

ADAPTER SECTION

CARCO "PS" WINCH

(POWER SHIFT FRICTION CLUTCH)

PURPOSE OF YOUR MOUNTING INSTRUCTIONS

This adapter text is general information. Details for individual tractor models are located on the adapter drawing included with this section. Follow the instructions carefully.

NOTE: Purchased parts, such as bearings and oil seals may be substituted with parts of equal quality on the manufacturer's recommendation, and with the approval of Pacific Car and Foundry Company.

PACIFIC CAR AND FOUNDRY COMPANY
R E N T O N , W A S H I N G T O N , U . S . A .

EQUIPMENT NEEDED FOR INSTALLATION:

1. Two-ton capacity hoist.
2. One-half inch capacity portable drill.
3. 1300 lb./ft. capacity torque winch.
4. Cutting or burning and welding equipment.

PREPARING THE TRACTOR

Remove paint from mounting surface of winch and tractor. Clean area around cover plate over tractor P.T.O. opening and remove cover plate.

Remove plugs from tapped holes in tractor rear face and install studs using LOCTITE Sealant Type AV on threads.

NOTE: Be sure installed studs extend from rear face of tractor transmission the distance specified on the installation drawing.

Install socket head NYLOK set screws or plugs in tapped holes around P.T.O. opening, if required. Use sealing compound on threaded items, particularly if holes are drilled through to a wet compartment.

Rework tractor sheet metal and guards as shown to permit installation of hydraulic pump, hoses, filters and control cables. Refer to installation drawing for details. Install trim as shown to avoid chafing of hoses and cables.

PREPARING AND MOUNTING THE WINCH

Brake Drain Openings

Two openings are provided in the brake assembly portion of the winch case to drain condensation. One opening is positioned in the mounting face of the winch, and is at the lowest point when winch is resting on the shipping and storage skids. The second open-

ing is located at the bottom of the case when the winch is assembled to the tractor.

NOTE: Be sure to install hex socket pipe plug in shipping drain hole before assembling winch to tractor. The square head pipe plug should be installed in the bottom of the brake housing if the winch is operated partially submerged in water or mud. If installed, it must be removed periodically to permit condensation to drain from brake housing.

Check tractor P.T.O. opening and remove sharp edges to prevent damage to O-ring.

Check fit of P.T.O. shaft and coupling splines with tractor shaft or coupling and winch bevel pinion shaft.

Be sure P.T.O. shaft length will provide minimum of 1/8" end clearance with winch installed.

Clean grease from groove in carrier, install O-ring in groove, and lubricate O-ring and P.T.O. opening in tractor.

Be sure hydraulic system fittings are installed in winch if required, before attaching winch to tractor.

Slide P.T.O. shaft and coupling on winch bevel pinion shaft. Hoist and guide winch toward tractor, making sure winch P.T.O. shaft slides over tractor P.T.O. shaft or into tractor coupling. Route control cables up through pre-cut holes to control stand position. Position winch on studs and secure with hex nuts and cap screws as shown.

NOTE: Do not force winch on with studs or cap screws.

INSTALLING HYDRAULIC PUMP

The hydraulic pump may be gear driven or belt driven depending on the particular tractor model. Refer to drawing for installation details.

On belt drives, be sure sheave and bushings are assembled to align tractor pulley and pump pulley. On gear driven pumps, be sure components are assembled as shown to ensure proper engagement of pump drive coupling and driving member of tractor.

Install fittings in pump prior to installation, if necessary.

NOTE: When removing engine or transmission drive cover for installation of gear drive pumps, be careful to avoid any foreign matter entering case.

INSTALLING FILTERS

Position filter bracket or brackets and drill holes as required or use existing holes as shown. Use filter bracket as template or to mark hole locations.

Install fittings in pressure and suction filter ports and position as shown on the installation drawing.

Install filters on brackets. Do not install filter guards until after hoses are installed, tightened and checked for leaks.

INSTALLING HOSES

NOTE: Always cap or plug hoses during installation to avoid entrance of contaminants.

Install fittings in suction and pressure port of pump if not previously installed.

Install hose end and clamps on one end of suction hose, and connect to suction fitting at pump. Route hose to suction filter as shown. Cut hose to fit (see drawing for approximate length) and clean thoroughly. Install hose end and clamps, and connect to outlet fitting of filter.

Connect one end of pressure hose to pump. Route pressure hose from pump to pressure

filter and connect to inlet fitting. Fasten suction and pressure hoses with clamps and brackets as required to avoid chafing in service.

Install hose end and clamp on one end of remaining suction hose. Starting near suction port on winch, route fitting end of hose forward and connect to inlet fitting on suction filter. Route pressure hose and connect to outlet fitting on pressure filter.

Connect pressure hose to inlet fitting on winch. Cut suction hose to fit (see drawing for approximate length) and clean thoroughly. Install hose end, clamps, union and connect to outlet fitting on winch.

Fasten hoses with clamps and brackets as required.

MOUNTING CONTROL STAND PS MODELS

Route control cable through pre-cut holes to control stand position. Insert end of cable into control stand, and engage cable core with control stand lever. Rotate entire stand around cable approximately 15 turns to thread cable core into lever. Tighten cable anchor set screw into groove in cable housing to secure it in stand.

Secure control stand support or bracket in position as shown on the installation drawing. Fasten with bolts or weld as required.

Fasten control stand to the support or bracket as shown.

Refer to Operator's Section for adjusting instructions.

MOUNTING CONTROL STAND PSM AND PSC MODELS

Refer to PSM and PSC Supplement Section for control stand mounting and adjusting instructions.

BEFORE OPERATING

Install pressure gauge, if used. Installation instructions are included in gauge package.

Remove gauge hose from winch and install master pressure gauge of at least 500 PSI capacity.

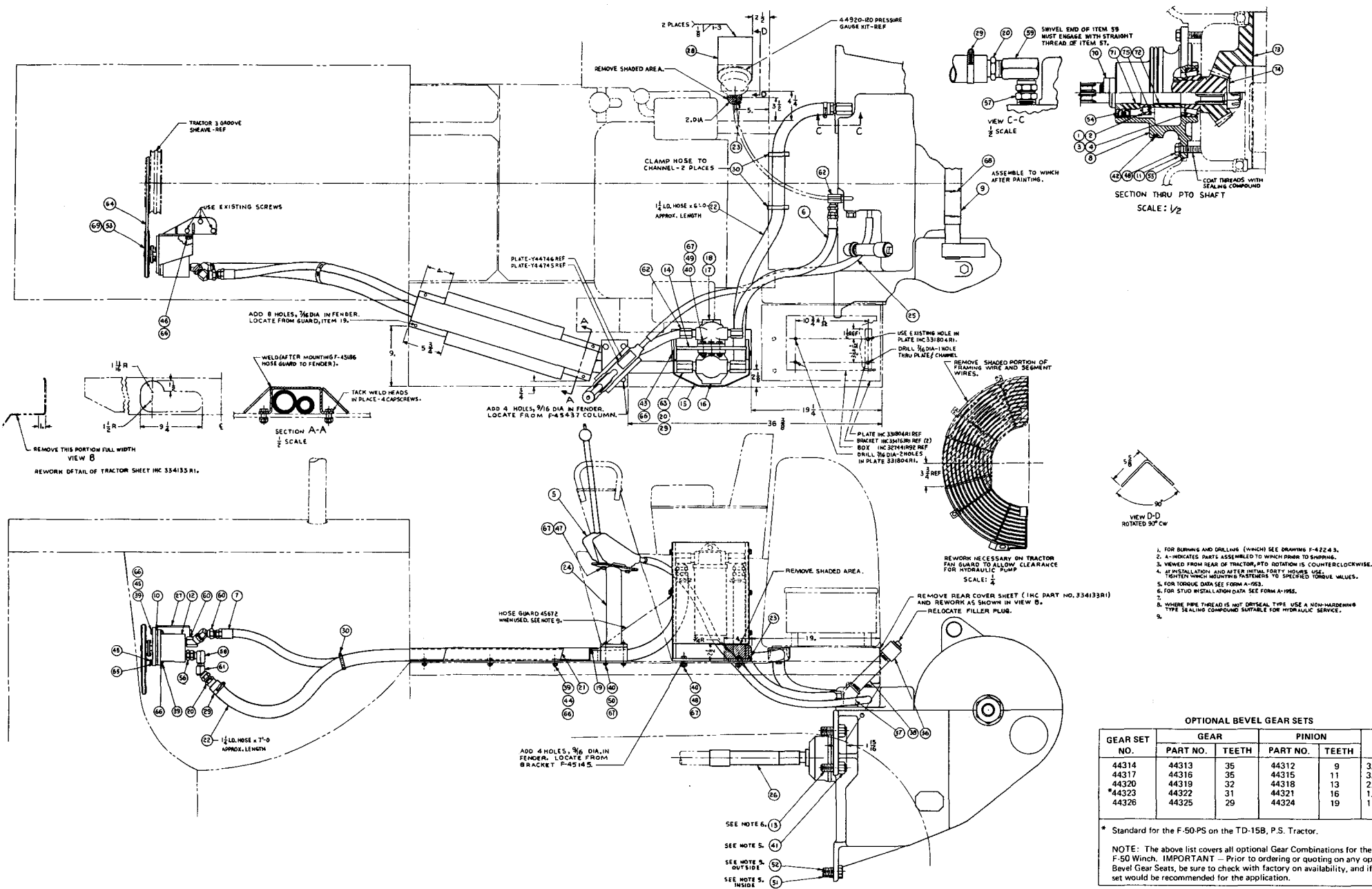
Be sure winch is filled with proper oil, as specified in the Operator's Section. Fill front suction line with oil to prime hydraulic pump. Reconnect line to filter.

Start tractor engine, and allow to run at low idle for five minutes to circulate oil

through hydraulic system. Move control handle to each position and check to see that winch operates properly in each position. If controls require adjustment, perform adjustment procedures specified in the Operator's Section for PS Models or in supplement Section for PSM and PSC Models.

Check and adjust operating pressure if required. Refer to Operator's Section for adjusting instructions. Check complete unit and hydraulic connections for leaks.

Remove master gauge and reconnect operating range gauge hose at winch. Install filter guards.



1. FOR BURNING AND DRILLING (WHICH) SEE DRAWING F-42243.
2. 4-INDICATES PARTS ASSEMBLED TO WINCH PRIOR TO SHIPPING.
3. VIEWED FROM REAR OF TRACTOR PTO, ROTATION IS COUNTERCLOCKWISE.
4. AT INSTALLATION, AND AFTER INITIAL FORTY HOURS USE, TIGHTEN WHICH MOUNTING FASTENERS TO SPECIFIED TORQUE VALUES.
5. FOR TORQUE DATA SEE FORM A-1963.
6. FOR STUD INSTALLATION DATA SEE FORM A-1965.
7. WHERE PIPE THREAD IS NOT DRY SEAL TYPE, USE A NON-HARDENING TYPE SEALING COMPOUND SUITABLE FOR HYDRAULIC SERVICE.
- 8.

OPTIONAL BEVEL GEAR SETS					
GEAR SET NO.	GEAR		PINION		RATIO
	PART NO.	TEETH	PART NO.	TEETH	
44314	44313	35	44312	9	3.89/1
44317	44316	35	44315	11	3.18/1
44320	44319	32	44318	13	2.46/1
*44323	44322	31	44321	16	1.94/1
44326	44325	29	44324	19	1.53/1

* Standard for the F-50-PS on the TD-15B, P.S. Tractor.

NOTE: The above list covers all optional Gear Combinations for the Model F-50 Winch. IMPORTANT - Prior to ordering or quoting on any optional Bevel Gear Sets, be sure to check with factory on availability, and if the gear set would be recommended for the application.

	REF.	CARCO PART NO.	NAME & DESCRIPTION	QUAN. PER UNIT
A	1	15148	Brg. Cup	1
A	2	15149	Brg. Cone	1
A	3	15173	Brg. Cup	1
A	4	15175	Brg. Cone	1
	5	41381-6	Stand	1
	6	44075-39	Hose Assy.	1
	7	44075-84	Hose Assy.	1
A	8	44297	Carrier	1
	9	44479	Tag	1
	10	44776	Spacer	1
A	11	16064-8	Washer, 44802-1/2	6
	12	44894-1	Pump	1
	13	45050-1826	Stud	4
	14	45145	Bracket	1
	15	45164	Guard	1
	16	45168-1	Filter	1
	17	45169-1	Filter	1
	18	45179-1	Element (spare)	1
	19	45186	Guard	1
	20	45244	Hose End	4
	21	45282	Plate	2
	22	45413-180	Hose	1
	23	45418-15	Trim	1
	24	45437	Column	1
A	25	45450-66	Cable	1
	26	45763-1	Shaft	1
	27	47774	Bracket	1
	28	46955	Bracket	1
	29	16013-2	Clamp, WITTEK 24H	4
	30	16013-13	Clamp, WITTEK 52H	3
	36	16133-20	Coupling, Blk. Stl. 1-1/4 NPT	1
	37	16154-20	Elbow, 150# Blk. 1-1/4 NPT	1
	38	16158-2048	Nipple, Blk. 1-1/4 NPT x 8	1
	39	16033-6	Nut, 3/8 UNC Hex	10
	40	16033-8	Nut, 1/2 UNC Hex	11
	41	16033-18	Nut, 1-1/8 UNC Hex	4
	42	16262-438	O-Ring, NAT'L. 622765	1
	43	16047-606	Cap Screw, 3/8 UNC x 3/4 H.H.	5
	44	16047-608	Cap Screw, 3/8 UNC x 1 H.H.	8
	45	16047-616	Cap Screw, 3/8 UNC x 2 H.H.	2
	46	16047-808	Cap Screw, 1/2 UNC x 1 H.H.	1
	47	16048-808	Cap Screw, 1/2 UNF x 1 H.H.	2
A	48	16047-812	Cap Screw, 1/2 UNC x 1-1/2 H.H.	10
	49	16047-818	Cap Screw, 1/2 UNC x 2-1/4 H.H.	3
	50	16047-828	Cap Screw, 1/2 UNC x 3-1/2 H.H.	4
	51	16047-1418	Cap Screw, 7/8 UNC x 2-1/4 H.H.	2
	52	16047-1618	Cap Screw, 1 UNC x 2-1/4 H.H.	2
	53	16254-4	Sheave, BROWNING K	1
A	54	16343-11	Seal, NAT'L. 455079	2
A	55	16237	Shim Set, TIMKEN 29	1
	56	16112-1212	Adapter, ANCHOR 12M-12MS	1
	57	16112-1616	Adapter, ANCHOR 16M-16MS	1
	58	16178-1212	Union, ANCHOR 12FA-12UFS	1
	59	16178-1616	Union, ANCHOR 16FA-16UFS	1
	60	16180-1212	Union, ANCHOR 12MAX-12UFS	2
	61	16180-1216	Union, ANCHOR 12MAX-16UFS	1
	62	16179-1212	Union, ANCHOR 12MA-12UFS	3
	63	16179-1616	Union, ANCHOR 12MA-16UFS	2
	64	16241-1	V Belt, BROWNING BP-38	1
	65	16063-6	Washer, 3/8	1
	66	16067-6	Lock Washer, 3/8	15
	67	16067-8	Lock Washer, 1/2	14
	68	47767-3	Wire, Galv. Stl. 16 Ga. x 24	1
	69	16255-12	Bushing, BROWNING Type H 3/4	1
A	70	16041-8	Lock Nut, N-08	2
A	71	44348	Sleeve	1
A	72	45084-5	Spacer	1
A	73	44322	Gear (31T)	1
A	74	44321	Pinion (16T)	1
	75	45088	Shim Set	As Req'd.

PACIFIC CAR AND FOUNDRY COMPANY
RENTON, WASHINGTON

ADAPTER ASSEMBLY NO. 47705
MODEL F-50-PS WINCH FOR INTERNATIONAL TD-15B,
POWER SHIFT TRACTOR, ENGINE (S/N 36043 & UP)

OPERATOR'S SECTION

Carco Model F-50-PS Winch

(POWER SHIFT FRICTION CLUTCH)

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GENERAL DESCRIPTION

The Carco power-shift winch is a single-drum unit that mounts on the rear face of the tractor main frame, and is driven by the tractor transmission. The winch control system valve is operated from the tractor operator's seat by a single-lever manual control that permits the winch to be operated in forward (pull-in) direction, reverse (pay-out) direction, brake-on, and brake-off. The winch can be converted from overwound to underwound cable drum rotation without additional parts.

OPERATION

The control handle is connected through a flexible cable to the control valve spool located in the winch case. Depending on the position of the control handle, and therefore the valve spool, pressurized hydraulic oil is ported to energize the forward and reverse clutches or to release the brake.

Before operating the winch, with tractor stationary set tractor transmission selector and throttle for proper operating power and speed.

Drum Action	Valve Handle Position	Forward Clutch	Reverse Clutch	Brake
Forward (Winch In)	Pull	ON	OFF	OFF
Brake-On	Center (Pull)	OFF	OFF	ON
Brake-Off	Center (Push)	OFF	OFF	OFF
Reverse (Pay Out)	Push	OFF	ON	OFF

Shift Operation

The winch is in neutral and the brake is set when the control handle is in the center position. Pulling the control handle back against the stop energizes the forward clutch and releases the brake to wind in. Pushing the handle forward against the stop energizes the reverse clutch and releases the brake.

Brake Operation

The brake is applied by spring tension when the winch control valve spool is in the open position or when the hydraulic system oil is not pressurized. When the valve control handle is moved to forward or reverse positions, pressurized oil is ported to the brake cylinder, forcing the brake cylinder open, rotating the brake arm, and extending the brake spring to release the brake. When the control handle is pushed forward to the clip lock (brake-off) position between brake-on and reverse, the brake is released without engaging the clutch.

LUBRICATION

Gear Case

Before operating winch, be sure it is filled to oil level plug with proper grade and weight of oil as instructed below and on winch identification plate.

After one week or 40 hours of operation, whichever occurs first, drain winch and refill with clean oil.

NOTE: Fill winch through fill plug opening in valve cover, or if this opening is concealed when winch is installed, fill

through oil level port in right side of winch case by temporarily installing a 1/2-inch NPT street elbow in oil level port.

Use weight of oil as follows for various temperatures:

1. Oil recommended by tractor manufacturer for power-shift transmission.

or

2. Above 32°F -- ATF Type C-2 SAE 10 or 10W.

Below 32°F -- ATF Type A Suffix A (DEXRON).

Change oil in winch every 600 hours or 3 months of operation, whichever occurs first.

Change pressure filter element and clean suction filter after each 200 hours or one month of operation, whichever occurs first.

NOTE: High humidity and wide ranges of temperature may cause condensation within the winch. Remove magnetic drain plug from bottom of winch case and drain water from case periodically before starting day's operation, to prevent corrosion or rusting of internal parts.

Cable Drum Lubrication

After each 200 hours or 1 month of operation, whichever is sooner, lubricate the cable drum brake-side bearing set through the grease fitting in the cable drum. Use general purpose grease. Grease sparingly to avoid damage to oil and dirt seals.

BRAKE ADJUSTMENT

NOTE: Under normal use, the brake mechanism will require very little attention. Do not adjust brake unless it does not hold the rated load, or brake band drags. Before adjusting brake, check brake band for excessive wear and for presence of oil or dirt.

Do not allow brake to slip or drag over extended periods of time.

Brake Band Clearance

1. Remove brake adjustment cover.
2. Start tractor engine and place winch control handle in brake-off position. Be sure brake is fully released.
3. Turn brake rod adjusting assemblies until brake band is tight on the brake drum, then back off adjusting nut four or five hex flats. Stop adjusting nut with spring clip resting against a flat.

NOTE: Winches of early manufacture may not have the spring clip. On these units, position a hex flat to match the flat on the brake adjustment cover.

4. Install brake adjustment cover.

Brake Spring Tension Adjustment

1. Remove spring adjustment cover and brake side cover.
2. With tractor engine stopped, remove orifice from brake cylinder return line and reinstall line.
3. Loosen jam nut and turn spring adjustment nut as required to increase or decrease spring tension. Brake should start to release at approximately 175 PSI and should be fully released at 190 - 200 PSI. Do not overtension.

4. Replace orifice in return line.

5. Tighten jam nut and install spring adjustment cover.

Relief Valve Adjustment

Relief valves are adjusted at the factory, and should not require further adjustment. After cleaning the relief valve, however, or if incorrect pressure adjustment is suspected, proceed as follows:

1. Stop tractor engine.
2. Install gage of 0 to 400 PSI range in 1/4 NPT port on valve cover.
3. Start tractor engine and place control handle in brake-off position.
4. Check pressure reading on gauge. Pressure should be 240 to 260 PSI.
5. If pressure setting requires readjustment, remove valve housing. Be sure ball is not dislodged to fall into winch case.
6. Remove shims between spring and end of housing to reduce pressure. Add shims to increase pressure.
7. Reinstall valve housing.
8. Start tractor engine and place control stand in brake-off position.
9. Check pressure reading on gauge. Pressure should be 240 to 260 PSI.
10. Place control stand in clutch positions. Pressure reading should be 240 to 260 PSI.

CAUTION: Before operating winch in clutch positions, be sure wire rope is removed or secured in a manner which will allow cable drum to turn without interference or damage to winch and wire rope.

TROUBLE SHOOTING THE WINCH

Preliminary Procedures

If winch does not operate correctly, perform a visual inspection for obvious faults, such as leaking oil, unusual noise, and loose, damaged, or broken parts. If cause of trouble is not readily apparent, check operation of winch in each of the four positions, as described in the following operating test, and determine the trouble. The numbers following the trouble refer to item numbers in the TROUBLE column of the trouble shooting table. When the trouble has been isolated, use the table to determine the cause and correction procedures. Procedures given in the CORRECTION column are covered in the Service Section, unless otherwise stated.

Operating Test

BRAKE-ON

Normal Conditions: Brake applied, forward clutch released, reverse clutch released.

Operating Problems:

1. Brake does not hold
 - A. Oil on band 3
 - B. Brake band 2
 - adjustment
 - too loose
 - C. Brake apply 7
 - spring adjust-
 - ment too loose
 - D. Valve spool 5
 - position incorrect
 - E. Brake cylinder 16
 - jammed in
 - extended position
2. Winch winds in wire rope
 - A. Forward clutch 10
 - assembly defective

- B. Forward clutch 11
 - pinion bearings
 - defective
- C. Valve spool 5
 - position incorrect
3. Tractor converter stalls
 - A. Both clutch 12
 - assemblies and/or
 - clutch pinion bear-
 - ings defective
 - B. Defective bearings . . . 18
 - on bevel gear
 - shaft or bevel
 - pinion shaft
4. Winch pays out wire rope
 - A. Reverse clutch 14
 - and brake defective

BRAKE-OFF

Normal conditions: Brake released, forward clutch released, reverse clutch released.

Operating Problems:

1. Brake does not release
 - A. Low pressure in 1
 - hydraulic system
 - B. Valve spool 5
 - positioned incorrectly
 - C. Control clip lock 19
 - positioned incorrectly
 - D. Brake band 4
 - adjustment
 - too tight
 - E. Brake apply 6
 - spring adjust-
 - ment too tight
 - F. Brake cylinder 17
 - jammed closed
 - G. Brake drag spring 8
 - tension excessive
 - H. Brake shaft, idler 20
 - shaft, drum shaft
 - bearings, and/or
 - gears have failed

2. Winch winds in wire rope
 - A. Brake drag spring . . . 9
tension insufficient
 - B. Forward clutch . . . 10, 11
assembly and
clutch pinion
defective
 - C. Oil level too high . . . 21
3. Converter or engine stalled
 - A. Both clutch . . . 12
assemblies and/or
clutch pinion bear-
ings defective
 - B. Defective bearings . . . 18
on bevel gear
shaft or bevel
pinion shaft

FORWARD (WINCH-IN)

Normal Conditions: Brake released, forward clutch engaged, reverse clutch released.

Operating Problems:

1. Winch does not pull
 - A. Low pressure in . . . 1
hydraulic system
 - B. Valve spool . . . 5
positioned incorrectly
 - C. P.T.O. drive failure . . 22
2. Winch pulls, brake overheats
 - A. Low pressure . . . 1
in hydraulic system
 - B. Brake band . . . 4
adjustment too
tight
 - C. Brake apply . . . 6
spring adjust-
ment too tight
 - D. Brake cylinder . . . 17
closed
3. Winch stalls tractor converter or engine
 - A. Brake band . . . 4
adjustment
too tight

- B. Brake apply . . . 6
spring adjust-
ment too tight
- C. Reverse or both . . . 13
clutch assemblies
and clutch pinion
bearings defective
- D. Defective bearings . . . 23
and/or gears in
winch transmission

REVERSE (PAY OUT)

Normal Conditions: Brake released, forward clutch released, reverse clutch engaged.

Operating Problems:

1. Drum does not pay out
 - A. Low pressure in . . . 1
hydraulic system
 - B. Valve spool . . . 5
positioned incorrectly
 - C. P.T.O. drive failure . . 22
2. Tractor converter stall
 - A. Brake band . . . 4
adjustment
too tight
 - B. Brake spring . . . 6
adjustment
too tight
 - C. Forward or . . . 10, 11, 12
both clutch
assemblies and
clutch pinion
bearings defective
 - D. Defective bearings . . . 23
and/or gears in
winch transmission
3. Winches in
 - A. Forward clutch . . . 15
locked and reverse
develops no torque

TROUBLESHOOTING TABLE

TROUBLE	CAUSE	CORRECTION
1. Low pressure in hydraulic system	Relief valve out of adjustment	Adjust relief valve. See <u>Relief Valve Adjustment</u> .
	Relief valve seized open	Clean suction filter and replace pressure filter element. Clean and adjust relief valve. See <u>Relief Valve Adjustment</u> . Replace defective relief valve.
	Pump drive belt slipping, or pump coupling or drive broken or worn	Tighten belt, or replace defective parts.
	Suction filter and/or pressure filter dirty	Clean suction filter and replace pressure filter element.
	Low oil level in winch	Fill to proper oil level with oil specified on lubrication plate.
	Air leak in suction line or suction filter canister	Repair piping or filter as required.
	Defective pump	Replace pump.
	Internal leak in pressure system at tubing, bevel shaft, clutch assembly, or brake release cylinder seals	Inspect internal seals and piping. Replace as required.
	Control valve assembly damaged or worn	Repair or replace control valve.

TROUBLE	CAUSE	CORRECTION
2. Brake band adjustment too loose	Brake band worn	Adjust brake. See BRAKE ADJUSTMENT.
	Brake adjustment loosens with use	Make certain brake rod adjustment lock is functioning.
3. Oil on brake band	Oil leak in brake compartment	Inspect cylinder, hose, fittings, bevel shaft cap, and brake shaft seal carrier. Repair or replace defective parts.
4. Brake band adjustment too tight	Incorrect adjustment	Adjust brake. See BRAKE ADJUSTMENT.
5. Valve spool positioned incorrectly	Control cable not threaded to proper depth in valve spool	Thread cable into spool until threaded end bottoms in spool (approximately 16 turns).
	Control cable damaged and binding	Replace control cable.
	Valve spool seized	Disassemble and clean up spool and body.
	Valve centering spring weak or broken	Replace valve spring.
6. Brake apply spring adjustment too tight	Incorrect adjustment	Adjust spring tension. See BRAKE ADJUSTMENT.
7. Brake apply spring adjustment too loose	Incorrect adjustment	Adjust spring tension. See BRAKE ADJUSTMENT.

TROUBLE	CAUSE	CORRECTION
8. Brake drag spring tension excessive	Variations in spring caused by manufacturing tolerances	Stretch spring to increase hook to hook distance
9. Brake drag drag spring tension insufficient	Brake band worn out	Replace brake lining on brake band.
	Hook-to-hook distance in spring too long	Replace brake drag spring.
10. Forward clutch assembly defective	Clutch plates warped	Replace plates. Check system for low pressure and correct as required.
	Piston return springs weak and broken	Replace springs.
	Clutch piston seized	Clean up parts and replace as required.
11. Forward clutch pinion bearings defective	Bearings broken or seized	Replace pinion bearings.
12. Both clutch assemblies and/or clutch pinion bearings defective	Clutch plates warped	Replace plates. Check system for low pressure and correct as required.
	Piston return springs weak and broken	Replace springs.
	Clutch piston seized	Clean up parts and replace as required.
	Bearings broken or seized	Replace pinion bearings.

TROUBLE	CAUSE	CORRECTION
13. Reverse or both clutch assemblies and clutch pinion bearings defective	Clutch plates warped	Replace plates. Check system for low pressure and correct as required.
	Piston return springs weak and broken	Replace springs.
	Clutch piston seized	Clean up parts and replace as required.
14. Reverse clutch and brake defective	Brake band worn	Adjust brake. See BRAKE ADJUSTMENT.
	Brake adjustment loosens with use	Make certain brake rod adjustment lock is functioning.
	Oil leak in brake compartment	Inspect cylinder, hose, fittings, bevel shaft cup, and brake shaft seal carrier. Repair or replace defective parts.
	Incorrect adjustment	Adjust spring tension. See BRAKE ADJUSTMENT.
15. Forward clutch locked and reverse develops no torque	Locked or seized forward clutch Reverse clutch does not function	Remove and disassemble clutches to determine causes of failure. Repair or replace defective parts.

TROUBLE	CAUSE	CORRECTION
16. Brake cylinder jammed in extended position	Brake cylinder rod or piston head damaged and seized in open position in cylinder	Rebuild or replace brake cylinder assembly.
	Hydraulic oil trapped in brake cylinder	Inspect winch-to-brake hose assembly. Inspect control valve assembly. Repair or replace defective parts.
17. Brake cylinder jammed closed	Brake release cylinder return line orifice plugged or undersize.	Clean and check diameter of orifice. Orifice should be .060".
	Excessive oil leaking by brake cylinder piston.	Replace piston seals. Check piston orifice diameter. Should be .031".
	Brake release cylinder rod or piston head damaged and seized in closed position in cylinder.	Rebuild or replace brake cylinder as required.
	Hydraulic oil blocked from entering brake cylinder	Inspect winch-to-brake hose assembly. Inspect control valve assembly. Repair or replace defective parts.
18. Defective bearings on bevel gear shaft or bevel pinion shaft	Bevel shaft bearing carriers adjusted too tight	Replace bearings and readjust providing proper shaft end clearance. See data sheet in Service Section.

TROUBLE	CAUSE	CORRECTION
18. Cont.	Secondary failure resulting from clutch pinion bearing failure and thrust loading from clutch spacers	Repair clutch. Replace bearings and readjust.
19. Valve spool and/or control clip lock positioned incorrectly	Incorrect adjustment	Adjust valve control handle clip lock.
	Control cable not threaded to proper depth in valve spool	Thread cable into spool until threaded end bottoms in spool (approximately 16 turns).
	Control cable damaged and binding	Replace control cable.
	Valve spool seized	Disassemble and clean up spool and body.
	Valve centering spring weak or broken	Replace valve spring.
20. Brake shaft, idler shaft, drum shaft bearings and/or gears have failed.	Gear train overloaded	Replace defective parts. Operate within limits of winch.
21. Oil level too high	Filling winch reservoir when tractor is not in level position	Reduce level of oil to proper height.
22. P.T.O. drive failure	P.T.O. coupler failure or P.T.O. shaft failure	Replace defective parts.

TROUBLE	CAUSE	CORRECTION
23. Defective bearings and/or gears in winch transmission	Gear train over-loaded	Replace defective parts. Operate within limits of winch.

PARTS LIST SECTION

Carco Model F-50-PS Winch

(POWER SHIFT FRICTION CLUTCH)

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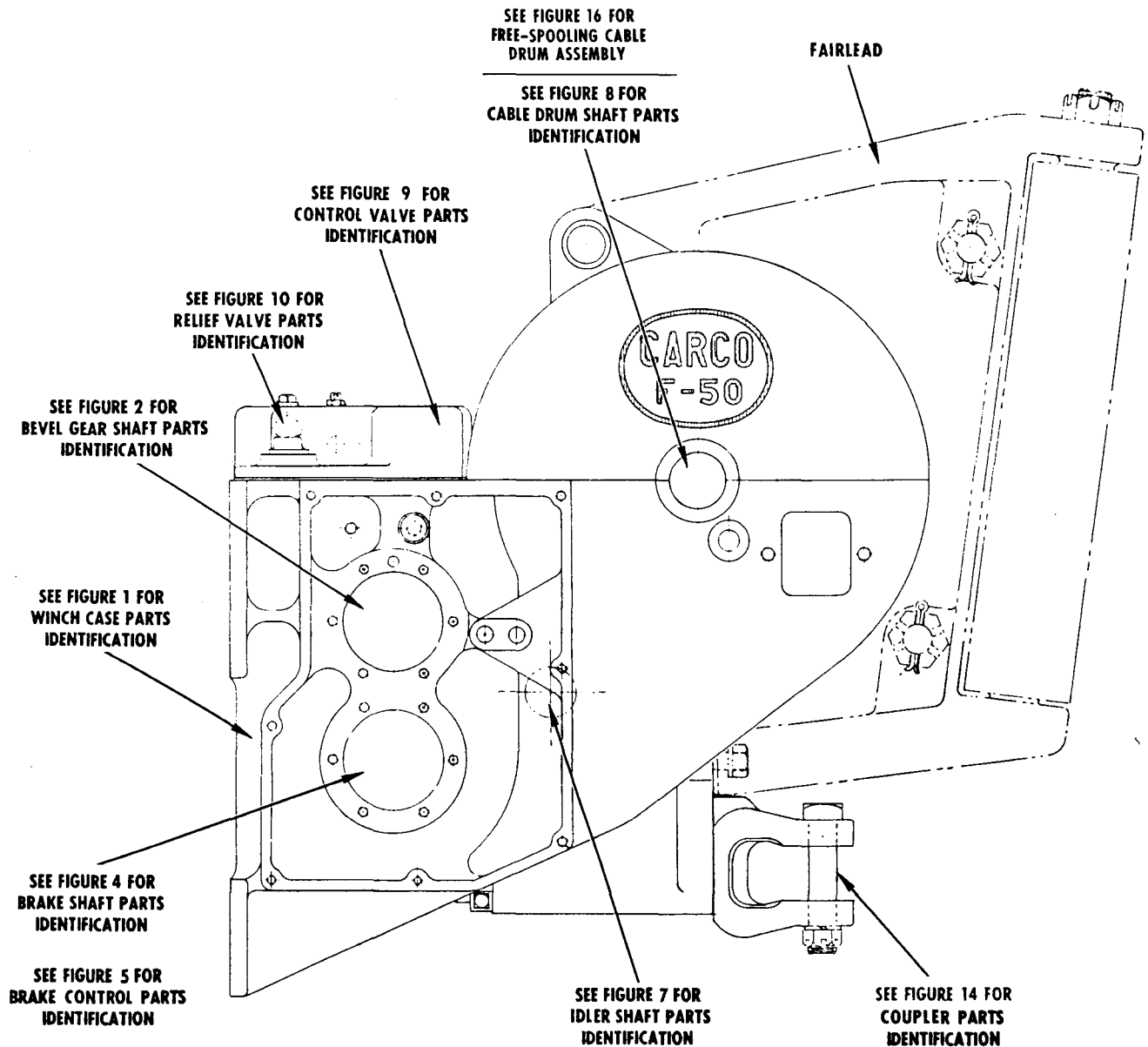
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Idler Shaft	12
Drum Shaft	13
Control Valve	14-15
Relief Valve	16
Filters	17-18
Control Stand	19
Coupler	20
Pressure Gauge	21
Free Spooling Cable Drum	22

Note: Purchased parts, such as bearings and oil seals may be substituted with parts of equal quality on the manufacturer's recommendation, and with the approval of Pacific Car and Foundry Company.

ATTENTION: Be sure to give correct part number, part name and complete serial number of winch when ordering. Also name and model of the tractor on which the winch is mounted.

PACIFIC CAR AND FOUNDRY COMPANY
 R E N T O N , W A S H I N G T O N , U . S . A .

PARTS IDENTIFICATION INDEX DRAWING
CARCO MODEL F-50-PS WINCH



CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 4
CASE

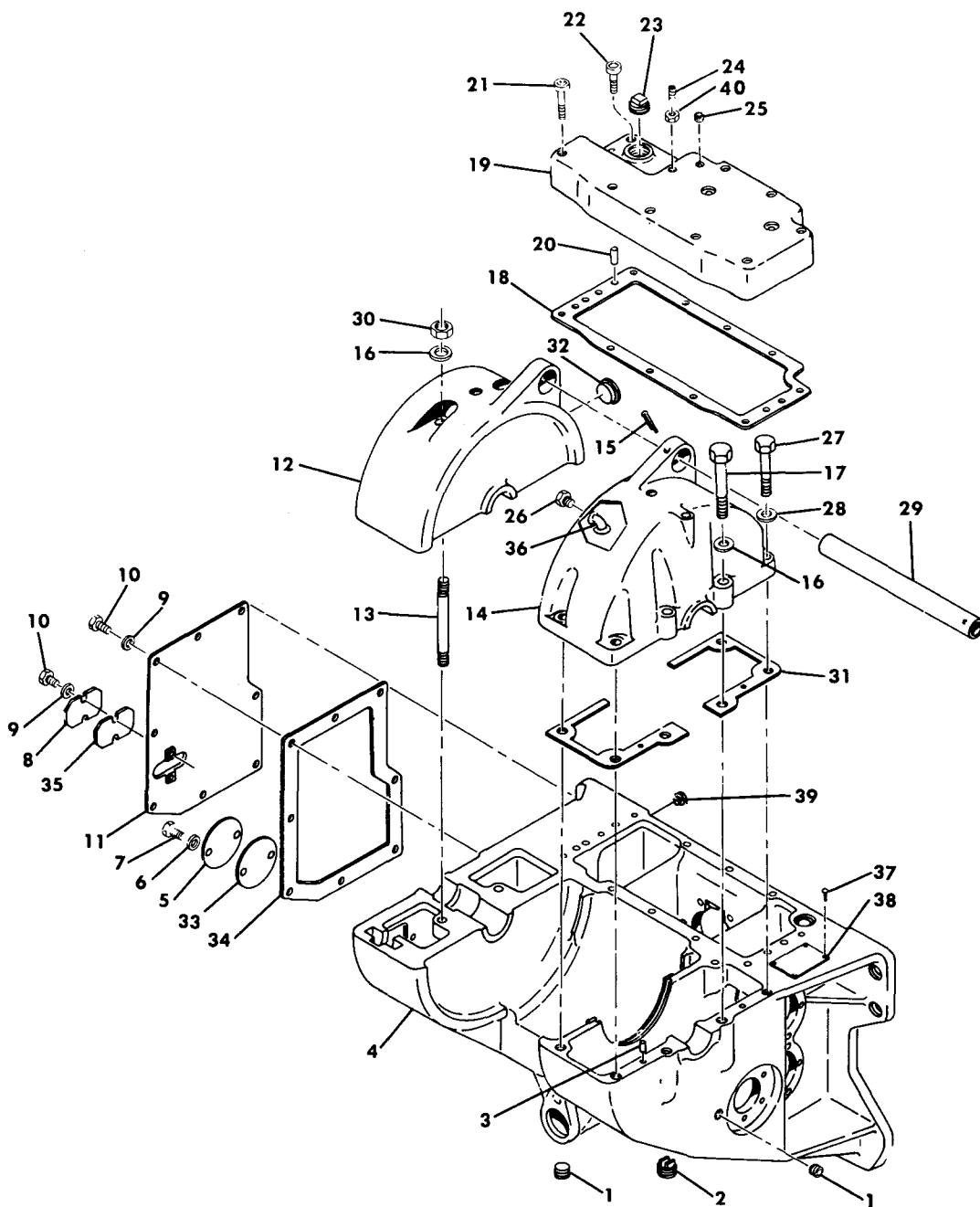


FIGURE 1

WINCH CASE

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16169-8	Plug, 1/2 NPT Sq. Hd.	2
2	16168-20	Plug, 1-1/4 NPT Mag.	1
3	16290-1616	Dowel Pin, 1/2 x 1	2
* 4	44401	Case Complete (includes items 12 and 14)	1
5	42048	Cover	1
6	16064-10	Washer, 44802-5/8	2
7	16047-1008	Cap Screw, 5/8 UNC x 1 H.H.	2
8	44816	Cover	1
9	16064-8	Washer, 44802-1/2	10
10	16047-810	Cap Screw, 1/2 UNC x 1-1/4 H.H.	10
11	44416	Cover	1
* 12	44415	Cover	1
13	45050-1655	Stud, 45050-R-92	2
* 14	44440	Cover	1
15	16288-1272	Cotter Pin, 3/8 x 4-1/2	1
16	16064-16	Washer, 44802-1	4
17	16047-1628	Cap Screw, 1 UNC x 3-1/8 H.H.	2
18	44474	Gasket	1
19	44472	Cover	1
20	16291-4	Pin, DRIVLOK 1/2 x 1-1/4 Type D	2
21	16049-828	Cap Screw, 1/2 UNC x 3-1/2 Hex Soc.	8
22	16049-810	Cap Screw, 1/2 UNC x 1-1/4 Hex Soc.	3
23	16169-20	Plug, 1-1/4 NPT Sq. Hd.	1
24	16056-636	Set Screw, 3/8 UNC x 3-1/4 Hex Soc.	1
25	16167-4	Plug, 1/4 NPT Hex Soc.	1
26	16249-1	Relief Plug, ALEMITE 317400	1
27	16047-1220	Cap Screw, 3/4 UNC x 2-1/2 H.H.	4
28	16064-12	Washer, 44802-3/4	4
29	45714-1	Guard	1
30	16033-16	Nut, 1 UNC Hex.	2
31	44412	Gasket	2
32	16220-38	Plug, WHITE 1604-136-Y	1
33	44833	Gasket	1
34	45914-2	Gasket (Length 66")	1
35	44815	Gasket	1
36	16150-2	Elbow, 1/8 NPT 90° Street	1
37	16055-5	Drive Screw, #10 x 3/8 Type U	4
38	45816	Name Plate	1
39	16167-8	Plug, 1/2 NPT Hex Soc.	1
40	16043-6	Nut, 3/8 UNC Hex Jam	1

*Items 4, 12 and 14 cannot be ordered separately.

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 6
BEVEL GEAR SHAFT

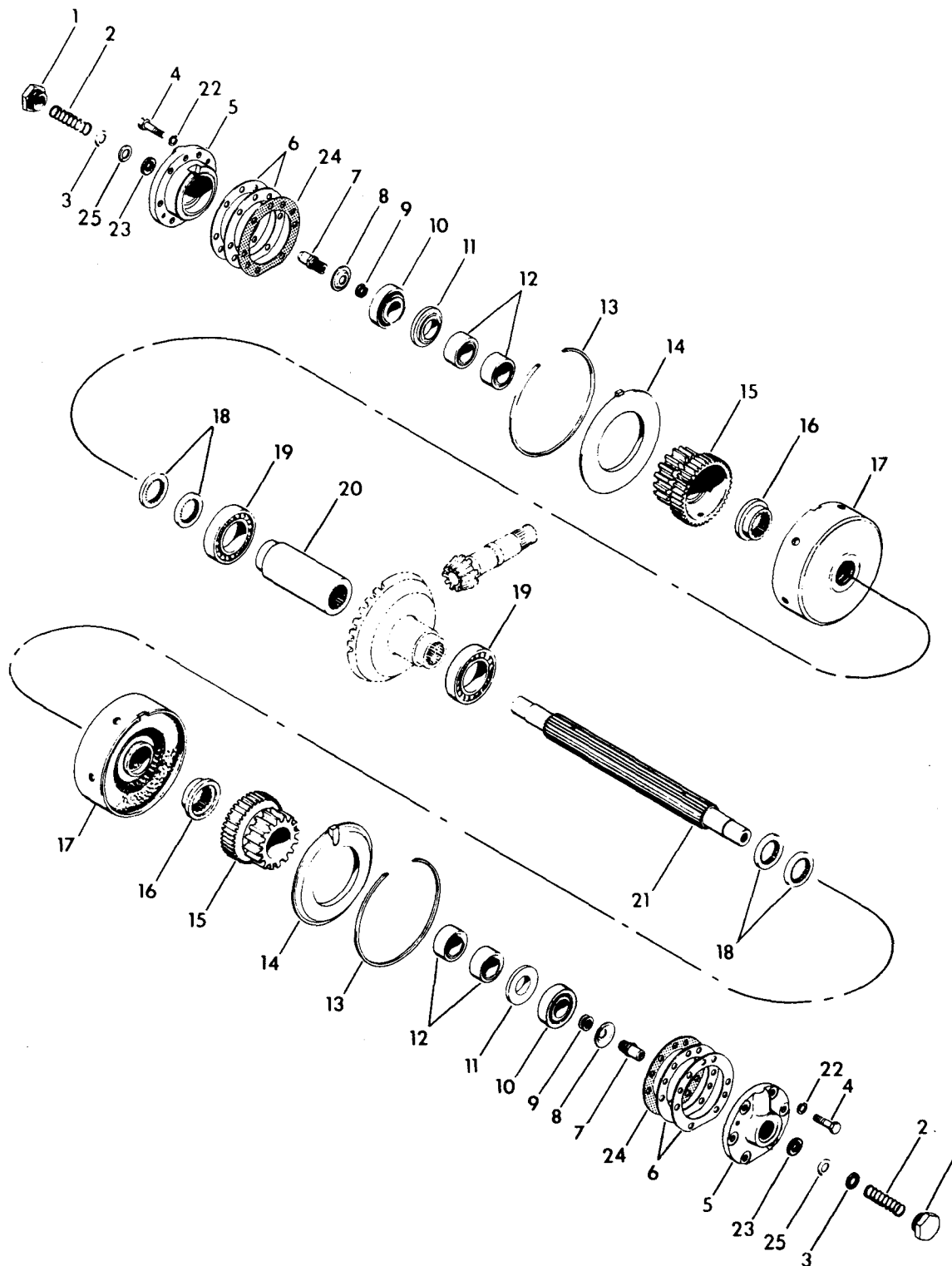


FIGURE 2

BEVEL GEAR SHAFT

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 7
BEVEL GEAR SHAFT

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16166-20	Plug, PARKER 20P50N-S	2
2	44753	Spring	2
3	44949	Seal (includes 16262-121 O-Ring)	2
4	16047-810	Cap Screw, 1/2 UNC x 1-1/4 H.H.	12
5	44432	Retainer	2
6	44431	Shim Set	2
7	41742	Stub Shaft	2
8	44478	Clamp Ring	2
9	44336	Shim Set	2
10	15179	Brg. Cup	2
	15180	Brg. Cone	2
* 11	45018	Thrust Washer	2
12	15253	Brg. Set (Matched)	2
13	44446	Retng. Ring	2
14	44343	Retng. Ring	2
* 15	45021	Pinion	2
* 16	45017	Thrust Washer	2
17	44441	Clutch (See Figure 3) (includes items 13 and 14)	2
18	44452	Seal	4
19	15030	Ball Brg.	2
20	44451	Spacer	1
21	44433	Shaft	1
22	16064-8	Washer, 444802-1/2	12
23	44940	Washer	2
24	45028	Gasket	2
25	16262-121	O-Ring, PARKER 2-121	2

*NOTE:

In winches prior to Serial Number 242, if necessary to replace Clutch Pinion, item 15, (previously part number 44454), order new part number 45021 (Clutch Pinion) and also new Thrust Washers (items 11 and 16) part numbers 45018 and 45017 in combination sets only.

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 8
CLUTCH

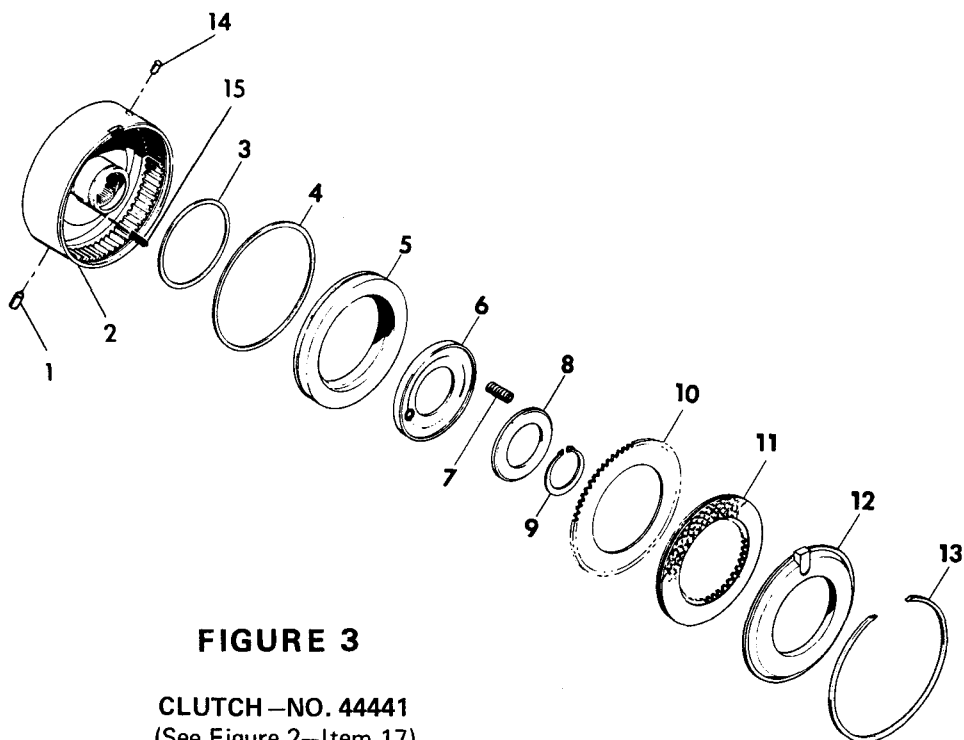


FIGURE 3

CLUTCH—NO. 44441
(See Figure 2—Item 17)

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16290-808	Dowel Pin, 1/4 x 1/2	1
2	44444	Housing (include items 1 and 14)	1
3	46242	Seal	1
4	46243	Seal	1
5	44445	Piston	1
6	44450	Ring	1
7	44449	Spring	16
8	44448	Retainer	1
9	16313-287	Retng. Ring, TRUARC 5100-287	1
10	46134	Steel Disc	5
11	46133	Friction Disc	4
12	44343	Retng. Ring	1
13	44446	Retng. Ring	1
14	45415-1	Orifice Dowel	1
15	16295-1424	Pin, SPIROL 437-1500-H-B-K	1

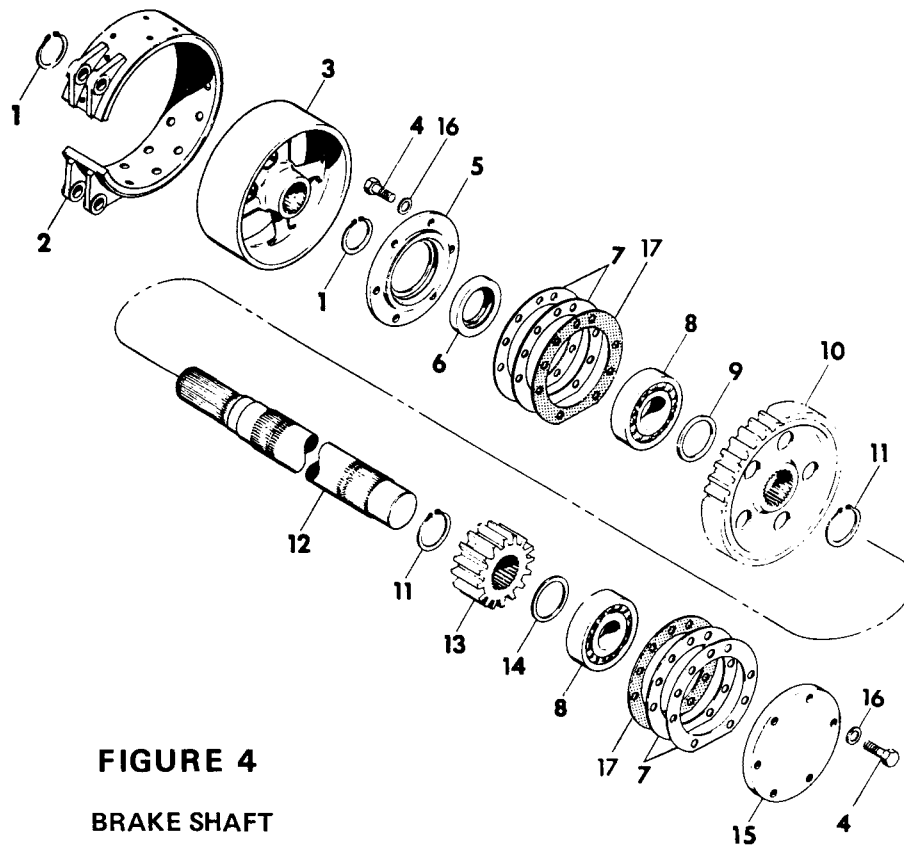


FIGURE 4
BRAKE SHAFT

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16313-200	Retng. Ring, TRUARC 5100-200	2
* 2	44417	Brake Band Assembly (includes following)	1
	44418	Band	1
	16203-3	Lining, RM 357B 3/8 x 3-1/4	1
	16323-808	Rivet, 1/4 x 1/2 Tub. Brass	30
3	44420	Brake Drum	1
4	16047-810	Cap Screw, 1/2 UNC x 1-1/4 H.H.	12
5	44435	Carrier	1
6	16342-1	Oil Seal, NAT'L. 415659	1
7	44431	Shim Set	2
8	15074	Ball Brg.	2
9	44463-2	Spacer	1
10	44436	Gear	1
11	16313-231	Retng. Ring, TRUARC 5100-231	2
12	44434	Brake Shaft	1
13	44462	Pinion	1
14	44463-1	Spacer	1
15	44464	Cover	1
16	16064-8	Washer, 44802-1/2	12
17	45028	Gasket	2

*For F-50-PSC and PSM brake band assembly use 46603 as listed in supplement section.

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 10
BRAKE CONTROL

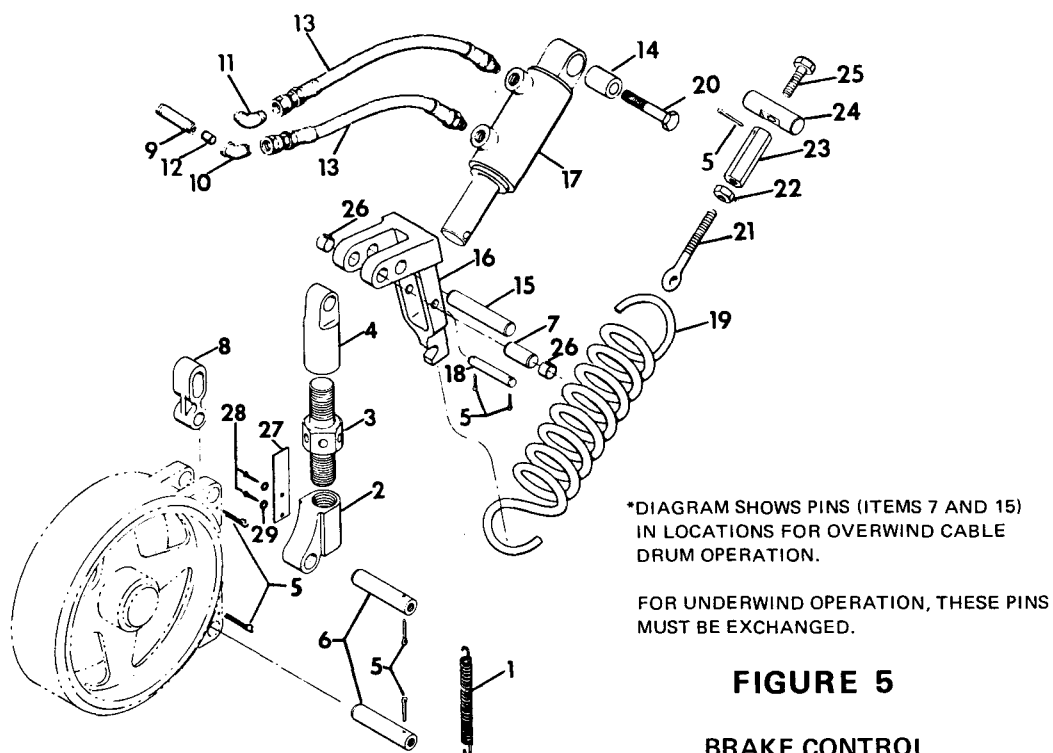
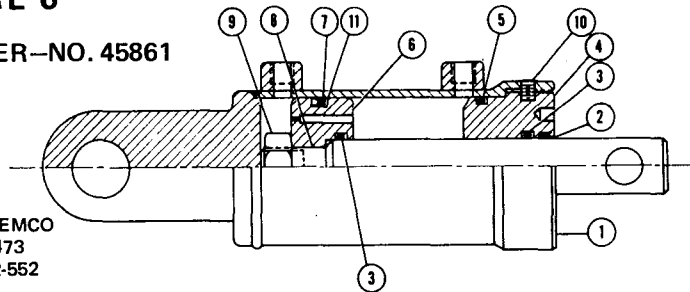


FIGURE 5
BRAKE CONTROL

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	44107	Spring	1
2	44422	Rod Nut	1
3	44423	Rod	1
4	44426	Rod Nut	1
5	16288-420	Cotter Pin, 1/8 x 1-1/4	5
6	44421	Pin	2
* 7	44429	Pin	1
8	44427	Link	1
9	45805	Nipple	1
10	16142-46	Elbow, WTHRHD. C5455 x 6	1
11	16145-86	Elbow, WTHRHD. C5405 x 6 x 8	1
12	45806	Orifice Dowel	1
13	44118-13	Hose, 44118-13AB	2
14	46077-1	Sleeve	1
* 15	44428	Pin	1
16	44437	Arm	1
17	45861	Cylinder (See Figure 6)	1
18	44438	Pin	1
19	40155	Spring	1
20	16047-1232	Cap Screw, 3/4 UNC x 1 H.H.	1
21	44206	Eye Bolt	1
22	16043-8	Nut, 1/2 UNC Hex Jam	1
23	40174	Nut	1
24	40175	Pin	1
25	42023	Screw	1
26	44687-2	Spacer	2
27	44806	Spring	1
28	16055-5	Drive Screw, #10 x 3/8	2
29	16063-3	Washer, 3/16 Flat	2

NOTE: For F-50-PSM & PSC brake control parts refer to supplement section.

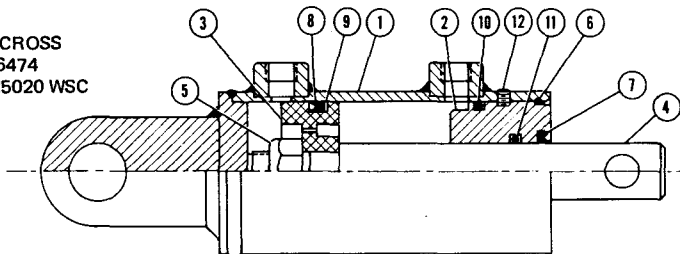
FIGURE 6
BRAKE CYLINDER—NO. 45861



MANUFACTURER: REMCO
CARCO PART NO. 46473
REMCO PART NO. C-2-552

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16281-1	Tube, REMCO B-25-658	1
* 2	16281-5	Wiper, REMCO 472309	1
* 3	16262-214	O-Ring, NAT'L. 622719	2
4	16281-2	Head, REMCO B-26-610	1
* 5	16262-228	O-Ring, NAT'L. 623006	1
6	16281-3	Piston, REMCO B-22-530	1
* 7	16334-1	Seal, C/R 710087	1
8	16281-4	Rod, REMCO B-23-761	1
9	16281-9	Nut, REMCO 410504	1
10	16054-404	Set Screw, 1/4 UNC x 1/4 Hex. Soc.	1
* 11	16301-1	Back-up Washer, C/R 451069	1
* *	46241	Repair Kit (includes items 2,3,5,7 and 11)	1

MANUFACTURER: CROSS
CARCO PART NO. 46474
CROSS PART NO. 225020 WSC



REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16280-1	Tube, CROSS 1C3281	1
2	16280-2	Head, CROSS 1C3243	1
3	16280-3	Piston, CROSS 1C3279	1
4	16280-4	Rod, CROSS 1C3282	1
5	16280-5	Nut, CROSS 1A0146	1
6	16280-6	Retng. Ring, CROSS 1A0280	1
* 7	16280-7	Wiper, CROSS 1A0014	1
* 8	16334-1	Seal, C/R 710087	1
* 9	16301-1	Back-up Washer, C/R 451069	1
* 10	16262-228	O-Ring, NAT'L. 623006	1
* 11	16262-214	O-Ring, NAT'L. 622719	1
12	16054-404	Set Screw, 1/4 UNC x 1/4 Hex. Soc.	2
* *	46241	Repair Kit (includes items 7,8,9, 10 and 11)	1

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 12
IDLER SHAFT

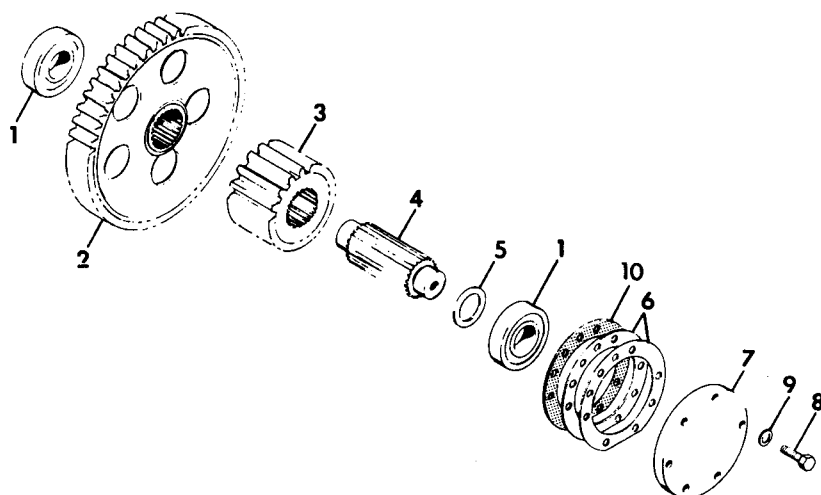


FIGURE 7
IDLER SHAFT

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	15137	Roller Brg.	2
2	44468	Gear	1
3	44465	Pinion	1
4	44466	Shaft	1
5	44467	Spacer	1
6	44431	Shim Set	1
7	44464	Cover	1
8	16047-810	Cap Screw, 1/2 UNC x 1-1/4 H.H.	6
9	16064-8	Washer, 44802-1/2	6
10	45028	Gasket	1

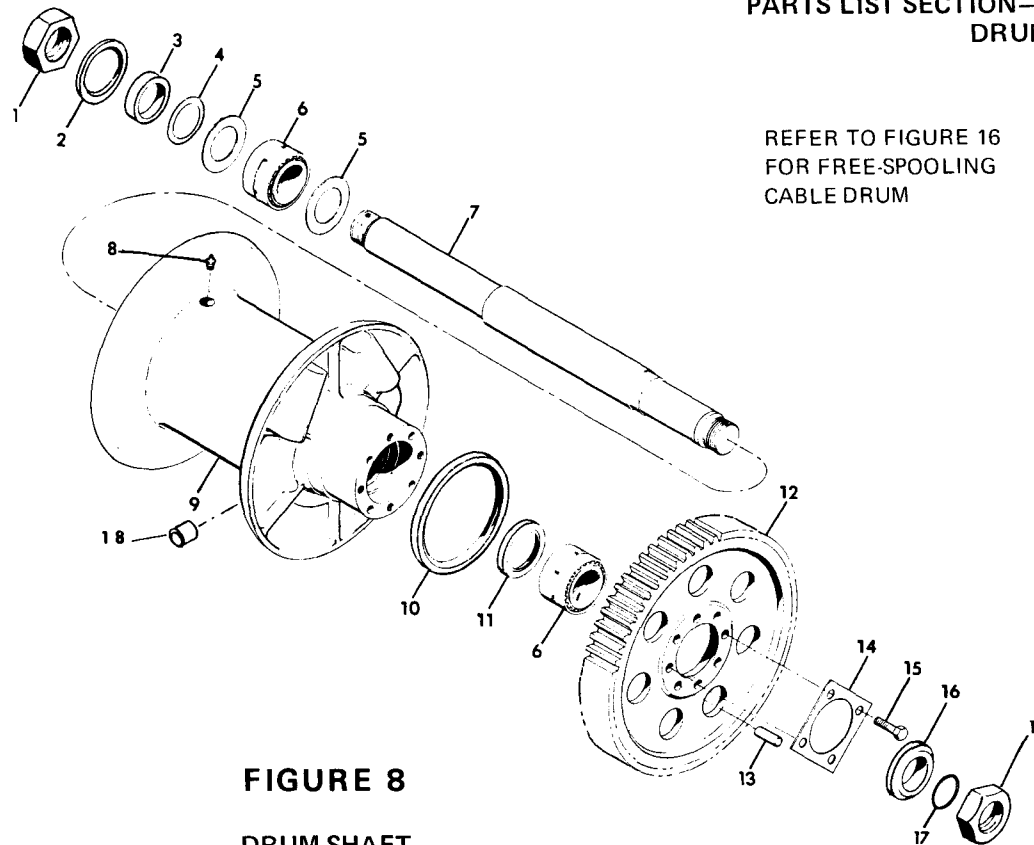


FIGURE 8

DRUM SHAFT

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
*** 1	16044-40	Nut, 2-1/2 UN Hex Jam	2
2	16343-21	Oil Seal, NAT'L. 455379	1
3	44457-1	Spacer	1
4	44881	Shim	As Req'd.
5	44458	Seal	2
6	15200	Brg. Set	2
*** 7	44459	Shaft	1
8	16222-2	Fitting, ALEMITE 1610B	1
* 9	44456	Standard Drum	1
	44682	High Capacity Drum	1
10	16342-10	Oil Seal, NAT'L. 415300	1
11	16343-16	Oil Seal, NAT'L. 455137	1
12	44461	Gear	1
** 13	45081-2	Dowel Pin	4
14	44469	Lock	1
15	16048-1218	Cap Screw, 3/4 UNC x 2-1/4 H.H.	4
16	44460-3	Spacer	1
17	16262-332	O-Ring, NAT'L. 622735	1
18	25457-3	Ferrule for 1 Wire Rope	1
	15457-2	Ferrule for 7/8 Wire Rope	1
	25457-1	Ferrule for 3/4 Wire Rope	1

NOTES:

*Optional high capacity drum is standard on PSC models.

**When bull gear or cable drum is replaced, dowel holes must be drilled 5/64" and reamed .9057"/.9077" to accommodate new dowels.

***For extended drum shaft order 46925 shaft and 2 each 16041-14 nut, Timken TN 14.

1436-B-9-1-70
SUPERSEDES
1436-B-3-1-67



CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 15
CONTROL VALVE

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	44472	Cover (See Figure 1)	1
2	42020	O-Ring	3
3	16310-323	Retainer, NAT'L. XRC323	3
4	44470	Brake Tube	1
5	44471	Forward Tube	1
6	16048-808	Cap Screw, 1/2 UNF x 1 H.H.	2
7	16064-8	Washer, 44802-1/2	2
8	45853	Valve	1
9	16129-68	Connector, WTHRHD. C5205 x 8	4
10	16129-128	Connector, WTHRHD. C5205 x 8 x 12	1
11	44120	Supply Tube	-
12	44473	Reverse Tube	1
13	44960	Valve (See Figure 10)	1
14	16309-827	Back-Up Ring, NAT'L. TRC 827	1
15	16262-114	O-Ring, NAT'L. 622712	1
16	16056-636	Set Screw, 3/8 UNC x 3-1/4 Hex. Soc.	1
17	16043-6	Nut, 3/8 UNC Hex Jam	1
8a	44259-1	Stop (Inner)	1
* 8b	45548	Spring	1
* 8c	45623	Stop (Outer)	1
8d	16313-75	Retng. Ring, TRUARC 5100-75	1
* 8e	45549	Spring	1
* 8f	45622	Washer	1
8g	16314-150	Retng. Ring, TRUARC N5000-150	1
** 8h	45854	Spool	1
8i	44257	Screw	1
8j	16071	Washer, AN960-D416L	1
** 8k	45818	Body	1
8l	16217-8	Ball, 1/2 Steel	4
8m	45855	Piston	1
8n	16262-215	O-Ring, NAT'L. 622720	1
8o	16308-131	Retng. Ring, SPIROLOX RS-131	1
8p	45857	Spring	1
8q	45856	Stop	1
8r	16305-156	Retng. Ring, SPIROLOX RR-156	1

*Items 8b, 8c, 8e and 8f not serviced separately. Order spring repair kit 45813.

**Valve spool and body are not serviced separately.

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 16
RELIEF VALVE

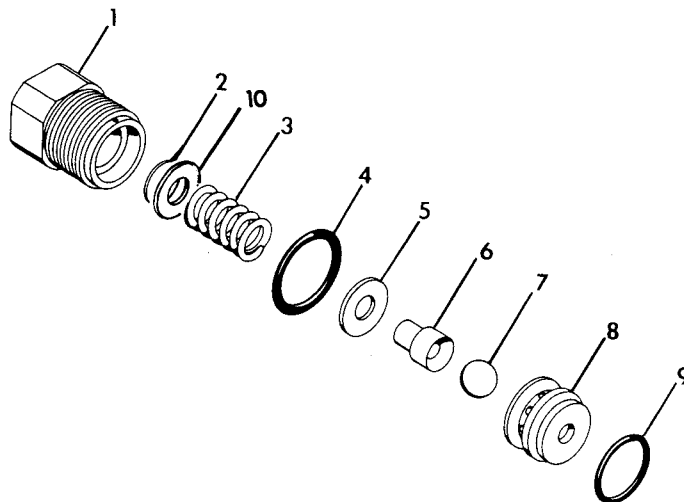


FIGURE 10

RELIEF VALVE—NO. 44960

(See Figure 9—Item 13)

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16271-57	Body, GRESEN 1747	1
2	{ 16271-54	Shim, GRESEN 949	As
	{ 16271-56	Shim, GRESEN 1743	Req'd
3	16271-19	Spring, GRESEN 953	1
4	16271-58	O-Ring, GRESEN 1615	1
5	16271-59	Washer, GRESEN 1742	1
6	16271-60	Follower, GRESEN 1744	1
7	16217-8	Ball, 1/2 Steel	1
8	16271-64	Seat, GRESEN 3093	1
9	16271-61	O-Ring, GRESEN 1718	1
10	16271-55	Washer, GRESEN 1213	1

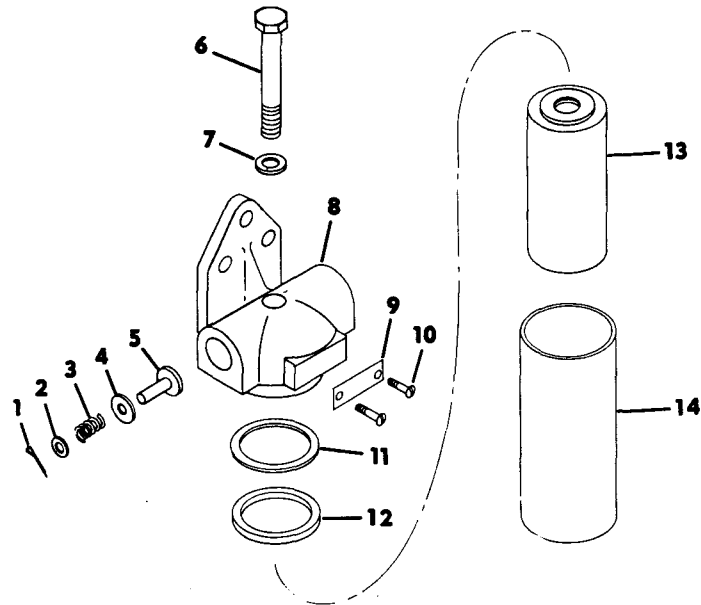


FIGURE 11

PRESSURE FILTER—NO. 45169

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16265-7	Cotter Pin, BOWSER 30100	1
2	16265-23	Washer, BOWSER 297-7-3	1
3	16265-17	Spring, BOWSER 2120-130	1
4	16265-16	Washer, BOWSER 1902-5-14	1
5	16265-21	Valve, BOWSER 2382-22-12-1	1
6	16265-14	Cap Screw, BOWSER 241-1016-64-HC	1
* 7	16265-26	Washer, BOWSER 310-0-1016	1
8	16265-4	Head, BOWSER 900090	1
9	16265-10	Name Plate, BOWSER 02N82	1
10	16265-13	Drive Screw, BOWSER 259-4-4	2
* 11	16265-12	Back-up Ring, BOWSER 544-8-233	1
* 12	16265-5	O-Ring, BOWSER 214-50-46	1
* 13	16265-2	Element, BOWSER BP-308-2	1
14	16265-19	Tank, BOWSER A1891-1	1
*	45179-1	Element Kit (includes items 7,11,12 and 13)	

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 18
SUCTION FILTER

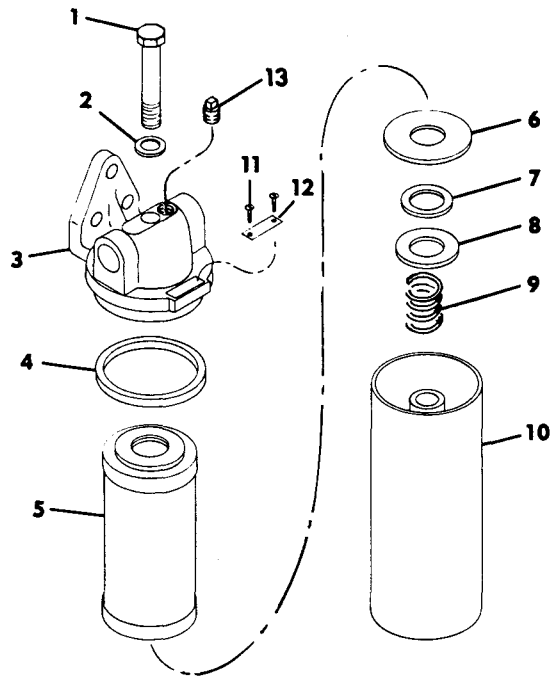


FIGURE 12

SUCTION FILTER—NO. 45168

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16265-15	Cap Screw, BOWSER 241-716-48-2	1
2	16265-22	Copper Washer, BOWSER 306-7	1
3	16265-3	Head, BOWSER 01N47	1
4	162656	O-Ring, BOWSER 00N51	1
5	16265-1	Element, BOWSER E-60045	1
6	16265-8	Plate, BOWSER 02N39	1
7	16265-25	Stat-O-Seal, BOWSER 310-0-1216	1
8	16265-24	Washer, BOWSER 01N97	1
9	16265-18	Spring, BOWSER 2120-29	1
10	16265-20	Tank, BOWSER 01N67	1
11	16265-13	Drive Screw, BOWSER 259-4-4	2
12	16265-9	Name Plate, BOWSER 02N37	1
13	16169-6	Plug, 3/8 NPT Sq. Hd.	1

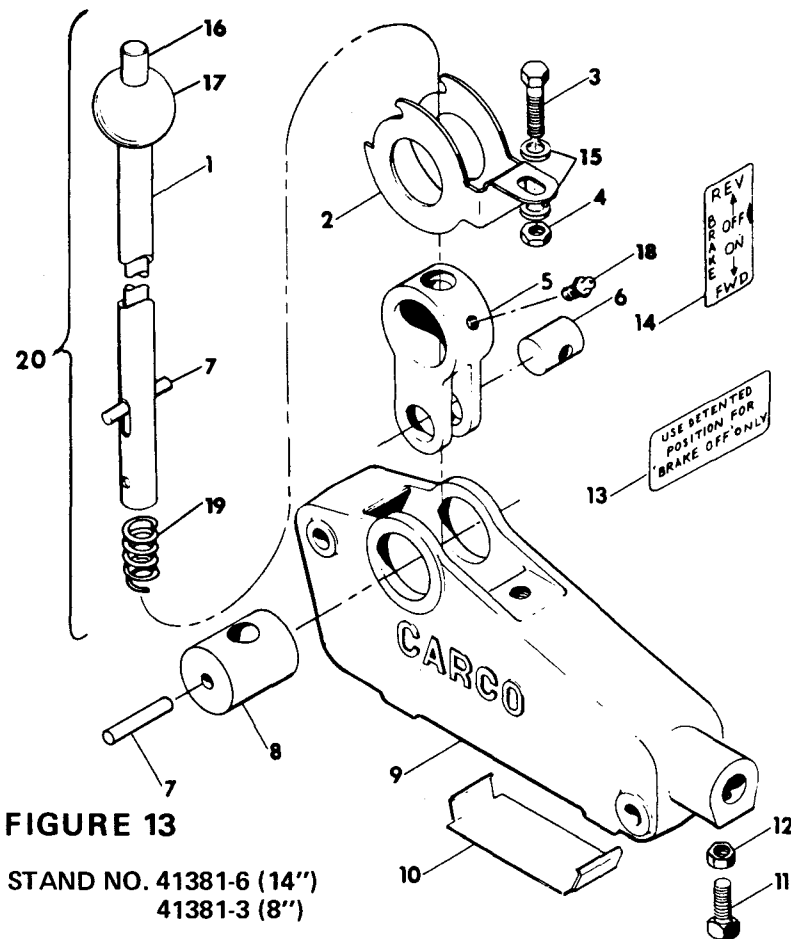


FIGURE 13

CONTROL STAND NO. 41381-6 (14")
41381-3 (8")

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
* 1	{ 44285 41405	Handle (14") Handle (8")	1
2	44099-3	Clip	1
3	16048-610	Cap Screw, 3/8 UNF x 1-1/4 H.H.	1
4	16044-6	Nut, 3/8 UNF Hex. Jam	1
5	41383	Lever	1
6	39202	Pin	1
* 7	16294-828	Spring, 1/4 x 1-3/4	2
8	44035	Pin	1
9	44098	Housing	1
10	44097	Plate	1
11	16061-616	Set Screw, 3/8 UNC x 1 Sq. Hd.	1
12	16033-6	Nut, 3/8 UNC Hex.	1
13	44746	Warning Plate	1
14	44745	Instruction Plate	1
15	16064-6	Washer, 44802-3/8	2
* 16	Not serviced separately	Rod	1
* 17	41404	Ball	1
18	16222-13	Fitting, ALEMITE 1641B	1
* 19	41403	Spring	1
* 20	{ 44283 41407	Handle Assy. (14") Handle Assy. (8")	1

*Item 20 includes items 1, 7, 16, 17, and 19. Control stand 41381-6 (14" handle) is standard for power shift winches.

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 20
COUPLER

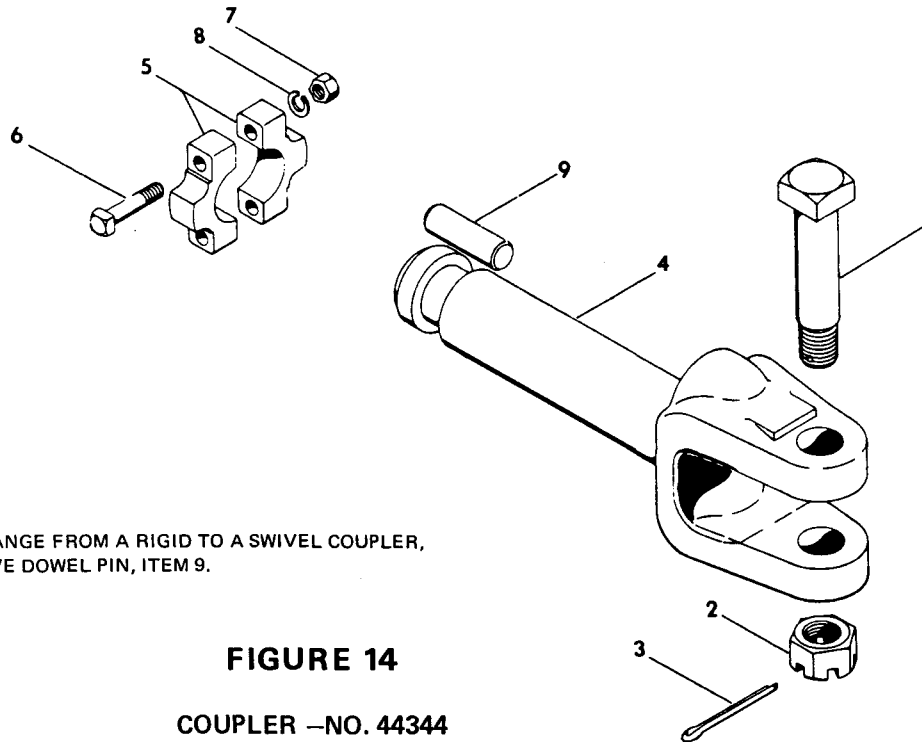


FIGURE 14
COUPLER —NO. 44344

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	32871-1	Bolt	1
2	Y-1216-1	Nut	1
3	16288-836	Cotter Pin, 1/4 x 2-1/4	1
4	32857	Coupler	1
5	45702	Clamp	1
6	16047-818	Cap Screw, 1/2 UNC x 2-1/4 H.H.	2
7	16033-8	Nut, 1/2 UNC Hex	2
8	16067-8	Washer, 1/2 Lock	2
9	32865	Dowel Pin	1

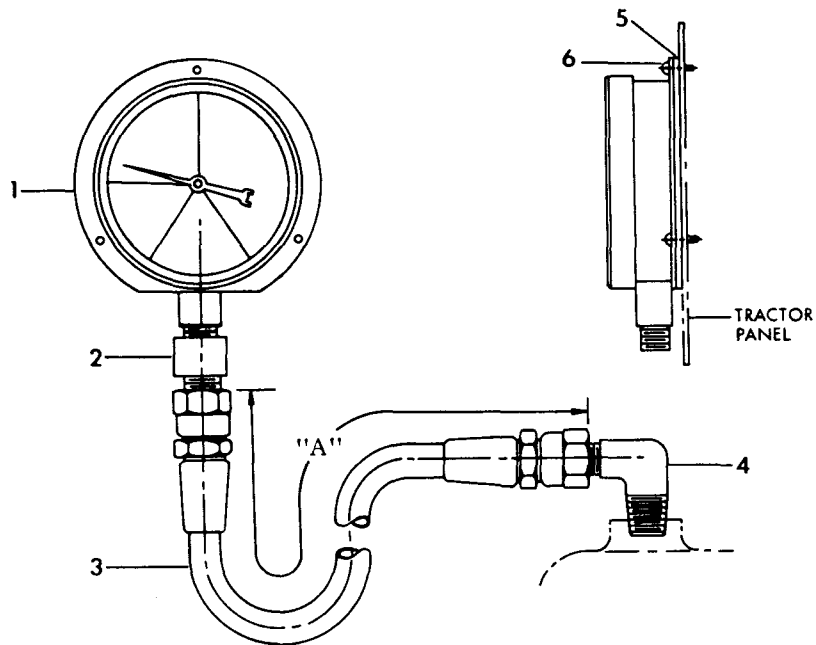


FIGURE 15

PRESSURE GAUGE—NO. 44920-120

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	46289	Gauge (includes items 5 and 6)	1
2	16116-44	Connector, WTHRHD. C5255 x 4 x 4	1
3	44921-120	Hose Assy.	1
4	16145-44	Elbow, WTHRHD. C5405 x 4 x 4	1
5	46341	Pad	1
6	16055-7	Tapping Screw, #10 x 1/2 Type AB	3

CARCO MODEL F-50-PS WINCH
PARTS LIST SECTION—PAGE 22
FREE SPOOLING CABLE DRUM

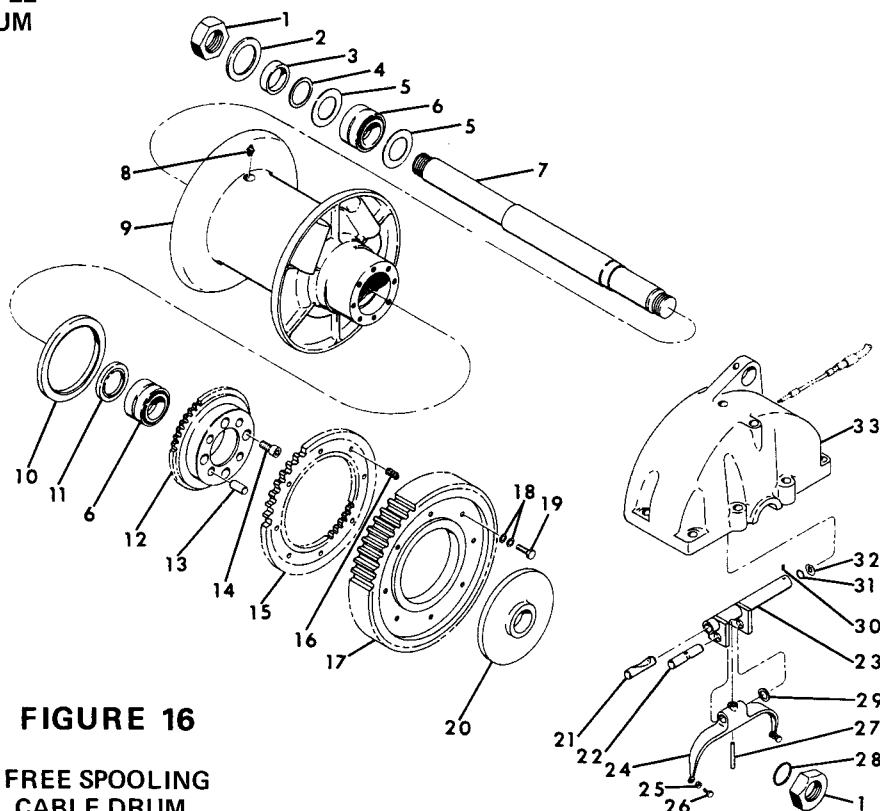
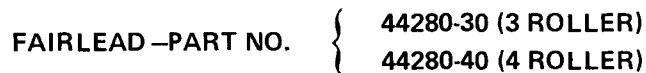


FIGURE 16

FREE SPOOLING
CABLE DRUM

REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT
1	16044-40	Nut, 2-1/2 UN Hex Jam	2
2	16343-21	Oil Seal, NAT'L. 455379	1
3	44457-1	Spacer	1
4	44881	Shim	As Req'd.
5	44458	Seal	2
6	15200	Brg. Set	2
7	44459	Shaft	1
8	16222-2	Fitting, ALEMITE 1610B	1
9	44456	Cable Drum	1
10	16342-10	Oil Seal, NAT'L. 415300	1
11	16343-16	Oil Seal, NAT'L. 455137	1
12	45977	Hub	1
13	45081-2	Dowel Pin	4
14	16050-1210	Cap Screw, 3/4 UNC x 1-1/4 Hex Soc.	4
15	45976	Gear	1
16	16240-2	Spring, LEE LC-045-G10	8
17	45975	Gear	1
18	16064-6	Washer, 44802-3/8	16
19	16052-616	Cap Screw, NYLOK 3/8 UNC x 2 H.H.	8
20	46355	Spacer	1
21	46098	Pin	1
22	46099	Shaft	1
23	46100	Tube	1
24	45982	Fork	1
25	16043-6	Nut, 3/8 UNC Hex Jam	2
26	16047-608	Cap Screw, 3/8 UNC x 1 H.H.	2
27	16290-1656	Dowel Pin, 1/2 x 3-1/2	1
28	16262-332	O-Ring, NAT'L. 622735	1
29	16064-16	Washer, 44802-1	1
30	16056-608	Set Screw, 3/8 UNC x 1/2 Hex Soc.	1
31	16262-114	O-Ring, NAT'L. 622712	1
32	16309-827	Retng. Ring, NAT'L. TRC 827	1
33	44440	Cover	1

THIS FAIRLEAD IS NORMALLY FURNISHED AS A 3-ROLLER UNIT, WITH HORIZONTAL ROLLER IN TOP POSITION – IF A 4-ROLLER UNIT IS REQUIRED, AN ADDITIONAL ROLLER CAN BE SUPPLIED CONSISTING OF ITEMS LISTED IN COLUMN "A" IN PARTS LIST.



REF.	CARCO PART NO.	NAME AND DESCRIPTION	QUAN. PER UNIT	"A"
1	16047-1420	Cap Screw, 7/8 UNC x 2-1/4 H.H.	2	
2	16288-1232	Cotter Pin, 3-1/8 x 2	3	1
3	16036-24	Nut, TIMKEN K8111	3	1
4	44371	Shaft	1	1
5	33958	Roller	1	1
6	44368	Housing	1	
7	{ 15235	Brg. Cup	6	2
	{ 15178	Brg. Cone	6	2
8	30044	Dust Guard	6	2
9	16222-2	Fitting, ALEMITE 1610B	5	1
10	30250	Roller	2	
11	30252	Shaft	2	
12	30045	Retainer	4	
13	26248	Name Plate	1	
14	16055-5	Drive Screw, #10 x 3-1/8 Type U	4	
15	42178	Attaching Lug	2	
16	16063-14	Washer, 7/8	2	

2090-F-9-1-70
SUPERSEDES
2090-F-3-1-66