE



This is the standard version of the multiple disc oil brake. This style of brake can be adjusted by turning the hex adjuster counter-clockwise to increase brake and clockwise to decrease brake. The direction of braking for all multiple disc brakes can be changed by removing the cam clutch, turning it over, and re-installing it. For detailed service instructions, contact your Tulsa Winch distributor or the factory.

If the input to the winch is accessible and a torque wrench can be adapted to it, the brake can be set with a torque wrench. The Model 64 adjustable oil brake is shipped from the factory pre-set at 120 Ft.-Lbs.

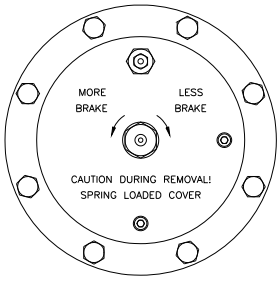
NON-ADJUSTABLE MULTIPLE DISC OIL BRAKE



CAUTION DURING REMOVAL!
SPRING LOADED COVER!

These brakes require no regular adjustment. The direction of braking for all multiple disc brakes can be changed by removing the cam clutch, turning it over, and re-installing it. For detailed service instructions, contact your Tulsa Winch distributor or the factory.

RUFNEK ADJUSTABLE MULTIPLE DISC OIL BRAKE



This brake is the Rufnek version of the adjustable oil brake. This is the latest design of the worm-driven winch brakes. This style of brake can be adjusted by turning the hex adjuster counter-clockwise to increase brake and clockwise to decrease brake. The direction of braking for all multiple disc brakes can be changed by removing the cam clutch, turning it over, and re-installing it. For detailed service instructions, contact your Tulsa Winch distributor or the factory.

If the input to the winch is accessible and a torque wrench can be adapted to it, the brake can be set with a torque wrench. The RN45W brake is shipped from the factory pre-set at 120 Ft.-Lbs.

DISASSEMBLY

DRUM BRAKE DISASSEMBLY

1. Loosen the capscrews (78).

2. Remove the capscrews (81) from the cover (87).

3. Remove the cover (87) from the brake housing (89).

4. Remove the brake shoes (86).

5. Remove the nut (85) and washer (84).

6. Use the two threaded holes in the brake drum (83) and a gear puller to remove the brake drum.

7. Inspect parts as follows, replace if necessary:

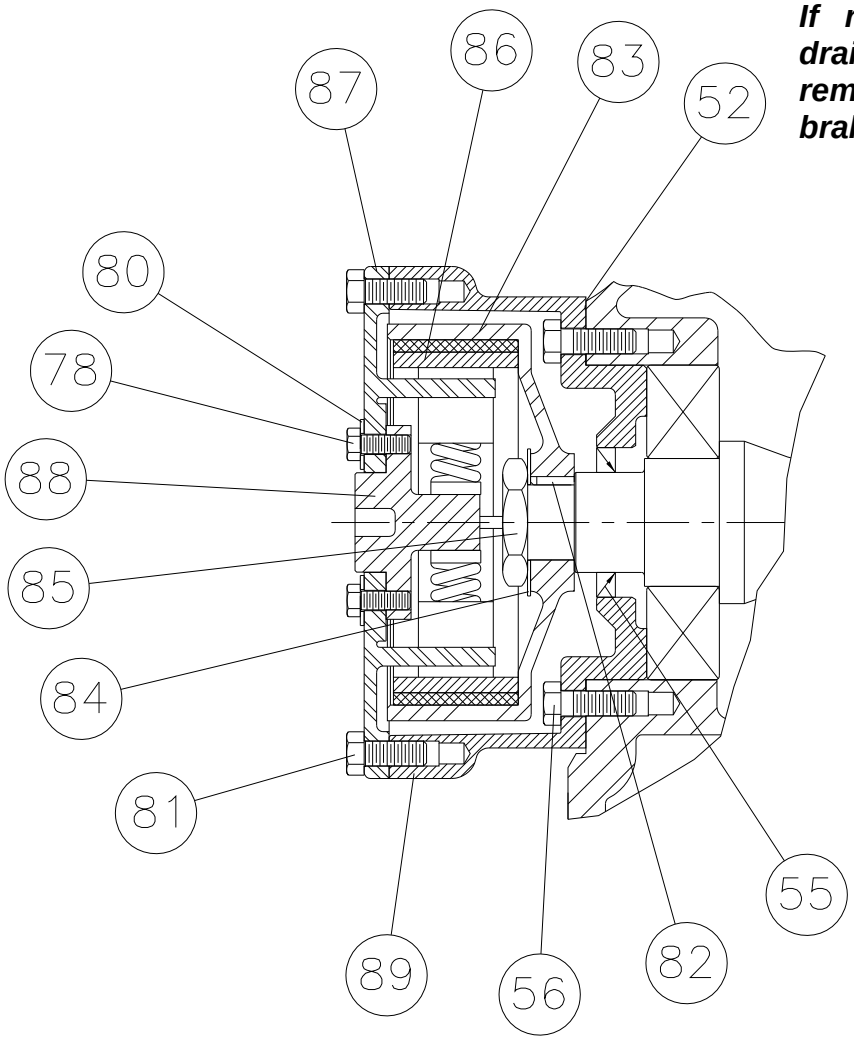
   A. Inspect the brake shoes (86) for wear. If the shoe linings are worn flush with the rivet heads, the shoes must be replaced.

   B. Inspect the brake drum (83) for severe wear or scoring.

   C. Check the inside lower part of the brake housing (89) for the presence of oil. Replace the seal (55) if oil is present

NOTICE

If replacing the seal (55), first drain the oil from the gearbox then remove the capscrews (56) and brake housing (89).



ADJUSTABLE OIL BRAKE DISASSEMBLY

1. Drain the oil from the brake by removing the drain plug (64).

2. Loosen the spring tension inside the brake by turning the adjusting mechanism (14) clockwise until it stops.

CAUTION

Extreme care should be taken when removing the cover of the brake housing. The cover compresses the spring which is used to set the brake, thus the cover is spring loaded against the cover screws.

3. Loosen and remove the capscrews (1) and washers (17) from the brake cover (19). If needed, rotate the adjusting mechanism counter-clockwise to allow the spring to apply force to the cover.

4. Remove the adjusting mechanism (14) from the brake cover (19) and inspect the o-ring (26), replace it if necessary.

5. Remove the spring (5). Grasp the brake driver (10) and remove the brake components.

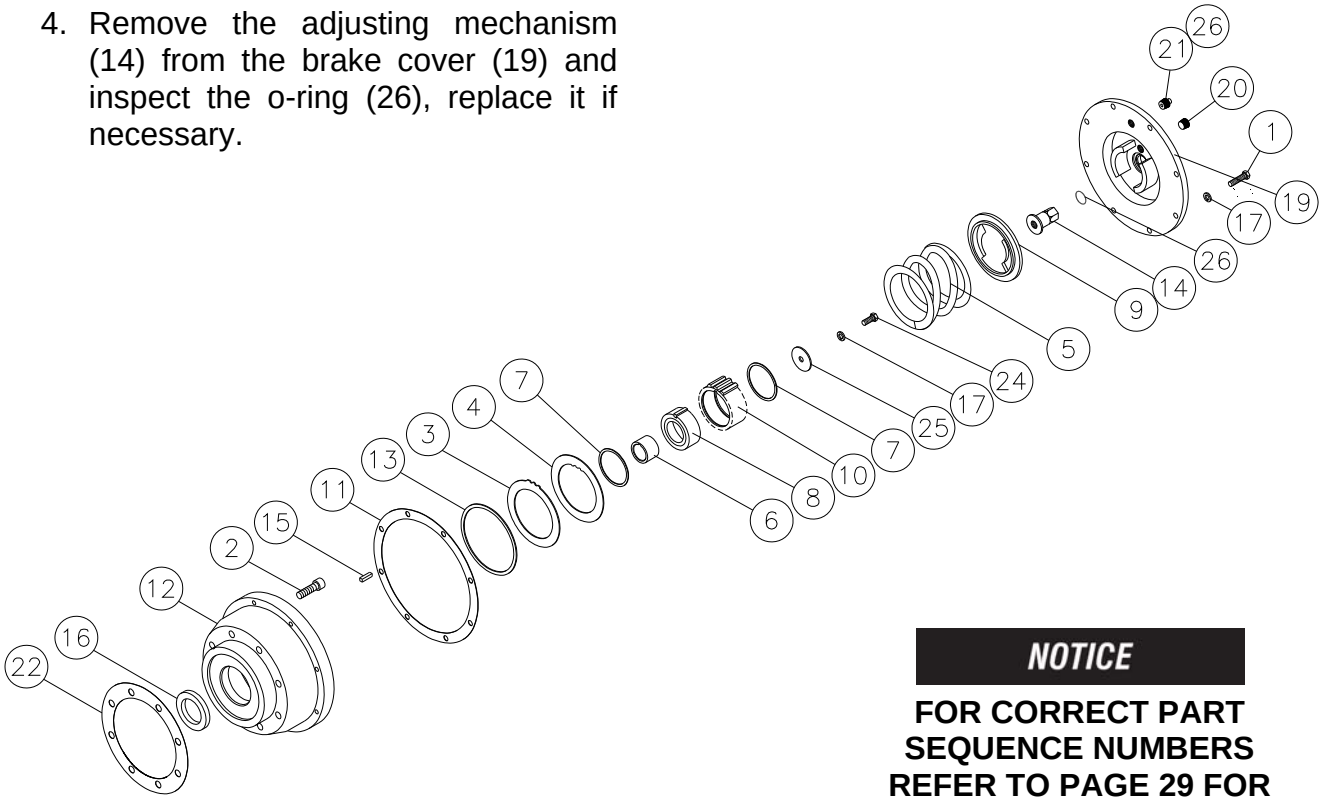
6. Inspect stator plates (3), friction discs (4), and retaining ring (13) for wear and replace them if necessary.

7. Noting the direction that the cam clutch (8) is installed, inspect it for wear. Replace if necessary.

NOTICE

Failure to re-install the clutch in the correct orientation will result in the brake engaging in the opposite direction.

8. If necessary, remove the brake housing (12) and replace the oil seal (16).



NOTICE

FOR CORRECT PART SEQUENCE NUMBERS REFER TO PAGE 29 FOR ADJUSTABLE BRAKE BILL OF MATERIAL

NON-ADJUSTABLE OIL BRAKE DISASSEMBLY

1. Place a container underneath the brake to catch the oil when the cover is removed.

⚠ CAUTION

Extreme care should be taken when removing the cover of the brake housing. The cover compresses the spring which is used to set the brake, thus the cover is spring loaded against the cover screws.

2. Evenly loosen and remove the capscrews (16) and washers (17) from the brake cover (13) to dislodge the cover.

3. Remove the spring (11), then grasp the brake driver (6) and remove the

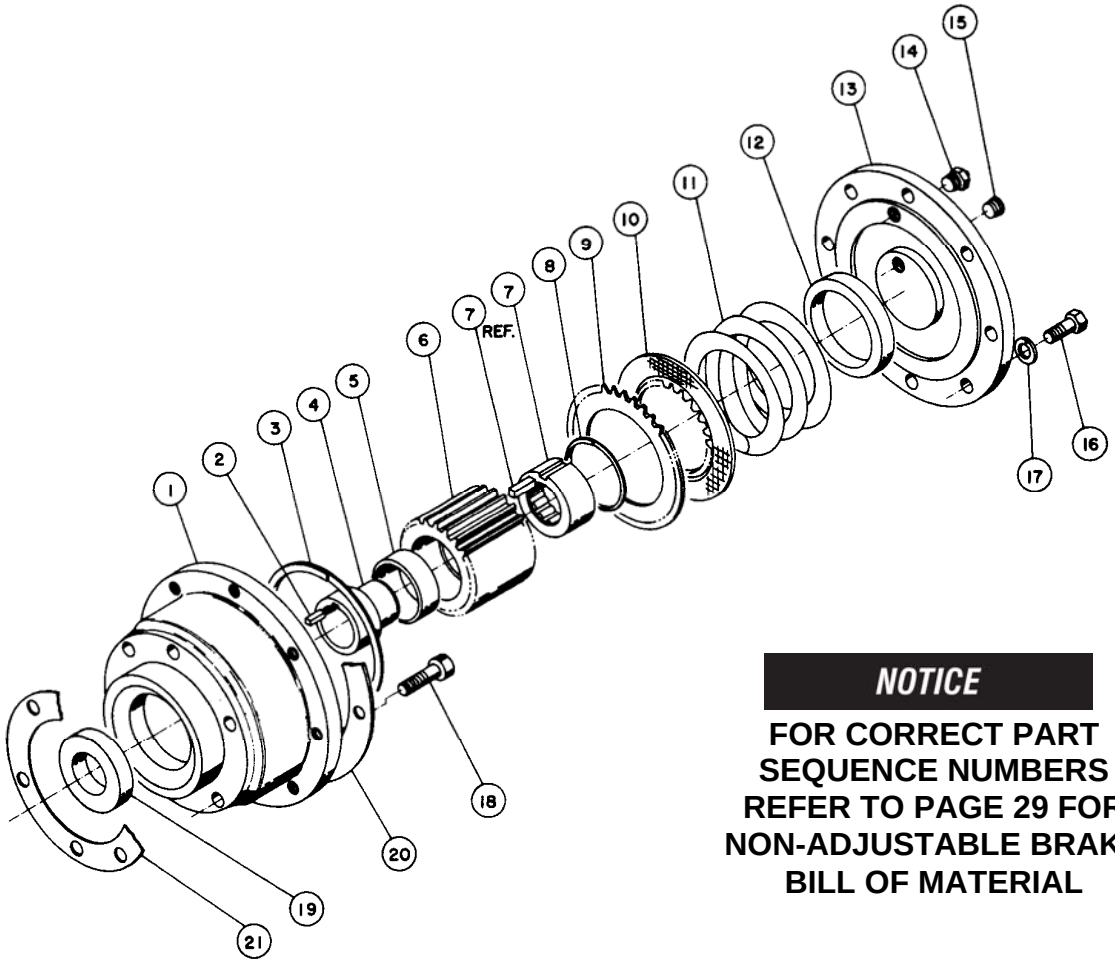
4. Inspect the stator plates (9), friction discs (10), and retaining ring (8) for wear and replace them if necessary.

5. Noting the direction that the cam clutch (7) is installed, and inspect for wear. Replace if necessary.

NOTICE

Failure to re-install the clutch in the correct orientation will result in the brake engaging in the opposite direction.

If necessary, remove the brake housing (1) and replace the oil seal (19).



NOTICE

FOR CORRECT PART SEQUENCE NUMBERS REFER TO PAGE 29 FOR NON-ADJUSTABLE BRAKE BILL OF MATERIAL

RUFNEK OIL BRAKE DISASSEMBLY

1. Remove the bottom drain plug (25) to drain oil from brake.

2. Loosen the spring tension inside the brake by rotating the adjusting mechanism (21) clockwise until it stops.

⚠ CAUTION

Extreme care should be taken when removing the brake cover. The cover is spring loaded against the cover screws.

3. Evenly remove the capscrews (17) and washers (16) from the brake cover (24).

4. Remove the spring (6) and retaining ring (10). Remove the brake driver (7) along with the brake components (2, 4, 5, 8, 9, and 11).

NOTICE

FOR CORRECT PART SEQUENCE NUMBERS REFER TO PAGE 30 FOR RUFNEK ADJUSTABLE BRAKE BILL OF MATERIAL

5. Inspect parts as follows, replace if necessary:

   A. Inspect the friction discs (5) for uneven or excessive wear. Friction discs should measure no less than .055-in thick.

   B. Inspect the stator plates (4) for warpage or excessive wear.

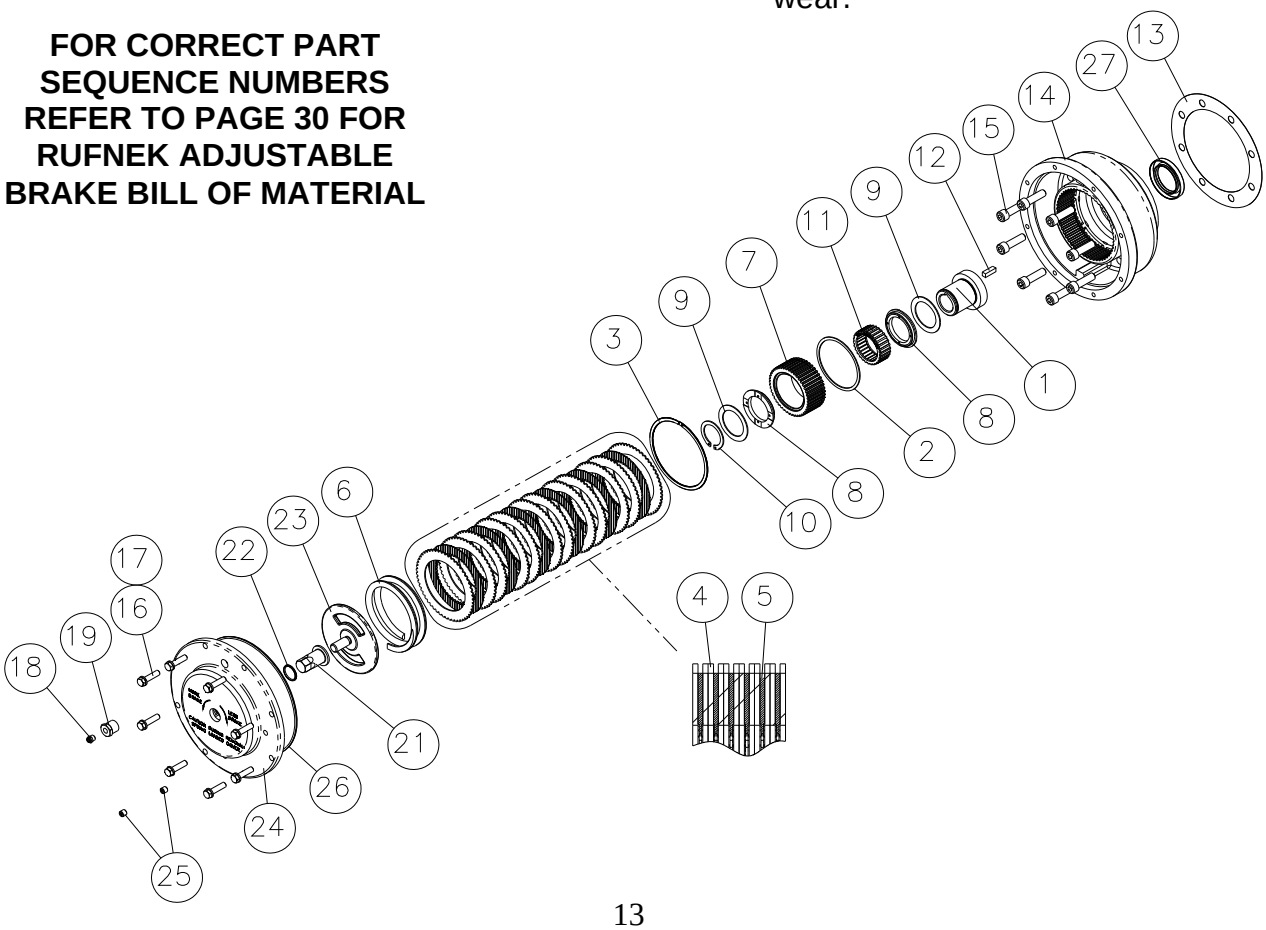
   C. Inspect the spring (6) for damage or discoloration.

   D. Cam clutch (11) should be free of debris and have all cams intact.

NOTICE

If replacing the cam clutch (11), take note of the direction it locks up for reassembly.

   E. Check the coupler (1) for signs of pitting, spalling, or excessive wear.



CLUTCH AND DRUM DISASSEMBLY

1. Remove the rod (44) by removing the cotter keys (32) and pins (33).

2. Remove the arms (34) by removing the capscrews (46), nuts (24), and washers (23) holding the arms in place.

3. Loosen the tension on the brake band by loosening the nuts on the rod (25), then remove the line shafts (35) by loosening the set screws in the collars (38) and the setscrews (37) in the control arms (27)(45).

4. Remove the capscrews (59), nuts (63), and washers (62) connecting the end bracket (6) to the frames (65 & 66).

5. Remove the end bracket (6) and yoke assembly (items 7, 16, 23, 24, 39, 40, and 41) or the clutch indicator assembly (90). Loosen the set screw (9) and remove the first collar (10).

6. Remove the sliding clutch (11), keys (67), and the other collar (10).

7. Remove the brake band assembly by removing the capscrews (31), washers (30), and nuts (26) attaching the brake band to the frame.

8. Slide the drum (14) off of the output shaft (68), using an overhead hoist.

9. Inspect parts as follows, replacing them if necessary:

   A. Inspect the collars (10) for excessive wear or damage.

   B. Inspect the bushings (2)(60) for wear or damage.

   C. Inspect the keys (67) for excessive wear or damage.

   D. Inspect the drum clutch (12) and sliding clutch (11) for wear. See page 30 this manual for Clutch Inspection.

   E. Inspect the brake band assembly (8) and verify that the band and lining is at least .225-in thick.

DISASSEMBLY

GEARBOX DISASSEMBLY

1. Supporting the end of the output shaft (68) with a hoist, remove the housing cover (76) by removing capscrews (3 & 46), nuts (20 & 24), and washers (19 & 23).

2. Use the hoist to lift the output shaft (68), bushings (69), keys (70), and gear (assembled items 26, 30, 71, 72, 73, 74, and 75) out of the housing (61).

3. Remove the bushings (69) from the output shaft (68).

4. Remove the gear (75) from the carriers (72) by removing the twelve capscrews (71), nuts (26), and washers (30), then pull the carrier (72) off of the shaft (68). Finally, remove the spacer (73), carrier (72), and keys (70).

5. Remove the worm (57) from the housing by removing either the motor (90) and motor adapter (95) or the end cap (51), depending on type of drive. From the brake end, push the worm (57) out of the housing (61). Remove the bearings (54).

NOTICE

If the brake has not been removed, see brake disassembly on pages 10-13 of this manual.

6. Inspect parts as follows, replacing them if necessary:

   A. Inspect the carriers (72) for damage.

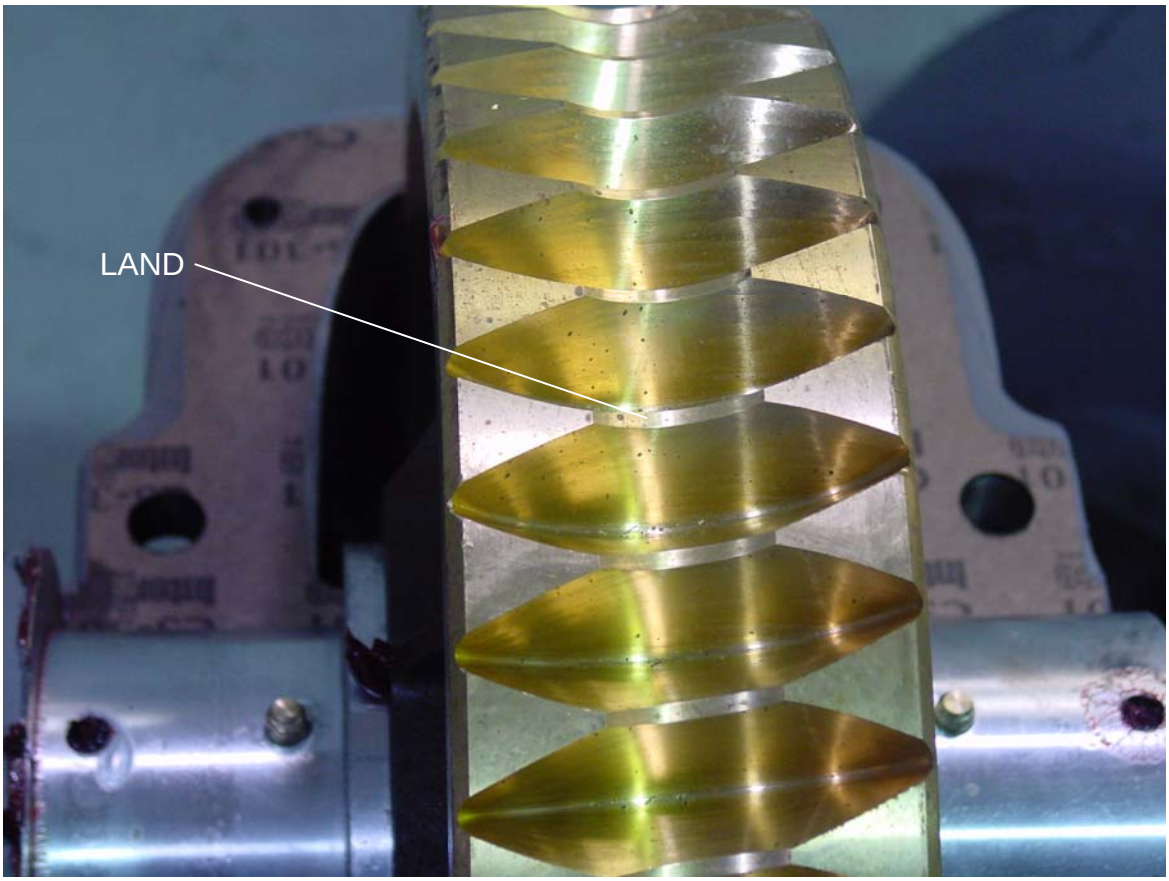
   B. Inspect the gear (75) for excessive wear or damage. See page 16 for detailed instructions.

   C. Inspect the keys (70) and bushings (69) for damage.

   D. Inspect the worm (57) for excessive wear or signs of heat checking or cracks.

   E. Inspect the bearings (54) and seals (55) for excessive wear or damage.

GEAR INSPECTION INSTRUCTIONS



Check gear wear by removing the cover and visually inspecting the bronze gear. If the gear is worn such that there is no visible land on the throat of the gear between the gear flanks as shown in picture above the gear should be replaced.

ASSEMBLY

GEARBOX ASSEMBLY

1. Press the bearings (54) onto the worm (57) then install the worm and bearings into the housing (61).

2. **For winches driven by a hydraulic motor:**

   Press a new oil seal (94) into the motor adapter (95). Attach the motor adapter (95) to the housing (61) with six capscrews (96), using gasket (52). Install the motor (90) with two capscrews (92), using gasket (93).

   For winches driven by a PTO sprocket and chain:

   Press a new oil seal (55) into the end cap (51). Attach the end cap (51) to the housing (61) with six capscrews (56), using gasket (52). Install the key (58) onto the end of the worm (57).

3. Install the keys (70) into the output shaft (68).

4. Slide the carrier (72) onto output shaft over the keys (70). Install the spacer (73) using two pins (74). Slide the gear (75) and the other carrier (72) onto the shaft and secure with twelve capscrews (71), nuts (26), and washers (30).

5. Slide the bushings (69) onto both ends of the shaft (68).

6. Install the output shaft assembly into the housing (61).

7. Install both gaskets (79) onto the housing (61). Attach the cover (76) to the housing, using capscrews (3 & 46), nuts (20 & 24), washers (19 & 23), using gaskets (79).

DRUM BRAKE ASSEMBLY

1. Press the oil seal (55) into the brake housing (89). Install the gasket (52), and attach the brake housing (89) to the gearbox with six capscrews (56), using gasket (52).

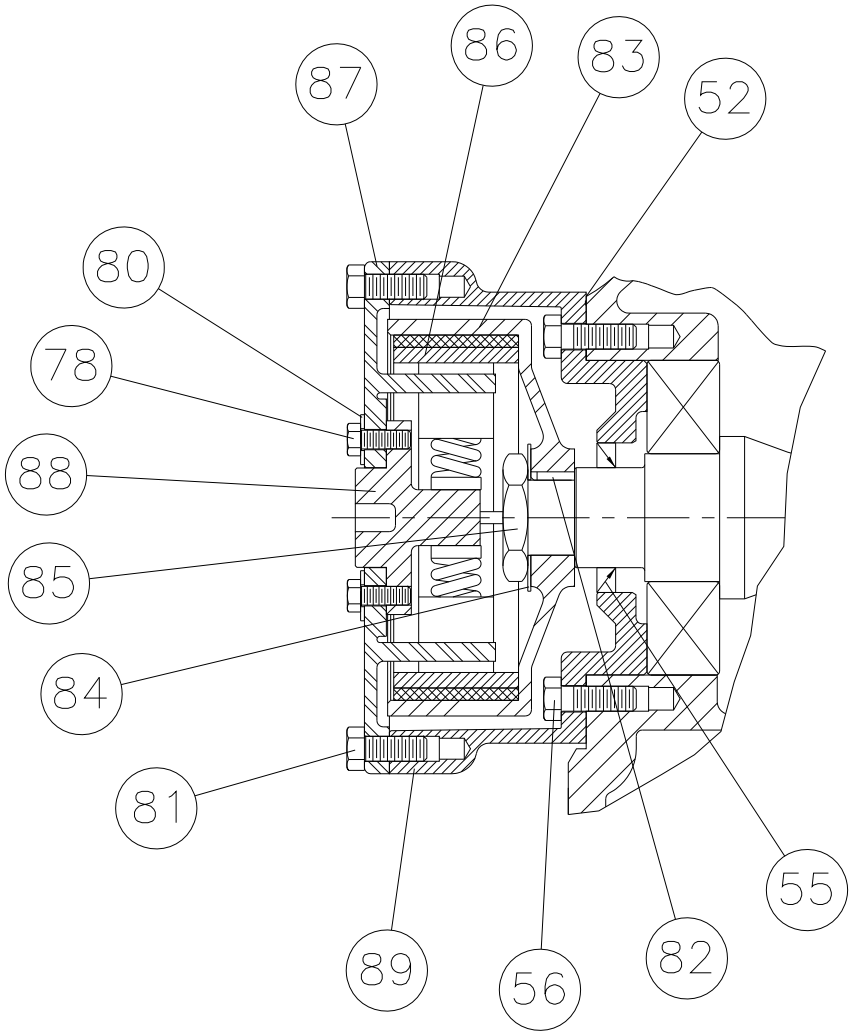
2. Install the brake drum (83) and key (82) onto the worm shaft (57). Secure the brake drum with the nut (85) using washer (84). Bend two tabs of the washer (84) over the flats of the nut (85).

3. If removed, reattach the cam (88) to the brake cover (87) using two capscrews (78) and washers (80).

4. Install the brake cover (87), cam (88), and brake shoes (86) into the brake housing (89).

5. Secure the brake cover (87) using four capscrews (81).

6. Adjust the brake using the procedure on page 8 of this manual.



ADJUSTABLE OIL BRAKE ASSEMBLY

1. Press the oil seal (16) into the brake housing (12). Mount the brake housing with six capscrews (2), using gasket (22).

2. Install the key (15), inner race (6) and clutch/driver assembly (8 and 10), onto worm shaft (57).

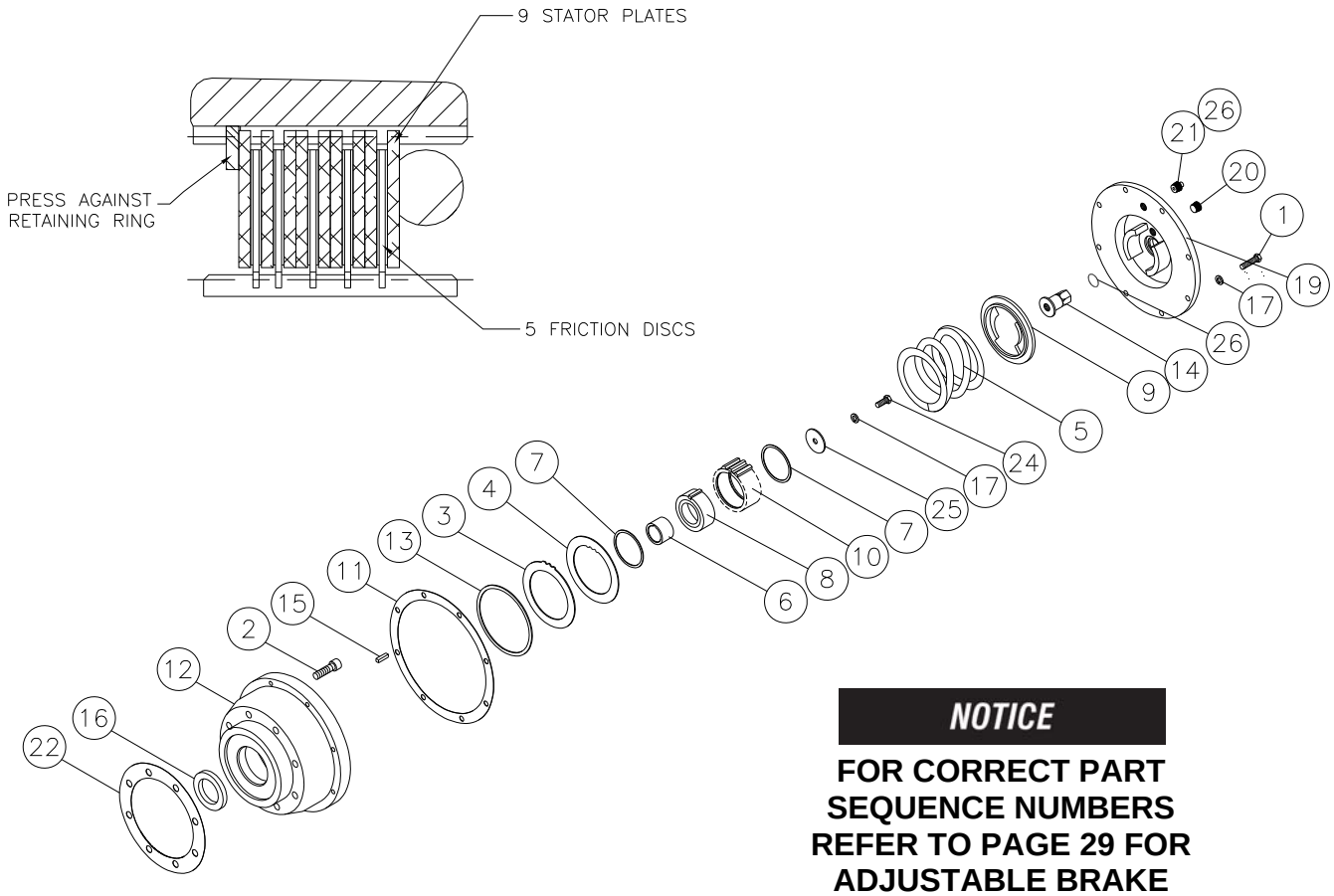
3. Install the retaining ring (13) into the brake housing, then install the stator plates (3) and friction discs (4) in the correct stack up, as shown below.

4. Install the spring (5). Insert the adjusting mechanism assembly (items 9, 14, 26) into brake cover (19).

5. Attach the brake cover (19) with eight capscrews (1) and washers (17), using gasket (11).

6. Fill gearbox and brake with proper oil. Refer to winch maintenance section of this manual for oil type and amounts.

7. Adjust the brake using the procedure on page 8 of this manual.



NOTICE

FOR CORRECT PART SEQUENCE NUMBERS REFER TO PAGE 29 FOR ADJUSTABLE BRAKE BILL OF MATERIAL

NON-ADJUSTABLE OIL BRAKE ASSEMBLY

1. Press the oil seal (19) into the brake housing (1). Attach the brake housing (1) with six capscrews (18), using gasket (21).

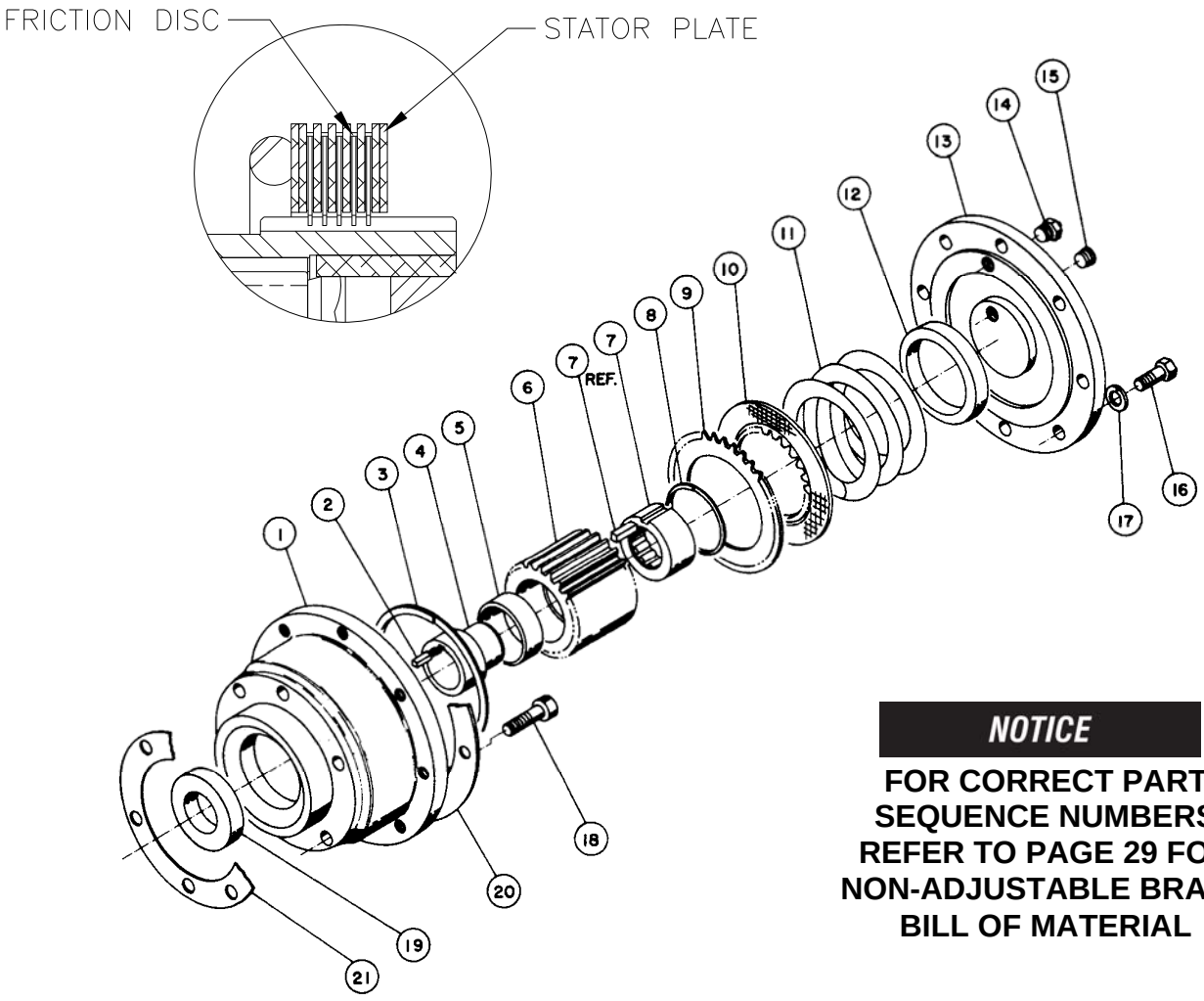
2. Install oil seal (19), key (2), coupler (4), and clutch/driver assembly (5 and 6) onto worm shaft (57).

3. Install retaining ring (3) into the brake housing (1), then install the stator plates (3) and friction discs (4) in the correct stack up, as shown below.

4. Install the spring (5) then press the washer (12) into the brake cover (13).

5. Secure the brake cover (13) with eight capscrews (16) and washers (17), using gasket (20).

6. Fill gearbox and brake with proper oil. Refer to winch maintenance section of this manual for oil type and amounts.



NOTICE

FOR CORRECT PART SEQUENCE NUMBERS REFER TO PAGE 29 FOR NON-ADJUSTABLE BRAKE BILL OF MATERIAL

RUFNEK OIL BRAKE ASSEMBLY

1. Press the oil seal (27) into the brake housing (14). Attach the brake housing to the gearbox with eight capscrews (15) using gasket (13).

2. Install the key (12) and coupler (1) onto the worm. Next, install the clutch/driver assembly (Items 2, 3, 7, 8, 9, and 10), onto the coupler (1).

3. With the retaining ring (2) on the clutch driver (7). Install the stator plates (4) and friction discs (5), in the correct layout as shown below.

4. Install the spring (6).

5. Install the adjusting mechanism assembly (assembled items 21, 22, and 23) into the brake cover (24) and attach the brake cover to the housing (14) with eight evenly installed capscrews (17) and washers (16).

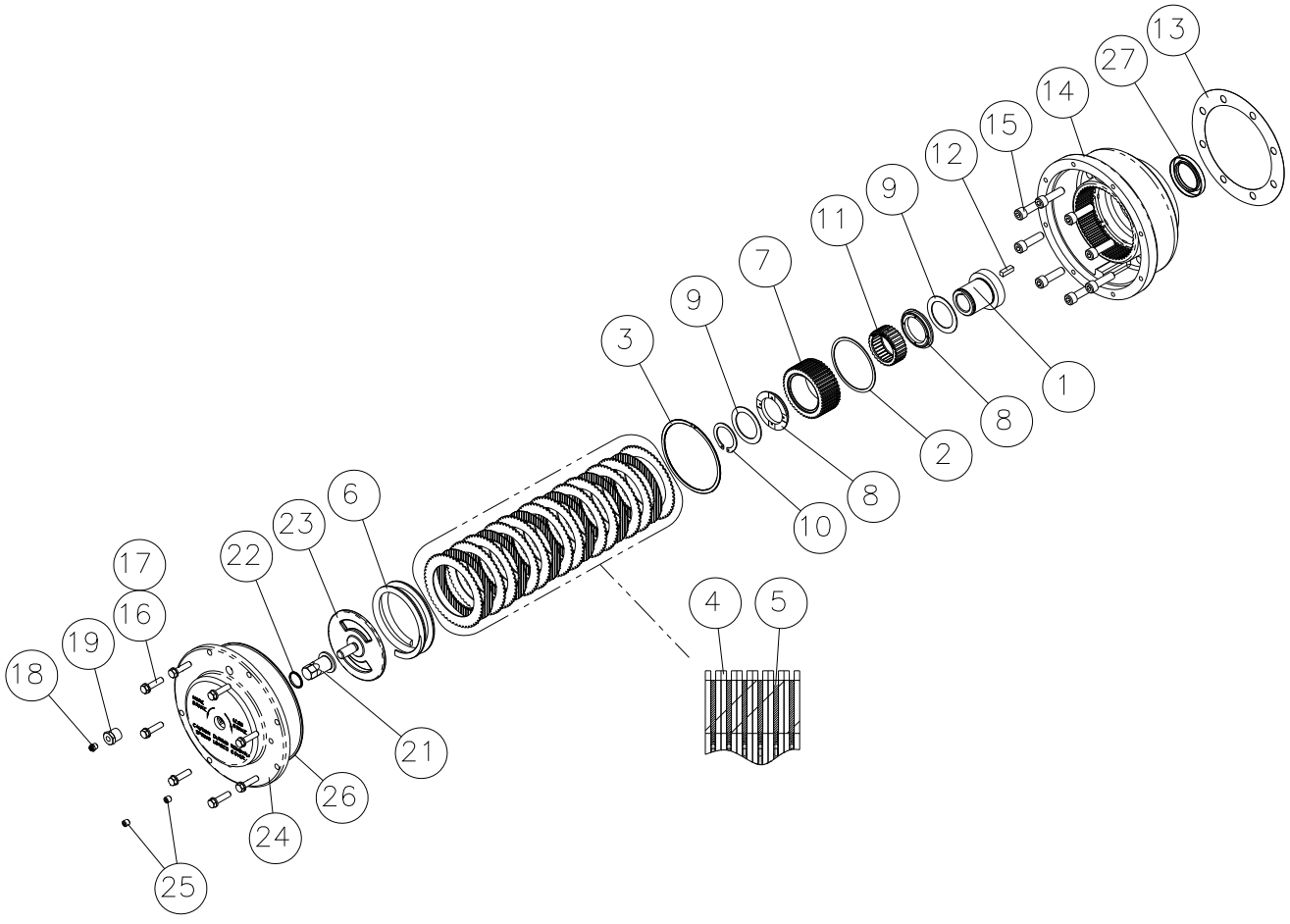
6. Install the drain plug (25) into the bottom of the brake cover (24).

7. Fill gearbox and brake with proper oil. Refer to winch maintenance section of this manual for oil type and amounts.

8. Adjust the brake using the procedure on page 9 of this manual.

NOTICE

FOR CORRECT PART SEQUENCE NUMBERS REFER TO PAGE 30 FOR RUFNEK ADJUSTABLE BRAKE BILL OF MATERIAL



CLUTCH AND DRUM ASSEMBLY

1. Install bushings (60) into drum (14). Install the drum (14) onto the output shaft (68).

2. Slide the collar (10) onto the output shaft (68) and secure it by tightening the set screw (9). Install the keys (67) into the output shaft.

3. Install the end bracket (6) and yoke assembly or clutch position indicator assembly (90) onto the output shaft (68) and mount it to the frame using four capscrews (59), nuts (63), and washers (62).

CLUTCH POSITION INDICATOR ADJUSTMENT
(FOR RUFNEK WINCHES ONLY)

Make sure that the sliding clutch (11) is fully engaged and that the clutch position indicator assembly (90) is not binding on the drum clutch. The lugs of the yoke MUST be centered in the groove with the clutch fully engaged in order for the clutch position indicator to be properly adjusted (See FIG-1)

The switch is a normally-open electrical switch that is actuated by disengaging the clutch which closes the circuit.

With the clutch fully engaged, adjust the switch in until the warning device is activated, then back-out 1/4 turn to deactivate the warning device.

Tighten the jam nut against the clutch bracket to secure the adjustment.

Test the switch by fully engaging, then disengaging, the clutch. The warning device should activate while disengaging the clutch pivoting no more than 3°.

FIG.-1

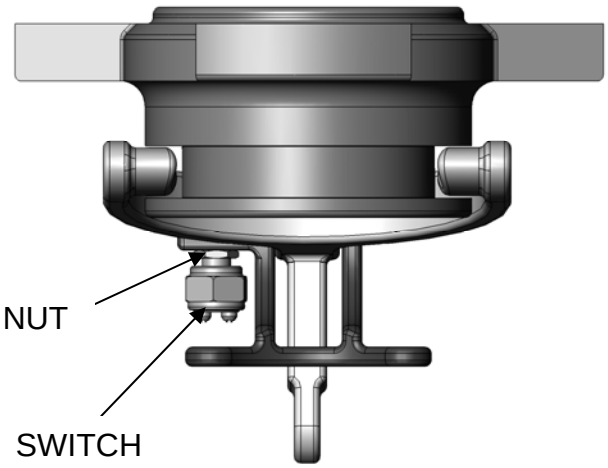
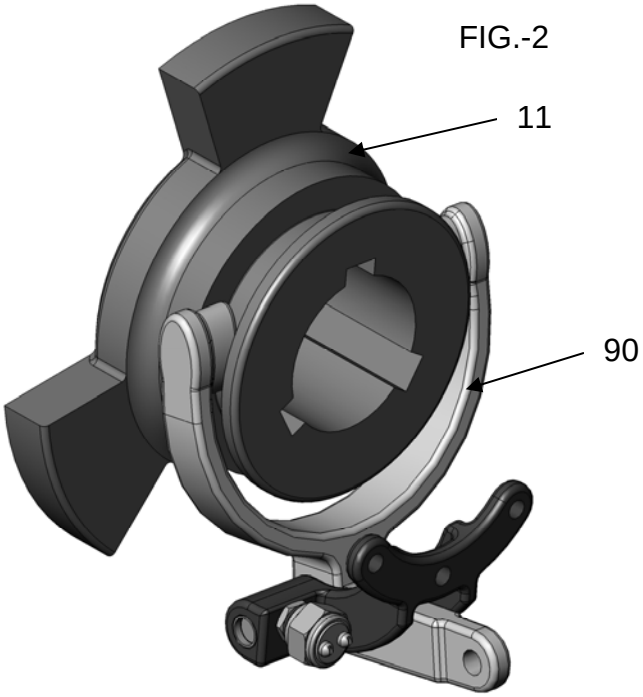


FIG.-2



TROUBLESHOOTING

FAILURE	PROBABLE CAUSE
Clutch handle won't latch	a) Clutch jaws aren't aligned. Align the jaws by rotating drum. b) Damaged yoke or linkage. Replace the yoke or clutch
Oil leaks from housing	a) Seal damaged or worn. Replace the seal(s). b) Too much gearbox oil. Drain excess oil. c) Gasket could be worn. Replace the gasket.
Load drifts	a) The brake is out of adjustment or worn. Adjust brake until load doesn't drift. Replace the parts as required.
Winch runs too slow	a) Low flow rate. Check the flow rate and increase if necessary. b) Hydraulic motor worn out. Replace the motor.
Cable drum won't free spool	a) Winch not mounted squarely. Check mounting and confirm that the winch is mounted on a level surface. b) Clutch not disengaged. Disengage the clutch.
Hydraulic fluid leaks from vent in the gearbox	a) Damaged motor shaft seal. Replace the seal.
Winch won't pick up heavy loads.	a) Too much cable on the drum. Use the snatch block or remove some cable from the drum. b) System pressure too low. Increase the hydraulic system pressure. c) Winch not broke-in. Run winch at half of rated load for several pulls.

TORQUE SPECIFICATIONS CHART

		Dry	Plated	Lubricated	Dry	Plated	Lubricated
		SAE Grade 5	SAE Grade 5	SAE Grade 5	SAE Grade 8	SAE Grade 8	SAE Grade 8
Nominal	Size	Torque *(Ft-Lbs)	Torque *(Ft-Lbs)	Torque *(Ft-Lbs)	Torque *(Ft-Lbs)	Torque *(Ft-Lbs)	Torque *(Ft-Lbs)
1/4	**20**	**8**	**6**	**5**	**12**	**9**	**7**
1/4	**28**	**10**	**7**	**6**	**14**	**10**	**8**
5/16	**18**	**17**	**13**	**10**	**25**	**18**	**15**
5/16	**24**	**19**	**14**	**11**	**27**	**20**	**16**
3/8	**16**	**31**	**23**	**19**	**44**	**33**	**26**
3/8	**24**	**35**	**26**	**21**	**49**	**37**	**30**
7/16	**14**	**49**	**37**	**30**	**70**	**53**	**42**
7/16	**20**	**55**	**41**	**33**	**78**	**58**	**47**
1/2	**13**	**76**	**57**	**45**	**106**	**80**	**64**
1/2	**20**	**85**	**64**	**51**	**120**	**90**	**72**
9/16	**12**	**109**	**82**	**65**	**153**	**115**	**92**
9/16	**18**	**122**	**91**	**73**	**172**	**129**	**103**
5/8	**11**	**150**	**113**	**90**	**212**	**159**	**127**
5/8	**18**	**170**	**128**	**102**	**240**	**180**	**144**
3/4	**10**	**266**	**200**	**160**	**376**	**282**	**226**
3/4	**16**	**297**	**223**	**178**	**420**	**315**	**252**
7/8	**9**	**430**	**322**	**258**	**606**	**454**	**364**
7/8	**14**	**474**	**355**	**284**	**668**	**501**	**401**
1	**8**	**644**	**483**	**386**	**909**	**682**	**545**
1	**14**	**721**	**541**	**433**	**1019**	**764**	**611**
1-1/8	**7**	**794**	**596**	**475**	**1288**	**966**	**772**
1-1/8	**12**	**890**	**668**	**534**	**1444**	**1083**	**866**
1-1/4	**7**	**1120**	**840**	**672**	**1817**	**1363**	**1090**
1-1/4	**12**	**1241**	**930**	**745**	**2012**	**1509**	**1207**

T = BOLT TORQUE (LB. FT.) **T = (KWD) / 12**

K = TORQUE COEFFICIENT (K **= 0.20 DRY** **K = 0.15 PLATED** **K = 0.12 LUBRICATED)**

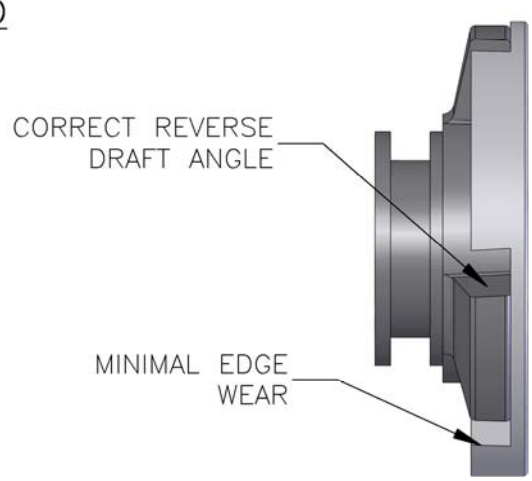
W = PRELOAD TENSION

D = NOMINAL BOLT SIZE (IN.) *** ALL TORQUE VALUE TOLERANCES ARE ± 5%**

CLUTCH INSPECTION

GOOD

THIS PICTURE ILLUSTRATES A SLIDING & DRUM CLUTCH WITH THE PROPER REVERSE DRAFT AND MINIMUM EDGE WEAR

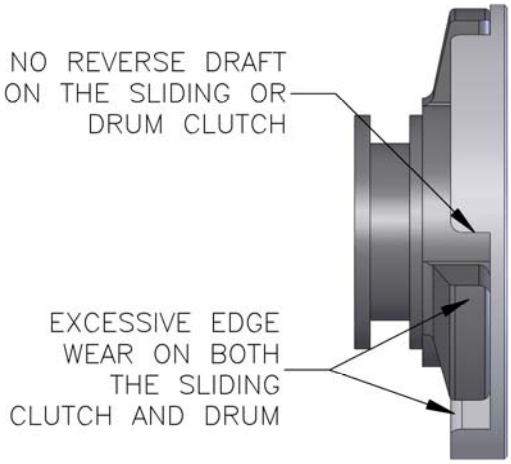


BAD

NOTICE

THE REVERSE DRAFT ENSURES THE CLUTCH STAYS ENGAGED DURING PAY–IN.

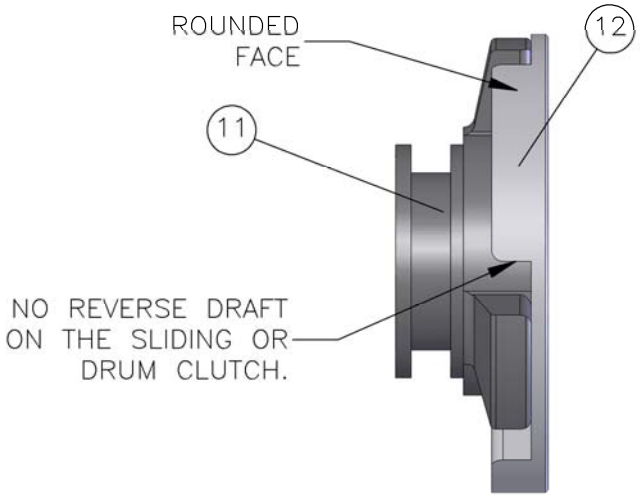
WITHOUT THE CORRECT DRAFT, THE CLUTCH COULD DIS–ENGAGE UNPREDICTIBLY.



CLUTCH REPLACEMENT CRITERIA

WARNING

IF 1/4 OF THE SURFACE OF THE FACE ON THE SLIDING CLUTCH OR DRUM CLUTCH IS ROUNDED OR HAS NO REVERSE DRAFT THE SLIDING CLUTCH AND OR DRUM CLUTCH MUST BE REPLACED.



BILL OF MATERIAL

SEQ	QTY	P/N	DESCRIPTION
1	5	20517	DOWEL PIN
2	1	32729	BUSHING
3	4	20886	CAPSCREW
4	5	21128	GREASE FITTING
5	1	20144	END CAP
6	1	20146	BRACKET
7	1	20129	BRACKET
8	1	1091	BRAKE BAND ASSEMBLY
9	4	20515	SET SCREW
10	2	20225	WASHER
11	1	20214	CLUTCH
12	1	23599	CLUTCH
13	6	20285	CAPSCREW
14	1	32720	DRUM
15	1	21163	U BOLT
16	3	20325	CAPSCREW
17	4	21775	DRIVE SCREW
18	--	--	OMIT
19	8	20520	WASHER
20	4	20274	NUT
21	5	20521	NUT
22	1	20958	SPRING
23	12	20526	WASHER
24	11	20271	NUT
25	1	20179	ROD
26	19	20267	CAPSCREW
27	1	20648	ARM
28	1	20054	CLEVIS
29	2	20913	WASHER
30	16	20518	WASHER
31	2	20310	CAPSCREW
32	3	20514	COTTER PIN
33	3	20633	CLEVIS PIN
34	2	20070	ARM
35	2	20404	SHAFT
36	2	20311	SCREW
37	6	20193	SET SCREW
38	4	20230	COLLAR
39	1	20152	YOKE
40	2	24724	SNAP RING
41	1	20116	PIN
42	--	--	OMIT
43	--	--	OMIT
44	1	20512	ROD

45		1		20072	ARM
46		8		20276	CAPSCREW
47		1		20175	BRACKET
48		4		20105	KEY
49		1		20278	CAPSCREW
50		1		20320	WASHER
51		1		20148	CAP
52		2		20315	GASKET
53		--		--	PIN
54		2		20319	BEARING
55		2		20231	SEAL
56		16		29792	CAPSCREW
57a		1		44072	MECHANICAL RUFNEK WORM
57b		1		44074	17 TOOTH INPUT RUFNEK WORM
57c		1		43972	16 TOOTH INPUT RUFNEK WORM
57d		1		41413	MECHANICAL LEFT HAND WORM W/ ADJ. BRAKE
57e		1		41709	MECHANICAL RIGHT HAND WORM W/ ADJ. BRAKE
57f		1		41707	16 TOOTH INPUT LEFT HAND WORM W/ ADJ. BRAKE
57g		1		41708	17 TOOTH INPUT LEFT HAND WORM W/ ADJ. BRAKE
57h		1		20766	MECHANICAL L.H. WORM W/ SHOE BRAKE OR NON ADJ.
57i		1		20767	MECHANICAL R.H. WORM W/ SHOE BRAKE OR NON ADJ.
57j		1		40764	16 TOOTH INPUT L.H. WORM W/ SHOE BRAKE OR NON ADJ.
57k		1		40665	17 TOOTH INPUT L.H. WORM W/ SHOE BRAKE OR NON ADJ.
58		1		20321	KEY
59		8		20408	CAPSCREW
60		2		21146	BUSHING
61		1		32747	HOUSING
62		8		20560	WASHER
63		8		20324	NUT
64		3		20286	PLUG
65		1		32835	LEFT HAND FRAME
66		1		32836	RIGHT HAND FRAME
67		3		20166	KEY
68a		1		25494	OUTPUT SHAFT (EXTENDED)
68b		1		32721	OUTPUT SHAFT (FLUSH)
69		2		20221	BUSHING
70		2		20575	KEY
71		12		23884	CAPSCREW
72		2		22452	CARRIER
73		1		20569	SPACER
74		2		164056	DOWEL PIN
75a		1		20789	RIGHT HAND GEAR
75b		1		20790	LEFT HAND GEAR
76a		1		20204	COVER (MODEL 64)
76b		1		44032	COVER (RUFNEK 45)
77		1		26799	BREATHER
78		4		20522	CAPSCREW
79		2		20316	GASKET
80		2		20617	WASHER
81		4		20524	CAPSCREW

82		1		20314		KEY
83		1		20679		DRUM
84		1		20313		WASHER
85		1		20312		NUT
86		2		1108		BRAKE SHOE
87		1		20683		COVER
88a		1		20685		RIGHT HAND CAM
88b		1		20687		LEFT HAND CAM
89		1		20677		HOUSING
90		1		4363		CLUTCH POSITION INDICATOR KIT
91a		1		40425		MOTOR (16 TOOTH INPUT)
91b		1		40666		MOTOR (17 TOOTH INPUT)
92		4		20310		CAPSCREW
93		1		40424		GASKET
94		1		41285		OIL SEAL
95		1		40698		MOTOR ADAPTER
96		8		33212		CAPSCREW
97		2		939243		CLEVIS PIN

ADJUSTABLE BRAKE BILL OF MATERIAL

SEQ	QTY	P/N	DESCRIPTION
1	8	20289	CAPSCREW
2	8	33212	CAPSCREW
3	9	26854	STATOR PLATE
4	5	32765	FRICTION DISC
5	1	33179	BRAKE SPRING
6	1	41403	INNER RACE
7	2	31076	RETAINING RING
8	1	33407	CAM CLUTCH
9	1	41404	SPRING PLATE
10	1	41405	DRIVER
11	1	32951	GASKET
12	1	33177	BRAKE HOUSING
13	1	27215	RETAINING RING
14	1	41406	ADJUSTING MECHANISM
15	1	23900	KEY
16	1	33244	OIL SEAL
17	9	20526	LOCKWASHER
18	--	--	OMIT
19	1	41409	BRAKE COVER
20	1	32220	PIPE PLUG
21	1	12208	BUSHING
22	1	20315	GASKET
24	1	20278	CAPSCREW
25	1	41419	WASHER
26	1	41411	O-RING
27	1	13050	BREATHER

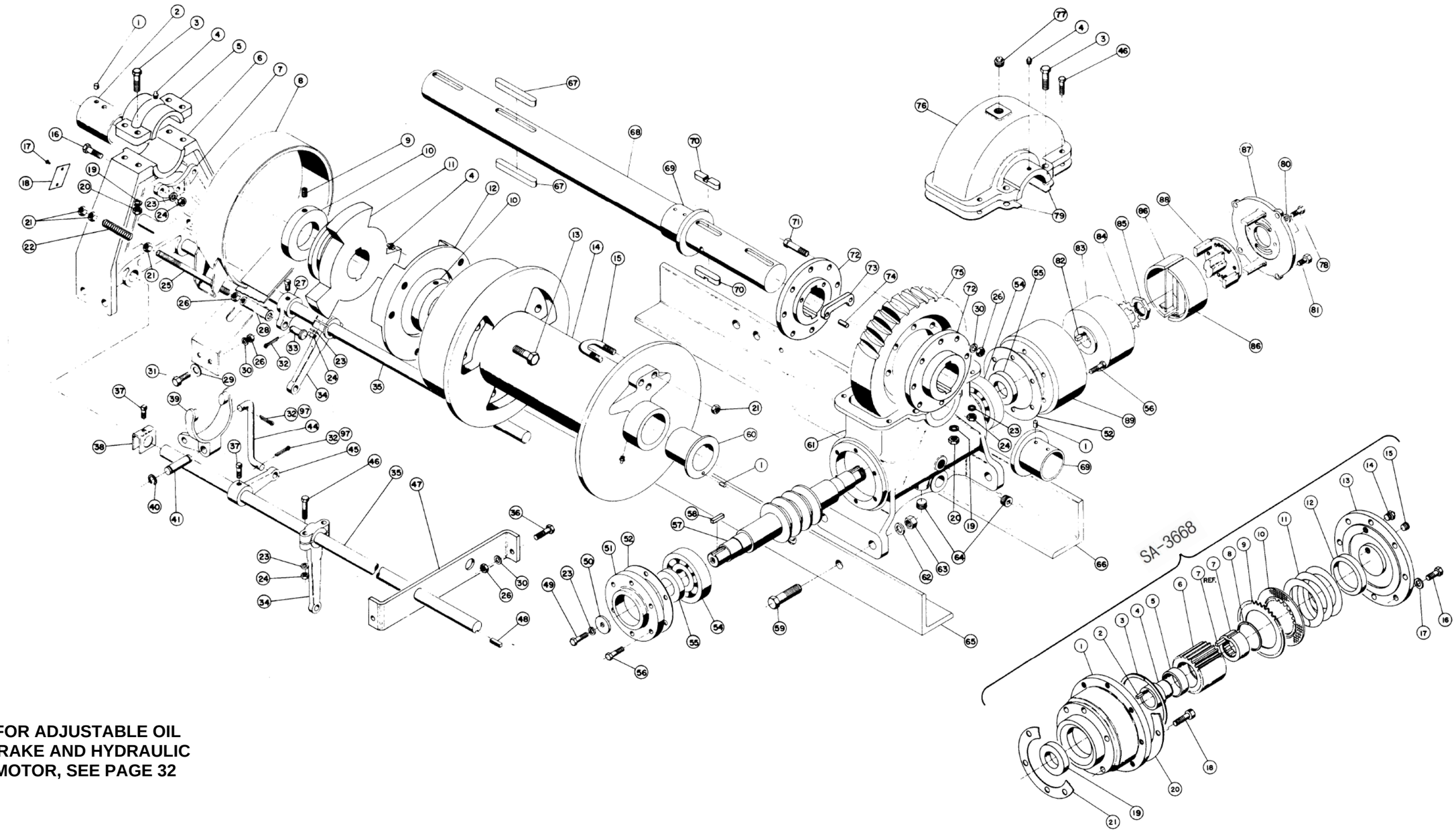
NON ADJUSTABLE BRAKE BILL OF MATERIAL

SEQ	QTY	P/N	DESCRIPTION
1	1	33177	BRAKE HOUSING
2	1	33420	KEY
3	1	27215	RETAINING RING
4	1	32942	COUPLER
6	1	3686	DRIVER/BUSHING ASSEMBLY
7	1	33407	CAM CLUTCH
8	1	31076	RETAINING RING
9	8	26854	STATOR PLATE
10	5	32765	FRICTION DISC
11	1	33179	SPRING
12	1	32944	WASHER
13	1	32941	BRAKE COVER
14	1	13050	BREATHER
15	1	20286	PIPE PLUG
16	8	20289	CAPSCREW
17	8	20526	WASHER
18	8	33212	CAPSCREW
19	1	33244	OIL SEAL
20	1	32951	GASKET
21	1	20315	GASKET

RUFNEK BRAKE BILL OF MATERIAL

SEQ	QTY	P/N	DESCRIPTION
1	1	44139	COUPLER
2	1	41416	RETAINING RING
3	1	27215	RETAINING RING
4	12	26854	STATOR PLATE
5	6	32765	FRICTION DISC
6	1	33179	SPRING
7	1	44148	DRIVER
8	2	41743	BUSHING
9	2	41723	RACE
10	1	26980	RETAINING RING
11	1	41759	CLUTCH
12	1	25519	KEY
13	1	20315	GASKET
14	1	33177	BRAKE HOUSING
15	8	33212	CAPSCREW
16	8	20289	CAPSCREW
17	8	20526	LOCKWASHER
18	1	13050	BREATHER
19	1	12208	BUSHING
20	--	--	OMIT
21	1	41406	ADJUSTING MECHANISM
22	1	41411	O-RING
23	1	41404	SPRING PLATE
24	1	43970	COVER
25	2	21684	PLUG PIPE
26	1	28269	O-RING
27	1	33244	OIL SEAL

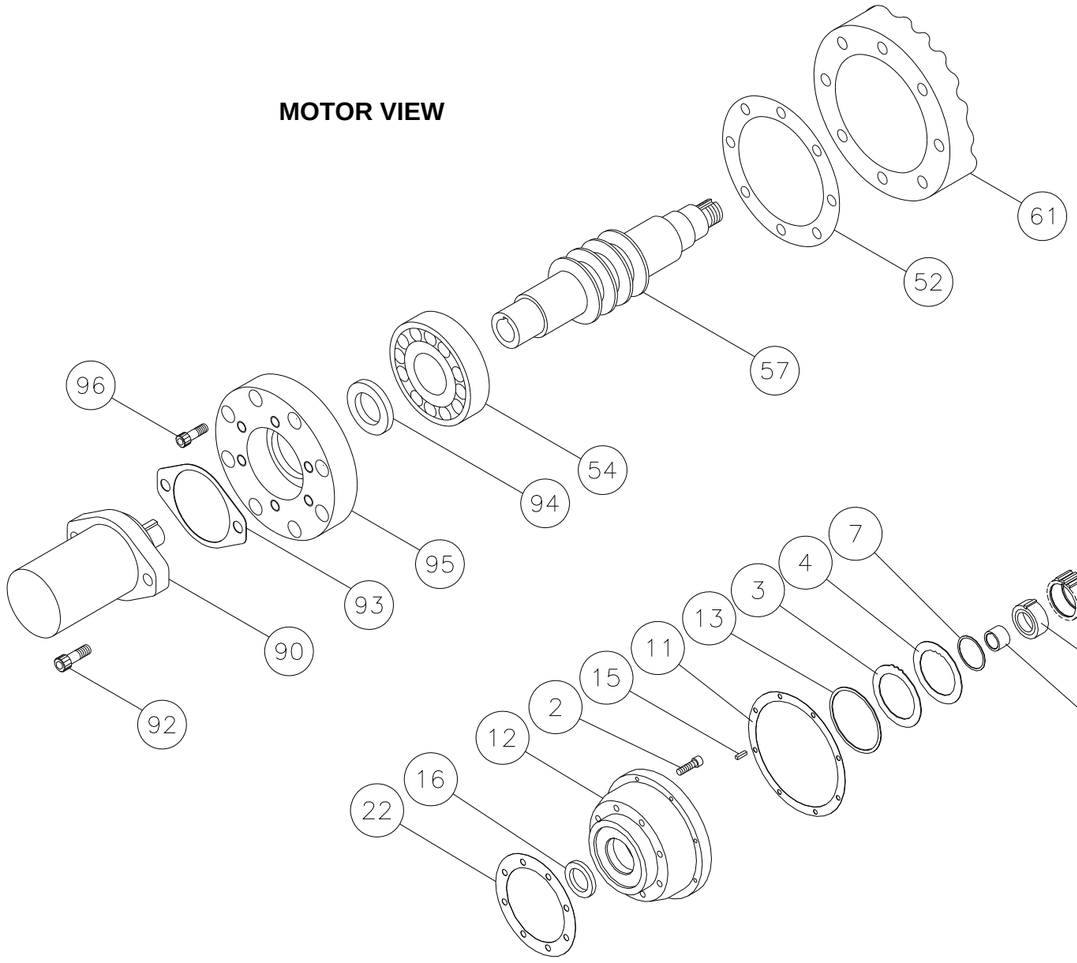
ISOMETRIC VIEW

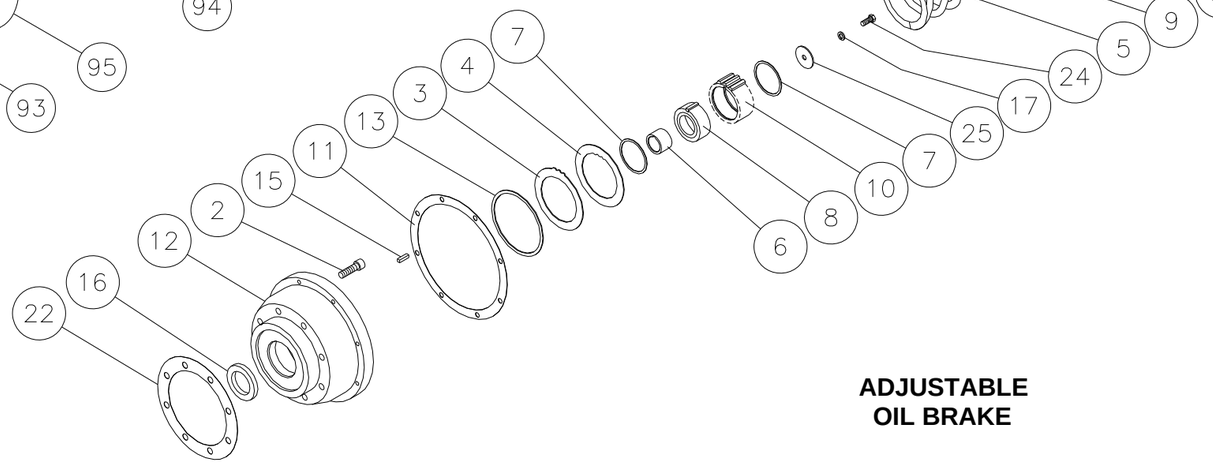


FOR ADJUSTABLE OIL BRAKE AND HYDRAULIC MOTOR, SEE PAGE 32

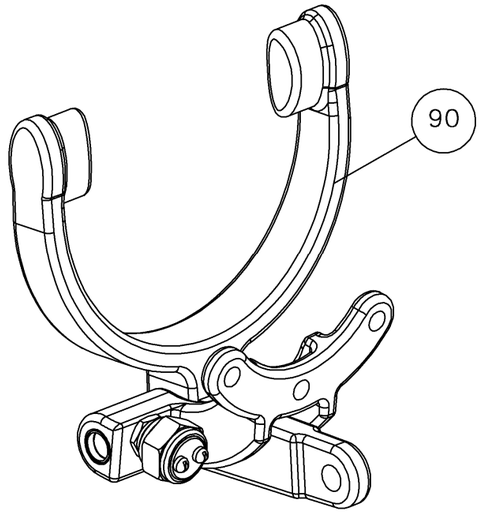
HYDRAULIC MOTOR, ADJUSTABLE OIL BRAKE, & CLUTCH POSITION INDICATOR

MOTOR VIEW





ADJUSTABLE OIL BRAKE



CLUTCH POSITION INDICATOR KIT