

MODEL 19 ^A_D 119
INSTRUCTIONS AND
PARTS MANUAL

11-9758-2

Gearmatic®

7400 - 132nd STREET, SURREY, B.C., CANADA

GEARMATIC MODEL 19

ADAPTER ASSEMBLY

ASSEMBLIES X19521, X19522 AND X19524

INSTALLATION INSTRUCTIONS

Ref. Fig. 8

When the winch is supplied with the adapter installed, follow steps 10 to 14 inclusive.

When the winch is supplied without the adapter installed, follow steps 1 to 14 inclusive.

1. Install the pinion gear (7)(Fig.8), washer (3) (Fig. 5), and nut (2) (Fig. 5) on the splined shaft on the winch. Torque load the nut (2) (Fig. 5) to 300 lbs. ft. and install the cotter pin(6)(Fig.8).
2. Press the needle bearing (14) into the idler gear (8) so that the ends of the bearing are just below the face of the gear at both ends.
3. Take the spacer (9) and give one face of each spacer a thick coating of grease. Press each spacer into the recess provided on the inside of the adapter housing (2) in way of the idler pin hole so that the grease will hold the spacers in location. Install the idler gear (8) in the adapter housing (2) so that the needle bearing (14) lines up with the idler pin hole.
4. Give the O-ring (11) a coating of grease and install it in the groove provided in the idler pin (12). Install the idler pin (12) so that it enters from the rough cast side of the adapter housing (2) with the O-ring (11) located away from the winch. Press the idler pin through far enough to allow a ball (10) to be installed in the hole provided in the idler pin (12) from the winch side of the adapter housing. Align the ball with the notch in the adapter housing (2) and press the idler pin (12) back into the adapter housing (2) until it is flush with the face of the adapter housing.
5. Install the oil seal (19) in the bore of the adapter housing (2) so that the lip of the oil seal will point towards the winch.
6. Install the bearing (16) on the P.T.O. gear (17). Install the bearing (18) on the P.T.O. gear (17). Install the P.T.O. gear (17) with the bearings and bearing ring (15) into the adapter housing (2). Give the O-ring (20) a coating of grease and install it on the P.T.O. gear.
7. Install the seal spacer (21) on the P.T.O. shaft being careful not to damage the oil seal (19).
8. Paint the winch face with gasket cement and place the largest gasket (13) in position. Install capscrews (1) in the winch housing and allow the capscrews to project sufficiently to locate the gasket and prevent it from moving. The smaller round gaskets should be positioned on the adapter housing (2) and held in position with capscrews (4).
9. Assemble the adapter assembly to the winch and secure it with capscrews (1) and (4). lockwashers (3) and nuts (5). Tighten all nuts (5) and capscrews (1) to the required torque.
10. Mount the winch in position and install the winch drive.
11. Mount the master control assembly X710B according to the control group installation instructions.
12. Fill the gear compartment of the winch with 6 Imp. quarts of oil through the filler hole shown on figure B on Page 4 of the Model 19 Instruction and Parts Manual. The oil will flow into the adapter housing through a hole provided in the back of the winch housing. Run the engine for 10 minutes with the P.T.O. engaged. Check the oil level and refill if necessary. Check the oil level weekly. Use good quality S.A.E. 90 EP gear oil (MIL-L-2105B or better).
13. Before operating the winch, read Page 4 in the Model 19 Instruction and Parts Manual.
14. After the first days operation, check all the attaching capscrews and nuts to make sure that they are tightened to the required torque loading.

TORQUE LOADING FOR FASTENERS

51114	.....	220 Lbs. Ft.
A884	.....	60-80 Lbs. Ft.
50521	.....	24 Lbs. Ft.
50517	.....	270 Lbs. Ft.
50518	.....	270 Lbs. Ft.
A19010	.....	100-120 Lbs. Ft. (on Pinion Shaft 300 Lbs. Ft.)

ASSEMBLIES X19521, X19522 AND X19524

X19521

Item No.	Part No.	Description	No. Req'd	Weight Per Part Lbs. Ozs.	
Ass'y	X19521	Adapter Assembly	1	112	0
1	50518	Capscrew (3/4" N.F. x 5" Hex. Hd.)	4	0	11.5
2	E19520	Adapter Housing	1	73	0
3	50104	Lockwasher (3/4" ø)	6	—	—
4	51114	Capscrew (3/4" N.C. x 3" Hex. Hd.)	2	0	7.5
5	50517	Nut (3/4" N.F.)	4	0	2
6	50514	Cotter Pin	2	—	—
7	B19525	Pinion Gear (28 teeth)	1	12	0
8	B19516	Idler Gear (24 teeth)	1	10	4
9	A19514	Spacer	2	0	2.5
10	50443	Steel Ball	1	—	—
11	50306	O-Ring	1	—	—
12	A19512	Idler Pin	1	1	13
13	C19502A	Gasket Set	1	—	—
14	50515	Bearing	1	0	7.5
15	B19541	Bearing Ring	1	1	14
16	50740	Bearing	1	0	12
17	B19523	P.T.O. Gear (17 teeth)	1	8	4
18	50741	Bearing	1	0	12.5
19	50743	Oil Seal	1	0	1
20	50307	O-Ring	1	—	—
21	A19518	Seal Spacer	1	0	4.5
22	A19026	Washer	1	0	1
23	Use 1 of Item 6				
24	A19010	Nut	1	0	4.5
25	50513	Pipe Plug	1	0	1.5

X19522

Item No.	Part No.	Description	No. Req'd	Weight Per Part Lbs. Ozs.	
Ass'y	X19522	Adapter Assembly	1	115	0
	For Adapter Assembly X19522 use all parts as listed under X19521 except Items 2, 6, 7, 8, 17, 21, 22, 23 and 24 change as listed below.				
2	E19521	Adapter Housing	1	73	0
6	50514	Cotter Pin	1	—	—
7	B19530	Pinion Gear (39 teeth)	1	13	8
8	B19531	Idler Gear (33 teeth)	1	12	8
17	B19529	P.T.O. Gear (12 teeth)	1	8	4
21	A19517	Seal Spacer	1	0	5.5
22	A864	Washer	1	0	0.5
23	50387	Cotter Pin	1	—	—
24	A884	Nut	1	0	2.5

X19524

Item No.	Part No.	Description	No. Req'd	Weight Per Part Lbs. Ozs.	
Ass'y	X19524	Adapter Assembly	1	109	0
	For Adapter Assembly X19524 use all parts as listed under X19521 except Item 23 which is not used. Items 2 and 7 change as listed below.				
2	E19518	Adapter Housing	1	73	0
7	B19517	Pinion Gear (22 teeth)	1	9	2

ADAPTER ASSEMBLY

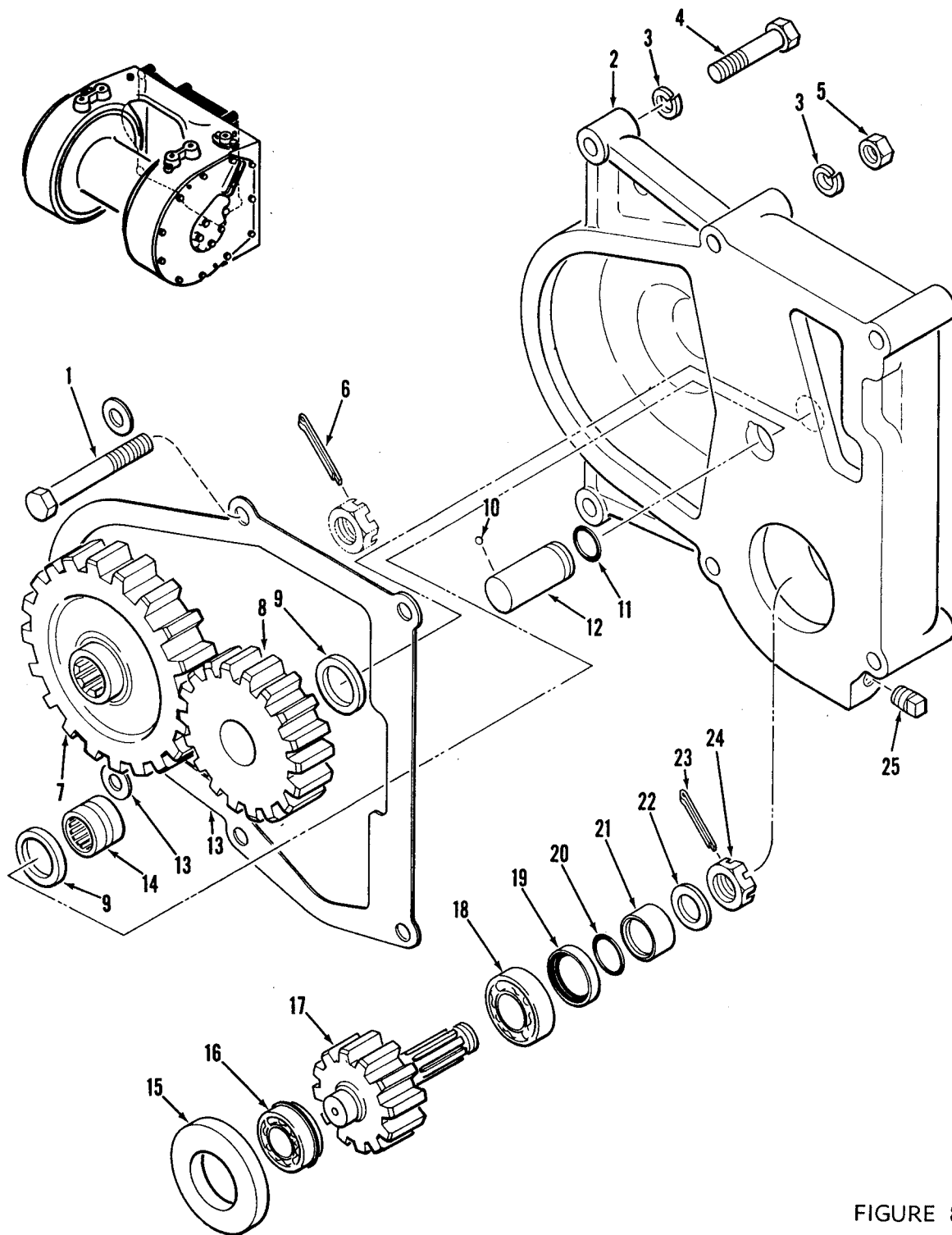


FIGURE 8

CONTROL GROUP

MOUNTING INSTRUCTIONS

Ref. Fig. 9

1. Locate the master control assembly (2) in a convenient position for the operator. Secure it in this position with capscrews (3), lockwashers (4) and nuts (5).
2. Connect the hydraulic lines to the brake and clutch fittings on the winch and master control, as illustrated.
3. Remove the red sealing tape from the filler plug on the master control unit (2) and read the instructions for "Bleeding Hydraulic System" in the Model 19 Instruction and Parts Manual, Page 4.

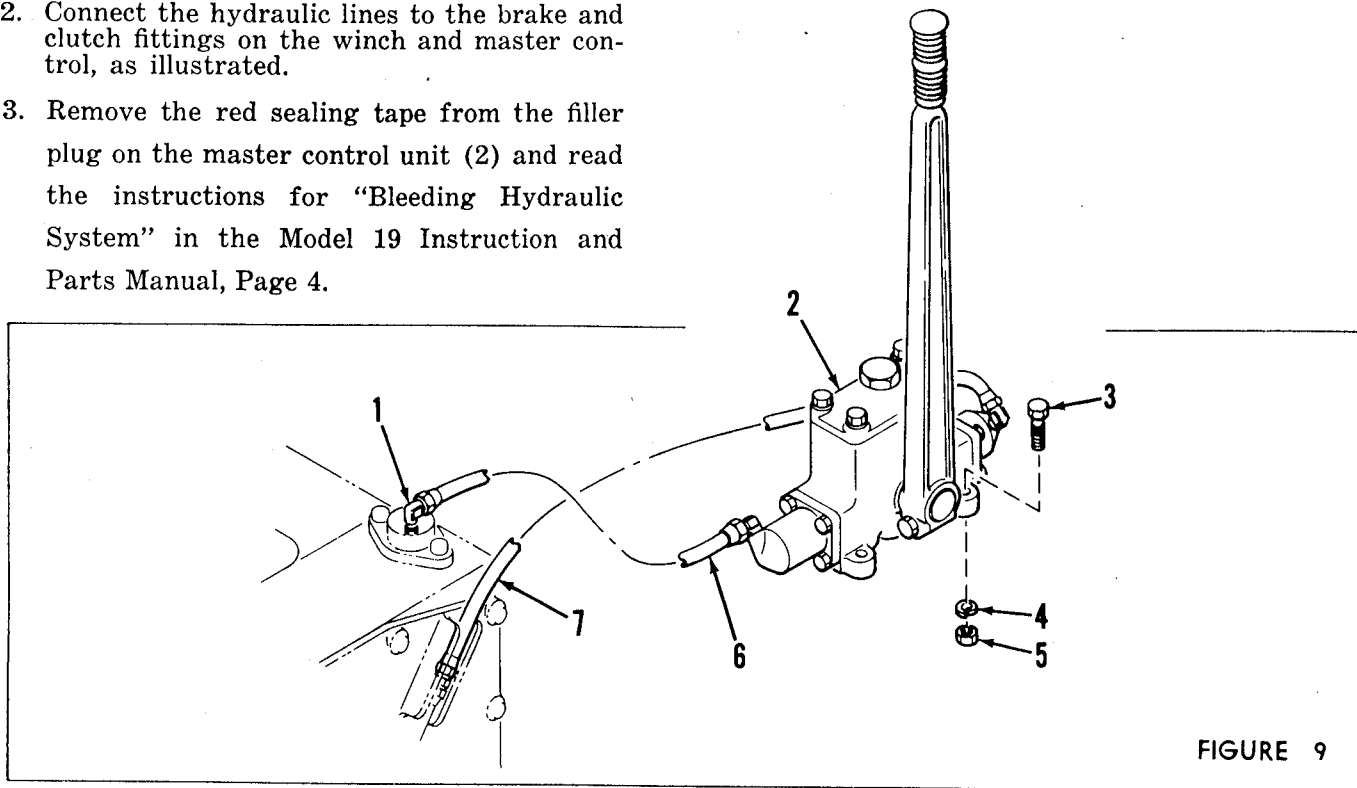


FIGURE 9

HYDRAULIC HOSE

Item No.	Part No.	Description	No. Req'd	Weight Per Part	
				Lbs.	Ozs.
1	50528	90° Elbow	1	—	—
2	X710C	Master Control (Includes 2 of 50528 and filled with brake fluid)	1	7	8
3	50729	Capscrew (3/8" N.C. x 1 1/4" Hex. Hd.)	4	—	—
4	50192	Lockwasher (3/8")	4	—	—
5	50730	Nut (3/8" N.C.)	4	—	—
6		See Chart Below	1	—	—
7		See Chart Below	1	—	—

HOSE ASSEMBLIES (Length from seat to seat)

Hose Part No.	Length	Hose Part No.	Length	Hose Part No.	Length	Hose Part No.	Length	Hose Part No.	Length	Hose Part No.	Length
51373	12	51375	15	51377	19	51379	24	51381	42	51384	60
51374	13	51376	16	50916	20	50919	27	51382	43	51385	60
50787	14	50789	18	51378	22	51380	31	51383	54	51386	74
										51387	90

COPPER TUBE

Item No.	Part No.	Description	No. Req'd	Weight Per Part	
				Lbs.	Ozs.
For Control Groups with Copper Tubing Items 6 and 7 change to the Part Numbers listed below and Item 8 is added.					
6	51974	Koroseal Tubing (1/4" x 120")	1	0	7
7	51346	Copper Tubing (1/4" x 120")	1	0	14
8	51361	Nut (Not shown)	4	—	—

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FACTORY WARRANTY FOR GEARMATIC PRODUCTS

Gearmatic Co., (Hereinafter "Gearmatic"), warrants its products to be free from defects in material and workmanship when installed in an application consistent with Gearmatic instruction manual procedures and specifications for that product. Should any part of said products, within one year from the date of shipment from the Gearmatic factory and under normal use and service, be found to have been defective when shipped, and such product was stored and maintained in factory condition until commencement of service, Gearmatic will repair or replace said part, f.o.b. Surrey, B.C., Canada, provided such defective part is returned to the location designated by an authorized Gearmatic representative, charges prepaid, and provided further that inspection of the original part establishes the claimed defect to the satisfaction of Gearmatic.

Any replacement part supplied by Gearmatic is warranted to be free from defects in material and workmanship for a period of ninety (90) days after proper installation.

Gearmatic's liability under this warranty is limited to such repair or replacement, subject to the conditions stated, and Gearmatic shall not in any event be held liable for any damage or delay caused by defective material or workmanship, and no allowances will be made for repairs, replacements, or alterations unless previously authorized in writing by Gearmatic.

Gearmatic makes NO WARRANTY of MERCHANTABILITY or FITNESS FOR PURPOSE and shall not be liable for any conditions, guaranties or warranties, express or implied by law, except those specifically set forth herein. Gearmatic shall not in any event be liable for any consequential or other damages, loss or expense resulting from any alleged defect in said products.

HOW TO ORDER PARTS

Order parts from your nearest authorized equipment dealer. Order by part number only and state the serial number of the winch. The Serial Number is stamped on the manufacturer's name plate attached to the top of the main housing.

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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.

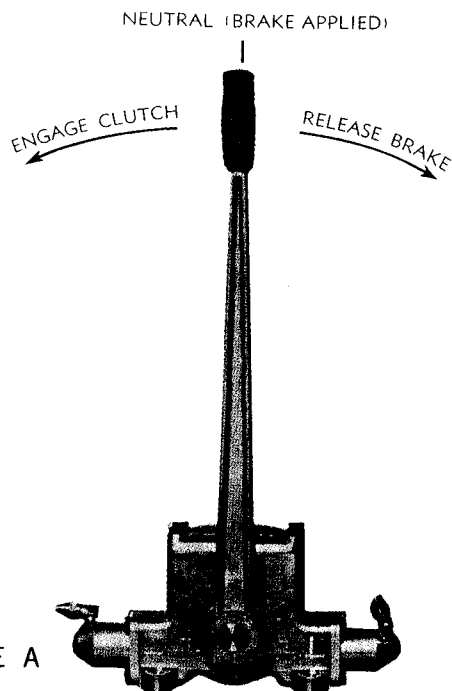


FIGURE A

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. See sales and service bulletin #120.

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
Below 0° F.	6 qts. - SAE 80 EP	Standard automotive hydraulic brake fluid
0° F. - 90° F.	6 qts. - SAE 90 EP	
Above 90° F.	6 qts. - SAE 140 EP	

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

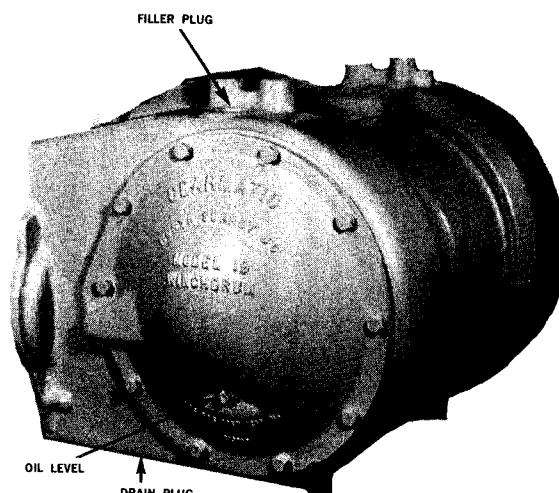


FIGURE B

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 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

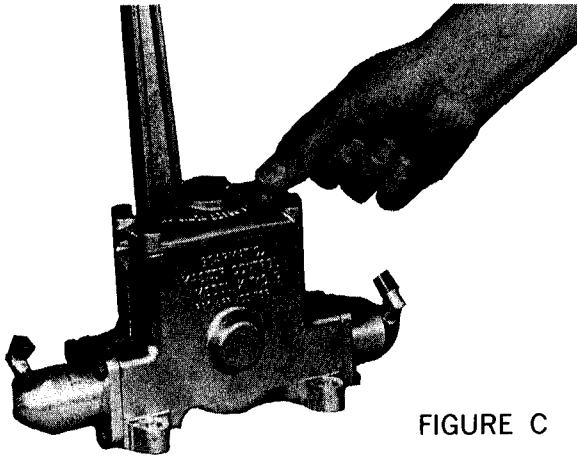


FIGURE C

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.

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 labour 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.

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').

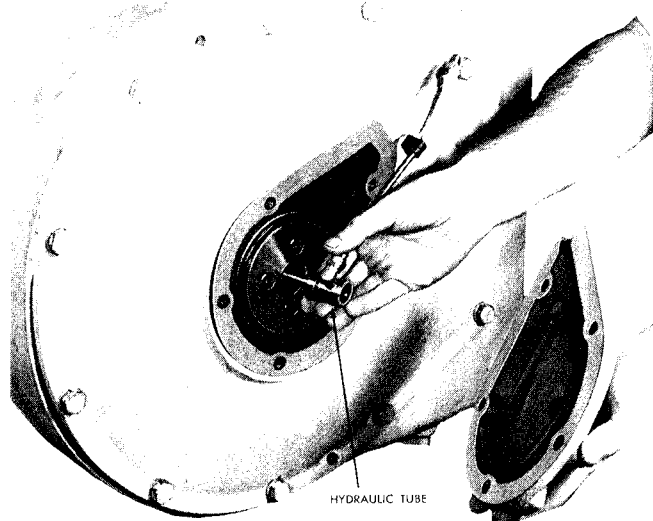


FIGURE D

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.

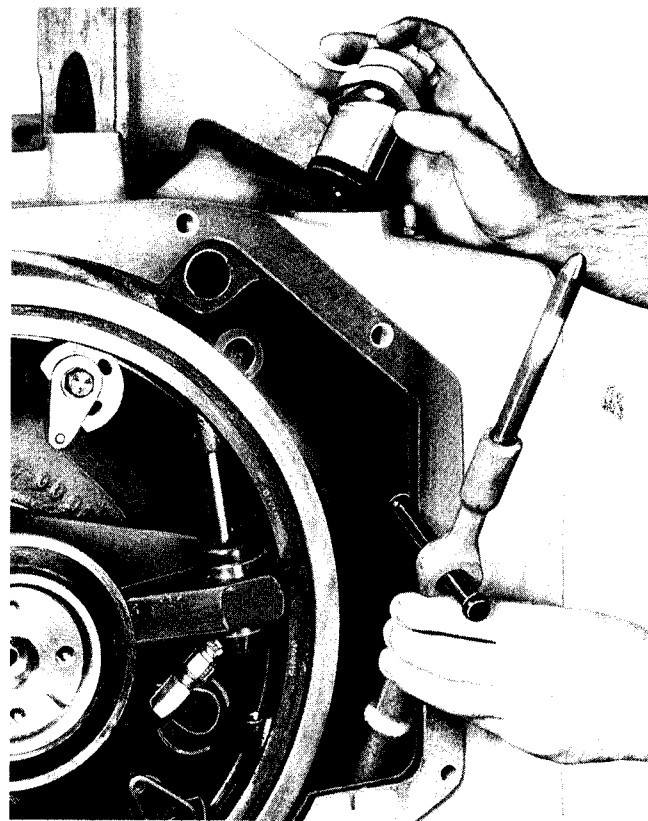


FIGURE E

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. 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 under normal operating conditions. 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 cap-screws (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). 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 purpose) (See Fig. 'G'). This procedure also removes the bearing (11). Now the secondary clutch band (29)

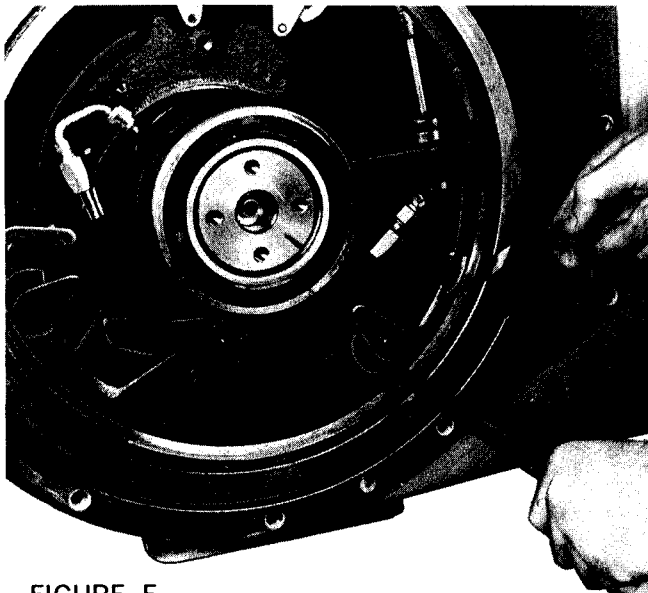


FIGURE F

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).

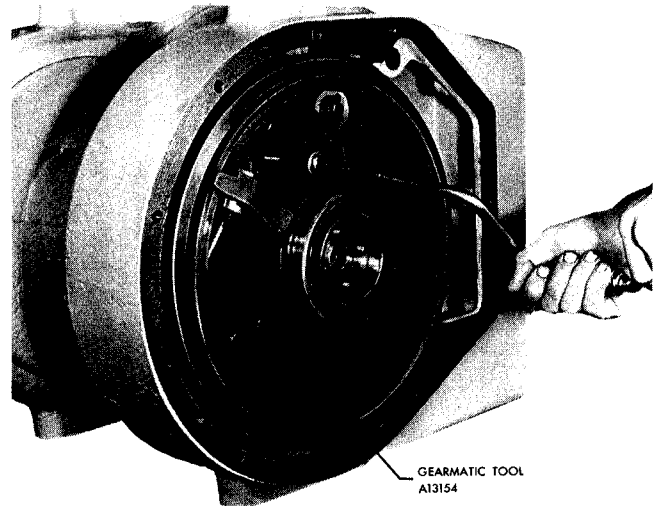


FIGURE G

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 push rod assembly. 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.

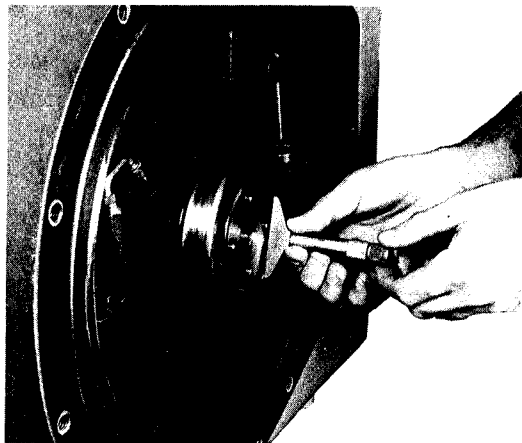


FIGURE H

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.

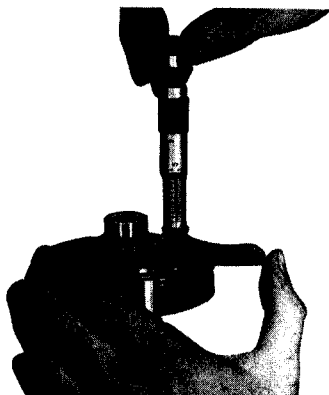


FIGURE J

Clutch Adjustment

With the primary clutch band removed and the adjusting cams engaged in the centre 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'). Set all of the adjusting cams to give a clearance of .010" to .015". Adjust push rod (32) so that no slack exists between the clutch lever (1) and clutch hub (22) while maintaining the required clutch band clearance of .010"-.015". When the correct setting has been obtained tighten all capscrews to 25 lbs. ft. torque. 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 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) installed at the ring gear compartment end of the winch housing (12). The grease used in the oil

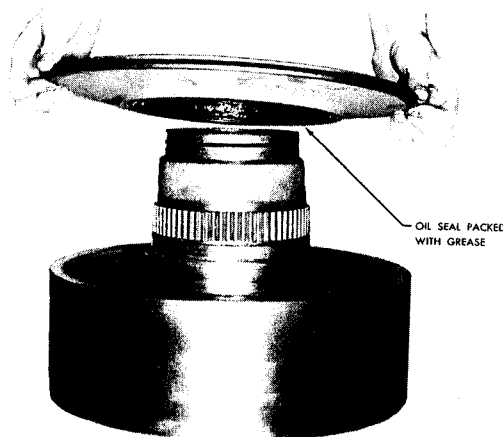


FIGURE K

seals (16), (17), (5) 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 drum 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 capscrows (2) and, using two $\frac{5}{8}$ " N.C. capscrows 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 $\frac{3}{4}$ " 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.

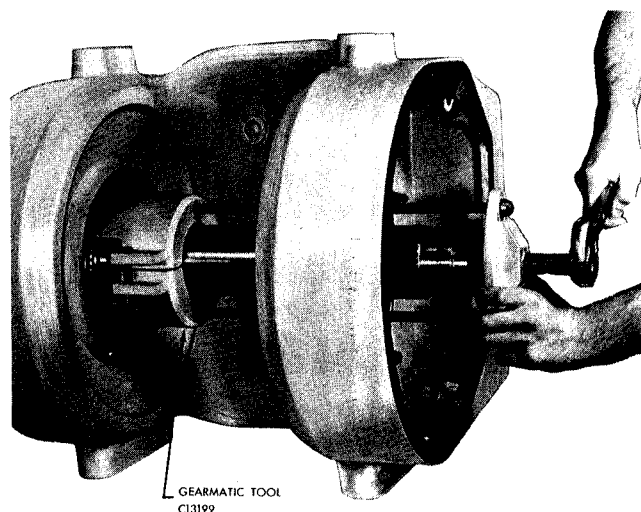


FIGURE M

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

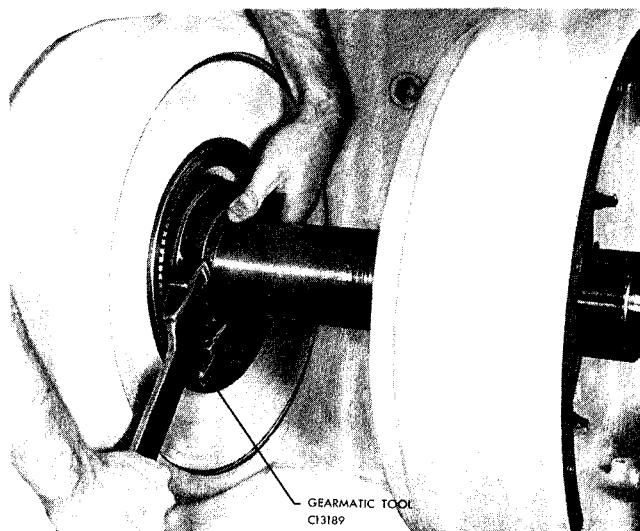


FIGURE N

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 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.

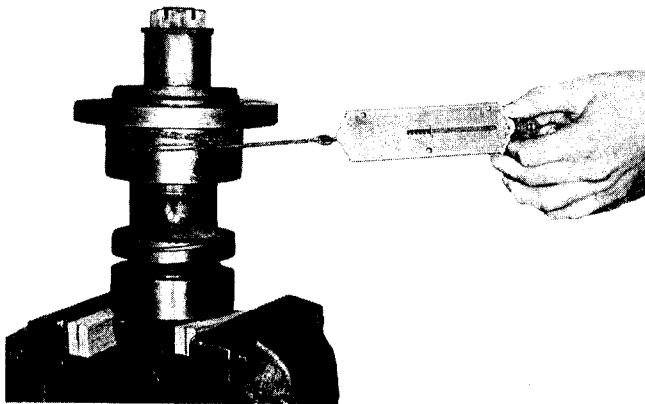


FIGURE O

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 A 13088 can be used for this purpose.) The length of each bearing spacer A 19022 is marked with electric pencil on the I.D. of the spacer.

Assemble the bearings with Spacer Tool A 13088 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 A 13088 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 A 19022 required.

Bearing Spacer A 19022 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 drumshaft 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).

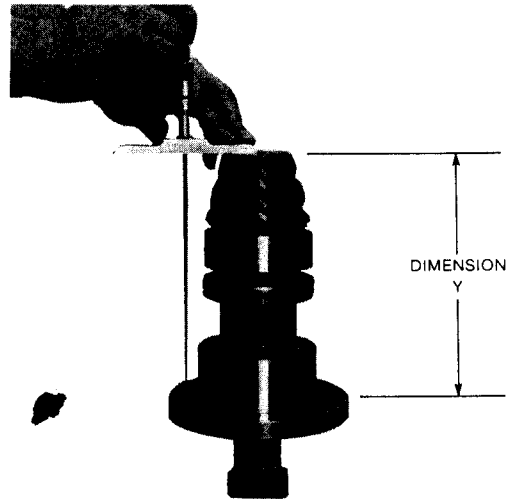


FIGURE P

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

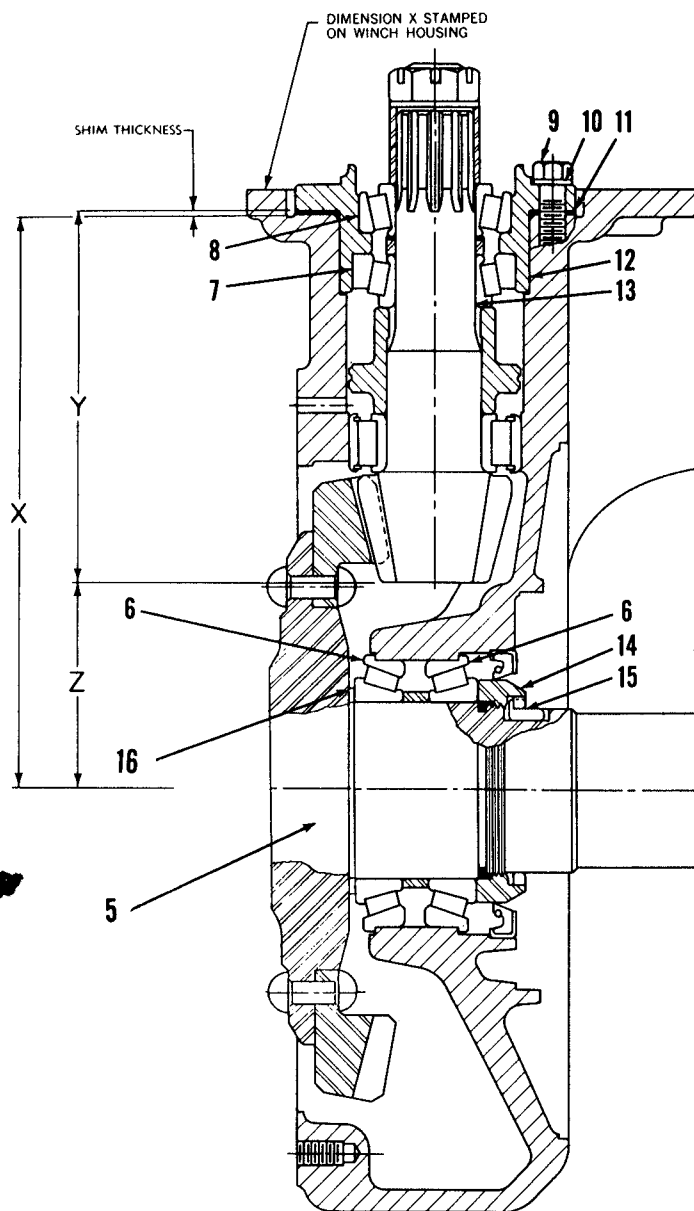
(Model 19 only)

(Winches Serial Number 19-8999 and Down)

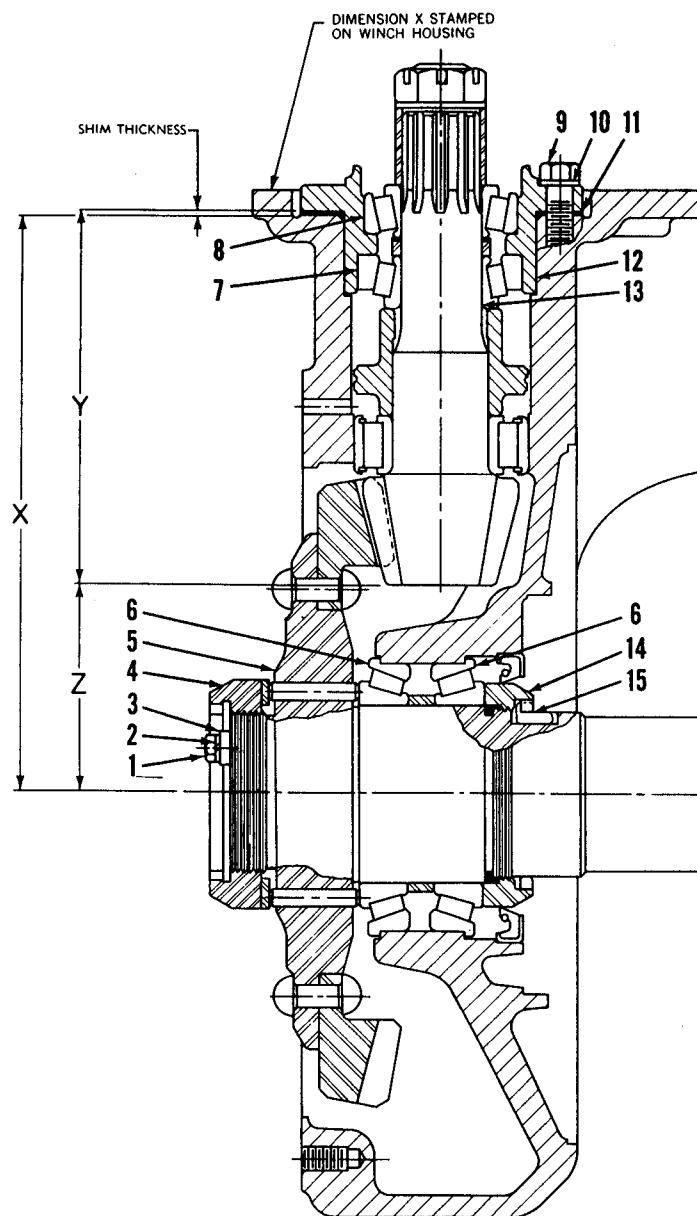
Ref. Fig. Q

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 bearing (6).

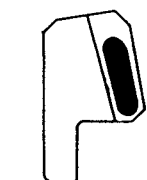
Establish the total thickness of shims (11) required under the flange of the pinion bearing housing (12), as follows. When the bevel pinion bearings have been correctly preloaded, as explained above, measure dimension 'Y' as shown on Fig. Q. Place the bevel pinion assembly on a surface table so that 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



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



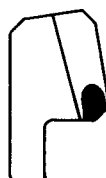
TYPICAL VIEW OF WINCHES WITH
SERIAL NUMBERS UP TO 19 - 8999



CONDITION A



CONDITION B



CONDITION C



CONDITION D



CONDITION E

FIGURE Q

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.

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 cap screws (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 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 increase the thickness of shim (16) until 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.

$$\text{TOTAL THICKNESS OF SHIMS (10) = } Y + Z - X \text{ inches}$$

2. Install the pre-assembled pinion assembly with shims (10) and capscrews (2) into the bore in the housing. 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 C 13189. Re-measure the backlash it should measure .010 to .015.

SPECIFICATIONS

Gear Compartment Capacity (with Adapter)
 Maximum Winch Input Speed
 Total Weight
 Width (Gear Cover to Clutch Cover)
 Length
 Maximum Bare Drum Rated Line Pull
 (when used with Torque Converter)
 Barrel Diameter
 Length between Flanges
 Cable capacity (3/4 in. Diameter Cable)
 7/8 in. Diameter Cable
 1 in. Diameter Cable

10 Imp. Qt.	11.3 Liter
2,000 R.P.M.	2,000 R.P.M.
985 lb.	447 kg.
28 5/8 in.	727 mm.
26 in.	660 mm.
20,000 lb.	9072 kg.
30,000 lb.	13608 kg.
8 1/2 in.	216 mm.
9 in.	229 mm.
165 ft.	50 m.
120 ft.	37 m.
90 ft.	28 m.

SPECIAL SERVICE PARTS

Service Kits

Part No.	Description	Where Used
A 8055X	Field Conversion Kit	Conversion of X 710B Master Control to X 710C Master Control Cylinders Clutch Cylinder Assembly Brake Cylinder Assembly To convert 51359 Hose Assembly and B 9516 Hydraulic Fitting
A 9545X	Repair Kit	
A 9546X	Repair Kit	
A 9547X	Repair Kit	
A 19179X	Repair Kit	

Tools

Part No.	Description	Where Used
A 13154	Jack Screw	Removing Clutch Hub Adjustment of Drumshaft Bearings Adjusting Nuts on Drumshaft Removing Bearing 50793 from Drumshaft
A 13088	Bearing Spacer	
C 13189	Wrench	
C 13199	Puller	

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
A. Clutch slipping	<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 $\frac{1}{8}$" 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>
B. Brake will not hold a load	<p>1. If the winch is new, the brake may require to be "run in".</p> <p>2. The brake drum may have become over heated due to the clutch slipping under heavy loads.</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>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> <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>

TROUBLE	PROBABLE CAUSE	REMEDY
C. Clutch slipping and brake will not hold.	1. Water or brake fluid may have leaked into the clutch and brake compartment.	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).
D. Brake will not release or stay released.	1. The cup in the master control cylinder which is connected to the winch brake cylinder may be leaking.	Remove the fittings from the end of the master control brake cylinder and install a 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.
	2. The cup in the winch brake cylinder may be leaking.	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.
	3. The line from the master control is expanding excessively under pressure thus reducing the movement available for releasing the brake.	The recommended hose for this application is single wire braid hose (Stratoflex No. 225 or similar). Alternatively steel or copper tubing should be used.
	4. If the winch or master control has recently been installed there may be air in the brake line.	See "Bleeding Hydraulic System" on page 4.
E. Drum will not rotate when clutch is engaged with no load on the cable.	1. The tractor P.T.O. may not be engaged.	Check P.T.O. engagement.
	2. The Master Control Unit may require to be filled with fluid.	Fill with automotive brake fluid.
	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.	If the gears are damaged or the rivets are sheared disassemble the winch and make the necessary repairs.
F. Drum will not free spool.	1. The base on which the winch is mounted may not be completely flat.	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.
	2. See Cause 'D' steps 3 and 4.	See Cause 'D' steps 3 and 4.

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	51176	18
50103	200	51177	25
50435	120	51178	35
50521	25	51518	10
50608	12	51563	18
50610	55	53920	400-475
50748	24	A11029	35
50767	25	A19010	250-300
50794	10	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 CLUTCH
HYDRAULIC TUBE
FIGURE 2

MODEL 119

MASTER CONTROL UNIT
FIGURE 6

FAIRLEAD ASSEMBLY
FIGURE 7

ADAPTER ASSEMBLY
FIGURE 8

CONTROL GROUP
FIGURE 9

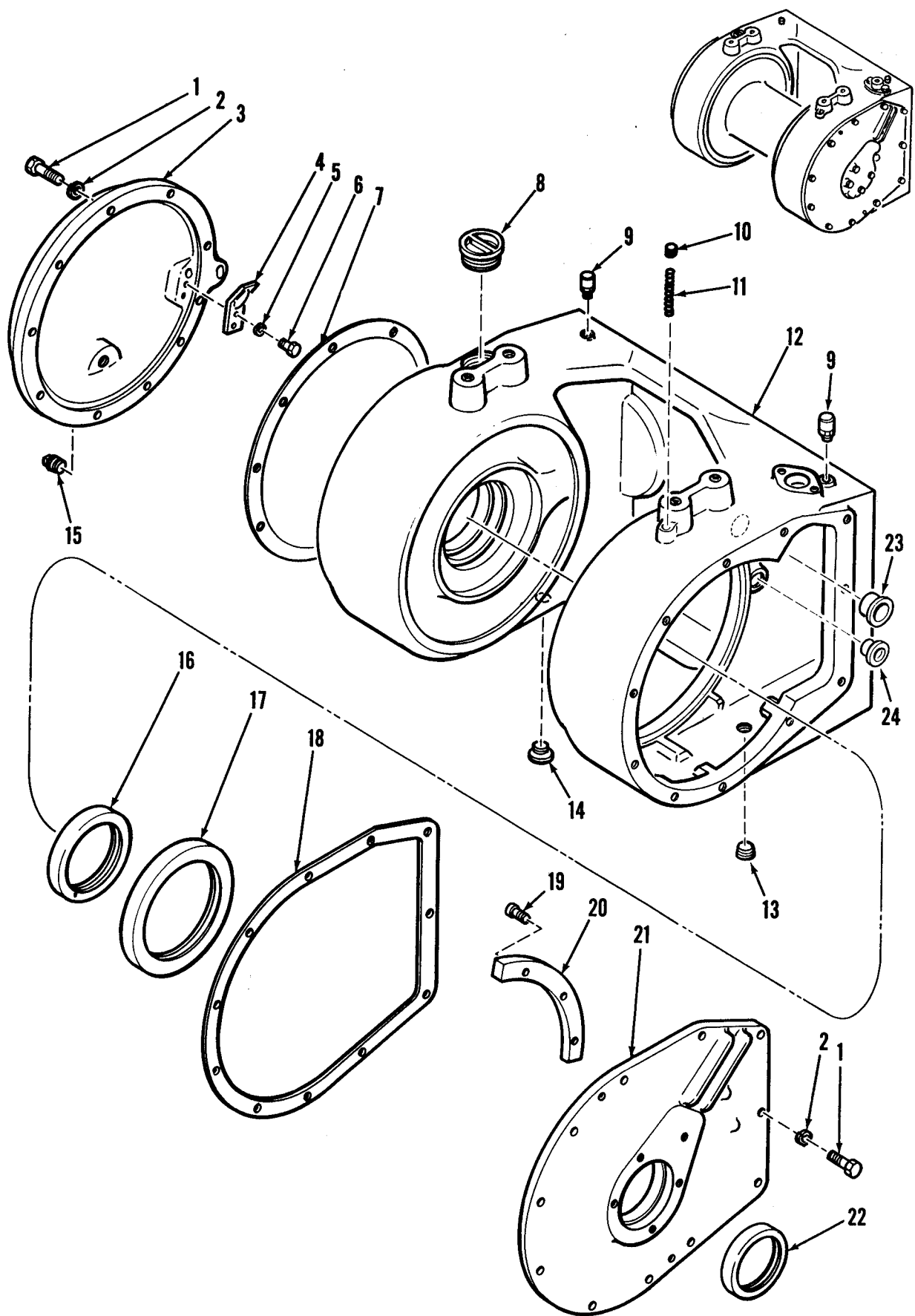


FIGURE 1

HOUSING ASSEMBLY

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	50610	Capscrew ($\frac{1}{2}$ N.C. x $1\frac{1}{4}$ Hex. Hd.)	21	0	1.7
2	50100	Lockwasher ($\frac{1}{2}$)	21	—	
3	C 19008	Gear Cover	1	33	0
4	A 19033	Oil Wiper	1	0	0.7
5	50097	Lockwasher (5/16)	2	—	
6	50608	Capscrew (5/16 N.C. x $\frac{5}{8}$ Hex. Hd.)	2	—	
7	B 19010	Gasket	1	—	
① 8	50782	Barrel Plug	1	0	3
9	50742	Vent (Model 119 Only)	1	0	0.5
	50742	Vent (Model 19 Only)	2	0	0.5
	50531	Pipe Plug (Model 119 Only)	1	0	0.5
10	52263	Set Screw	1	0	0.5
11	A 9536	Spring	1	—	
12	E 19001	Housing (Model 119 Only)	1	350	0
	E 19000	Housing (Model 19 Only)	1	350	0
*13	50587	Pipe Plug	1	—	
14	51174	Barrel Plug	1	0	1
15	50513	Pipe Plug	1	0	1.5
16	50799	Oil Seal (Model 119 Only)	1	0	12
	51426	Oil Seal (Model 19 Only)	1	0	12
*17	51431	Oil Seal	1	1	1
*18	C 19009	Gasket	1	—	
19	51176	Capscrew ($\frac{3}{8}$ N.C. x $\frac{3}{4}$ Sock. Hd.)	3	0	0.7
20	B 19014	Guide Ring	1	1	2
21	C 19003	Clutch Cover	1	50	0
*22	50482	Oil Seal	1	0	4.5
② 23	A 19092	Lever Plug (Secondary)	1	0	0.5
② 24	A 19091	Lever Plug (Primary)	1	0	0.5

*Not required in Model 119 winches.

① Winches Serial Number 19-1065 and down used F 10 Barrel Plug.

② Winches Serial Number 19-5154 and down do not require A 19092 Lever Plug and A 19091 Lever Plug.

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

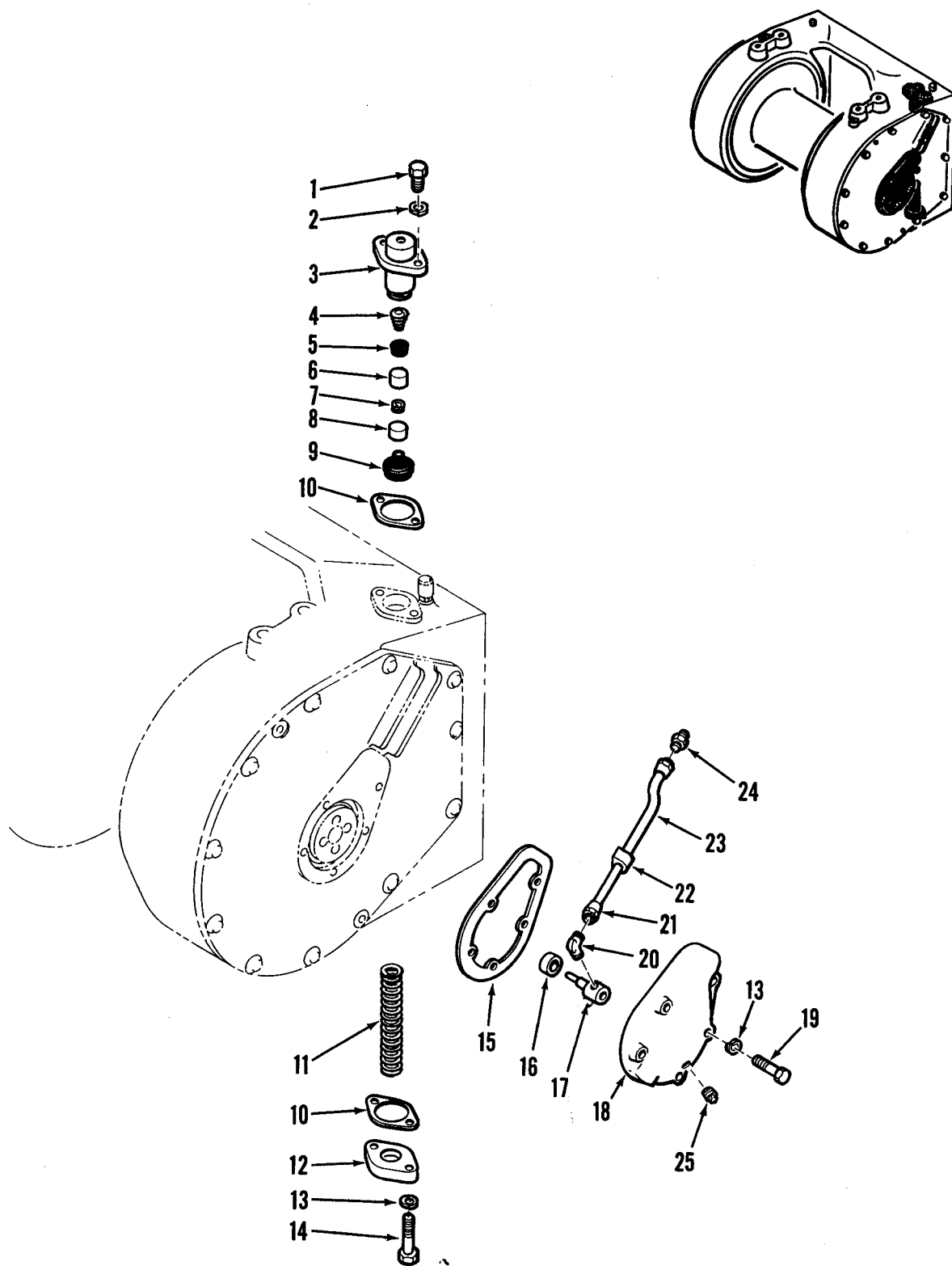


FIGURE 2

BRAKE CYLINDER AND HYDRAULIC TUBE

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	50521	Capscrew ($\frac{3}{8}$ N.C. x 1 Hex. Hd.)	2	0	0.7
2	50192	Lockwasher ($\frac{3}{8}$)	2	—	
Sub Ass'y	A 839BX	Brake Cylinder Ass'y (Consists of Items 3 to 9)	1	0	15.2
3	A 839B	Brake Cylinder	1	0	11.5
4	50952	Spring	1	—	
5	51470	'U' Cup	1	—	
6	A 8043	Piston	1	0	0.5
7	A 8044	Spring	1	—	
8	51471	Piston	1	0	0.5
* 9	51474	Boot	1	—	
*10	{ A 9526	Gasket (Model 119 Only)	1	—	
	{ A 9526	Gasket (Model 19 Only)	2	—	
11	54293	Brake Spring	1	0	11
12	{ 50524	Spring Cap (Model 119 Only)	1	0	11
	{ A 9517	Spring Cap (Model 19 Only)	1	0	11
13	50398	Lockwasher (7/16)	7	—	
14	A 11029	Capscrew	2	0	1.5
*15	B 19007	Gasket	1	—	
16	50956	Bearing	1	0	1.2
17	A 19018	Hydraulic Tube	1	0	2.7
18	{ C 19007	End Cap (Model 119 Only)	1	8	0
	{ C 19007X	End Cap (includes item 25) (Model 19 Only)	1	8	0
19	51178	Capscrew (7/16 N.C. x 1½ Hex. Hd.)	5	0	1.5
20	50528	Elbow	1	0	1
Sub Ass'y	A 19037X	Tube Ass'y (Consists of Items 21, 22 and 23)	1	0	2.5
21	51361	Nut	2	—	
22	A 9518	Gromet	1	—	
23	51337	Copper Tubing	1	0	0.7
24	50644	Adapter	1	0	0.5
*25	50531	Drain Plug (part of item 18) (Model 19 Only)	1	—	
Service Kit	A 9547X	Repair Kit (includes items 4 to 10 and 1 capsule of 50816 Lubricating Fluid)	1		

*Not required in Model 119 Winches.

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

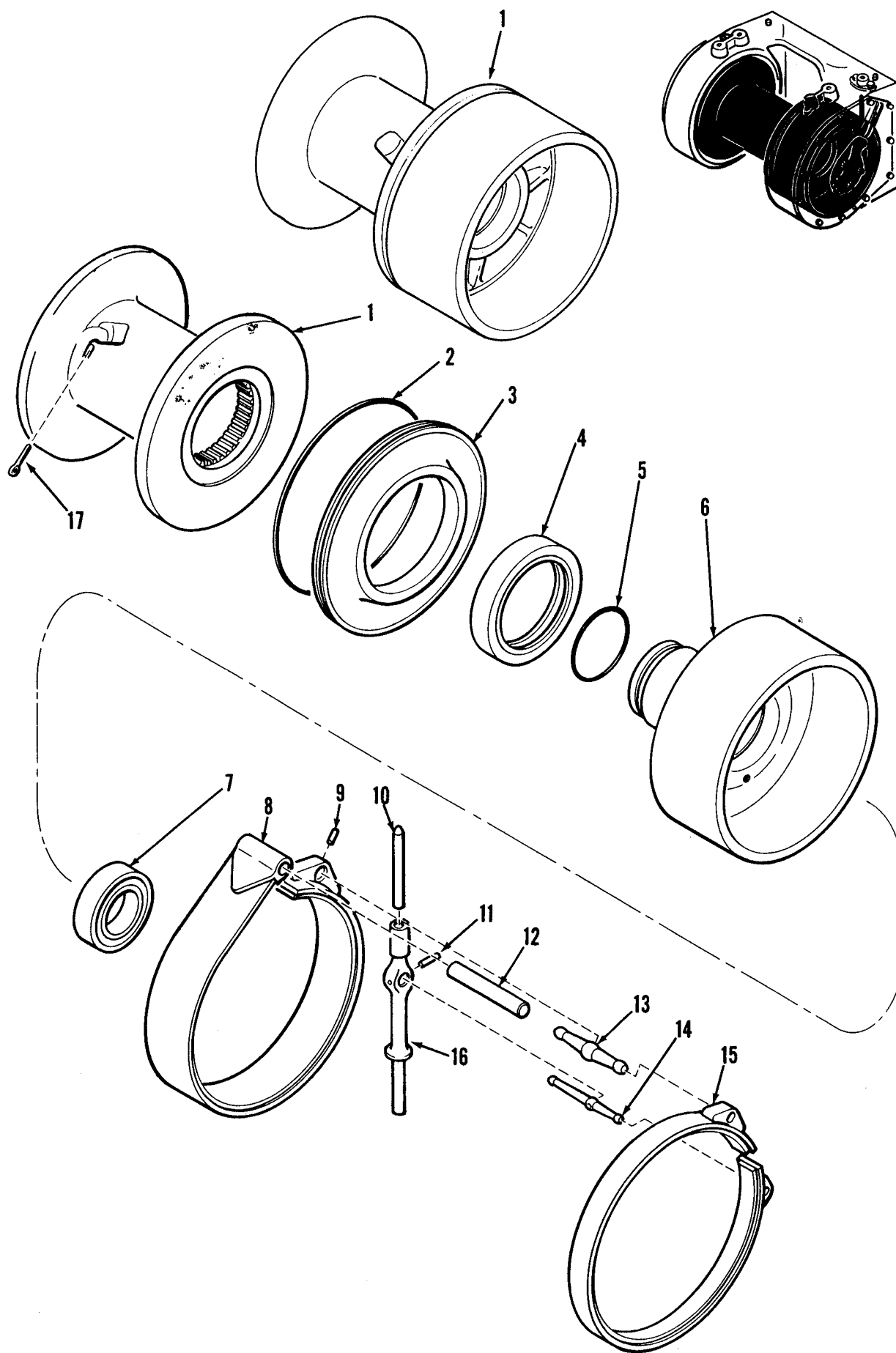


FIGURE 3

DRUM AND BRAKE BAND

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
① 1	D 19035	Cable Drum (Model 119 only)	1	208	0
	54405	Cable Drum (Model 19 only)	1	125	0
*2	50347	'O' Ring	1	—	
*3	B 19002	Oil Seal Housing	1	15	2
*4	51430	Oil Seal	1	0	13
*5	50331	'O' Ring	1	—	
*6	C 19005	Brake Drum	1	83	0
7	50793	Bearing	1	4	13
8	C 19001X	Secondary Brake Band	1	12	8
9	50573	Pin	1	—	
10	A 9515	Push Rod	1	0	5
11	51179	Pin	1	—	
12	A 19027	Anchor Pin	1	1	2
13	A 19017	Brake Lever	1	0	11.5
14	A 19003	Brake Lever	1	0	5.2
15	C 19000X	Primary Brake Band	1	4	8
② 16	B 19019	Lever Block	1	0	8
17	50514	Cotter Pin (Part of item 1)	1	—	

* Not required in Model 119 winches.

① Winches Serial Number 19-4999 and down used C 19006 (Hondu) Cable Drum. Winches Serial Number 19-5000 to 19-9000 used C 19036 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 B 19019; Lever Block A 19019, Guide Rod A 9516 and Washer W 65. When ordering replacement parts for any of these parts, order B 19019 only.

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

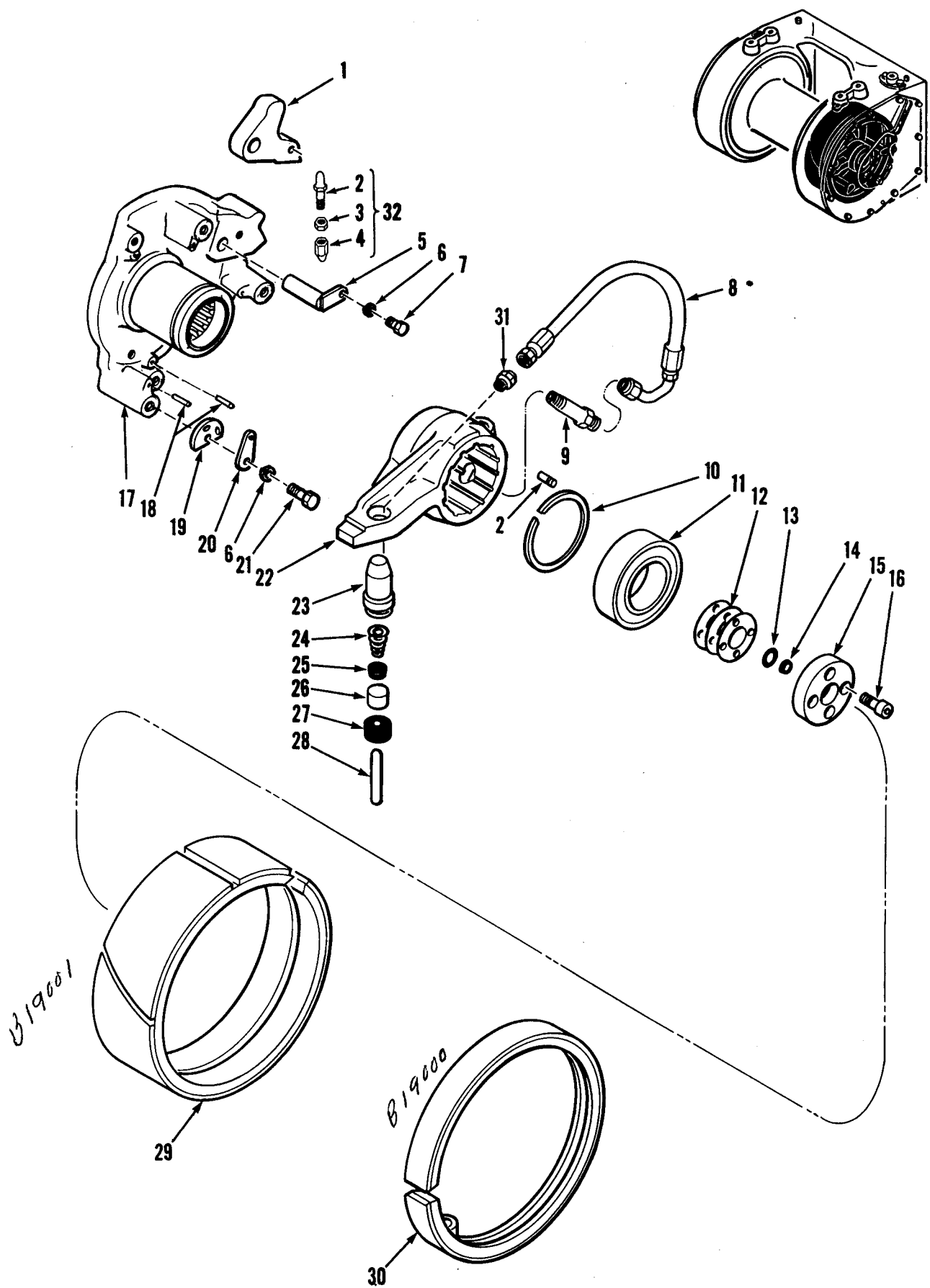


FIGURE 4

CLUTCH ASSEMBLY

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
② 1	51626	Lever Arm (includes 1 Off 51220 Pin)	1	1	8
Sub Ass'y	51160	Clutch Adjuster Ass'y (includes Items)	1	—	—
2	51158	Adjusting Screw	1	—	—
3	52065	Locknut	1	0	0
4	51159	Adjusting Nut	1	0	0
5	A 19005	Pivot Pin	1	0	6.5
6	50192	Lockwasher (3/8)	7	—	—
7	53009	Capscrew	1	0	0.7
① 8	51175	Hose Assembly <i>K. + LL 2055-46</i>	1	0	5.5
① 9	A 19158	Hydraulic Fitting	1	—	—
10	50833	Snap Ring	1	0	1
11	50792	Bearing	1	3	4
12	A 19024	Shim Set	1	—	—
13	50408 <i>G-115</i>	'O' Ring	1	—	—
14	51181 <i>u-25</i>	'U' Seal	1	—	—
15	A 19006	Gland Cap	1	2	9
16	51177	Capscrew (3/8 N.F. x 1 1/4 Sock. Hd.)	4	0	0.7
17	54301	Clutch Hub	1	20	8
18	51180	Pin	6	—	—
19	A 19180	Adjusting Cam	6	0	1.2
20	A 9504	Lock Plate	6	0	1
21	50521	Capscrew (3/8 N.C. x 1 Hex. Hd.)	6	0	0.7
22	51627	Clutch Lever	1	9	8
Sub Ass'y	A 825AX	Clutch Cylinder Assembly (Includes Items 23 to 27)	1	0	8
23	51063	Cylinder <i>LL 2055-48</i>	1	0	6.7
24	50952	Spring	1	—	—
25	51473	'U' Cup	1	—	—
26	51472	Piston	1	—	—
27	51475	Boot	1	—	—
28	A 19025	Push Rod	1	0	1.5
③ 29	52894	Secondary Clutch Band	1	17	8
③ 30	B 19050	Primary Clutch Band	1	6	0
① 31	50644	Connector	1	—	—
32	51160	Adjusting Screw Assembly (consists of items 2, 3 and 4)	1	—	—
Service Kit	A 9546X	Repair Kit (Includes items 24 to 27 and 1 capsule of 50816 Lubricating Fluid)			

① Winches Serial Number 19-1307 and down used A9539 Hydraulic Fittings, B9516 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 A 19179X Replacement Kit. A 19179X 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-B 19001 Secondary Clutch Band and 1-B 19000 Primary Clutch Band. When ordering replacement parts for B 19001, order 1-B 17004 Secondary Clutch Band plus 3-A 19180 Adjusting Cams. When ordering replacement parts for B 19000, order B19050 Primary Clutch Band plus 3-A 19180 Adjusting Cams. Spring A 19036 or A 19046 are no longer required on the Secondary Clutch Band.

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

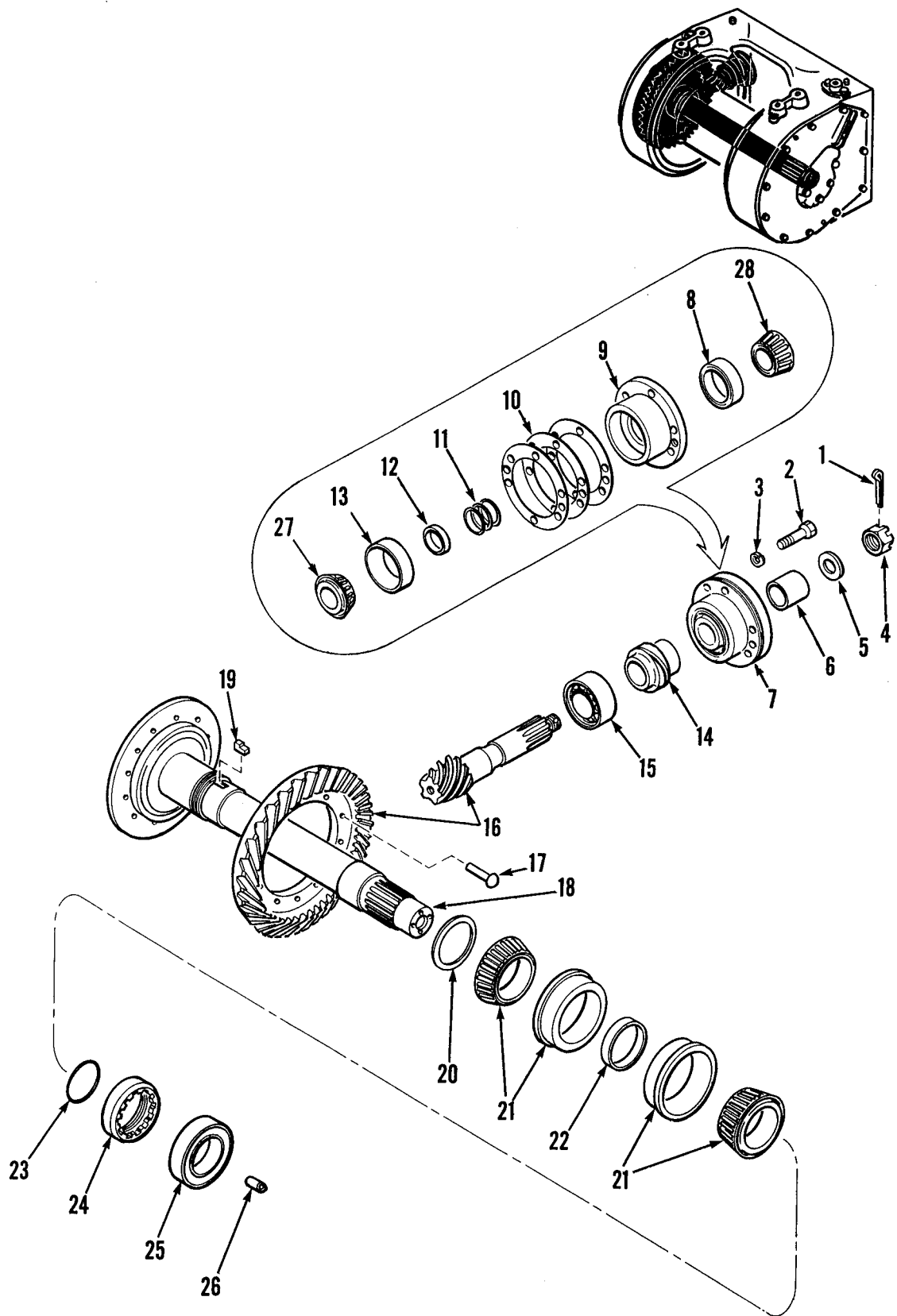


FIGURE 5

RING GEAR, PINION AND SHAFT

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	50514	Cotter Pin	1	—	
2	50435	Capscrew ($\frac{5}{8}$ N.C. x $1\frac{3}{4}$ Hex. Hd.)	6	0	3.2
3	50098	Lockwasher ($\frac{5}{8}$)	6	0	0.7
4	53920	Nut	1	0	4.7
⑤ 5	A 19026	Washer	1	0	1
† 6	A 19011	Bushing (shipping only)	1	1	9
7	B 19011X	Bearing Housing Assembly (Includes items 8 to 13, 27 and 28)	1	6	12
8	50808	Bearing Cup	1	1	11
9	B19004X	Bearing Housing (incl. items 13 & 8)	1		
10	A 19015	Shim Set	1	—	
11	A 19021	Shim Set	1	—	
12	A 19020	Bearing Spacer	1	0	2
13	50806	Bearing Cup	1	2	2
14	A 19013	Spacer Sleeve	1	2	9
15	50810	Bearing	1	2	8
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	C 19071X	Drum Shaft (includes item 26)	1	95	8
19	A 19009	Lock Key	1	—	
③ 20	A 17014	Spacer (specify length req'd.)	1	—	
21	50910	Bearing Assembly	2	4	8
① 22	A 19022-*	Bearing Spacer (*specify length req'd.)	1	0	9.7
23	50318	O-Ring	1	—	
① 24	A 19012	Locknut	1	1	10
25	50793	Bearing	1	4	13
26	A 9506	Cup Retainer (part of item 18)	1	—	
27	50809	Bearing Core	1	—	
28	50807	Bearing Core	1	—	

† This item is used for shipping purposes only when Winch supplied without the Adapter Assembly.

- ① For correct length see pre-load of drum shaft bearings page 10. Winches Serial Number 19-9000 and down used 1-S 181 Capscrew, 1-W 10 Lockwasher, 1-A 19007 Lockplate, 1-A 19012 Locknut, 1-A 19008 Thrust Spacer and one set of 6 pins A 19014. These parts are no longer required. When ordering replacement parts, order 1-A 17014 Spacer and see "RING GEAR AND PINION ADJUSTMENT" for tooth contact instructions.
- ② Winches Serial Number 19-8999 and down used 1-C 19002X Drumshaft. When ordering replacement parts, order 1-50837 Drumshaft Kit.
- ③ For correct length of Spacers see Ring Gear and Pinion Adjustment on page 12.
- 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 Drumshaft Kit.
- ⑤ Winches Serial Number 19-15525 and down used Pinion Nut A 19010.

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

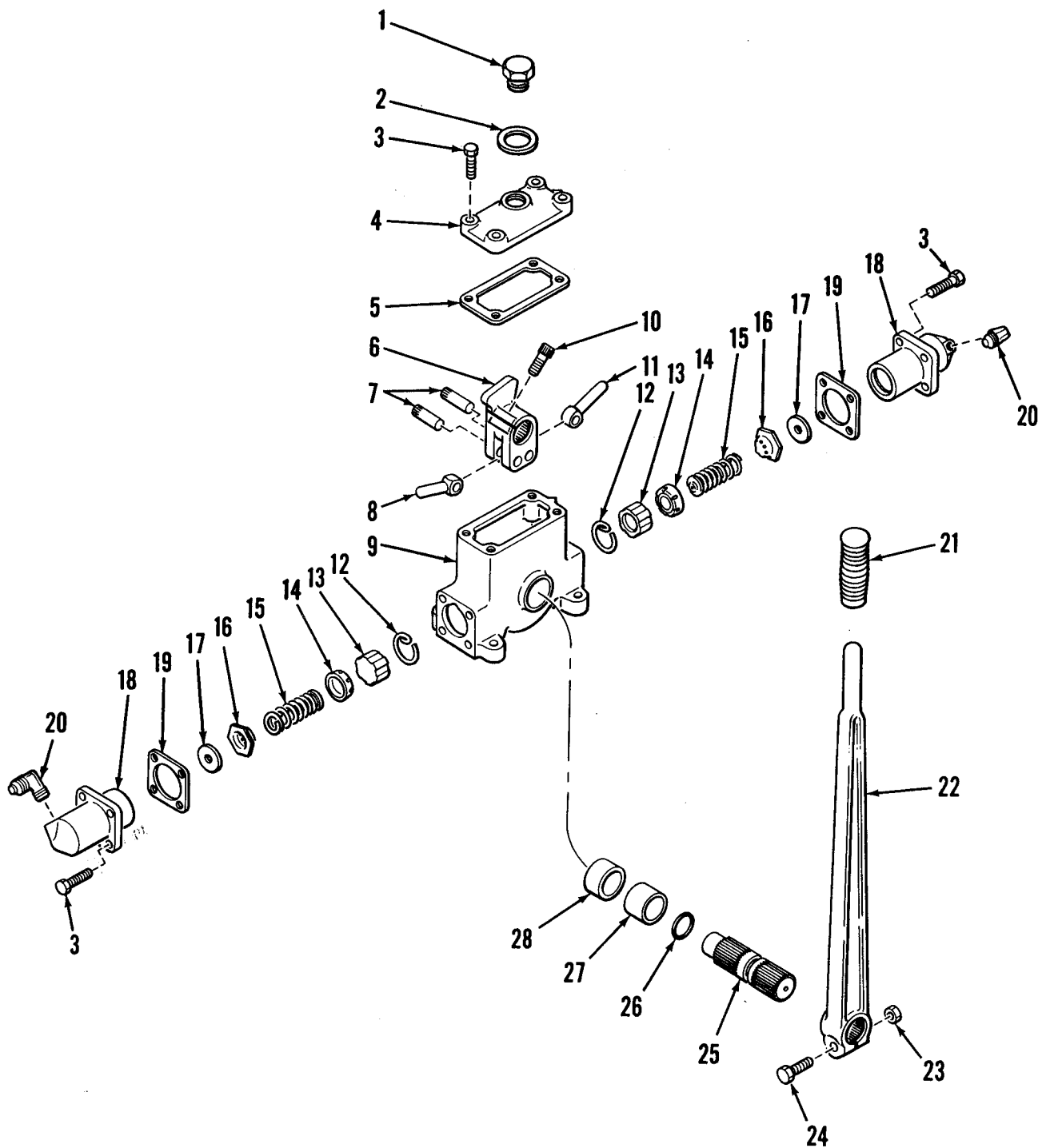


FIGURE 6

MASTER CONTROL UNIT

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
① Assembly	X 710C	Master Control Assembly	1	7	8
1	A 797	Filler Cap	1	0	2
2	51162	Washer	1	—	
3	50794	Capscrew (5/16 N.C. x 7/8 Hex. Hd.)	12	—	
4	A 771	Cover	1	0	5
5	A 794	Gasket	1	—	
6	A 769	Rocker Arm	1	0	5
7	A 785	Push Rod Pin	2	0	0.5
8	A 8053	Short Push Rod	1	0	1
9	C 709X	Housing (Includes items 27 and 28)	1	2	0.5
10	50518	Capscrew	1	0	0.5
11	A 8054	Long Push Rod	1	0	1.5
Sub Ass'y	B 765X	Cylinder Assembly (Includes items 12 to 18)	2	0	11.5
12	50815	Lock Ring	2	—	
13	A 830A	Piston	2	0	0.5
14	51477	Cup	2	—	
15	51478	Spring	2	—	
16	51476	Valve Assembly (Includes items 17)	2	—	
17	51145	Washer (Part of item 16)	2	—	
18	A 770	Cylinder <i>66.255112</i>	2	0	8.5
19	A 793	Gasket	2	—	
20	50528	Elbow	2	0	0.7
21	A 798	Hand Grip	1	0	1.5
22	B 716	Control Handle	1	1	0
23	50748	Nut (3/8 N.F.)	1	—	
24	51563	Capscrew (3/8 N.F. x 1 3/4 Hex. Hd.)	1	1	1
25	A 772	Shaft	1	0	14
26	50301	'O' Ring	1	—	
27	A 855A	Bushing (Included in item 9)	1	0	1.5
28	A 8051	Bushing (Included in item 9)	1	0	1
Service Kit	A 9545X	Repair Kit (Includes items 12, 13, 14, 15,, 16, 17, 19 and 1 capsule of 50816 Lubricating Fluid)	2		

① Master Control X 710B is now replaced by X 710C. X 710B is no longer available as a spare part. To convert an X 710B Master Control to X 710C order field conversion kit A 8055X.

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

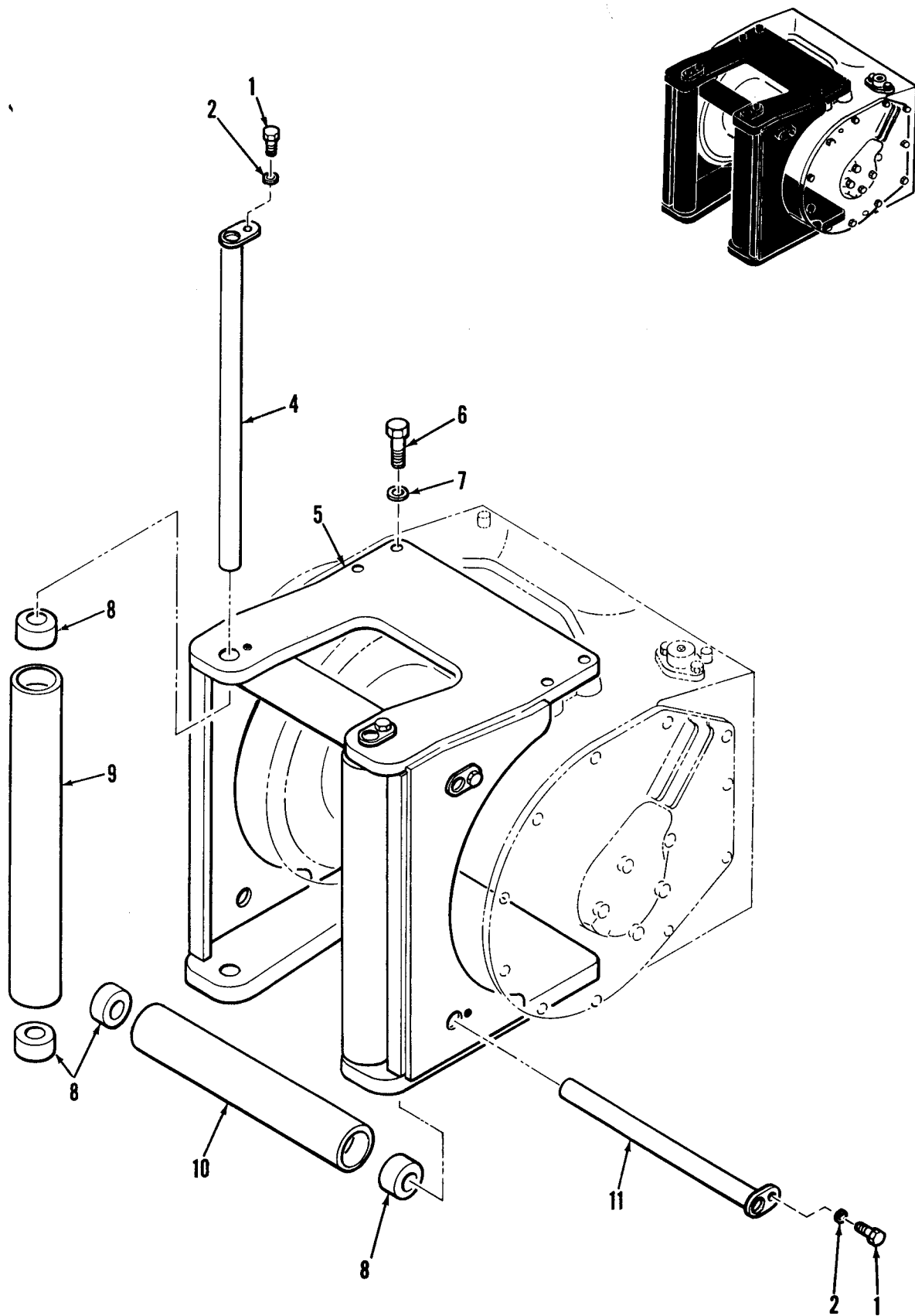


FIGURE 7

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 (5/16 N.C. x 1/2 Hex. Hd.)	4	—	.
2	50097	Lockwasher (5/16)	4	—	
4	50080	Long Roller Shaft	2	10	0
5	50085	Fairlead Body	1	106	0
6	50103	Capscrew (3/4 N.C. x 1 3/4 Hex.)	10	0	5.5
7	50104	Lockwasher (3/4)	10	—	
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 100 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.

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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B716	29	C19005	23	50093	31	51063	25
B765X	29	A19006	25	50095	31	51145	29
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A770	29	A19007	27	50097	19, 31	51158	25
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A785	29	C19007X	21	50103	31	51162	29
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A797	29	A19009	27	50123	13	51176	19
A798	29	C19009	19	50192	21, 25, 27	51177	25
A825AX	25	A19010	27	50301	29	51178	21
A830A	29	B19010	19	50318	27	51179	23
A839B	21	C19010X	27	50331	23	51180	25
A839BX	21	A19011	27	50347	23	51181	25
A855A	29	B19011X	27	50398	21	51220	25
A8043	21	C19011X	27	50408	25	51337	21
A8044	21	A19012	27	50435	27	51359	13, 25
A8051	29	A19013	27	50482	19	51361	21
A8053	29	A19014	27	50513	19	51426	19
A8054	29	B19014	19	50514	23, 27	51430	23
A8055X	13	A19015	27	50518	29	51431	19
A9504	25	A19016	25	50521	21, 25	51436	13
A9506	27	A19017	23	50524	21	51437	13
A9515	23	A19018	21	50528	21, 29	51438	13
A9516	23	A19019	23	50529	21	51467	7, 13
B9516	25	B19019	23	50531	19, 21	51469	13
A9517	21	A19020	27	50573	23	51470	21
A9518	21	A19021	27	50587	19	51471	21
A9526	21	A19022	27	50608	19	51472	25
A9536	19	A19024	25	50610	19	51473	25
A9539	25	A19025	25	50644	21, 25	51474	21
A9545X	13, 29	A19026	27	50742	19	51475	25
A9546X	13, 25	A19027	23	50748	29	51476	29
A9547X	13, 21	A19033	19	50767	27	51477	29
A11029	21	D19035	23	50782	19	51478	29
A13088	13	A19036	25	50792	25	51518	29
A13154	13	C19036	23	50793	13, 23, 27	51563	29
C13189	13	A19037X	21	50794	29	51626	25
C13199	13	A19040X	31	50799	19	51627	25
B17004	25	A19046	25	50806	27	52065	25
A17014	27	B19050	25	50807	27	52263	19
B19000	25	C19071X	27	50808	27	52849	31
C19000X	23	C19072X	27	50809	27	52894	25
E19000	19	A19091	19	50810	27	53009	25
B19001	25	A19092	19	50815	29	53232	19
E19001	19	A19158	25	50816	21, 25	53342	27
C19001X	23	A19179X	13, 25	50833	25	53348	27
B19002	23	A19180	25	50837	27	53920	27
C19002X	27	50076	31	50838	27	54293	21
A19003	23	50078	31	50890	27	54301	25
C19003	19	50080	31	50891	31	54405	23
A19004X	25	50081	31	50910	27		