

MODEL 19 AND 119

**SERVICE AND
PARTS MANUAL**

Gearmatic®

**800 E. DALLAS • BROKEN ARROW, OK
74013 USA**

Gearmatic®

P.O. BOX 547 • BROKEN, ARROW, OK 74103
PHONE: (918) 251-8511 • TELEX: 492340 • FAX: (918) 258-4822

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Any accessories or replacement parts supplied by GEARMATIC are warranted for a period of ninety (90) days from date of shipment from GEARMATIC factory.

Should any part of said products be found, under normal use and service, during the warranty period, to be defective, GEARMATIC will repair or replace, at its option, said part FOB GEARMATIC factory, provided such defective part is returned to the location designated by an authorized GEARMATIC representative, charges prepaid, and provided inspection of the original part establishes the claimed defect to the satisfaction of GEARMATIC.

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To the extent any provision of this warranty contravenes the law of any jurisdiction, such provision shall be inapplicable in such jurisdiction, and the remainder of the warranty shall not be affected thereby.

EFFECTIVE JANUARY 1, 1986

Continuing improvement and advancement of design may cause changes to your winch which may not be included in this publication. Each publication is reviewed and revised, as required, to update and include these changes in later editions.

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DESCRIPTION

The Models 19 and 119 are mechanically driven winches designed to give long, trouble free service. The design features are the result of many years experience in the tractor winch business.

The model 19 is sealed and would normally be fitted on a crawler tractor. The model 119 is unsealed and is normally used on log skidders.

These winches are powered from the tractor P.T.O. through a ring gear and pinion set. The ring gear is rigidly supported by taper roller bearings. The cable drum is connected to the ring gear shaft through a high capacity, self energizing friction clutch. The clutch bands have a large contact area and are designed with positive location and adjustment features.

During towing operations, the cable drum is held by a self energizing, heavy duty brake band. When the brake is released, the drum will "free spool" with just enough resistance to prevent the cable drum from unspooling more cable than is required. The clutch and brake compartment on the model 19 is completely sealed from mud and water, the 119 is unsealed.

The winch is controlled by a single lever which operates a master control unit. When the control handle is

in the neutral position, the brake is spring applied for towing operations. When the control handle is pulled to engage the clutch, the master control unit supplies hydraulic fluid to a slave cylinder in the clutch for the "winching in" operation. The harder the operator pulls on the control handle, the greater will be the clutching effort. When the control handle is moved to its full extent in the brake release direction it will remain in that position, releasing the brake for "free spooling". The clutch and brake hydraulic cylinders are each connected to an independent master cylinder in the master control unit and operate in the same manner as an automobile's master cylinder which is connected to the wheel brakes.

These winches are manufactured with a standard main housing for the basic winch. Adapter assemblies are designed specifically for each make and model of tractor or skidder. In this way, 95% interchangeability of parts is achieved.

When the model 19 winch is mounted on the rear of a crawler tractor, the adapter housing is installed between the winch and the tractor. The adapter housing contains a gear train which is designed to suit the P.T.O. speed and rotation to provide the maximum rated line pull at the winch drum.

OPERATING INSTRUCTIONS

OPERATION REF. FIG. 'A'

To engage the clutch, pull the handle of the master control in the "engage clutch" direction (See Fig. 'A'). To apply the brake, release the handle from the clutching position and allow it to return to the neutral position. To release the brake, move the handle in the "release brake" direction until the degree of brake release required is obtained. To lock the brake in full release for "free spooling", move the handle to the end of its travel in the "release brake" direction. The handle will remain in this position until released manually.

IMPORTANT: When "winching in" do not allow the clutch to slip. The heavier the load, the harder it is necessary to pull the master control handle.

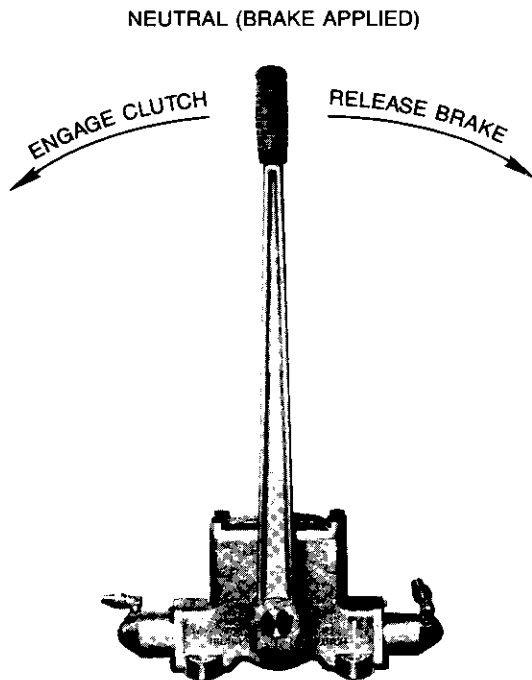


Figure A

LUBRICATION REF. FIG. 'B'

Winches With a Filler Hole in the Adapter

Remove the filler plugs and oil level plugs from the ring gear end of the winch and the adapter assembly. Fill both gear compartments to the oil level plugs.

Winches Without a Filler Hole in the Adapter

Remove the filler plug from the top of the ring gear end of the winch. Add six quarts of oil through the filler hole. This oil will pass through an oil transfer hole in the winch housing.

Before running the winch check to see that oil has entered the adapter assembly. This can be done by

slowly removing the drain plug from the adapter. If there is no oil in the adapter assembly, see the note below before proceeding.

When oil has entered the housing, run the winch for 15 minutes. Top up the oil level if necessary.

General Note: Winches serial number 19-2301 and down do not have an oil transfer hole as mentioned above. All winches with a sprocket drive have the oil transfer hole blocked off with a pipe plug.

When a new winch has just been installed or if the pinion shaft has been removed, run the tractor engine at idle with the winch drive engaged for 10 minutes. This will ensure that oil will be fed into the pinion bearings before the pinion shaft is driven at maximum R.P.M.

After 40 hours of operation, drain and replace the gear oil. Repeat every 600 hours of winch operation.

IMPORTANT: Check oil weekly.

AMBIENT TEMP.	GEAR OIL	MASTER CONTROL
10°F to -30°F -12°C to -34°C	SAE 75 WEP	Standard auto-motive hydraulic brake fluid
70°F to -10°F 21°C to -23°C	SAE 80W-90EP	
120°F to 20°F 48°C to -7°C	SAE 85W-140EP	

Gear Oil Spec.: MIL-L-2105B or better

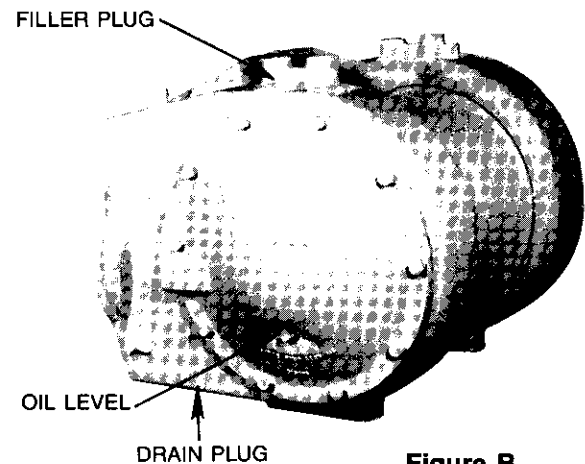


Figure B

BLEEDING HYDRAULIC SYSTEM

The X710C master control is shipped from the factory filled with hydraulic brake fluid.

When the master control unit has been installed, remove the red sealing tape covering the vent hole in the filler plug (See Fig. 'C'). Set the tractor engine at idle with the P.T.O. engaged. Move the master control handle through its entire stroke several times. Move the control handle as far as it will go in the brake release

FOREWORD TO SERVICING

The following service instructions have been arranged to provide the best methods for assembly and disassembly of the Gearmatic Model 19 and 119 winch. It is suggested that before any work is done on this unit, all the steps for disassembly and assembly should be read and understood.

Expendable parts such as gaskets, oil seals, cylinder cups and 'O' rings, should never be re-used even though inspection may show these items as being serviceable for future use. The cost of these items is negligible compared to the labor involved in replacing such items if they do not function properly.

All replacement parts should be given a final inspection to insure that no damage has resulted after the final factory inspection was made.

Cleanliness is of prime importance when any part of the winch is to be assembled or disassembled. Before commencing disassembly of components used in the hydraulic circuit be sure that a clean work area with a dust and grit free work bench is available.

GENERAL

Before reassembly of the winch be sure that all parts are perfectly clean, and that all machined surfaces of the winch parts are in good condition and free from damage or excessive wear.

In the following assembly, disassembly and inspection instructions, the numbers in brackets refer to the item numbers on the exploded parts drawing illustrated in the reference page stated below the heading for each section.

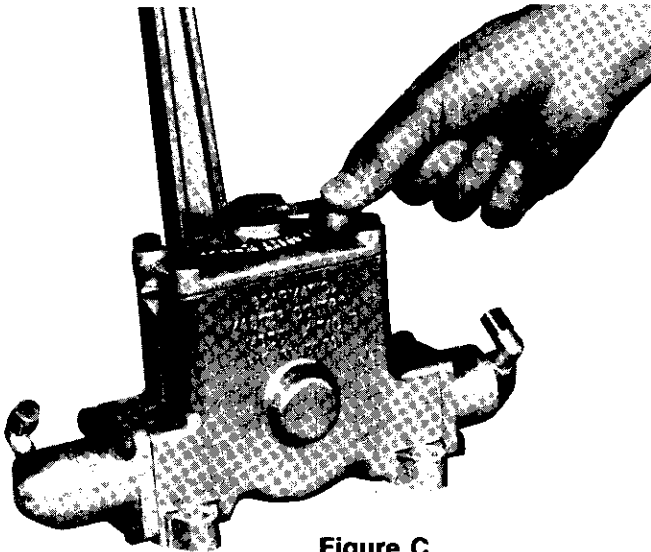


Figure C

direction (See Fig. 'A'), and slacken off a fitting in the brake line at the highest point in that line so that air may escape. Tighten the fitting and return the control handle to neutral. After a slight pause, repeat this process until all the air has been removed. Repeat this procedure for the clutch end of the master control until all air has been expelled from the clutch line.

When all the air has been expelled from the system, move the master control handle to the end of its travel in the brake release direction. The cable drum should now spool freely. To check the clutch engagement, move the master control handle to engage the clutch. After a short distance of travel, the control handle should feel solid when 40-50 lbs. force is applied at the handle. If the drum does not "free spool" when the control handle is in the brake release position or if the control feels "spongy" in the clutch engaged position, repeat the above instructions for bleeding the system.

Check the level of the brake fluid in the master control housing and fill to within one to two inches of the top if necessary.

IMPORTANT: Do not use any fluid other than automotive hydraulic brake fluid. The correct fluid can be obtained from any service station.

SERVICE INSTRUCTIONS

BRAKE DISASSEMBLY

Ref. Fig. 1, 2 and 3

Remove the drag adjustment screw (10) and the drag spring (11) from the top of the main housing (12).

Remove the capscrews (19) and the end cap (18) Fig. 2. Remove the hydraulic tube (17) Fig. 2 from the end of the drum shaft (See Fig. 'D').



Figure D

HYDRAULIC TUBE

Place the hydraulic tube, still connected to the hydraulic line, at a point above the master control unit so that the brake fluid will not leak out of the line. Remove the clutch cover (21).

Remove the spring cap (12) and the spring (11) Fig. 2 will drop out. Now remove the primary brake band (15) by gripping it at the ends and slide the band off the brake levers (13 and 14) Fig. 3, using a rocking motion if necessary. The lever block (16) and push rod (10) Fig. 3 can now be removed as one unit (See Fig. 'E'). Remove the brake anchor pin (12) and rotate the brake band clockwise until it can be removed as explained for removing the primary brake band.

The secondary brake lever (13) Fig. 3 will be removed with the secondary band. With a hammer and punch, drive the pin (9) into the center of the brake lever (13) then remove the brake lever with the pin from the secondary brake band. Remove the brake cylinder assembly by removing the capscrews (1) Fig. 2 (See Fig. 'E').

BRAKE CYLINDER DISASSEMBLY

Ref. Fig. 2

Remove the boot (9), piston (8), spring (7), primary piston (6), cup (5) and spring (4) from the brake cylinder (3). Discard the cup (5) and install a new part on reassembly. Inspect all parts for wear or damage and replace if necessary.

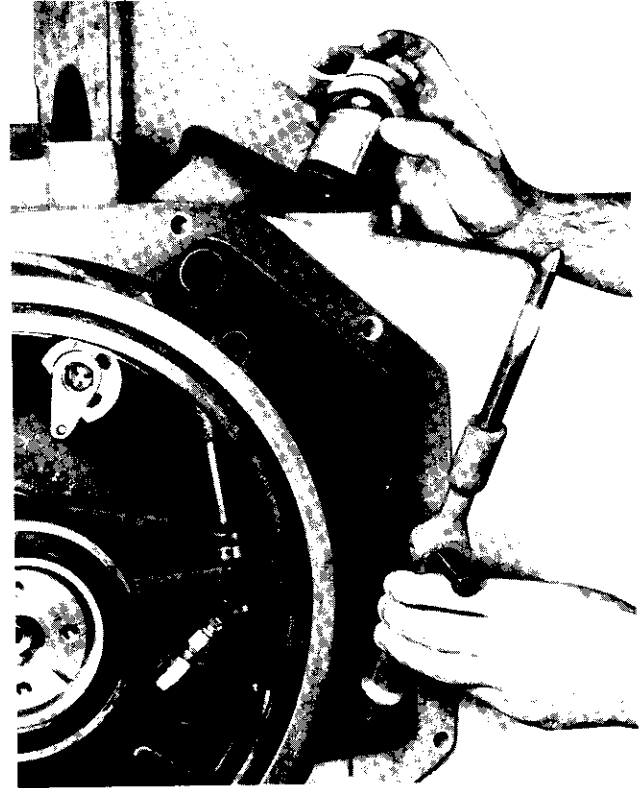


Figure E

BRAKE CYLINDER ASSEMBLY

Ref. Fig. 2

Clean the cylinder bore, if necessary, using extra fine emery cloth and wash all parts in clean brake fluid. Assemble all parts in the order shown on Fig. 2 so that the large end of spring (4) contacts the bottom of the brake cylinder (3). Spring (7) must be installed in the counter bore end of the primary piston (6) and must contact the flat end of piston (8).

BRAKE ASSEMBLY

Ref. Fig. 1 and 2

To assemble the brake, proceed in the reverse order of disassembly.

When installing brake lever (13) ensure the shorter end is located nearest the housing lever plug (23) Fig. 1. Replace the clutch cover (21), then hydraulic tube (17).

Secure the end cap (18) in place using the capscrews (19).

Drag Adjustment

Adjust to set drum drag when Brake is in "Free Spool." Adjusting screw (10) should be screwed clockwise to apply drag to brake or anticlockwise to relieve drag, depending on operator preference.

BRAKE ADJUSTMENT

Ref. Fig. 2

No brake adjustment is required on this winch unless winch is equipped with brake travel stop adjusting screw (23). To adjust, pressurize brake cylinder for free spool and turn setscrew (23) clockwise until it contacts lever block (16). Return control valve to neutral then add half a turn to setscrew (23). Hold setscrew and torque jamnut (26) to specification.

When brake bands become worn and require replacing, inspect the brake spring and replace the spring if the free length is less than $6\frac{29}{32}$ ". If the winch is new and the brake does not hold the required load, the brake may require to be "run in". See Trouble 'B', cause 1 in Trouble Shooting section.

CLUTCH DISASSEMBLY

Ref. Fig. 4

Remove the clutch cover (21), Fig. 1, as instructed above for "Brake Disassembly". Release the adjusting cams (19) by loosening the capscrews (21) and rotating the cams until the flat side of each cam is towards the bands (See Fig. 'F'). Release the clutch push rod (28) by depressing it into the clutch cylinder (23) and releasing it from the primary clutch band socket. The primary clutch band can now be removed.

To remove the secondary clutch band (29) it is necessary to remove the clutch hub (17). Remove the clutch hub (17) and clutch lever (22) with the secondary clutch band (29) attached as follows, Disconnect the hydraulic hose assembly at the hydraulic fitting (9), then remove the fitting (9) from the drum shaft. Remove the four socket head capscrews (16) from the gland cap (15).

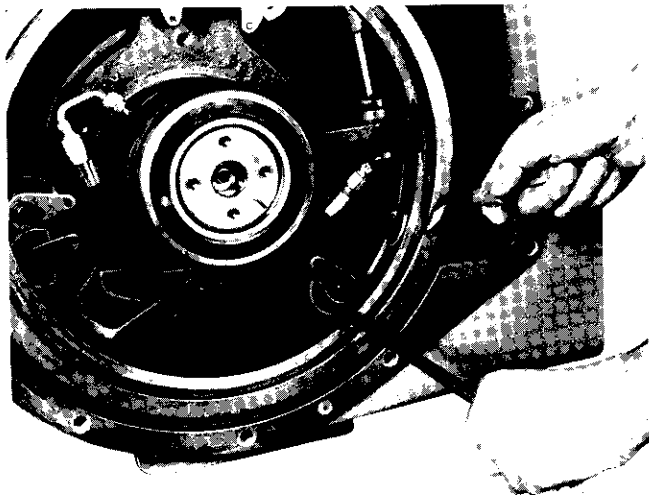


Figure F

Remove the gland cap (15) and shims (12) being careful not to damage the seal diameter inside the bore of the drum shaft (21), Fig. 5. Using three $\frac{1}{2}$ " N.C. capscrews as jacks in the holes provided in the clutch hub (17), remove the clutch hub from the drum shaft, (Gearmatic tool Number A 13154 can be supplied for this pur-

pose) (See Fig. 'G'). This procedure also removes the bearing (11). Now the secondary clutch band (29) and clutch lever (22) can easily be removed from the clutch hub by removing the snap ring (10) and sliding the clutch lever off the clutch hub. Disconnect the hose assembly (8) from the clutch cylinder (23) and remove the clutch cylinder. Remove the pivot pin (5) and lever arm (1).

Remove and discard the 'U' seal (14) and 'O' ring (13) from the gland cap (15) and replace the 'U' seal and 'O' ring with new parts on reassembly. Inspect the bearing diameters of the hydraulic tube (17), Fig. 2, for wear. If wear is excessive, replace the hydraulic tube.

CLUTCH CYLINDER DISASSEMBLY

Ref. Fig. 4

Remove the push rod (28), boot (27), piston (26), cup (25) and spring (24) from the clutch cylinder (23). Discard the 'U' cup (25) and install a new part on reassembly. Inspect all parts for wear and replace if necessary.

CLUTCH CYLINDER ASSEMBLY

Ref. Fig. 4

Clean the cylinder bore, if necessary, using extra fine emery cloth and wash all parts in clean brake fluid. Coat the bore of the cylinder (23) with Tru-Torque Oil (Gearmatic part No. 51467). Assemble all parts in the order shown on Fig. 4 so that the large end of the spring (24) contacts the bottom of the clutch cylinder (23) and the flat side of the 'U' cup (25) contacts the flat end of the piston (26).

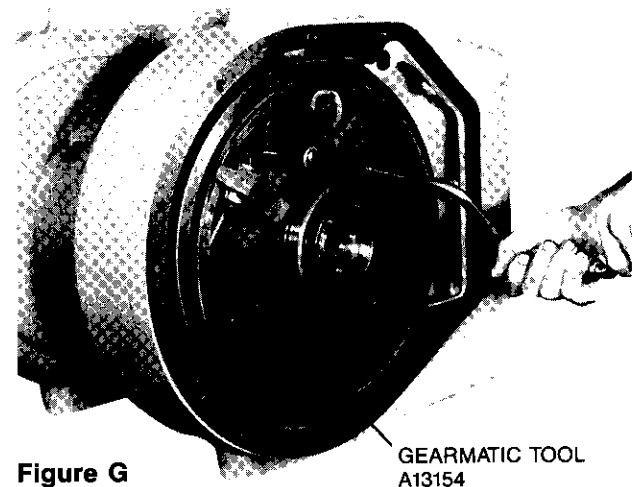


Figure G

GEARMATIC TOOL
A13154

CLUTCH ASSEMBLY

Ref. Fig. 1, 2, 3 and 4

Pack the grooves in the clutch lever (22) with grease and install it on the clutch hub (17), then install the snap ring (10). Install the lever arm (1), pivot pin (5) and adjustable push rod assembly. (see page 24 items 2-3-4). Install the secondary clutch band (29). Install the clutch hub (17) on the drum shaft (18), on Fig. 5, so that

the hole in the side of the clutch hub (17) lines up with the $\frac{1}{8}$ N.P.T. hole in the drum shaft (18) on Fig. 5. Install the bearing (11). Check that the clutch hub (17) contacts the drum bearing (8) and that the bearing (11) contacts the clutch hub (17) by installing the gland cap (15) on the end of the drum shaft. Carefully tighten the capscrews (16) one half turn at a time progressively around until the capscrews are secure. Remove the gland cap (15) and, using a depth micrometer, measure the depth from the edge of the bearing (11) to the end of the drum shaft. (See Fig. H). Measure the length of the gland cap pilot diameter with the depth micrometer (See Fig. J). Subtract this length from the depth already measured to establish the total thickness of shims (12) required.

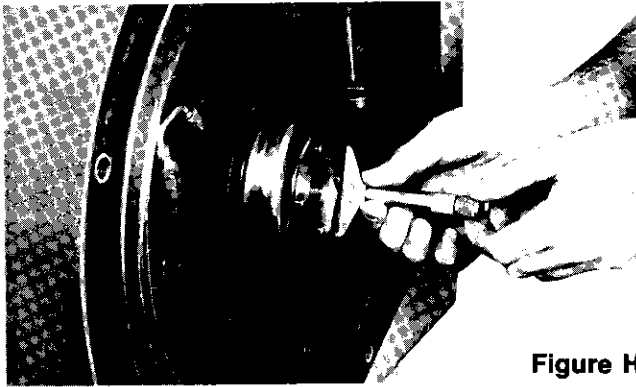


Figure H

Add an additional .025" shim (12) to ensure clearance between the bearing (11) and the gland cap (15). Install a new 'U' cup (14) and O-Ring (13) in the gland cap (15). Install the shims (12) and the gland cap (15) and tighten the capscrews (16) one half turn at a time progressively around until the capscrews are secure. Torque to 18 lbs. ft. Using a heavy drift on the inside of the cable drum flange, drive the cable drum (1) towards the clutch assembly. This will remove any pre-load imposed on the bearings while the shims (12) were being established. Set the adjusting cams (19) to give the required clearance between the clutch bands (29) and (30) and the drum (6) by following the instructions "To Adjust the Clutch". Install the clutch cover (21), hydraulic tube (17), elbow (20), tube assembly, the end cap (18) and tighten all capscrews to the required torque.

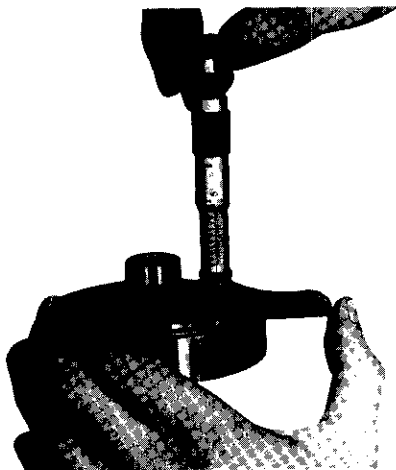


Figure J

CLUTCH ADJUSTMENT

With the primary clutch band removed and the adjusting cams engaged in the center groove of the secondary clutch band, adjust the secondary clutch band by turning the adjusting cams with a screw driver inserted in one of the slots provided in each cam (See Fig. 'F'). Ensure that the cams rotate in a counter clockwise direction when taking up the slack in the clutch bands. Set the adjusting cams in the secondary clutch band so that there is no clearance between the band and the drum. Then gradually release the cams until a clearance of .010" to .015" is obtained all around between the band and the drum. Adjust the push rod so that no slack exists between the tip of the clutch band and the lever. Install the primary clutch band and adjust the cams following the same procedure used on the secondary clutch band to give .010" to .015" clearance all around. When the correct setting has been obtained, torque all capscrews to 25 lb. ft. Release the brake and check that the drum rotates freely.

DRUM DISASSEMBLY (MODEL 19 ONLY)

Ref. Fig. 3

Remove the brake bands and clutch assembly as outlined under "Brake Disassembly" and "Clutch Disassembly". The drum can now be removed by drifting carefully on the cable side of the drum flange next to the brake end. The brake drum (6) and the seal flange (3) will be removed with the cable drum (1) as an assembly. After removing this assembly from the main housing, separate the drums (1) and (6) using two $\frac{1}{2}$ N.C. capscrews as jacks in the holes provided on the inside wall of the brake drum (6). After the drums are separated, remove and inspect the oil seal (4) and O-Ring (2) for damage or wear. Replace on reassembly.

DRUM ASSEMBLY (MODEL 19 ONLY)

If the brake drum (6) has been removed from the cable drum (1), pack the oil seal (4), Fig. 3, completely full of grease in the cavity between the two oil seal lips (Fig. K). Fill the space surrounding 'O' ring (5) with grease and pack grease into the bore of oil seals (15) and (16)

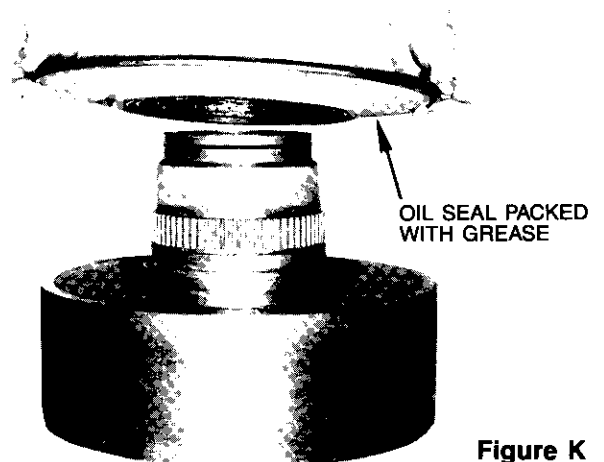


Figure K

installed at the ring gear compartment end of the winch housing (12). The grease used in the oil seals (16), (17), and 'O' ring (5) should be of the water repellent type (e.g. Shell Darina Grease). Assemble the cable drum (1), seal flange (3), oil seal (4) and brake drum (6) and install this assembly in the winch as a unit.

When the cable drum (1) and brake drum (6) assembly has been installed, then install the bearing (7) on the drum shaft so that it contacts the shoulder in the brake drum bore.

DRUM DISASSEMBLY (MODEL 119 ONLY)
 Ref. Fig. 3

Remove the brake bands and clutch assembly as outlined under "Brake Disassembly" and "Clutch Disassembly". The drum can now be removed by drifting carefully on the cable side of the drum flange next to the brake end. Lifting can be aided by use of a hoist and chain in the cast holes provided in the drum.

DRUM ASSEMBLY (MODEL 119 ONLY)

Using a hoist and chain in the cast holes provided lift the drum into the winch. Drive the drum onto the drum bearing using a copper drift.

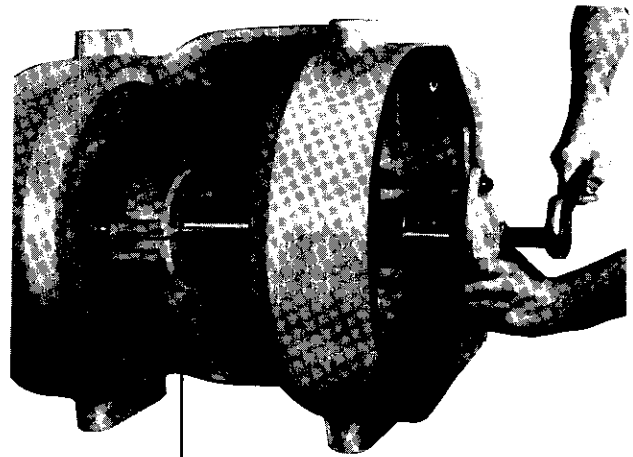
When the drum has been installed, fit the bearing (7) on the drum shaft so that it contacts the shoulder in the drum.

RING GEAR AND PINION DISASSEMBLY
 Ref. Fig. 1 and 5

Remove the winch from the tractor, then remove the brake, clutch and drum assemblies from the winch, as outlined under the appropriate headings. Now remove the gear cover (3). Be careful not to damage the oil wiper (4). Remove the ball bearing (25) from the drum shaft using a suitable bearing puller (Gearmatic Tool Number C 13199 can be supplied for this purpose). (See Fig. M).

Remove the lock key (19) from the drum shaft (18). Unscrew the locknut (24) from the drum shaft (Gearmatic Tool No. C 13189 can be supplied for this purpose) (See Fig. N). Remove O-ring (28) and replace with a new part on reassembly. Protecting the end of the drum shaft, drive it out of the main housing.

Remove the cotter pin (1), nut (4), washer (5) and the pinion gear or sprocket. Next remove the capscrews (2) and, using two 5/8" N.C. capscrews as jacks in the tapped holes provided in the bearing housing (9), remove the bearing housing (9). Then shims (10). If the pinion bearings (8), or (13) require to be replaced, remove the pinion (16) by pressing it out of the assembly. A piece of 3/4" plate having a 3.625" diameter bored hole can be used to locate over the pinion and contact the outer race of the roller bearing (15) while the pinion (16) is pressed out of the assembly.

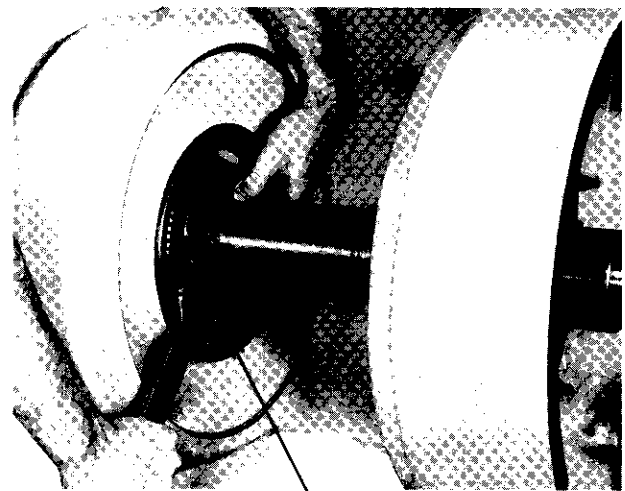


GEARMATIC TOOL
 C13199

Figure M

RING GEAR AND PINION ASSEMBLY
 Ref. Fig. 5

If the pinion bearings (8) and (13) are being replaced, it is necessary to re-adjust the shims (10) for the correct preload, as follows. Press the outer races of the bearings (8) and (13) in their ends of the bearing housing (9). Press the bearing (15), spacer sleeve (14) and the inner race of the bearing (27) on the pinion shaft as illustrated. Make sure that the large radius on the inside of the inner race (15) goes onto the pinion shaft first. Place the pinion shaft in the bearing housing so that the outer race (13) and inner race (27) mate up. Then from the flange end of the bearing housing, install the bearing spacer (12). Place a piece of soft lead gauge wire on



GEARMATIC TOOL
 C13189

Figure N

the end of the bearing spacer then press the inner race of the bearing (28) on the pinion shaft. Install the preload bushing (6) or sprocket or gear previously removed, washer (5) and nut (4). With this assembly held securely in a vise, proceed with preloading. Fasten a piece of string (12" to 18") to the bearing housing flange and

wrap the excess around on the O.D. of the bearing housing, then attach the free end to a suitable spring balance. Tighten the nut (4) until a reading of 6½ to 10 pounds on the spring balance is required for continuous rotation of the bearing housing about the shaft. Remove the nut (4), washer (5), preload bushing (6) and the inner race of the bearing (28). Carefully remove the lead gauge wire and measure the compressed thickness to determine the correct number and size of the shims (11). Install the shims, placing the thinner shims between the thicker shims, then replace the inner race of the bearing (28), pinion gear or sprocket previously removed, washer (5) and nut (4). Torque the nut to specifications in torque chart and check the preload using the spring balance (Fig. O). Install the cotter pin (1). This assembly is now complete and ready for assembly in the main housing.

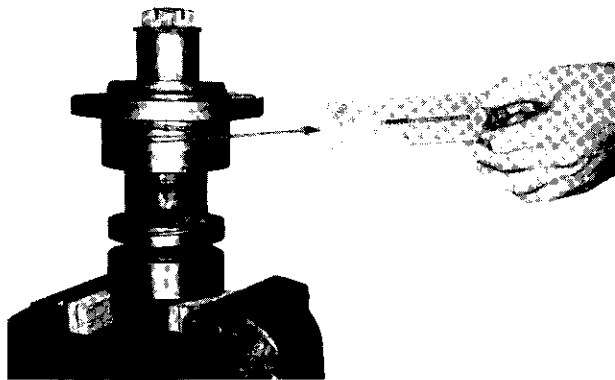


Figure O

PRE-LOAD OF DRUM SHAFT BEARINGS

Ref. Fig. 5

If the roller bearings (21) on the drum shaft are being replaced they require to be pre-loaded to 11-20 in. lbs. torque when the adjusting nut is tightened to 150 lbs. ft., making the bearing cones (21) grip the bearing spacer (22).

To establish the correct spacer length use a bearing spacer (22) that is approximately .025" shorter than the original bearing spacer. (Gearmatic Spacer Tool Number A13088 can be used for this purpose.) The length of each bearing spacer A19022 is marked with electric pencil on the I.D. of the spacer.

Assemble the bearings with Spacer Tool A13088 and a piece of soft lead gauge wire between the bearings. Tighten the adjusting nut until it requires 11-20 inch pounds to rotate the drum shaft against the bearing pre-load. Remove the Spacer Tool A13088 and gauge wire and measure the total thickness of the spacer tool and compressed gauge wire. This will be the exact length of the bearing spacer A19022 required.

Bearing Spacer A19022 is available in twenty-four lengths which vary by .001 increments. The faces of spacer A 19022 must be parallel within .0005".

To check the pre-load (11-20 lbs. inch), wrap a piece of string around the outside diameter of the drum shaft and attach the free end to a suitable spring balance. The correct pre-load will have been obtained when a reading of 5-9 lbs. on the spring balance is obtained for continuous rotation of the drum shaft (18).

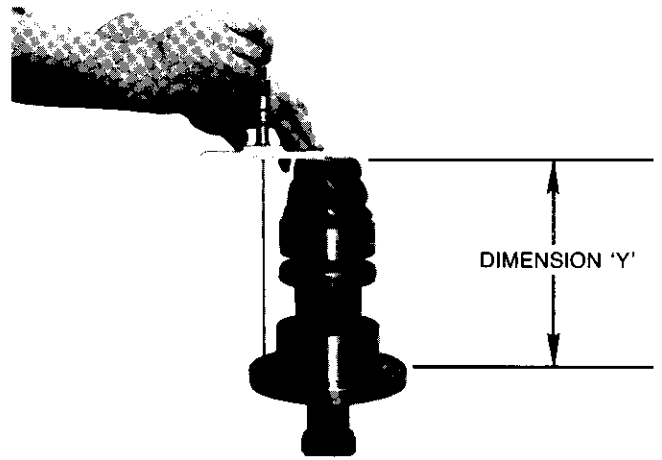


Figure P

IMPORTANT: Shims must not be used between the bearing cones (21) and the bearing spacer (22). A bearing spacer having the correct length for the required pre-load must be used.

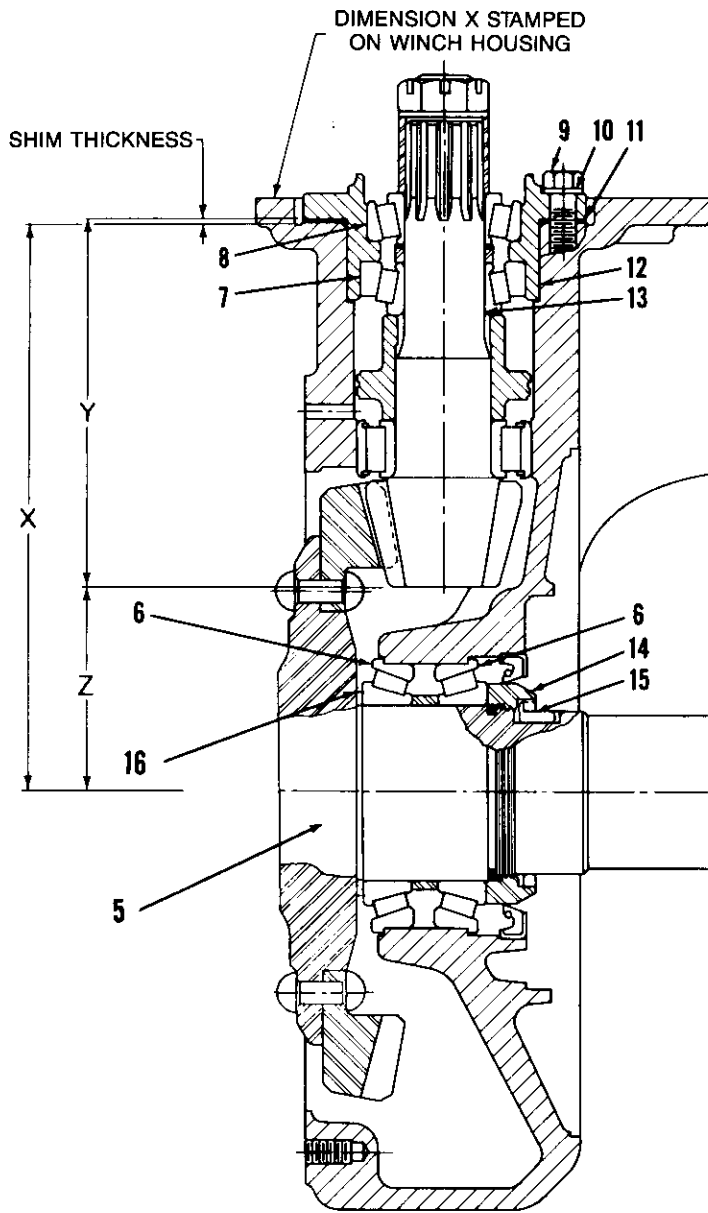
RING GEAR AND PINION ADJUSTMENT (MODEL 19 ONLY) (WINCHES SERIAL NUMBER 19-8999 AND DOWN)

Ref. Fig. Q

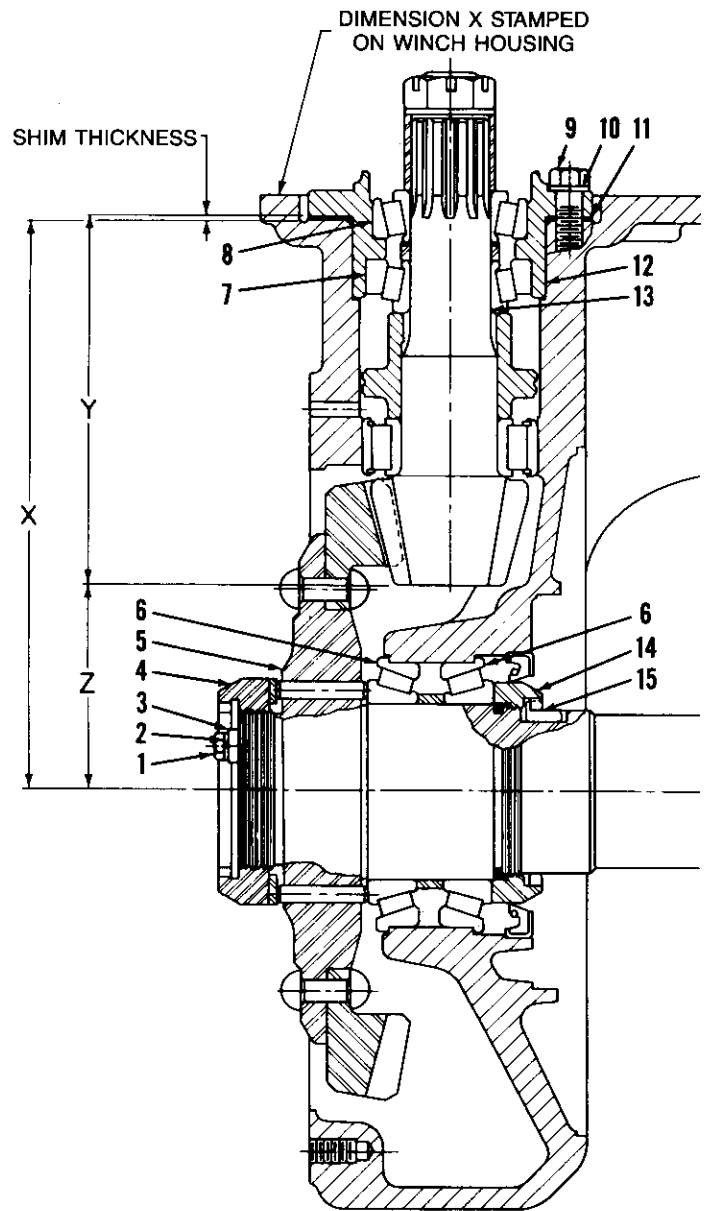
The following instructions are to be followed whenever the ring gear and pinion setting has been disturbed due to disassembly of the winch or replacement of the pinion shaft bearings (7) and (8) or drum shaft bearings (6).

Establish the total thickness of shims (11) required under the flange of the pinion bearing housing (12), as follows. When the bevel pinion bearings have been correctly preloaded, as explained above, measure dimension 'Y' as shown on Fig. Q. Place the bevel pinion assembly on a surface table so that it stands on the end of the pinion and use an inside micrometer to measure dimension 'Y'. Dimension 'Z' is marked on the end of the bevel pinion and dimension 'X' is marked on the back of the winch housing as indicated. Add dimensions 'Y' and 'Z' and subtract dimension 'X' from this total. The result will be the total thickness of shims (11) required.
Total thickness of shims (11) = Y + Z - X inches.

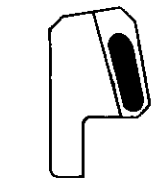
Install the bevel pinion assembly with shims (11) as established above and torque capscrews (9) to 120 ft. lbs.



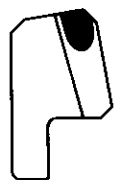
TYPICAL VIEW OF WINCHES WITH SERIAL NUMBER 19-9000 AND UP



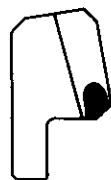
TYPICAL VIEW OF WINCHES WITH SERIAL NUMBERS UP TO 19-8999



CONDITION A



CONDITION B



CONDITION C



CONDITION D



CONDITION E

Figure Q

BACKLASH: Adjust the position of the ring gear by adjusting nuts (4) and (14) to provide .010" to .015" backlash at the heel of the ring gear tooth. The correct backlash for each gear set is marked on the outside diameter of the ring gear with an electric pencil.

CORRECT TOOTH CONTACT: Remove the 1½ N.P.T. barrel plug from the gear end of the winch housing and paint the face of each ring gear tooth with a light coating of marking paint. Red lead oxide mixed with a light grease will make an ideal paint for this purpose. To check the tooth contact, rotate the pinion shaft in a clockwise direction when viewed from the back of the winch. The correct tooth contact is illustrated at 'A'. If the thickness of shims has been established correctly and the backlash is correct, the correct tooth contact should be obtained. Illustrations B, C, D and E show incorrect tooth markings which must be corrected as follows:

CONDITION 'B' — 'B' illustrates a heavy heel mark. To correct this condition, the pinion must be moved into mesh and the ring gear further out of mesh. Remove the capscrews (9), lockwashers (10) and pull the pinion housing (12) out of the main housing. Remove one .010" shim (11) from under the pinion housing flange. Replace the pinion housing (12) in the winch and secure it.

For winches up to serial number 19-8999

Remove items (1, 2, 3 and 15) from the drum shaft (5). Turn item (4) clockwise one serration. Now turn item (14) counter clockwise one serration. In some cases it may be necessary to turn items (4) and (14) two serrations to obtain the correct marking and required backlash of .010 to .015. When adjustments have been made, tighten nuts (4) and (14) securely and replace items (1), (2), (3) and (15). Note that two keyways are provided in the drum shaft for the key (7) (Fig. 5) in case it is necessary to turn the lock nuts through half a serration.

For winches serial number 19-9000 and up

Remove the drum shaft (5) and decrease the thickness of the laminated spacer (16) until the desired tooth contact is established.

CONDITION 'C' — 'C' illustrates a heavy toe mark. To correct this condition, the pinion shaft must be moved slightly out of mesh and the ring gear moved further into mesh. Remove capscrews (9), lockwashers (10) and pull the pinion housing (12) out of the main housing as outlined. Add one .010" shim (11) under the pinion housing flange. Replace the pinion housing in the winch and secure it.

For winches up to serial number 19-8999

Remove items (1), (2), (3) and (15) from the drum shaft (5). Turn item (4) counter clockwise one serration. Now turn item (14) one serration in a clockwise direction. In some cases it may be necessary to turn the adjusting

nut two serrations to obtain the correct marking and required backlash of .010" to .015". When adjustments have been made, tighten nuts (4) and (14) securely and replace (1), (2), (3) and (15). Note that two keyways are provided in the drum shaft for the key (7) (Fig. 5) in case it is necessary to turn the lock nuts through half a serration.

For winches serial number 19-9000 and up

Remove the drum shaft (5) and install a new laminated spacer (16) so the desired tooth contact is established.

CONDITION 'D' — This can be corrected by following the procedure stated under condition 'C'.

CONDITION 'E' — This can be corrected by following the procedure stated under condition 'B'.

RING GEAR AND PINION ADJUSTMENT (WINCHES SERIAL NUMBER 19-9000 AND UP) (REF. FIG. 5)

1. Establish the total thickness of shims (10) required under the flange of the pinion bearing housing (9), as follows: When the pinion bearings have been correctly preloaded, measure dimension 'Y'. See Figure P. Place the bevel pinion assembly on a surface table so that it stands on the end of the pinion and use an inside micrometer to measure dimension 'Y'. Dimension 'Z' is marked on the end of the bevel pinion. This dimension represents the distance from the end of the pinion shaft to the center of the ring gear. Dimension 'X' is marked on the back of the winch housing. Add dimensions 'Y' and 'Z' and subtract dimension 'X' from this total. The result will be the total thickness of shims (1) required.

Total thickness of shims (10) = Y + Z - X inches.

2. Install the pre-assembled pinion assembly with shims (10) and capscrews (2) into the bore in the housing (9). Torque the capscrews as shown in the torque specifications. Check to see that the pinion shaft rotates freely.
3. Install the bearing cups (21) in the main housing. Using a micrometer, measure the cups to insure that they are parallel.
4. Establish the thickness of spacer (20) as follows. Wrap a piece of lead gauge wire around the drum shaft and install the bearing cone (21). Turn the main housing into an upright position and install the drum shaft so that it is vertical with the housing. Make sure the bearing cone (21) seats in the cup. Using a dial indicator, measure the backlash between the pinion shaft and ring gear. The backlash should measure .010" to .015", if not, press the drum shaft down until this measurement is attained.

5. Remove the drum shaft from the housing. Remove the bearing cone (21) from the drum shaft and measure the thickness of the lead gauge wire.
6. Install a spacer (20) thickness as established in step (5) so that the solid side of the spacer is toward the gear, and bearing cone (21) on the drum shaft (18).
7. Fit the drum shaft back into the housing. Make sure that the bearing cone (21) seats in the cup.
8. Using a copper drift, drive the drum shaft (18) into the housing, to ensure that the bearing cone is fully seated on the shaft. Install the spacer (22) and the second bearing cone (21).
9. Grease and install the 'O' Ring (23) and lock nut (24). Tighten the lock nut using Gearmatic Wrench Number C13189. Re-measure the backlash. It should measure .010" to .015".

SPECIFICATIONS

Gear Compartment Capacity (with Adapter)	10 Imp. Qt.	11.3 Liter
Maximum Winch Input Speed	2,000 R.P.M.	2,000 R.P.M.
Total Weight	985 lb.	447 kg.
Width (Gear Cover to Clutch Cover)	28 ⁵ / ₈ in.	727 mm.
Length	26 in.	660 mm.
Maximum Bare Drum Rated Line Pull	20,000 lb.	9072 kg.
(when used with Torque Converter)	30,000 lb.	13608 kg.
Barrel Diameter	8 ¹ / ₂ in.	216 mm.
Length between Flanges	9 in.	229 mm.
Cable capacity (3/4 in. Diameter Cable)	165 ft.	50 m.
7/8 in. Diameter Cable	120 ft.	37 m.
1 in. Diameter Cable	90 ft.	28 m.

SPECIAL SERVICE PARTS

SERVICE KITS

PART NO.	DESCRIPTION	WHERE USED
A8055X	Field Conversion Kit	Conversion of X 710B Master Control to X 710C
A9545X	Repair Kit	Master Control Cylinders
A9546X	Repair Kit	Clutch Cylinder Assembly
A9547X	Repair Kit	Brake Cylinder Assembly
A19179X	Repair Kit	To convert 51359 Hose Assembly and B9516 Hydraulic Fitting
56599	Conversion Kit	To convert Model 119 to Model 19
57625	Conversion Kit	Hydraulic Tube Repair Kit

TOOLS

PART NO.	DESCRIPTION	WHERE USED
A13154	Jack Screw	Removing Clutch Hub
A13088	Bearing Spacer	Adjustment of Drum shaft Bearings
C13189	Wrench	Adjusting Nuts on Drum shaft
C13199	Puller	Removing Bearing 50793 from Drum shaft

DRAWINGS FOR THE ABOVE TOOLS ARE AVAILABLE ON REQUEST.

MISCELLANEOUS

PART NO.	DESCRIPTION	WHERE USED
51436	Spiral Ferrule	To Anchor 1/2 Cable to Drum
51437	Spiral Ferrule	To Anchor 5/8 Cable to Drum
51438	Spiral Ferrule	To Anchor 3/4 Cable to Drum
50107	Hondu	To Anchor Cable 5/8 and Down
50123	Hondu	To Anchor Cable 11/16 and Up
51467	Tru-Torque Oil (4 oz. bottle)	Lubricating Hydraulic Components
51469	Spray Paint	Gearmatic Yellow, Touch Up Paint

TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
<p>A</p> <p>Clutch slipping</p>	<p>1. If the winch or master control has recently been installed, there may be air in the clutch line.</p> <p>2. If the master control handle continues to move gradually when a constant force is applied to engage the clutch, there may be a leak in the clutch line, clutch cylinder in the winch or master control cylinder.</p> <p>3. The clutch may require to be adjusted. If the clearance between the clutch drum and the clutch bands has become excessive due to wear, the master control handle will have greater than normal travel when moved for clutch engagement.</p> <p>4. The clutch bands may have become soaked by brake fluid.</p> <p>5. The clutch may have become hot from excessive slippage under heavy pulls.</p> <p>6. The clutch bands may be worn and require to be replaced.</p>	<p>See "Bleeding Hydraulic System" on page. 4.</p> <p>Check all fittings for escaping fluid. If no leak is visible, remove the fitting in the end of the master control clutch cylinder and install a 1/8" N.P.T. pipe plug. If the control handle still moves when a constant load is applied, the cup (Item 14, Fig. 6) in the master control cylinder is leaking. If the leak is not found by the above tests, remove the clutch cover from the winch and inspect all clutch line connections and the clutch cylinder.</p> <p>Remove the clutch cover from the winch and adjust the clutch bands. See "Clutch Adjustment" on page. 8.</p> <p>Remove the clutch bands and replace them with new parts.</p> <p>Allow the winch to cool for 10-15 minutes.</p> <p>Remove the clutch bands and replace them with new parts.</p>
<p>B</p> <p>Brake will not hold a load</p>	<p>1. If the winch is new, the brake may require to be "run in".</p> <p>2. The brake drum may have heated due to the clutch slipping under heavy loads.</p>	<p>Attach the winch cable to a stump and drive the tractor away from the stump using low gear. Allow the brake to slip just enough to let the tractor move forward until all the cable has been run out from the drum. Repeat this operation until the tractor has travelled a total of 300 ft. under these conditions. Allow the winch to cool and check the holding power of the brake. Repeat if necessary.</p> <p>Allow the winch to cool for 10-15 minutes.</p>

TROUBLE	PROBABLE CAUSE	REMEDY
<p style="text-align: center;">B Continued</p>	<p>3. The brake bands may have become soaked by brake fluid.</p> <p>4. The brake bands may be worn.</p> <p>5. The brake spring may have taken a permanent set.</p>	<p>Remove the brake bands and replace them with new parts.</p> <p>Check that the brake levers (Items 13 and 14, Fig. 3) are properly engaged in the brake band ends and that they have clearance to permit them to move in the direction of engagement. When Brake Bands become worn and require replacing, inspect the brake spring and replace the spring if the free length is less than $6\frac{29}{32}$".</p> <p>Replace the brake spring if free length is less than $6\frac{29}{32}$".</p>
<p style="text-align: center;">C</p> <p>Clutch slipping and brake will not hold.</p>	<p>1. Water or brake fluid may have leaked into the clutch and brake compartment.</p>	<p>Remove the clutch cover and inspect. If brake fluid is present, find the leak and make the necessary repairs. If water is present, inspect the clutch cover gasket and all seals for possible damage (Model 19 only).</p>
<p style="text-align: center;">D</p> <p>Brake will not release or stay released.</p>	<p>1. The cup in the master control cylinder which is connected to the winch brake cylinder may be leaking.</p> <p>2. The cup in the winch brake cylinder may be leaking.</p>	<p>Remove the fittings from the end of the master control brake cylinder and install a $\frac{1}{8}$" N.P.T. pipe plug. If the master control handle can be moved gradually until it reaches the end of its stroke, the cup (Item 14, Fig. 6) in the master control cylinder is damaged. Replace this cup and remove and inspect the parts in the winch brake cylinder. If the cup in the master control cylinder requires to be replaced, clean the pistons (Items 6 and 8, Fig. 2) in the winch brake cylinder and install a new cup (Item 5, Fig. 2) in this cylinder also.</p> <p>Remove the brake cylinder (Item 3, Fig. 2) and inspect. If brake fluid has been leaking from this cylinder, replace the cup and clean the pistons in this assembly. Also remove the clutch cover and inspect the brake bands. Clean all excess fluid from the clutch and brake compartment and replace the brake bands if they are soaked with brake fluid.</p>

TROUBLE	PROBABLE CAUSE	REMEDY
<p style="text-align: center;">D Continued</p>	<p>3. The line from the master control is expanding excessively under pressure thus reducing the movement available for releasing the brake.</p> <p>4. If the winch or master control has recently been installed there may be air in the brake line.</p>	<p>The recommended hose for this application is single wire braid hose (Stratoflex No. 225 or similar). Alternatively steel or copper tubing should be used.</p> <p>See "Bleeding Hydraulic System" on page 4.</p>
<p style="text-align: center;">E</p> <p>Drum will not rotate when clutch is engaged with no load on the cable.</p>	<p>1. The tractor P.T.O. may not be engaged.</p> <p>2. The Master Control Unit may require to be filled with fluid.</p> <p>3. If the winch has been used to pull heavy loads, that are beyond the rated capacity of the winch, the ring gear in the winch may be broken or the ring gear rivets may have sheared.</p>	<p>Check P.T.O. engagement.</p> <p>Fill with automotive brake fluid.</p> <p>If the gears are damaged or the rivets are sheared disassemble the winch and make the necessary repairs.</p>
<p style="text-align: center;">F</p> <p>Drum will not free spool.</p>	<p>1. The base on which the winch is mounted may not be completely flat.</p> <p>2. See Cause 'D' steps 3 and 4.</p>	<p>Back the winch mounting bolts off. Check to see if there is a gap between the winch pads and base. If there is a gap, measure it with a feeler gauge. Shim the gap and retighten the mounting bolts.</p> <p>See Cause 'D' steps 3 and 4.</p>

MASTER CONTROL SERVICE INSTRUCTIONS

MASTER CONTROL DISASSEMBLY

Ref. Fig. 6

Remove the master control assembly from the tractor, then remove the handle by loosening the nut (23) and capscrew (24) in the handle boss. Remove the cover (4) by removing the capscrews (3) and empty the housing (9) of brake fluid. Slacken the socket head capscrew (10) in the rocker arm (6) and pull the shaft (25) out of the housing (9). The rocker arm assembly can now be removed from the housing (9). Press the push rod pins (7) out of the rocker arm (6) and remove the push rods (8) and (11). Remove capscrews (3) and remove the cylinder assemblies from the housing.

CYLINDER DISASSEMBLY

Press the piston (13) into the cylinder (18) and remove the lock ring (12). The piston (13), cup (14), spring (15) and foot valve assembly (16) and (17) can now be removed from the cylinder.

CYLINDER ASSEMBLY

Wash all parts in clean brake fluid. Do not use any other cleaning fluid as it may contaminate the hydraulic system. Inspect all parts to ensure that they are in good condition. Discard the used cup (14) and replace with a new part. Check the rubber valve in the foot valve assembly (16) and the rubber washer (17). If the rubber is swollen, replace the foot valve assembly. Lubricate all parts lightly with Tru-Torque Oil. (Gearmatic Part no. 51467). Place the rubber washer (17) in the bottom of

the cylinder (18). Press the domed end of the foot valve (16) into the large end of the spring (15) and install the spring (15) in the cylinder so that the foot valve (16) contacts the rubber washer (17). Place the cup (14), open end down, on the spring (15) and place the piston (13) with its flat end against the cup (14). Press this assembly into the cylinder (19) until the lock ring (12) can be installed. Install the lock ring (12) so that its gap is in line with the bleed hole on the outside diameter of the cylinder.

MASTER CONTROL ASSEMBLY

Wipe all parts thoroughly with a clean cloth. Assemble the push rods (8) and (11) in the rocker arm (6) using pins (7) so that the short push rod (8) is on the same side of the rocker arm (6) as the capscrew (10). Make sure the push rods (8) and (11) move freely on the pins (7). Place the rocker arm assembly in the housing (9) so that the short push rod (8) is in the brake end of the housing (9) (marked on the outside of the housing).

Install the 'O' ring (26) in its groove on the shaft (25). Insert the shaft (25) through the housing (9) and into the rocker arm (6) then tighten the capscrew (10) in the rocker arm. Install the handle (22) on the shaft (25) with the counter bore towards the housing and tighten the capscrew (24) in the boss of the handle. Install new gaskets (19) on the cylinders. Replace the cylinder assemblies making sure the bleed holes are on top. Fasten the cover (4) and new gasket (5) in place and fill the housing with standard brake fluid.

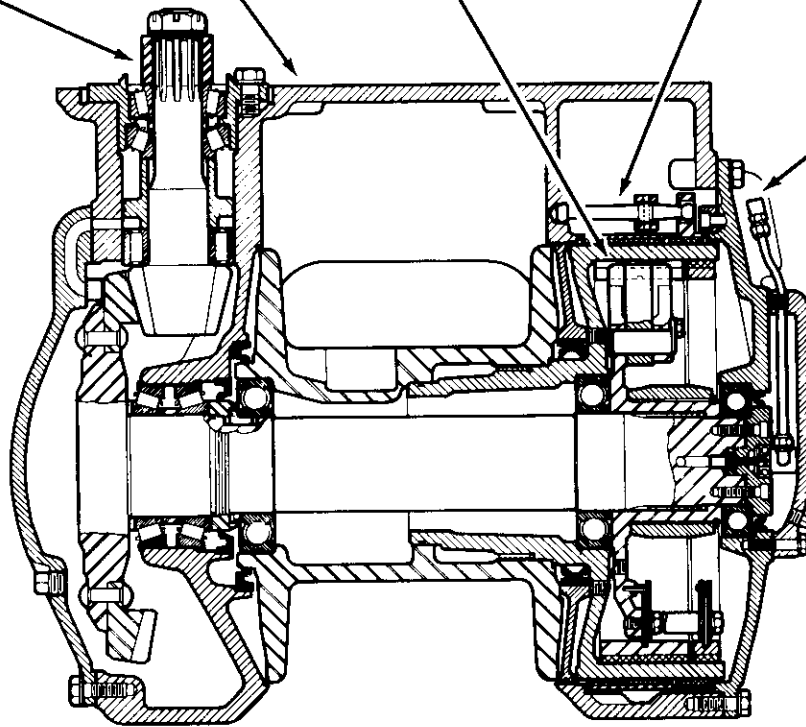
TORQUE LOADING FOR FASTENERS

PART NO.	TORQUE LOAD LB. FT.	PART NO.	TORQUE LOAD LB. FT.
50096	10	51177	25
50103	200	51178	35
50435	120	51518	10
50608	12	51563	18
50609	24	52065	70
50610	75	53009	28
50748	24	53920	400-475
50767	25	59229	25
50794	10	A11029	35
51139	45	A19010	250-300
51176	18	A19012	150

PARTS SECTION

RING GEAR AND PINION ASSEMBLY FIGURE 5 HOUSING ASSEMBLY FIGURE 1 CLUTCH ASSEMBLY FIGURE 4 CABLE DRUM AND BRAKE BANDS FIGURE 3 BRAKE CYLINDER AND HYDRAULIC TUBE FIGURE 2

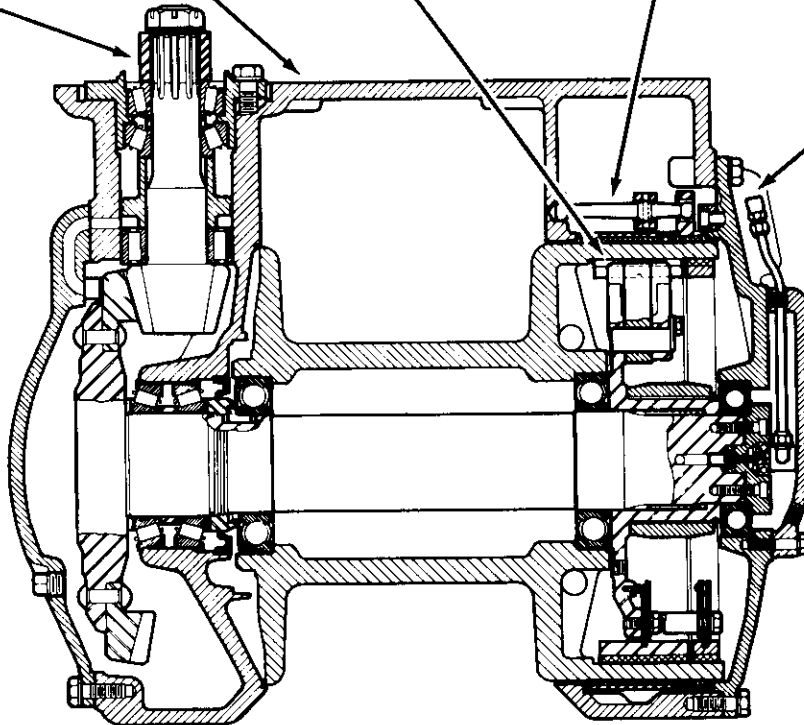
MODEL 19



MASTER CONTROL UNIT FIGURE 6 FAIRLEAD ASSEMBLY FIGURE 7 ADAPTER ASSEMBLY FIGURE 8 CONTROL GROUP FIGURE 9

RING GEAR AND PINION ASSEMBLY FIGURE 5 HOUSING ASSEMBLY FIGURE 1 CLUTCH ASSEMBLY FIGURE 4 CABLE DRUM AND BRAKE BANDS FIGURE 3 BRAKE CYLINDER AND HYDRAULIC TUBE FIGURE 2

MODEL 119



MASTER CONTROL UNIT FIGURE 6 FAIRLEAD ASSEMBLY FIGURE 7 ADAPTER ASSEMBLY FIGURE 8 CONTROL GROUP FIGURE 9

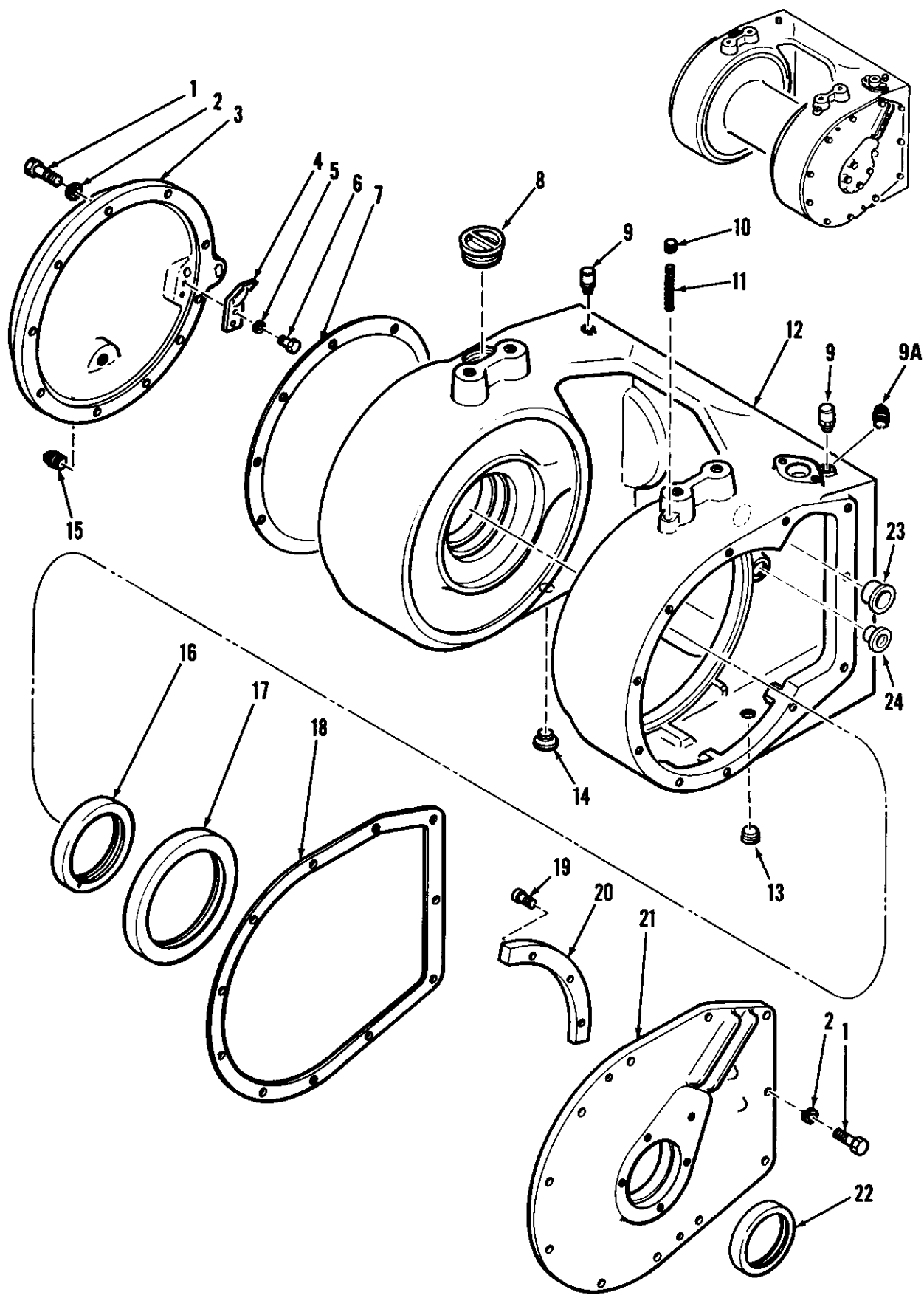


Figure 1

HOUSING ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	NO. REQ'D	WEIGHT	
				LBS.	OZS.
1	50610	Capscrew (1/2 N.C. x 1 1/4 Hex. Hd.)	21	0	2
2	50100	Lockwasher (1/2)	21	0	1
3	C19008	Gear Cover	1	33	0
4	A19033	Oil Wiper	1	0	1
5	50097	Lockwasher (5/16)	2	0	1
6	50608	Capscrew (5/16 N.C. x 5/8 Hex. Hd.)	2	0	1
7	B19010	Gasket	1	0	1
① 8	50782	Barrel Plug	1	0	3
③ 9	50742	Vent (Model 19 Use Qty. 2) (Model 119 Use Qty. 1)	2	0	1
9A	50531	Pipe Plug (Model 119 Only)	1	0	1
10	52263	Set Screw	1	0	1
11	A9536	Spring	1	0	1
12	E19001	Housing (Model 119 Only)	1	350	0
	E19000	Housing (Model 19 Only)	1	350	0
13	50429	Pipe Plug (Model 19 Only)	2	0	1
14	51174	Barrel Plug	1	0	1
15	50513	Pipe Plug	1	0	2
16	50799	Oil Seal	1	0	12
17	51431	Oil Seal (Model 19 Only)	1	1	1
18	C19009	Gasket	1	0	1
19	51176	Capscrew (3/8 N.C. x 3/4 Sock. Hd.)	3	0	1
20	B19014	Guide Ring	1	1	2
21	C19003	Clutch Cover	1	50	0
22	50482	Oil Seal (Model 19 Only)	1	0	5
② 23	A19092	Lever Plug (Secondary)	1	0	1
② 24	A19091	Lever Plug (Primary)	1	0	1

- ① Winches Serial Number 19-1065 and down used 53232 Barrel Plug
- ② Winches Serial Number 19-5154 and down do not require A19092 Lever Plug and A19091 Lever Plug.
- ③ Winches Serial Number 19/119-29586 and down used Vent 50742.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

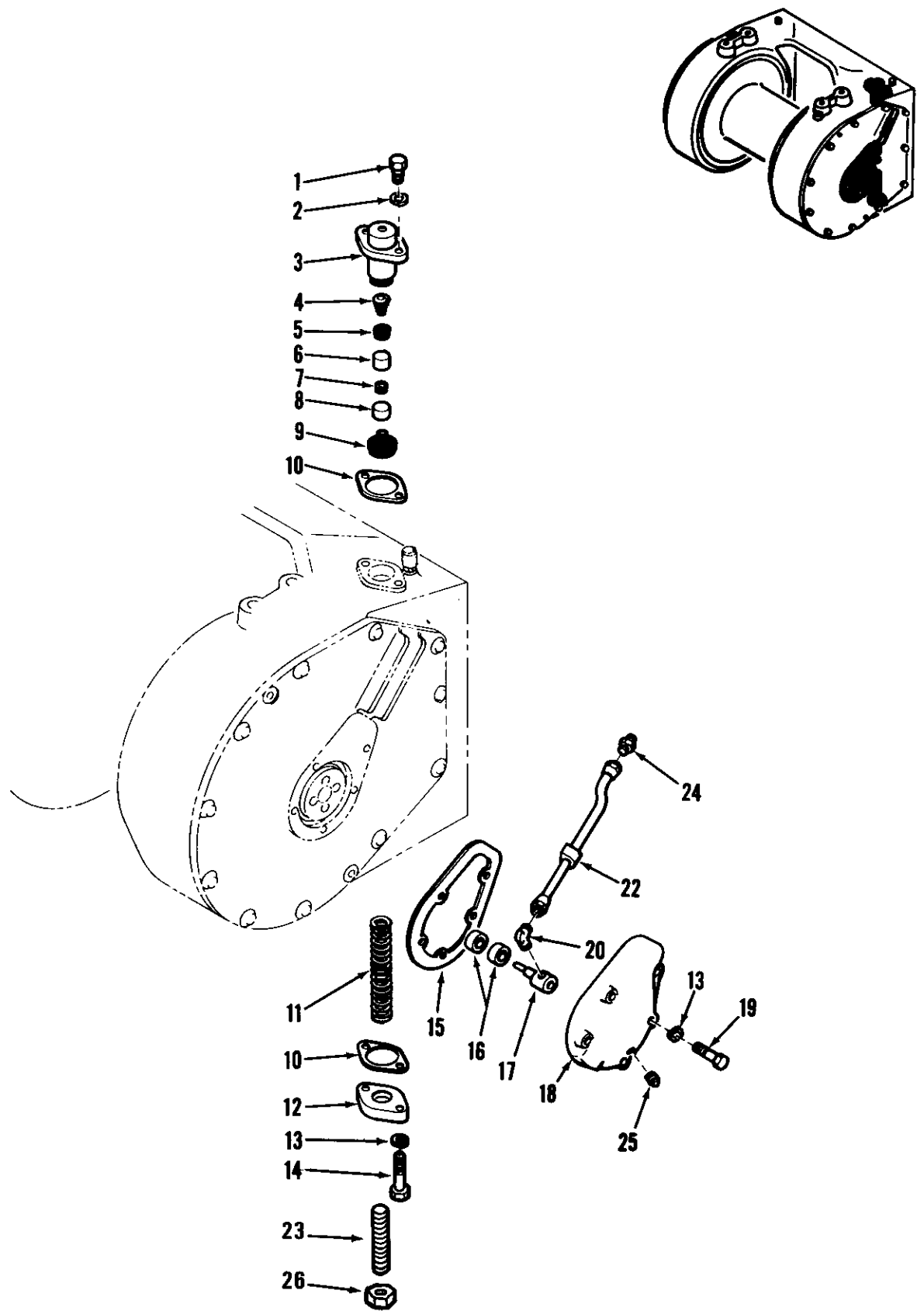


Figure 2

BRAKE CYLINDER AND HYDRAULIC TUBE

ITEM NO.	PART NO.	DESCRIPTION	NO. REQ'D	WEIGHT	
				LBS.	OZS.
1	59229	Capscrew (3/8 N.C. x 1 1/2 Hex. Hd.)	2	0	1
2	50192	Lockwasher (3/8)	2	0	1
Sub Ass'y	A839BX	Brake Cylinder Ass'y (Consists of Items 3 to 9)	1	0	15
3	55614	Brake Cylinder	1	0	12
4	50952	Spring	1	0	1
5	51470	'U' Cup	1	0	1
6	A8043	Piston	1	0	1
7	A8044	Spring	1	0	1
8	51471	Piston	1	0	1
9	53656	Boot	1	0	1
10	A9526	Gasket (Model 19 Only)	2	0	1
① 11	54293	Brake Spring (colour coded green)	1	0	11
③ 12	59224	Spring Cap (Model 119 Only)	1	0	11
	59223	Spring Cap (Model 19 Only)	1	0	11
13	50398	Lockwasher (7/16)	7	0	1
14	A11029	Capscrew	2	0	2
15	B19007	Gasket	1	0	1
② 16	50956	Bearing	2	0	1
② 17	57552	Hydraulic Tube	1	0	3
18	C19007	End Cap (Model 119 Only)	1	8	0
	C19007X	End Cap (includes item 25) (Model 19 Only)	1	8	0
19	51178	Capscrew (7/16 N.C. x 1 1/2 Hex. Hd.)	5	0	2
20	50528	Elbow	1	0	1
22	A19037X	Tube Ass'y	1	0	3
③ 23	59218	Set Screw	1	0	1
24	51042	Connector	1	0	1
25	50531	Drain Plug (part of item 18) (Model 19 Only)	1	0	1
③ 26	51139	Hex Nut	1	0	1
Service Kit	A9547X	Repair Kit (includes items 4 to 10 and 1 capsule of 50816 Lubricating Fluid)	1	0	3

- ① Brake Spring 54293 replaces Brake Spring 51852 (colour coded blue) serial no. effectivity 19-21939 and up 119-16147 and up.
- ② Hydraulic Tube 57552 Replaces Hydraulic Tube A19018 and allows two Bearings 50956 to be installed. Serial no. effectivity 19/119-25020 and up. Winches prior to this serial no. and requiring up date should order Field Repair Kit 57625.
- ③ Spring Cap 59224 replaces 50524 and Spring Cap 59223 replaces A 9517 to accommodate brake travel stop items 23 and 26. Serial no. effectivity 19/119-30352 and up.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

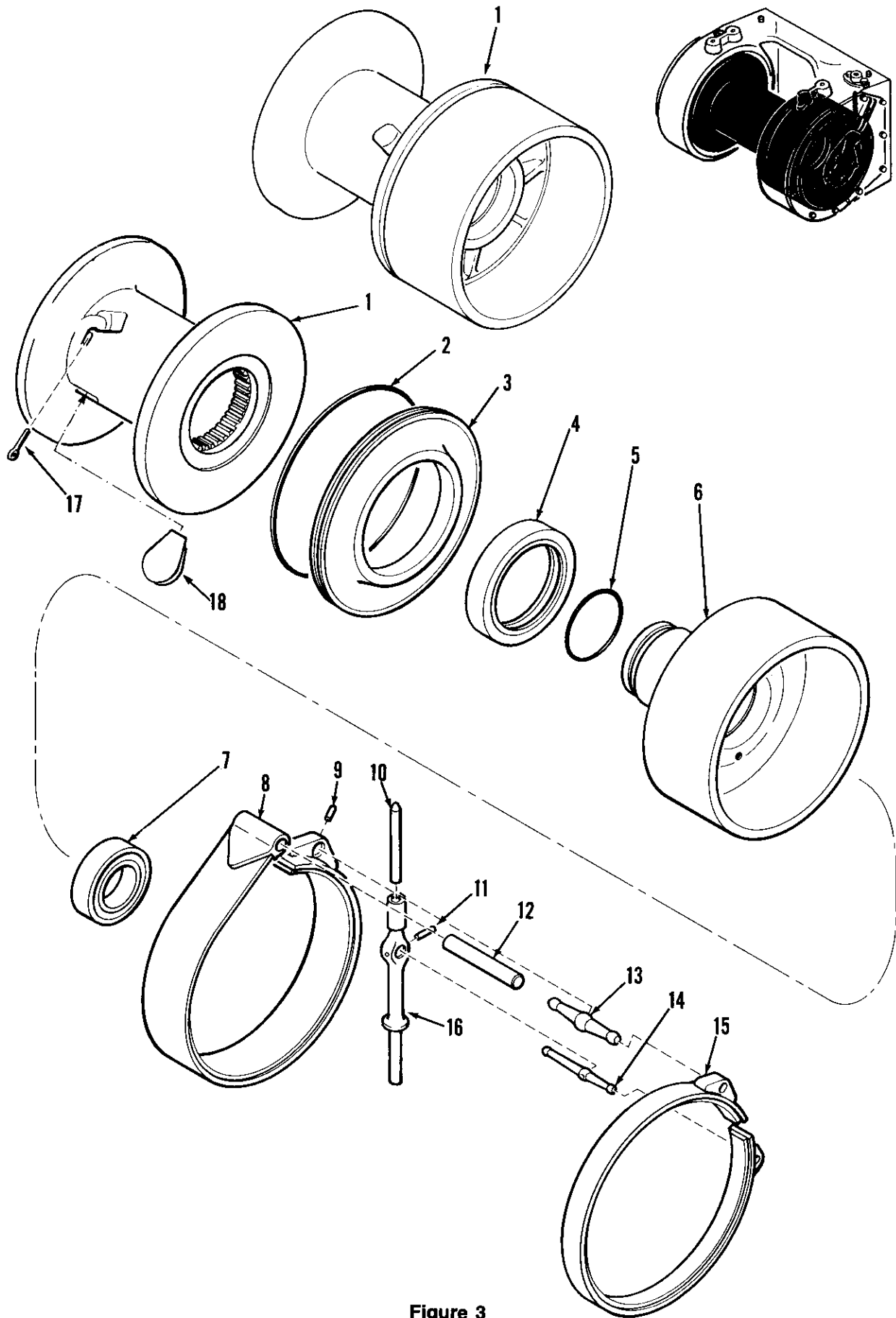


Figure 3

DRUM AND BRAKE BAND

ITEM NO.	PART NO.	DESCRIPTION	NO. REQ'D	WEIGHT	
				LBS.	OZS.
① 1	D19035	Cable Drum (Model 119 only)	1	208	0
	54405	Cable Drum (Model 19 only)	1	125	0
*2	50347	'O' Ring	1	0	1
*3	B19002	Oil Seal Housing	1	15	2
*4	51430	Oil Seal	1	0	13
*5	50331	'O' Ring	1	0	1
*6	C19005	Brake Drum	1	83	0
7	50793	Bearing	1	4	13
③ 8	58205	Secondary Brake Band	1	12	8
9	50573	Pin	1	0	1
10	A9515	Push Rod	1	0	5
11	51179	Pin	1	0	1
12	A19027	Anchor Pin	1	1	2
13	A19017	Brake Lever	1	0	12
14	A19003	Brake Lever	1	0	5
③ 15	58204	Primary Brake Band	1	4	8
② 16	B19019	Lever Block	1	0	8
17	50514	Cotter Pin (Part of item 1)	1	0	1
18	50107	Hondu ($\frac{7}{16}$ to $\frac{5}{8}$ in. Cable)	1	0	8
	50123	Hondu ($1\frac{1}{16}$ in. to $\frac{7}{8}$ in. Cable)			

*Not required in Model 119 winches.

- ① Winches Serial Number 19-4999 and down used C19006 (Hondu) Cable Drum. Winches Serial Number 19-5000 to 19-9000 used C19036 Cable Drum (Ferrule). Winches Serial Number 19-16660 and up use 54405 Cable Drum (Hondu and Ferrule).
- ② Winches Serial Number 19-1904 and down. The following three pieces were used in place of B19019; Lever Block A19019, Guide Rod A9516 and Washer 51151. When ordering replacement parts for any of these parts, order B19019 only.
- ③ Primary Brake Band 58204 Replaces Primary Brake Band C19000X and Secondary Brake Band 58205 Replaces Secondary Brake Band C19001X.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

CLUTCH ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	NO. REQ'D	WEIGHT	
				LBS.	OZS.
② 1	51626	Lever Arm	1	1	8
2	51158	Adjusting Screw	1	0	1
3	52065	Locknut	1	0	1
4	51159	Adjusting Nut	1	0	1
⑥ 5	59225	Pivot Pin	1	0	6
6	50192	Lockwasher (3/8)	7	0	1
⑤ 7	50609	Capscrew	1	0	1
① 8	51175	Hose Assembly	1	0	6
① 9	A19158	Hydraulic Fitting	1	0	1
10	50833	Snap Ring	1	0	1
11	50792	Bearing	1	3	4
12	A19024	Shim Set	1	0	1
13	50408	'O' Ring	1	0	1
14	51181	'U' Seal	1	0	1
④ 15	57553	Gland Cap	1	2	9
16	51177	Capscrew (3/8 N.F. x 1 1/4 Sock. Hd.)	4	0	1
17	54301	Clutch Hub	1	20	8
18	51180	Pin	6	0	1
19	A19180	Adjusting Cam	6	0	1
20	A9504	Lock Plate	6	0	1
21	50521	Capscrew (3/8 N.C. x 1 Hex. Hd.)	6	0	1
22	51627	Clutch Lever	1	9	8
Sub Ass'y	A825AX	Clutch Cylinder Assembly (Includes Items 23 to 27)	1	0	8
23	51063	Cylinder	1	0	7
24	50952	Spring	1	0	1
25	51473	'U' Cup	1	0	1
26	51472	Piston	1	0	1
27	51475	Boot	1	0	1
28	A19025	Push Rod	1	0	2
③ 29	52894	Secondary Clutch Band	1	17	8
③ 30	B19050	Primary Clutch Band	1	6	0
① 31	50644	Connector	1	0	1
32	51160	Adjusting Screw Assembly (consists of items 2, 3 and 4)	1	0	1
⑥ 33	A19038	Lug	1	0	3
Service Kit	A9546X	Repair Kit (Includes items 24 to 27 and 1 capsule of 50816 Lubricating Fluid)			

① Winches Serial Number 19-1307 and down used A 9539 Hydraulic Fittings, B 9516 Elbow, 51359 Hose Assembly. Winches Serial Number 19-1308 to 19-8256 used B 9516 Hydraulic Fitting, and 51359 Hose Assembly. When ordering replacement parts for any of these pieces, order A19179X Replacement Kit. A19179X consists of: 51019 Connector, 1-A19158 Hydraulic Fitting and 1-51175 Hose.

② Springs A19046 are no longer required. Lever arm A19004X, clutch lever C19004X and push rod A19016 are replaced by lever arm 51626, clutch lever 51627 and adjustable push rod 51160. When replacing lever arm A19004X or clutch lever C19004X, adjustable push rod 51160 must be used.

③ Winches Serial number 19-8420 and down used 1-B19001 Secondary Clutch Band and 1-B19000 Primary Clutch Band. When ordering replacement parts for B19001, order 1-52894 Secondary Clutch Band plus 3-A19180 Adjusting Cams. When ordering replacement parts for B19000, order B19050 Primary Clutch Band plus 3-A19180 Adjusting Cams. Spring A19036 or A19046 are no longer required on the Secondary Clutch Band.

④ Gland Cap 57553 replaces Gland Cap A19006 serial no. effectivity 19/119-25020 and up. For Winches prior to this serial no. and requiring update use Field Repair Kit 57625.

⑤ Capscrew 50609 replaces capscrew 53009 but is not interchangeable. Capscrew 50609 has 3/8 NC thread and capscrew 53009 has 3/8 NF thread.

⑥ Pivot Pin 59225 and Lug A19038 replace Pivot Pin A19005.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

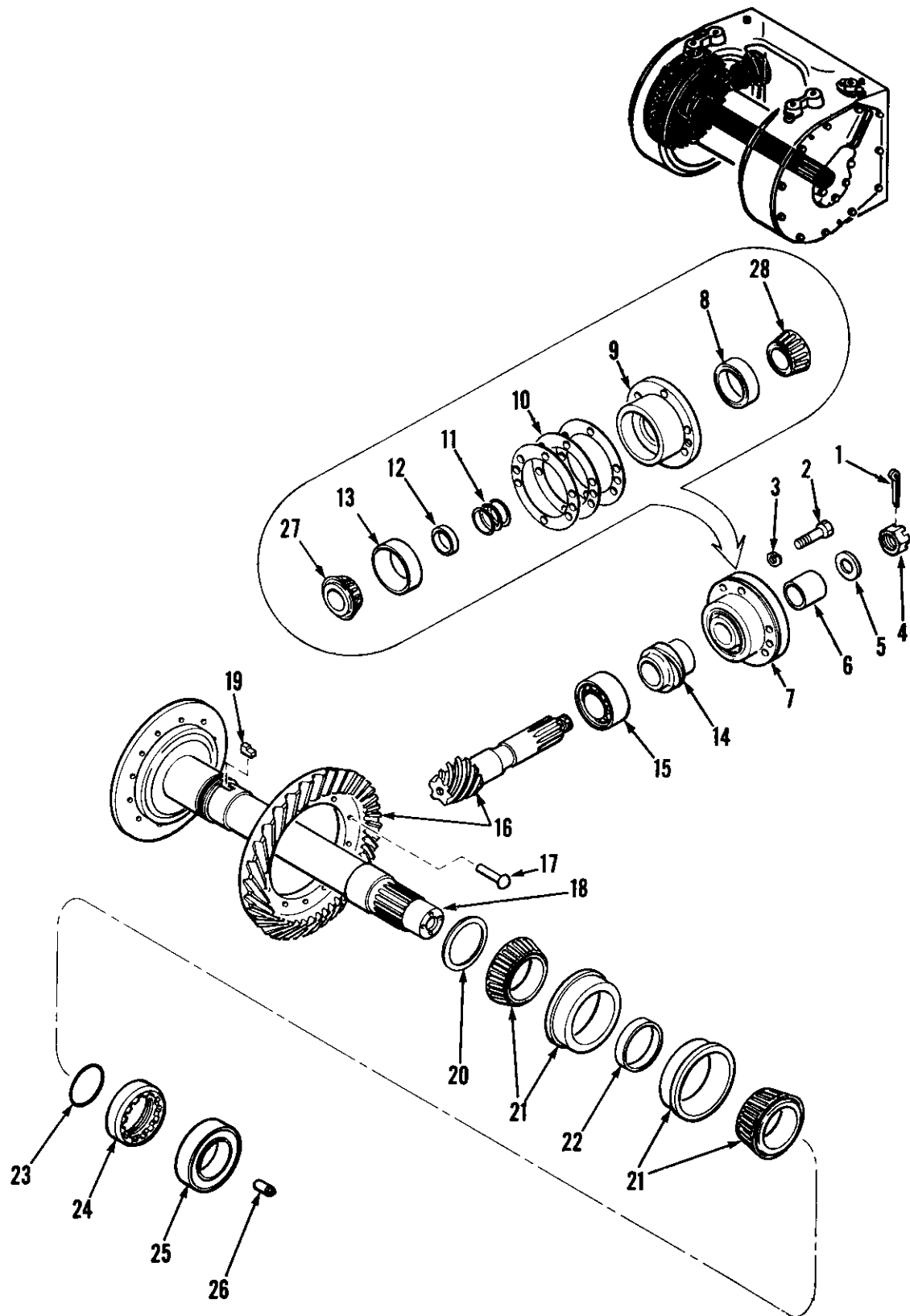


Figure 5

RING GEAR, PINION AND SHAFT

ITEM NO.	PART NO.	DESCRIPTION	NO. REQ'D	WEIGHT	
				LBS.	OZS.
1	50514	Cotter Pin	1	0	1
2	50435	Capscrew (5/8 N.C. x 1 3/4 Hex. Hd.)	6	0	3
3	50098	Lockwasher (5/8)	6	0	1
⑤ 4	53920	Nut	1	0	5
5	A19026	Washer	1	0	1
6	A19011	Bushing (shipping only)	1	1	9
7	B19011X	Bearing Housing Assembly (Includes items 8 to 13, 27 and 28)	1	6	12
8	50806	Bearing Cup	1	0	11
9	B19004X	Bearing Housing (incl. items 13 & 8)	1	3	14
10	A19015	Shim Set	1	0	1
11	A19021	Shim Set	1	0	1
12	A19020	Bearing Spacer	1	0	2
13	50808	Bearing Cup	1	0	14
14	A19013	Spacer Sleeve	1	2	9
15	50810	Bearing	1	2	8
④ Sub Ass'y.	53348	Gear Pinion and Shaft Assembly (Includes items 16, 17 and 18)	1	136	14
16	53342	Ring Gear and Pinion Assembly (Matched Set includes item 17)	1	41	6
17	50890	Rivet	16	0	1
② 18	C19071X	Drum Shaft (includes item 26)	1	95	8
19	A19009	Lock Key	1	0	1
③ 20	A17014	Spacer	1	0	1
21	50910	Bearing Assembly	2	4	8
① 22	A19022-*	Bearing Spacer (*specify length req'd.) .591" to .615"	1	0	10
23	50318	O-Ring	1	0	1
① 24	A19012	Locknut	1	1	10
25	50793	Bearing	1	4	13
26	A9506	Cup Retainer (part of item 18)	1	0	1
27	50809	Bearing Cone	1	1	4
28	50807	Bearing Cone	1	1	0

① For correct length see pre-load of drum shaft bearings page 10. Winches Serial Number 19-9000 and down used 50767 Capscrew, 1-50192 Lockwasher, 1-A19007 Lockplate, 1-A19012 Locknut, 1-A19008 Thrust Spacer and one set of 6 pins A19014. These parts are no longer required. When ordering replacement parts, order 1-A17014 Spacer and see "RING GEAR AND PINION ADJUSTMENT" for tooth contact instructions.

② Winches Serial Number 19-8999 and down used 1-C19002X Drum Shaft. When ordering replacement parts, order 1-50837 Drum Shaft Kit.

③ For production units only a solid spacer is used. Serial no effectivity 19-18420. Laminated spacers will continue to be supplied as replacement parts.

④ Winches Serial Number 19-8999 and down used 1-C19011X Gear Pinion and Shaft Assembly. Winches Serial Number 19-12872 and down used 1-C19072X Gear Pinion and Shaft Assembly. When ordering replacement parts, order 50838 Drum Shaft Kit.

⑤ Winches Serial Number 19-15525 and down used Pinion Nut A19010.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

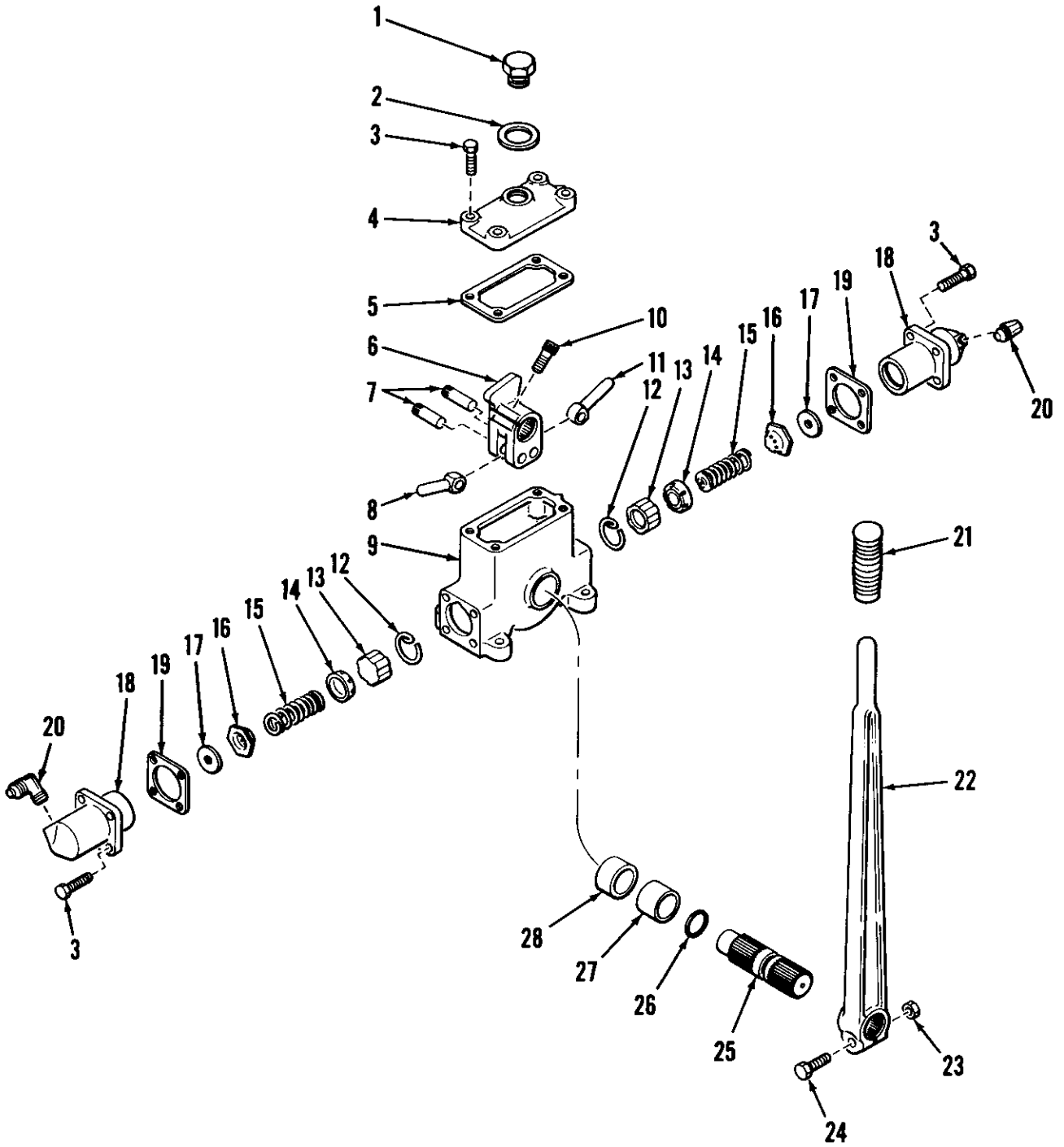


Figure 6

MASTER CONTROL UNIT

ITEM NO.	PART NO.	DESCRIPTION	NO. REQ'D	WEIGHT	
				LBS.	OZS.
① Assembly	X710C	Master Control Assembly	1	7	8
1	A797	Filler Cap	1	0	2
2	51162	Washer	1	0	1
3	50794	Capscrew ($\frac{5}{16}$ N.C. \times $\frac{7}{8}$ Hex. Hd.)	12	0	1
4	A771	Cover	1	0	5
5	A794	Gasket	1	0	1
6	A769	Rocker Arm	1	0	5
7	A785	Push Rod Pin	2	0	1
8	A8053	Short Push Rod (Brake)	1	0	1
9	C709X	Housing (Includes items 27 and 28)	1	2	1
10	51518	Capscrew	1	0	1
11	A8054	Long Push Rod (Clutch)	1	0	2
Sub Ass'y.	B765X	Cylinder Assembly (Includes items 12 to 19)	2	0	12
12	50815	Lock Ring	2	0	1
13	A830A	Piston	2	0	1
14	51477	Cup	2	0	1
15	51478	Spring	2	0	1
16	51476	Valve Assembly (Includes items 17)	2	0	1
17	51145	Washer (Part of item 16)	2	0	1
18	A770	Cylinder	2	0	9
19	A793	Gasket	2	0	1
20	50528	Elbow	2	0	1
21	A798	Hand Grip	1	0	2
22	B716	Control Handle	1	1	0
23	50748	Nut ($\frac{3}{8}$ N.F.)	1	0	1
24	51563	Capscrew ($\frac{3}{8}$ N.F. \times $1\frac{3}{4}$ Hex. Hd.)	1	1	1
25	A772	Shaft	1	0	14
26	50301	'O' Ring	1	0	1
27	A855A	Bushing (Included in item 9)	1	0	2
28	A8051	Bushing (Included in item 9)	1	0	1
Service Kit	A9545X	Repair Kit (Includes items 12, 13, 14, 15, 16, 17, 19 and 1 capsule of 50816 Lubricating Fluid)	2	0	3

① Master Control X710B is now replaced by X710C. X710B is no longer available as a spare part. To convert an X710B Master Control to X710C order field conversion kit A8055X.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

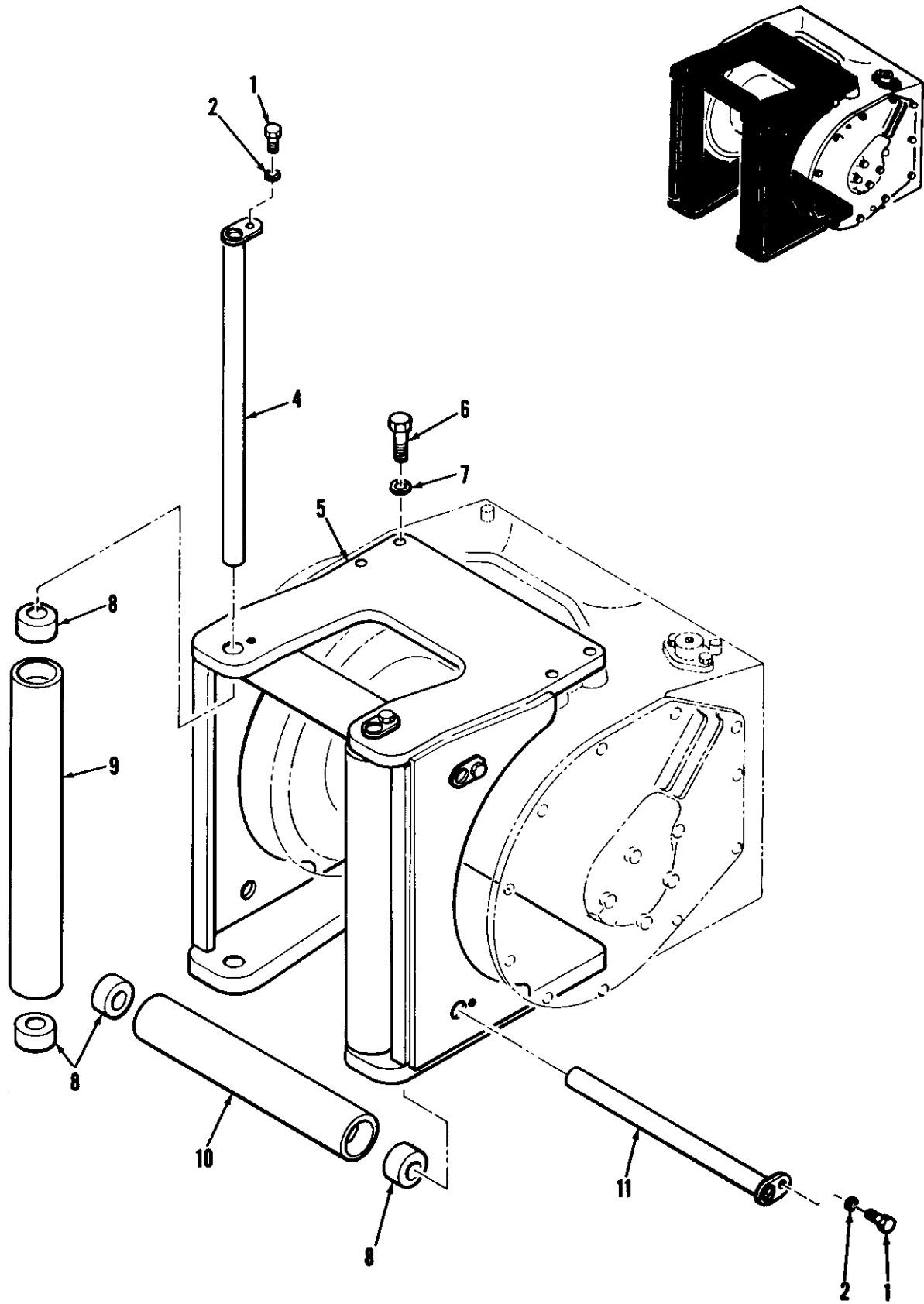


Figure 7

FAIRLEAD ASSEMBLY FOR CRAWLER TRACTOR

ITEM NO.	PART NO.	DESCRIPTION	NO. REQ'D	WEIGHT	
				LBS.	OZS.
Assembly	50086	4-Roller Fairlead Assembly	1	200	0
1	50096	Capscrew ($\frac{5}{16}$ N.C. \times $\frac{1}{2}$ Hex. Hd.)	4	0	1
2	50097	Lockwasher ($\frac{5}{16}$)	4	0	1
4	50080	Long Roller Shaft	2	10	0
5	50085	Fairlead Body	1	106	0
6	50103	Capscrew ($\frac{3}{4}$ N.C. \times $1\frac{3}{4}$ Hex. Hd.)	10	0	6
7	50104	Lockwasher ($\frac{3}{4}$)	10	0	1
Sub Ass'y.	50078	Long Roller Assembly (Consists of items 8 and 9)	2	22	14
8	50081	Bushing	8	1	6
9	50076	Long Roller	2	20	2
Sub Ass'y.	50093	Short Roller Assembly (Consists of items 8 and 10)	2	14	6
10	50095	Short Roller	2	11	10
11	50091	Short Roller shaft	2	6	0
Sub Ass'y.	52849	Short Roller and Shaft Assembly (Consists of 1 of item 1, 1 of item 2, 2 of item 3, 2 of item 8, 1 of item 10, 1 of item 11)	2	20	8

(For 3 Roller Fairlead Assembly use parts as listed above under 4 Roller Fairlead Assembly and omit 1 of 52849 and change the assembly number to 50891.)

INSTALLATION INSTRUCTIONS

The Gearmatic Model 19 winch is provided with four bosses, two on the top of the winch housing and two on the bottom. The fairlead assembly is fastened to these bosses with capscrews (6) and lockwashers (7). Capscrews (6) should be tightened to 200 ft. lbs. torque.

The fairlead assembly can be supplied with three or four rollers.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

PREVENTIVE MAINTENANCE INSTRUCTIONS

The following recommendations are made with a view to providing long, trouble-free service from your Gearmatic winch. All steps are to be completed at the intervals stated.

NOTE — If water build up in the housing is a problem, make sure drain plugs are removed.

DO NOT USE KINKED OR FRAYED WIRE ROPE CABLE. WEAR GLOVES WHENEVER HANDLING WIRE ROPE CABLE.

ONCE A WEEK:

1. Check the level of brake fluid in the master control and top up as required. If brake fluid requires to be added frequently, investigate for leaks at all line connections, roto-seal, brake release cylinder and clutch cylinder. Ensure that only clean brake fluid is used.
2. Position the vehicle on level ground and check the oil level in the ring gear compartment by removing the oil level plug in the gear cover. On winches that have an oil level plug in the adapter gear housing, check the oil level in the adapter. Top up with SAE 90 oil as required. If oil requires to be added frequently, check for oil leaks.

Model 19 Only

3. Check for condensation and hydraulic leaks in the clutch compartment by removing the drain plug. If evidence of hydraulic brake fluid is found, follow steps 2 & 3b.
4. Put the control handle in the brake release position and check that the drum will free-spool and will maintain the free-spool condition for at least 5 minutes. If the brake creeps on, there is an internal or external hydraulic leak; check at both the master control and brake release cylinders for damaged 'U' cups and check all hydraulic connections.
5. Check all mounting bolts and capscrews and tighten as required.

Model 19 Only

6. Check the two-way breather at the clutch end for damage. Remove and clean if necessary.

EVERY MONTH:

Machines in storage should have the winch operated for a period of fifteen minutes at least once per month.

EVERY SIX MONTHS:

On winches that are used regularly, otherwise once a year.

1. Disassemble the master control unit. Clean all parts thoroughly and replace all parts that have excessive wear. Lubricate the shaft and outboard bushing with Tru-Torque lubricant — Gearmatic part # 51467. Using new 'U' cups and shaft 'O' ring, reassemble the master control unit as described in the parts and instruction manual for the winch. Fill with clean automotive brake fluid.
2. Remove and disassemble the brake release cylinder assembly. Clean all parts thoroughly. Lubricate the cylinder bore, pistons and springs with Tru-Torque lubricant. Using a new 'U' cup and boot, reassemble as described in the parts and instruction manual for the winch. Using a new gasket, replace the brake cylinder assembly.
- 3.a. Remove the end cap from the clutch cover. Remove the hydraulic tube and inspect for wear. If wear is excessive, replace the hydraulic tube.
b. Remove the clutch cover then remove and disassemble the clutch cylinder assembly. Clean all parts thoroughly and lubricate the cylinder bore and piston with Tru-Torque lubricant. Using a new 'U' cup and boot, reassemble as described in the parts and instruction manual.
c. Remove the primary and secondary clutch bands and check for free movement of clutch lever. Reinstall bands and adjust in accordance with the Parts and Instruction Manual. See Clutch Adjustment.
d. Remove brake bands and check for damage or wear and replace as required, lubricate linkages with non-drip grease. Inspect all hydraulic line connections for leaks and repairs as required. Check ball bearing on end of the drum shaft and replace if necessary.
e. Remove the gland cap from the end of the drum shaft. Clean the outside diameter of the gland cap and polish if necessary with fine emery cloth. Replace the 'U' seal and 'O' ring on the gland cap with new parts. Inspect the oil seal in the clutch cover and lubricate seal lip.
f. Reassemble all parts and use new gaskets between the clutch cover and winch housing and between the end cap and clutch cover.

NUMERICAL INDEX OF PARTS

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B765X	29	A19007	27	50103	31	51162	29
A769	29	B19007	21	50104	31	51174	19
A770	29	C19007	21	50107	23, 13	51175	25
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A798	29	B19010	19	50398	21	51359	13, 25
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B19001	25	A19180	25	50891	31	57552	21
E19001	19	50076	31	50910	27	57553	25
C19001X	23	50078	31	50952	21, 25	57625	13
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		50096	31				

PACCAR WINCH DIVISIONS

P.O. BOX 547 • BROKEN ARROW, OK 74013
PHONE: (918) 251-8511 • TELEX: 492340 • FAX: (918) 258-4822