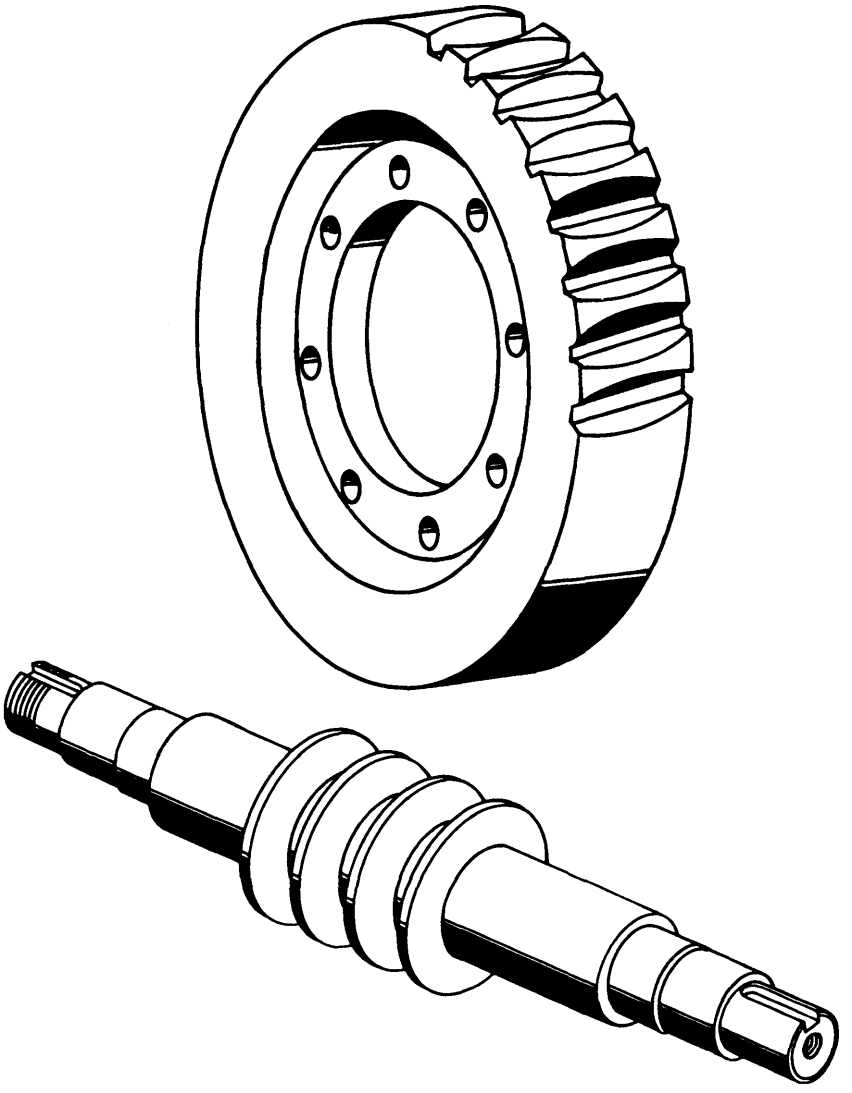
Service Parts Information

900 SERIES WINCHES



Tulsa Winch

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XI. CHECKING THE ASSEMBLY ARRANGEMENT AND WORM BRAKE SETTING:

1. The worm brake must be set so the cam clutch engages in the payout direction only. The winch model code determines which direction the cam clutch should be installed.

   EXAMPLE #1: (900-SLRFO)
   The LRFO is as viewed from the rear of the truck with the winch behind the cab: (NOTE: The lettering on the cam clutch is facing outward from the gearbox.)
   L=Left hand worm
   R=Gearbox is on the right side of the winch.
   F=Input shaft to front of truck.
   O=Cable wraps over the drum.

   EXAMPLE #2. (9000-SRLRU)
   The RLRU is as viewed from the rear of the truck with the winch behind the cab: (NOTE: lettering on the cam clutch is facing inward toward the gearbox.)
   R=Right hand worm.
   L=Gearbox is on left side of winch.
   R=Input shaft to rear of truck.
   U=Cable wraps under the drum.

Install Cam Clutch (63) W/lettering inward to gearbox on the following assemblies.	Install Cam Clutch (63) W/lettering outward from gearbox on the following assemblies.
RRRU RLFO RRFO	RRRO RLFU RRFU
RLRU LRFU LLRO	RLRO LRFO LLRU
LRRO LLFU	LRRU LLFO

2. If the winch is used in a model configuration it was not designed for, the brake must be checked. Damage to the brake can happen if installed wrong. If help is needed, contact your nearest Tulsa Winch sales/service representative before running your winch.

XII. HYDRAULIC SYSTEMS:

Refer to the performance chart below to properly match your hydraulic system to the 900 series winch. The chart contains first layer line pulls and line speeds @ various pressures and flow rates. Below the chart, are multipliers to figure 2nd, 3rd, and 4th layer line pulls and line speeds.

H938 WINCH—FIRST LAYER PERFORMANCE

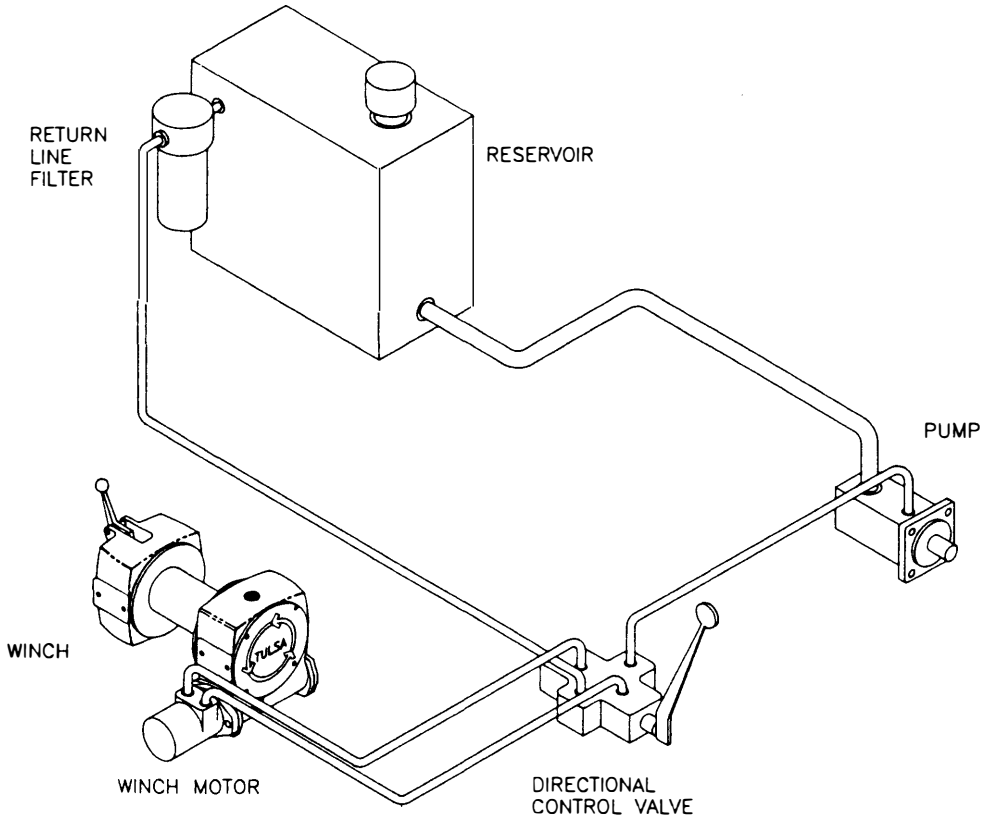
PRESSURE (PSI)

FLOW (GPM)	200	400	600	800	1000	1200	1400	1600	1800	2400
2	757 **2.7**	1,590 **2.7**	2,449 **2.7**	3,280 **2.6**	4,111 **2.5**	4,949 **2.4**	5,680 **2.3**	6,495 **2.2**	7,197 **2.1**	9,090 **1.4**
4	824 **5.5**	1,824 **5.5**	2,763 **5.4**	3,769 **5.3**	4,734 **5.3**	5,682 **5.2**	6,597 **5.1**	7,552 **4.9**	8,417 **4.8**	10,940 **4.2**
6	845 **8.3**	1,889 **8.2**	2,950 **8.2**	4,031 **8.1**	5,103 **8.0**	6,158 **7.9**	7,147 **7.8**	8,203 **7.7**	9,205 **7.5**	
8	816 **11.0**	1,859 **11.0**	3,025 **10.9**	4,135 **10.8**	5,268 **10.7**	6,382 **10.7**	7,452 **10.5**	8,580 **10.4**	9,661 **10.2**	
10	729 **13.8**	1,803 **13.7**	3,055 **13.6**	4,144 **13.5**	5,352 **13.5**	6,551 **13.3**	7,673 **13.2**	8,838 **13.1**	9,987 **12.9**	
12	588 **16.5**	1,733 **16.4**	2,990 **16.4**	4,135 **16.3**	5,389 **16.2**	6,642 **16.0**	7,795 **15.9**	8,985 **15.8**	10,189 **15.6**	
14	445 **19.2**	1,594 **19.2**	2,867 **19.0**	4,091 **18.9**	5,320 **18.8**	6,612 **18.7**	7,837 **18.6**	9,074 **18.5**		
15	376 **20.6**	1,513 **20.5**	2,797 **20.4**	4,033 **20.3**	5,273 **20.2**	6,586 **20.1**	7,803 **19.9**	9,067 **19.8**		
18	149 **24.5**	1,287 **24.5**	2,475 **24.4**	3,729 **24.3**	5,121 **24.2**	6,464 **24.1**	7,695 **23.9**	9,075 **23.8**		

CL H, 4.5 CU.IN.

FOR LAYER NUMBER	MULTIPLY	
	LINEPULL BY	LINESPEED BY
2	0.818	1.222
3	0.692	1.444
4	0.600	1.667

XIII. TYPICAL HYDRAULIC CIRCUIT FOR A WINCH:



XIV. TROUBLE SHOOTING TIPS:

CONDITION	POSSIBLE CAUSE	CORRECTION
CLUTCH HANDLE WON'T LATCH.	1. Clutch jaws not aligned. 2. Damaged yoke or linkage.	1. Align jaws by rotating drum. 2. Replace yoke or clutch.
OIL LEAKS FROM HOUSING.	1. Seal damaged or worn. 2. Too much gearbox oil.	1. Replace seal. 2. Drain excess oil.
LOAD DRIFTS DOWN.	1. Oil-cooled brake is out of adjustment or worn.	1. Adjust brake until load doesn't drift. 2. Replace parts as required.
WINCH RUNS TOO SLOW.	1. Low flow rate. 2. Hydraulic motor worn out.	1. Check flow rate. 2. Replace motor.
CABLE DRUM WON'T FREE SPOOL	1. Winch is not mounted square. 2. Clutch not disengaged.	1. Check mounting. 2. Disengage clutch.
CABLE "BIRDNESTS" WHEN CLUTCH IS DISENGAGED.	1. Drag brakes are worn.	1. Replace brakes.
HYDRAULIC FLUID LEAKS FROM THE GEARBOX.	1. Damaged motor shaft seal.	1. Replace seal.
WINCH WON'T PICK UP HEAVY LOADS.	1. Too much cable on the drum. 2. System pressure too low.	1. Use a snatch block or remove some cable from the drum. 2. Correct the hydraulic system pressure.

TEST PROCEDURE FOR AN ELECTRIC MOTOR

The Tulsa Winch motor is a (4 pole-4 coil) series wound 12 volt or 24 volt DC motor. This motor will provide high torque at low speeds.

To determine if the motor is operating correctly, apply the following test:

1. Secure the motor to a bench or stable work place.
2. Connect a jumper wire (at least a number 6 wire) from F-1 to terminal A (see figure 2.0)
3. Attach a wire (at least a number 6 wire) from positive (+) battery terminal to motor terminal F-2.
4. Ground negative (—) battery terminal to motor housing (see figure 2.0). Motor should now run.

NOTE: Always attach positive battery wire solidly to positive motor terminal. Make and break the negative connection at the battery to avoid burning the motor terminals. **CAUTION:** Do not run motor for a long period of time.

To reverse motor direction:

1. Attach wire from F-2 to motor terminal A (see figure 2.1).
2. Attach wire from positive (+) battery terminal to motor terminal F-1.

TULSA WINCH MODELS 938 & E945

I. INTRODUCTION:

PLEASE READ THIS MANUAL CAREFULLY.

This manual contains ideas for operating your Tulsa Winch safely and efficiently.

II. ⚠ WARNING!

- DO NOT USE THE WINCH TO LIFT, SUPPORT, OR TRANSPORT PEOPLE.
- WINCHES WITHOUT AUTOMATIC WORM BRAKES MUST NEVER BE USED TO LIFT LOADS.
- A MINIMUM OF FIVE WRAPS OF CABLE MUST BE AROUND THE DRUM BARREL TO LIFT OR HOLD THE RATED LOAD. THE CABLE CLAMP IS NOT DESIGNED TO HOLD THE RATED LOAD OF THE WINCH.
- DO NOT EXCEED THE MAXIMUM RATED LINE PULL OF THE WINCH.
- THE CLUTCH MUST BE FULLY ENGAGED BEFORE OPERATING THE WINCH.
- DO NOT ATTEMPT TO DISENGAGE THE CLUTCH UNDER LOAD.
- STAY AWAY FROM SUSPENDED LOADS.
- STAND CLEAR OF CABLE WHILE OPERATING. DO NOT TRY TO GUIDE CABLE.

III. WARRANTY:

Tulsa winches are designed and built to exact specifications. Great care and skill go into every winch we make. Warranty assistance can be obtained by contacting your nearest Tulsa Winch sales/service representative.

IV. WINCH OPERATION:

It is very important that the winch is mounted securely for proper alignment of the gear box, and clutch end.

All Tulsa winches are furnished with recommended mounting angles. The angle size for 938/E945 is ⅜"x3"x2½".

V. CABLE INSTALLATION:

1. Unroll desired cable out in a straight line on the ground. This will prevent kinking. Securely wrap the end of the cable, opposite the hook, with tape to prevent fraying.
2. Insert the taped end of the cable into the hole in the drum. Secure the cable using the setscrew furnished. Tighten the setscrew.
3. Carefully run the winch in the "reel in" direction, keeping tension on the cable. Spool all cable on to the drum in neat layers. Do not over speed the winch during initial cable installation.

VI. BREAK-IN:

A winch, like any other machinery, must be broken-in to perform properly. **DO NOT** over speed the winch during initial cable installation. Run the winch half the rated load and speed for the first thirty minutes.

VII. WINCH OPERATION:

It is best to make test runs with your winch before you actually use it. Remember, you hear your winch as well as see it operate. Get familiar with the sounds of a light pull, a heavy pull, and the sounds caused by the load jerking or shifting.

Uneven spooling of the cable is not a problem unless too much cable collects at one end of the drum. If this happens, reverse the winch to relieve the load and move your point of contact closer to the center of the vehicle. After the job is over, unspool and rewind the cable evenly on the winch drum.

Check the oil level of the winch every month. Replace oil every six months or earlier, depending on the winch use. Use three pints of SAE 140 multipurpose gear lube. Under adverse environmental conditions SAE 250 and SAE 90 gear lube may be required (Consult Tulsa Winch for proper selection). If the oil is contaminated with metallic particles, inspect the winch for the cause of the wear. A small amount of bronze present is normal wear for a worm gear winch.

Inspect cable frequently. If cable becomes frayed replace it immediately.

To engage the clutch, move clutch handle to the position marked "IN" or, the vertical 12-o'clock.

The jaws of the winch and the drum must be aligned for proper engagement. Drum rotation may be necessary for good alignment.

The clutch is held in the engaged position by the reverse draft angle of the clutch as well as the over-center action of the clutch lever. These provide a mechanical lock.

To disengage the clutch, move the clutch handle to the "OUT" position. **CAUTION, DO NOT ATTEMPT TO DISENGAGE WITH A LOAD ON THE WINCH**

VIII. ADJUSTING THE OIL COOLED BRAKE

All parts of the automatic oil-cooled brake are submerged in the gearbox lubricant. This brake uses a one way cam clutch (63) allowing free spooling in the in-haul position and braking in the payout direction. When the brake wears to the point that the load begins to drift simply adjust as follows:

1. Loosen locknut (67) and adjusting screw (66).
2. Tighten the brake by turning adjusting screw (66) clockwise. **CAUTION:** A slight ¼ turn is usually all that is required. Over-tightening can cause overheating and premature wear on brake parts. Tighten locknut (67) after adjustment is completed. The brake should be adjusted only enough to hold the heaviest load you lift. If the brake does not respond to adjustment, replacement of the stator plates (62), friction discs (61), or spring (64) may be required.

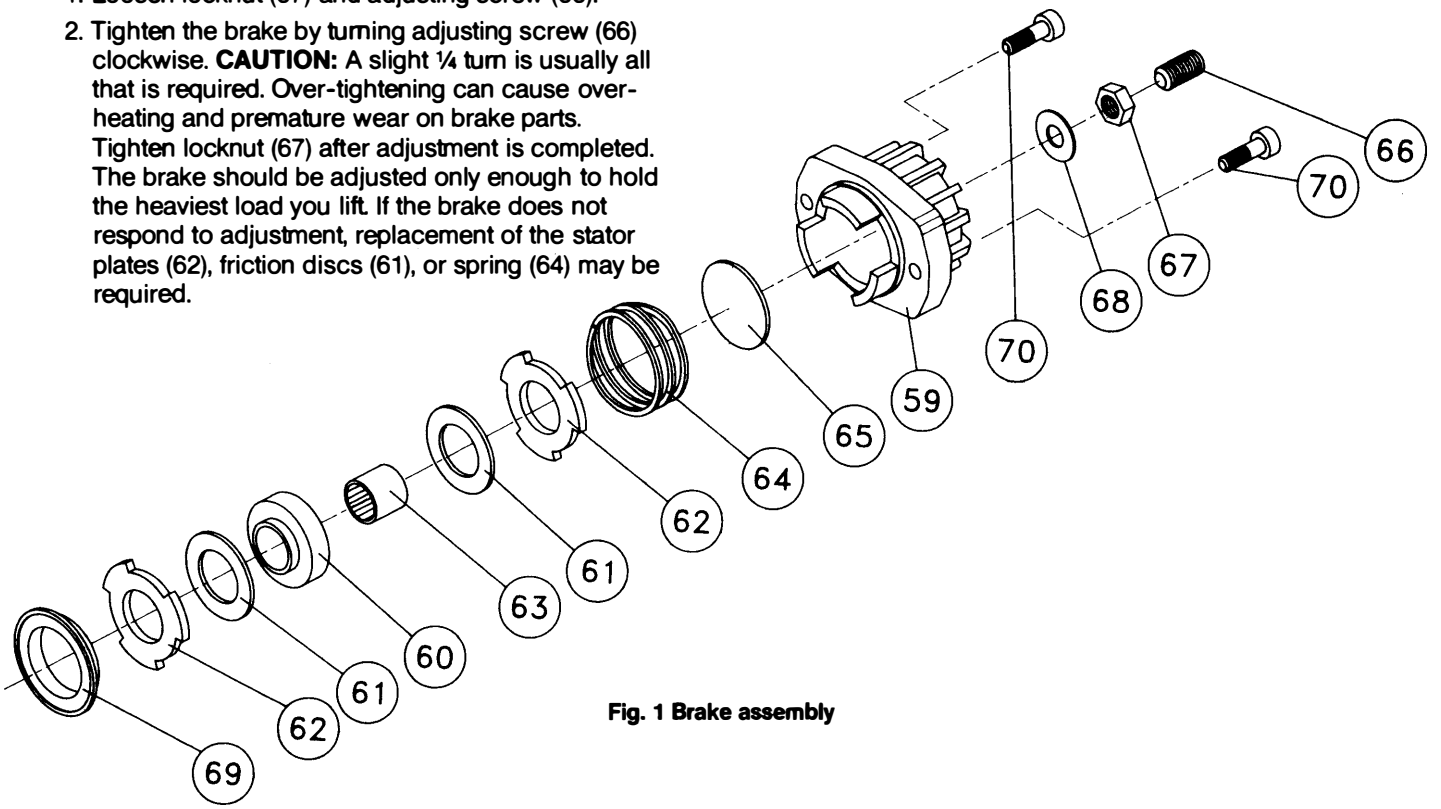


Fig. 1 Brake assembly

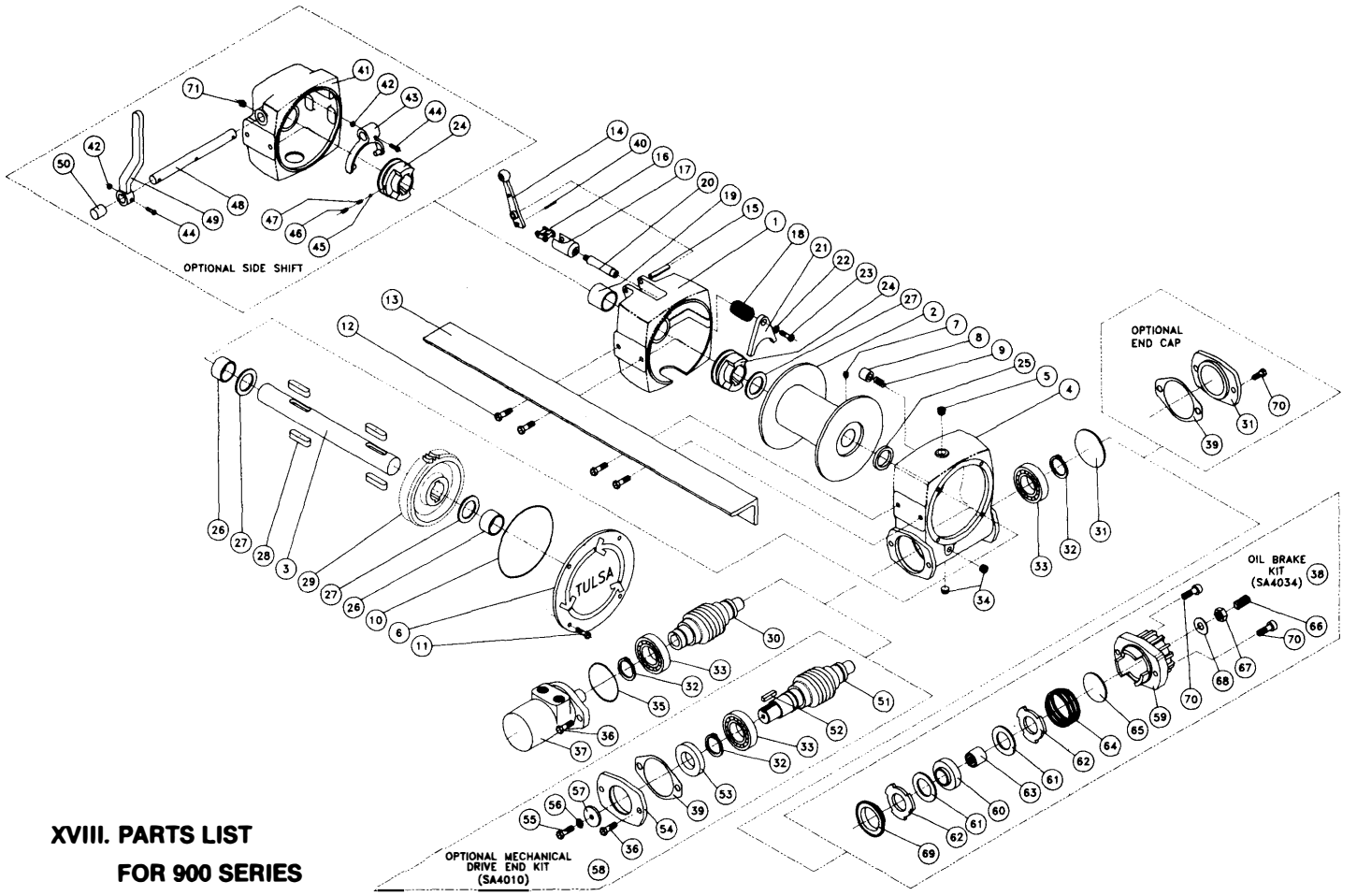
IX. SERVICING THE OIL COOLED BRAKE:

1. Remove bottom plug (34). See XVII.
2. Back off locknut (67) and adjusting screw (66) two or more turns to loosen brake.
3. Remove capscrews (70) from brake housing (59).
4. Remove brake housing (59), thrust washer (65), and spring (64) from gear box housing.
5. Remove stator plates (62), friction discs (61), brake hub (60), and cam clutch (63) from the worm (30). **NOTE:** Make sure to note the direction that the cam clutch is installed before it is removed. It must be replaced the same way.
6. Inspect parts as follows:
   A. Inspect friction discs (61) for uneven or excessive wear.
   B. Inspect flat surfaces of brake hub (60), stator plates (62), and thrust washer (65) for warpage or other damage. Replace if necessary.
   C. Inspect spring (64) for wear and discoloration. Replace if necessary.
   D. Cam clutch (63) should be free of all debris and have all rollers intact. If it needs replacing, a new cam clutch should be carefully pressed into the brake hub (60).

X. RE-ASSEMBLING AND CHECKING THE BRAKE:

1. With brake housing cover face up, insert the following parts in this order;
   thrust washer (65)
   spring (64)
   stator plate (62)
   friction disc (61)
   cam clutch (63) brake hub (60) assembly
   friction disc (61)
   stator plate (62)
   brake spacer (69)
   gasket (39) See XVII.
   Reference fig. 1 brake assembly diagram for assistance.
2. Place complete brake assembly on gearbox housing (4) and secure with two capscrews (70).
3. Install pipe plug (34) into bottom of gearbox housing and add three pints of SAE 140 gearbox lubricant.
4. Tighten brake adjustment screw (66) until tension from spring (64) is felt. Refer to section VIII. "Adjusting the oil cooled brake" and set brake to hold required load. Do not set brake for loads greater than winch rating.

XVII. PARTS ASSEMBLY DRAWING FOR 900 SERIES:



XVIII. PARTS LIST FOR 900 SERIES

ITEM #	QTY./ UNIT	PART #	DESCRIPTION
1	1	40955	End Bracket
2	1	40462	Drum 11"
	1	40575	Drum 8"
	1	40393	Drum 6"
3	1	40464	Shaft
4	1	40383	Housing
5	1	27504	Breather
6	1	40391	Cover
7	1	23582	Set Screw
8	1	25692	Drag Brake
9	1	25774	Spring
10	1	40547	O-ring
11	4	40407	Capscrew
12	8	20522	Capscrew
13	2	41131	Frame 11" Drum
	2	41177	Frame 8" Drum
	2	40623	Frame 6" Drum
14	1	40708	Handle
15	1	27801	Pin
16	1	40865	Chain Link
17	1	40707	Rod
18	1	40404	Spring
19	1	40399	Bushing
20	1	40767	Shift Rod
21	1	40402	Yoke
22	1	30841	Washer
23	1	33233	Capscrew
24	1	40377	Clutch
25	1	40401	Seal
26	2	40400	Bushing
27	3	29017	Washer
28	4	40518	Key
29	1	40618	Gear R.H. H938, M938
	1	40374	Gear R.H. E945
30	1	40598	Worm R.H. H938
	1	40635	Worm R.H. M938
	1	41178	Worm R.H E945 W/Brake
	1	40375	Worm R.H. E945 W/O Brake
31	1	40397	Plug Cap
	1	40042	End Cap
32	2	40396	Ring

ITEM #	QTY./ UNIT	PART #	DESCRIPTION
33	2	40395	Bearing
34	2	32220	Pipe Plug
35	1	32566	O-ring
36	2	40410	Capscrew
37	1	40271	Hydraulic Motor
38	1	4034	Brake Kit
39	1	40147	Gasket
40	1	40866	Roll Pin
41	1	41220	End Bracket, Side Shift
42	2	16990	Nut
43	1	41224	Yoke, Side Shift
44	2	31748	Capscrew
45	1	41237	Ball
46	1	10351	Set Screw
47	1	41236	Spring
48	1	41234	Shaft, Shifter
49	1	41222	Handle, Shifter
50	1	40397	Plug
51	1	40635	Worm, Mechanical
52	1	20105	Key
53	1	20232	Seal
54	1	40082	End Cap
55	1	20278	Screw
56	1	20526	Lockwasher
57	1	20092	Washer
58	1	SA4010	Mechanical Drive Kit
59	1	40069	Brake Housing
60	1	40617	Brake Hub
61	2	40075	Friction Disc
62	2	40076	Stator Plate
63	1	40013	Cam Clutch
64	1	40077	Spring
65	1	40078	Thrust Washer
66	1	40775	Set Screw
67	1	40774	Locknut
68	1	29044	Washer
69	1	40599	Spacer
70	2	40546	Socket Capscrew
71	2	21128	Grease Zerk

XIX. DISASSEMBLY OF E945 COMPONENTS:

A. Disassembly of E945 transmission.
1. Remove twelve capscrews (22).
2. Remove gasket (31).
3. Remove both needle bearings (24) and thrust washers (25). Inspect and replace if necessary.
4. Remove smaller spur gear (45) and larger spur gears (26). Inspect and replace if needed.
5. Remove input shaft (28) and input shaft (41). Inspect and replace of needed.
6. Remove thrust washer (25) and needle bearing (24). Inspect and replace if needed.
7. Remove nuts (39) and remove motor (36).
8. Loosen set screw (44) and remove spur gear (43), o-ring (42), and key (37) from motor shaft. Check and replace if needed.
9. Remove capscrews (32) and remove transmission housing (34). Inspect transmission housing bushing (33), seal (35), seal (38), and gasket (48) for excessive wear. Press new bushing or seals if needed.

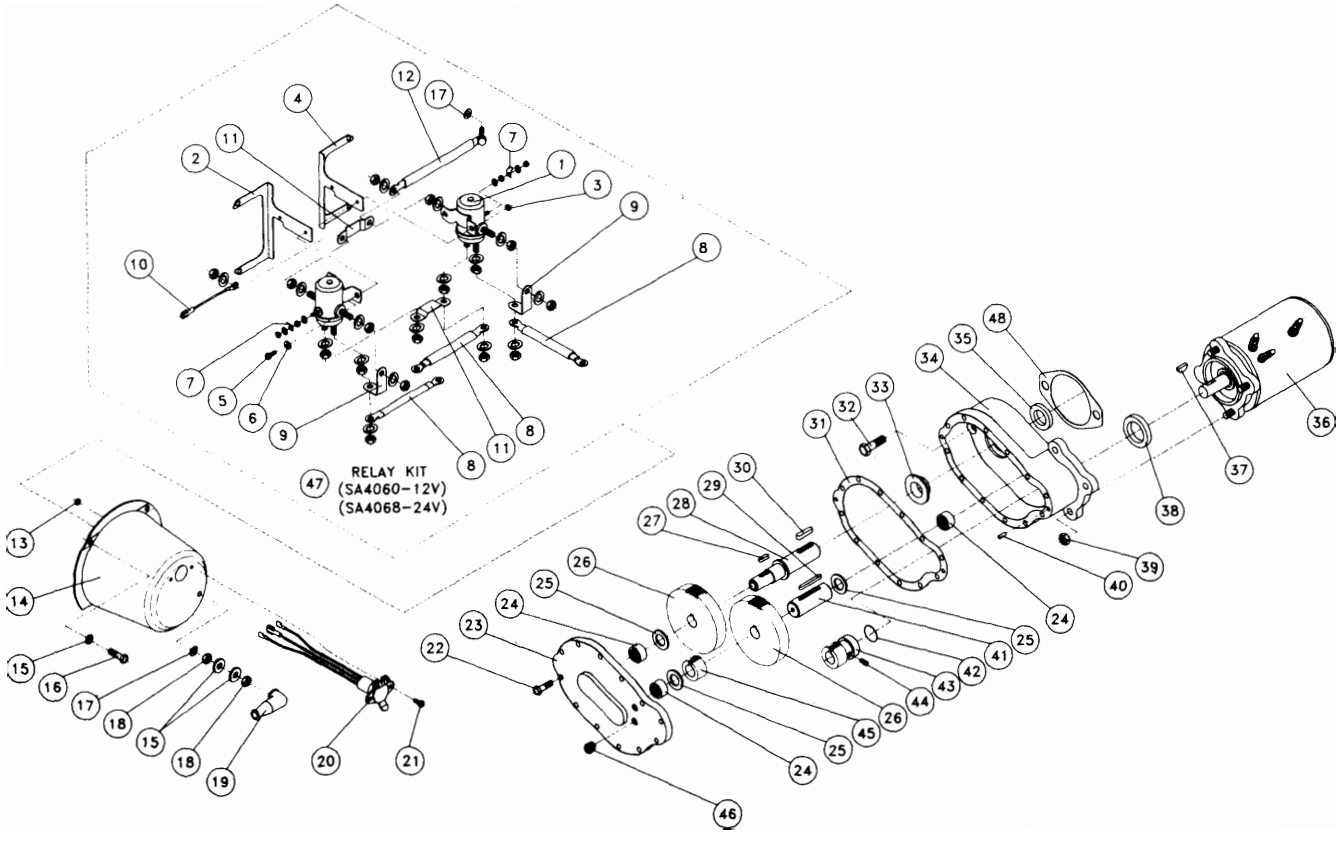
B. Disassembly of an E945 relay kit.
1. Remove two top capscrews (16) from relay cover (14) and remove cover. Unplug receptacle (20) and remove cover (14).
2. Remove bottom two capscrews (16) to remove relay kit (SA4060-12V or SA4068-24V).

XX. ASSEMBLY OF E945 COMPONENTS.

A. ASSEMBLY OF AN E945 TRANSMISSION:
1. Press bushing (33) into transmission housing (34)
2. Press seal (35) into back of transmission housing (34).
3. Secure transmission housing to gear housing with two capscrews (32) and gasket (48).
4. Insert key (29) on shaft (41).
5. Assemble shaft (41), washer (25), and needle bearing (24). Install into transmission housing (34).
6. Install keys (27) (30) into shaft (28) and insert shaft into worm end (30).
7. Place spur gear (26) on shaft (41).
8. Place spur gear (26) on shaft (28).
9. Place spur gear (45), thrust washer (25), and needle bearing (24) on shaft (41).
10. Place needle bearing (24) on shaft (28).
11. Insert two dowel pins (40) into transmission housing (34).
12. Apply sealer and gasket (31) to transmission housing (34).
13. Install transmission cover (23) to housing with twelve capscrews (22).

B. ASSEMBLY OF AN E945 RELAY KIT;
1. Secure female receptacle (20) to relay cover (14).
2. Secure relay kit to gearbox cover (6) with two capscrews (16) in the bottom two holes.
3. Plug receptacle ends (20) to relay ends.
4. Secure cover (14) to gearbox cover (6) with two capscrews (16) in the top two holes.

XXI. PARTS DRAWING E945 TRANSMISSION AND RELAY KIT:

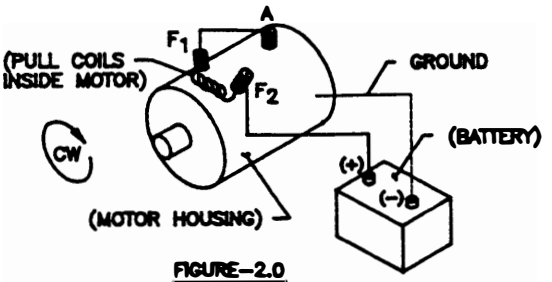


3. Ground negative (—) battery terminal to motor housing (see figure 2.1). Motor should now run.

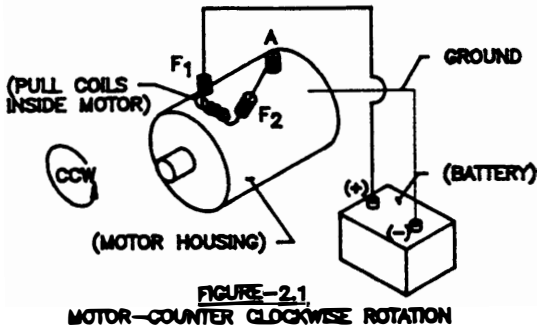
The running idle on the bench will draw 55 amperes and must run free and easy. If the ampere draw is more than 60 amperes and the motor runs rough, it should be replaced.

With the motor mounted on the winch (less cable on drum) the ampere draw should be approximately 65 to 70 amps. If this test greatly exceeds 70 amps refer to section (XIV. TROUBLE SHOOTING TIPS) for the mechanical portion of the winch.

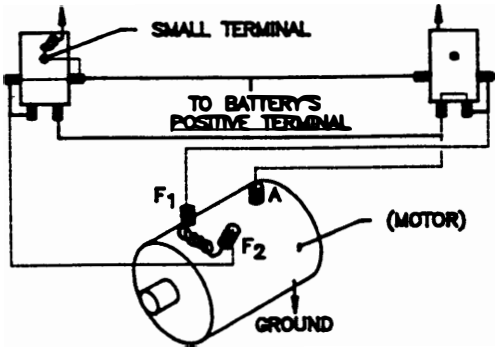
See figure 2.2 for solenoid connection to the motor and battery.



FIGURE–2.0
MOTOR–CLOCKWISE ROTATION



FIGURE–2.1
MOTOR–COUNTER CLOCKWISE ROTATION



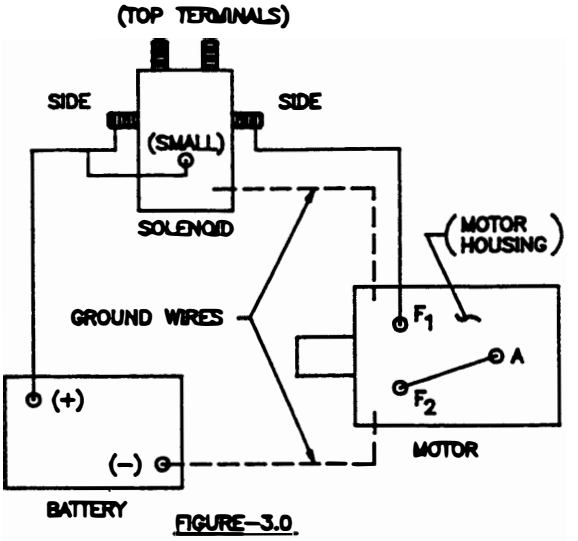
SOLENOIDS TO MOTOR CONNECTIONS

THE DASHED LINES ARE CURRENT'S PATH IN FORWARD ROTATION. SOLID LINES ARE CURRENT'S PATH AT ALL TIMES.
NOTE: DIRECTION OF MOTOR ROTATION DEPENDS ON WHICH SMALL TERMINAL OF EITHER SOLENOID IS CONNECTED TO BATTERY'S POSITIVE TERMINAL

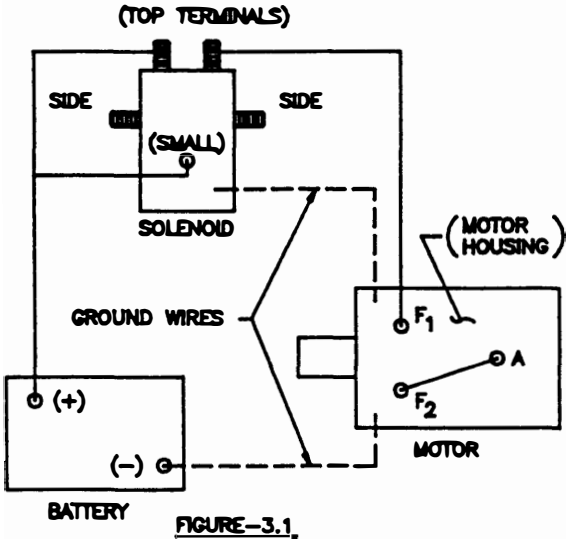
FIGURE–2.2

TEST PROCEDURE FOR SOLENOIDS:
When testing the DC motor the motor and the battery must be of the same voltage.

1. Secure motor to a bench or stable work surface. (see figure 3.0)
2. On the motor, attach a No. 6 wire from terminal A to terminal F-2.
3. Attach motor terminal F-1 to one side terminal of the solenoid. (see figure 3.0)
4. Ground the solenoid to the motor as shown.
5. Attach positive (+) battery terminal to the opposite solenoid terminal.
6. Ground negative (—) battery terminal to the motor housing.
7. Touch the positive wire from the battery to the small terminal of the solenoid. The motor should now run if the solenoid is good. If not, make sure the motor will run directly from the battery. (see test procedure for an electric motor)
8. To test the upper contacts of the solenoid use the same procedure except use the top contacts of the solenoid. (see figure 3.1) When hooked up, the motor should start running. When the positive wire is touched to the small terminal of the solenoid the motor will stop running.



FIGURE–3.0



FIGURE–3.1

XV. DISASSEMBLY OF A TULSA MODEL 900 SERIES WINCH:

1. Remove plug (34) to drain oil.
2. Remove frame angles (13) from gearbox (4) by removing eight cap screws (12).
3. For hydraulic drive, remove motor (37) from gearbox housing (4) by removing capscrews (36).
4. Check o-ring (35) and replace if required.

195. For mechanical drive, remove key (52) from worm (51). Remove end cap (54) and seal (53). Inspect and replace if necessary. Care should be taken in removing the end cap (54) from the gearbox housing so as not to damage the seal (53).

6. For an oil-cooled brake, remove the brake sub-assembly (SA 4034) from the gearbox housing (4) by unscrewing capscrews (70). See section IX. "SERVICING THE OIL-COOLED BRAKE" for details.
7. For a winch without a brake, remove end cap (31) and gasket (39) by removing capscrews (70). Inspect gasket and replace if necessary.
8. Slide end cover sub-assembly (1) off output shaft (3). The clutch (24) will slide off with the end cover sub-assembly.
9. Check the bushing (19) in the end cover (1) sub-assembly for signs of wear. Press a new bushing in the end cover sub-assembly if necessary.
10. Check yoke (21) for wear by unscrewing cap screw (23).
11. Check clutch (24) for wear and replace if needed.
12. Remove keys (28) from output shaft (3) and replace if needed.
13. Remove outside thrust washer (27) from output shaft (3), replace if needed.
14. Remove drum (2). Inspect bores and replace if needed.
15. Remove drag brake discs (8) and springs (9). Inspect and replace if needed.
16. Remove gearbox housing cover (6) and o-ring (10). Inspect o-ring and replace if needed. Check bushing (26) for wear and press a new bushing in if needed.
17. Remove thrust washer (27). Check for wear and replace if needed.
18. Remove output shaft (3) from bronze gear (29) through the cover side of the gearbox.
19. Remove the bronze gear (29). The bronze must be tilted up and out to clear the teeth of the worm (30).
20. Remove the snap rings (32) and press the worm (30) out of the gearbox housing. Turn the gearbox around and press the other bearing (33) out the other end. Inspect worm, bearings and snap rings and replace if necessary.
21. Inspect gearbox bushing (26) and seal (25). Press a new bushing and seal in if necessary. It is recommended that the seal be changed if the bushing is replaced.

XVI. ASSEMBLY OF A 900 SERIES TULSA WINCH:

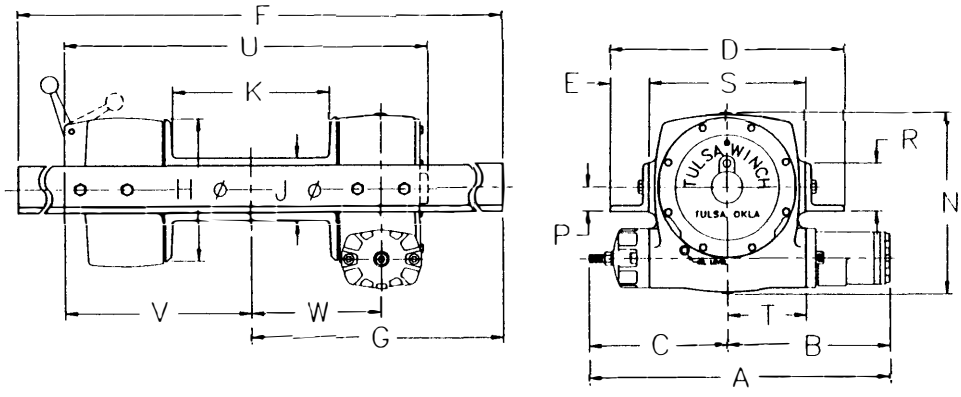
1. Press bushing (26) into gearbox housing (4).
2. With one bearing (33) pressed onto the worm (30). Install snap ring (32) to retain bearing. Press worm into gearbox. Press another bearing (33) on the other end of the worm. Secure other bearing with a snap ring (32).
3. Place thrust washer (27) inside gearbox housing.
4. Position bronze gear (29) in housing.
5. Install keys (28) into the output shaft (3).
6. Carefully insert output shaft (3), from the cover side, through the bronze gear and thrust washer (27). Make sure the keys line up through bronze gear (29).
7. Place thrust washer (27) over the output shaft onto the bronze gear (29).
8. Place o-ring (10) on cover (6) and lubricate with grease.
9. With bushing in cover, place cover on gearbox and secure with four capscrews (11). Do not over tighten. NOTE: For electric model reference XVIII. PART B
10. Press seal (25) into housing if not present.
11. Install springs (9) and drag brakes (8) into the pockets of the gearbox.
12. Slide drum (2) onto the output shaft (3).
13. Slide thrust washer (27) onto the output shaft.
14. Place yoke in grove of clutch (24). Secure yoke and clutch with cap screw (23) and spring (18).
15. Aligning clutch (24), slide end cover sub-assembly (1) onto the output shaft (3).
16. If the winch does not have a brake, install gasket (39) and end cap (31) to housing with capscrews (70).
17. For a hydraulic drive winch, secure hydraulic motor (37), o-ring (35) to gearbox housing with capscrews (36).
18. For mechanical drive, secure seal (53), gasket (39), and end cap (54) onto worm (51) with capscrews (36). Secure key (52) with washer (57), nut (56), and capscrew (55).
19. For an electric drive see section XVIII. "ASSEMBLY OF E945 COMPONENTS". 945, secure gasket (67), seal (35), and transmission assembly (22-46) to gearbox housing with capscrews (32). Install key (37) and seal (38) and secure electric motor (36) to transmission housing (34) with set screws and nuts (39)
20. Secure frames (13) onto the gearbox housing and end cover.

XXII. PARTS LIST FOR E945 TRANSMISSION AND RELAY KIT:

ITEM #	QTY./ UNIT	PART #	DESCRIPTION
1	2	40999	Relay, 12V
	2	41176	Relay, 24V
2	1	41010	Bracket, L.H.
3	2	41014	Nut
4	1	41011	Bracket, R.H.
5	2	41013	Screw
6	2	41028	Washer
7	2	41029	Wire Terminal, Male
8	3	41031	Wire Assembly
9	2	41032	Buss Bar
10	1	41034	Wire Assembly
11	2	41036	Buss Bar
12	1	41030	Wire Assembly
13	2	41014	Nut
14	1	41009	Cover
15	6	30841	Washer
16	4	40407	Capscrew
17	2	31569	Washer, Star
18	2	26432	Nut
19	1	41180	Nipple, Terminal
20	1	4062	Receptacle, Female
21	2	41013	Screw
22	12	41132	Capscrew
23	1	40979	Cover. Transmission
24	3	27897	Bearing, Needle

ITEM #	QTY./ UNIT	PART #	DESCRIPTION
25	1	40993	Thrust Washer
26	2	40992	Gear
27	1	40997	Key
28	1	40984	Shaft
29	1	25395	Key
30	1	23900	Key
31	1	40996	Gasket
32	2	40803	Capscrew
33	1	40994	Bushing
34	1	40981	Transmission Housing
35	1	30414	Seal
36	1	40998	Electric Motor
37	1	22925	Woodruff Key
38	1	34118	Seal
39	3	21723	Nut
40	2	31545	Dowel Pin
41	1	40983	Shaft
42	1	34251	O-ring
43	1	41203	Spur Gear
44	1	41205	Set Screw
45	1	40990	Spur Gear
46	1	23521	Plug
47	1	SA4060	Relay Kit 12V
	1	SA4080	Relay Kit 24V
48	1	40147	Gasket

XXIII. INSTALLATION DIMENSIONS AND PERFORMANCE DATA:



Model	A	B	C	D	E	F	G	H	J	K	N	P	R	S	T	U	V	W
H938-6"	16.54	9.04	7.50	13.44	3.00	34.00	17.00	7.25	3.50	6.00	10.00	1.25	2.50	7.44	3.72	18.12	8.74	5.25
H938-11"	16.54	9.04	7.50	13.44	3.00	34.00	17.00	7.25	3.50	11.00	10.00	1.25	2.50	7.44	3.72	23.12	11.24	7.75

SPECIFICATIONS

Safe Working Capacity Pounds	*Drum Shaft Diameter*	*Worm Gear Ratio*	*Transmission Ratio*	*Weight Pounds*
9,000	1½"	45:1	10.24:1	W/6" Drum 126.5 W/8" Drum 130.5 W/11" Drum 138.0 Add for Brake 3.5

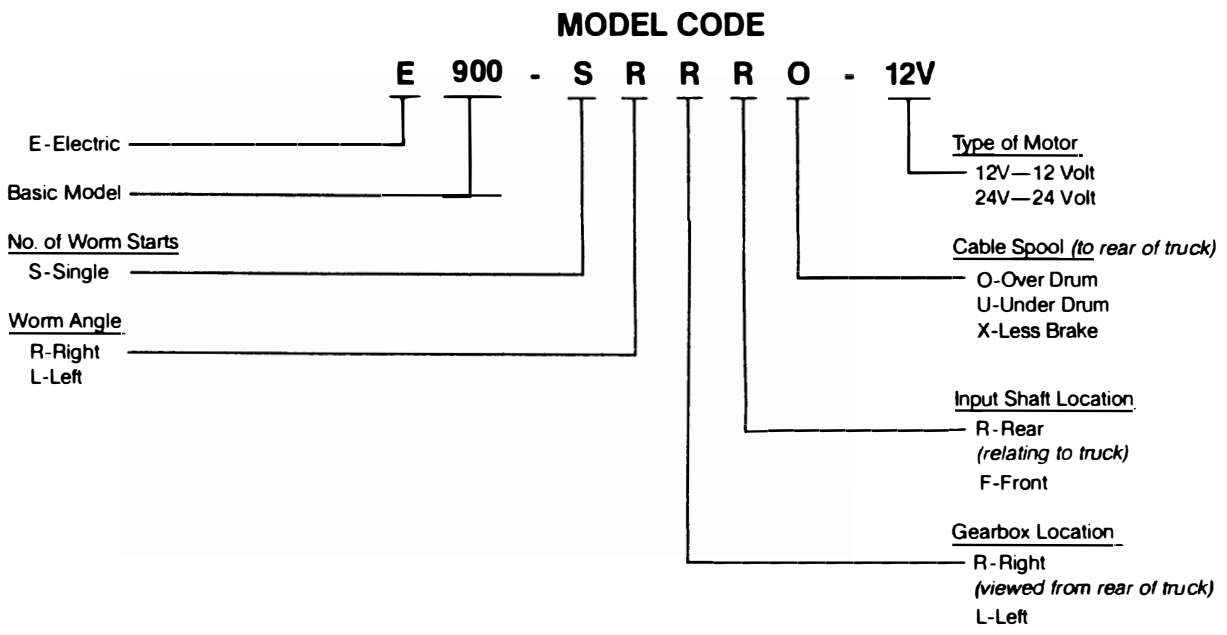
RATED LINEPULL IN POUNDS PER LAYER OF CABLE

Cable Size	*1st Layer*	*2nd Layer*	*3rd Layer*
7/16"	9000	7364	6231

CABLE CAPACITY IN FEET (7/16" CABLE)

Drum Size	*1st Layer*	*2nd Layer*	*3rd Layer*
6"	12	27	44
8"	17	37	61
11"	23	52	85

XXIV. MODEL CODE



XXV. LIMITED WARRANTY

LIMITED WARRANTY

Tulsa Winch expressly warrants its products against defects in material and workmanship under normal and ordinary use and service for a period of One (1) year from the date of purchase from Tulsa Winch or any authorized distributor of Tulsa Winch products. This warranty is not applicable to product failure due to improper operation or usage, misapplication, or employment for other than normal and ordinary purposes.

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