

**101BBX2L1C & 101BBX2R1C
HYDRAULIC WINCHES**

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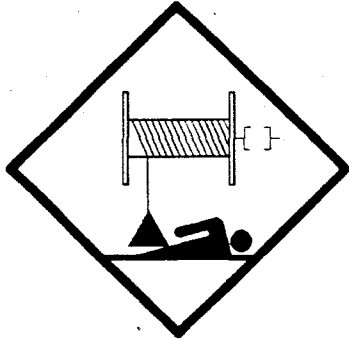
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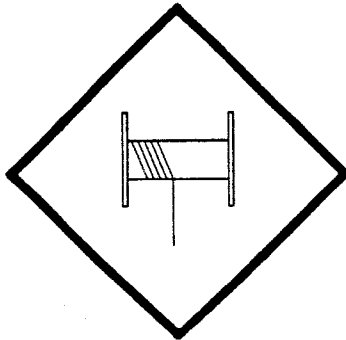
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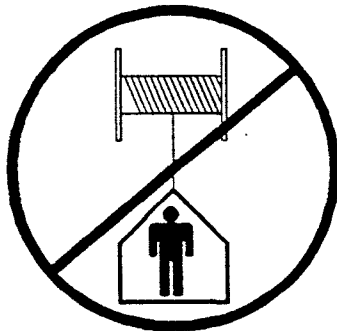
DANGER

**DO NOT DISENGAGE
WINCH UNDER LOAD**



DANGER

**THE LAST FIVE
WRAPS OF WIRE ROPE
MUST BE LEFT ON
THE DRUM TO ASSIST
THE WIRE ROPE CLAMP IN
HOLDING THE LOAD**



WARNING

**WINCHES ARE NOT
TO BE USED FOR
THE LIFTING OR
MOVING OF
PERSONS**

OPERATING PROCEDURE FOR SHIFTING GEARS

The following steps are necessary for proper gear shifting operations.

Single Speed Gearbox*

Gear Dis-Engagement:

1. Winch must be "at rest" and have **no** load on cable.
2. Shift winch to out of gear "*free spool*" mode.

Gear Engagement:

1. Winch must be "at rest" and have **no** load on cable.
2. Shift winch to in-gear mode and **slowly** rotate drum 90° in pay out direction, and then **stop** rotation. Next, **slowly** rotate drum in pay in direction to insure gears are fully engaged and **begin** paying in of load.

Two Speed Gear Box*

Low Gear to High Gear:

1. Winch must be "at rest" and have **no** load on cable.
2. Shift winch from low gear to high gear and **slowly** rotate drum 90° in pay out direction, and then **stop** rotation. Next, **slowly** rotate drum in pay in direction to insure gears are fully engaged and **begin** paying in of load.

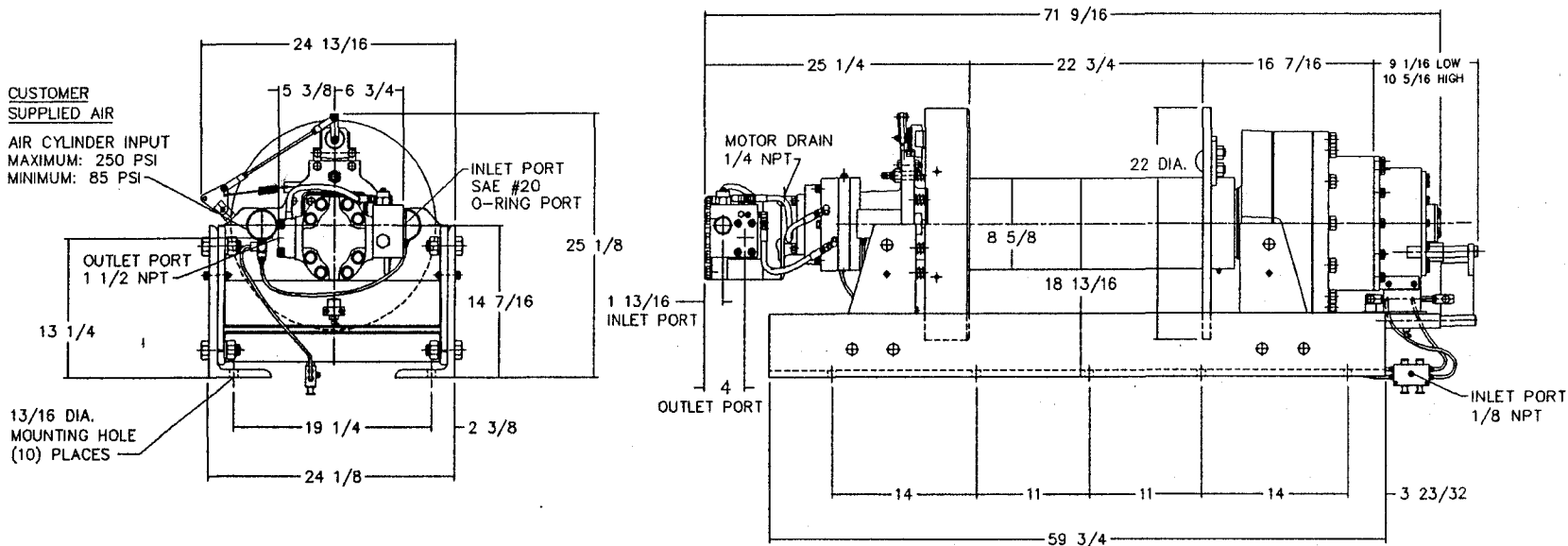
High Gear to Low Gear:

1. Winch must be "at rest" and have **no** load on cable.
2. Shift winch from high gear to low gear and **slowly** rotate drum 90° in pay out direction, and then **stop** rotation. Next, **slowly** rotate drum in pay in direction to insure gears are fully engaged and **begin** paying in of load.

* Also applies for two speed gear box with neutral position

WARNING!

If your winch has ever been "*shifted under load*" or has ever encountered "*rotational face contact of non-engaged gear components*," the gear teeth could be damaged. Damaged gear teeth can prevent your winch from fully engaging into gear and could allow it to jump out of gear. If this has happened to your winch, this procedure may *not* insure that it is fully engaged and it may need to be inspected for possible gear damage.



PERFORMANCE DATA

LOW SPEED LINE PULL (LBS) & SPEED (FPM)

CABLE SIZE	1ST LAYER		2ND LAYER		3RD LAYER		4TH LAYER		5TH LAYER	
	LINE PULL	FPM	LINE PULL	FPM	LINE PULL	FPM	LINE PULL	FPM	LINE PULL	FPM
1	100,000	18	82,800	21	70,600	25	61,600	29	54,600	32
1 1/8	100,000	18	81,300	22	68,400	26	59,100	30	52,000	34
1 1/4	100,000	18	79,800	23	66,400	27	56,800	32	—	—

HIGH SPEED LINE PULL (LBS) & SPEED (FPM)

CABLE SIZE	1ST LAYER		2ND LAYER		3RD LAYER		4TH LAYER		5TH LAYER	
	LINE PULL	FPM	LINE PULL	FPM	LINE PULL	FPM	LINE PULL	FPM	LINE PULL	FPM
1	16,300	108	13,500	131	11,500	153	10,000	176	8,880	198
1 1/8	16,300	110	13,200	135	11,100	160	9,610	186	8,450	211
1 1/4	16,300	111	13,000	139	10,800	167	9,240	196	—	—

THE RATED LINE PULLS SHOWN ARE FOR THE WINCH ONLY. CONSULT THE WIRE ROPE MANUFACTURER FOR WIRE ROPE RATINGS.

LINE SPEED IS BASED ON 60 GPM.

LINE PULL IS BASED ON 2,500 PSI PRESSURE DIFFERENTIAL ACROSS THE MOTOR.

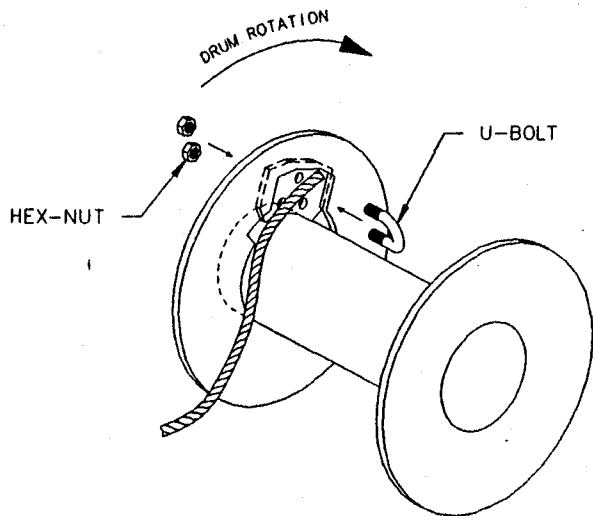
CABLE CAPACITY (FT)

CABLE SIZE	1ST LAYER	2ND LAYER	3RD LAYER	4TH LAYER	5TH LAYER
1	52	114	187	271	365
1 1/8	46	104	172	250	339
1 1/4	42	95	159	234	—

RECOMMENDED BREAK-IN PROCEDURE
 FULLY EXTEND CABLE AND MAKE (3) COMPLETE PULLS AT APPROXIMATELY HALF THE RATED CAPACITIES.
 THIS WILL EXTEND THE LIFE OF BOTH THE CABLE AND THE WINCH.

CABLE CAPACITIES ARE IN ACCORDANCE WITH SAE J706.

ACTUAL CAPACITIES ARE USUALLY UP TO 10% GREATER THAN THOSE SHOWN.

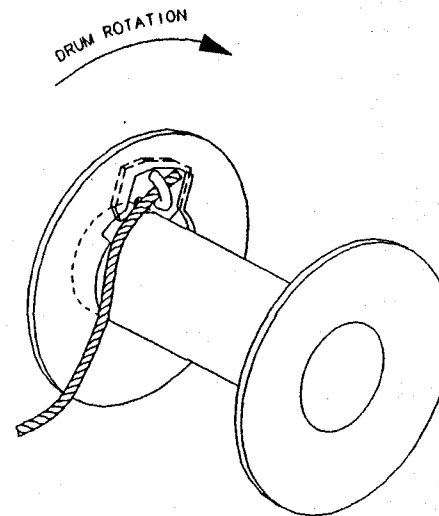


STEP 1

ALIGN WIRE ROPE BETWEEN PROPER HOLES ACCORDING TO DRUM ROTATION. INSERT U-BOLT INTO HOLES AND THREAD ON NUTS FROM BACK OF FLANGE.

CAUTION:

IF WINCH WIRE ROPE IS NOT INSTALLED FOR THE CORRECT DRUM ROTATION, THE WINCH BRAKE VALVE WILL NOT HOLD THE LOAD.



STEP 2

ONCE NUTS ARE TIGHTENED SECURE, THE WIRE ROPE IS PROPERLY INSTALLED.

CAUTION:

DO NOT OPERATE WINCH WITH LESS THAN 5 FULL WIRE ROPE WRAPS ON THE DRUM.

WIRE ROPE INSTALLATION

COMMERCIAL INTERTECH MOTOR

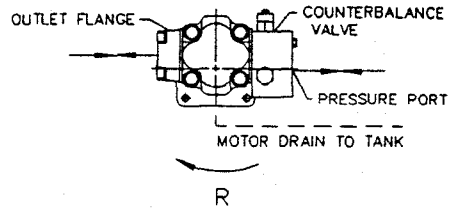
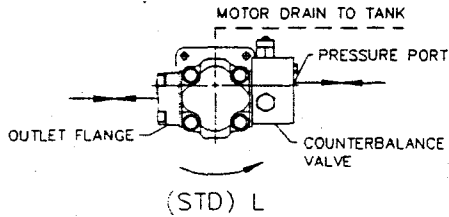
TO REVERSE WIRE ROPE PULL IN DIRECTION

METHOD 1

REMOVE THE COUNTERBALANCE VALVE AND OUTLET FLANGE.
REMOVE THE MOTOR MOUNTING BOLTS AND ROTATE THE MOTOR 180°.
REASSEMBLE MOTOR, COUNTERBALANCE VALVE, AND OUTLET FLANGE.

METHOD 2

SWITCH POSITIONS OF COUNTERBALANCE VALVE AND OUTLET FLANGE.
NOTE: HOSES GOING TO BRAKE HOUSING MAY NEED TO BE LONGER.

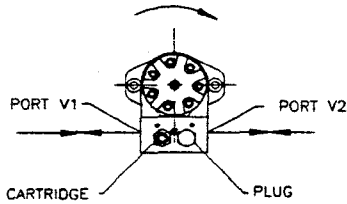


CHAR-LYNN MOTORS

(STD) L PRESSURE TO V1 ROTATES WINCH DRUM CLOCKWISE WHEN VIEWED FROM MOTOR END.

R PRESSURE TO V2 ROTATES WINCH DRUM COUNTER CLOCKWISE WHEN VIEWED FROM MOTOR END.

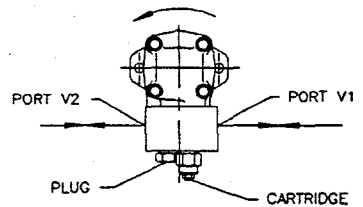
TO REVERSE WIRE ROPE PULL DIRECTION,
SWITCH POSITIONS OF CARTRIDGE AND PLUG.



(STD) L PRESSURE TO V1 ROTATES WINCH DRUM COUNTER CLOCKWISE WHEN VIEWED FROM MOTOR END.

R PRESSURE TO V2 ROTATES WINCH DRUM CLOCKWISE WHEN VIEWED FROM MOTOR END.

TO REVERSE WIRE ROPE PULL DIRECTION,
SWITCH POSITIONS OF CARTRIDGE AND PLUG.

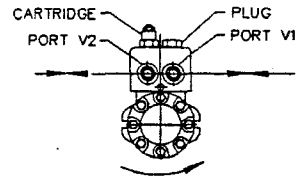


NICHOLS MOTOR

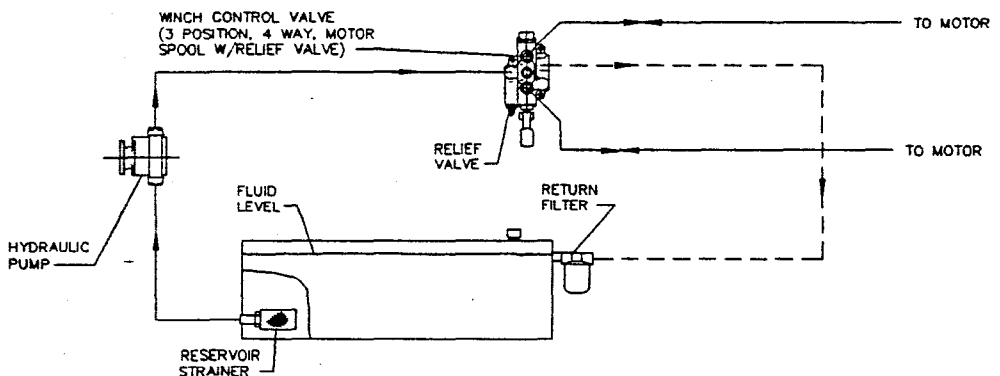
(STD) L PRESSURE TO V2 ROTATES WINCH DRUM COUNTER CLOCKWISE WHEN VIEWED FROM MOTOR END.

R PRESSURE TO V1 ROTATES WINCH DRUM CLOCKWISE WHEN VIEWED FROM MOTOR END.

TO REVERSE WIRE ROPE PULL DIRECTION,
SWITCH POSITIONS OF CARTRIDGE AND PLUG.

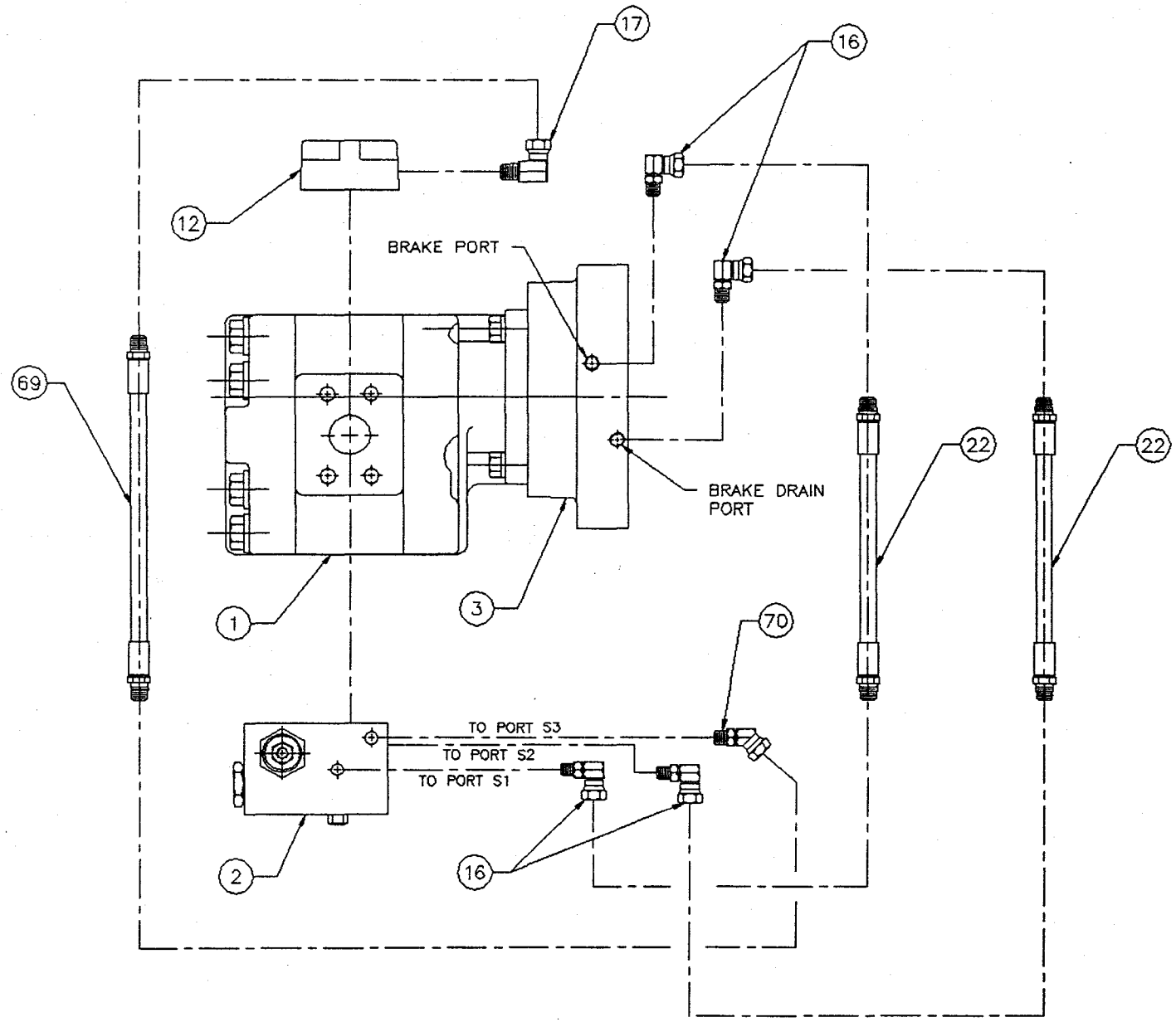


TYPICAL WINCH HYDRAULIC SYSTEM



NOTE: IF TENSIONER AND, OR FAIRLEAD OPTIONS EXIST, THEN REVERSAL OF THEIR POSITION
IN RELATION TO WINCH MUST TAKE PLACE BEFORE REVERSAL OF WIRE ROPE PULL DIRECTION CAN OCCUR.

WINCH PLUMBING DIAGRAM



REFER TO MOTOR END PARTS LIST 1.10135

SERVICE INSTRUCTIONS DP BRAKE

GENERAL:

The winch is fully hydraulic with a multi disc wet brake. The brake is spring applied and hydraulically released, and will automatically set any time the winch control valve is in neutral or in case of power failure. When the hydraulic pressure is less than 270 psi, the brake will set. Hydraulic power must be restored before brake will release. Maximum brake torque is achieved at 0 psi. (These winches are not to be used for moving or lifting people.)

DISASSEMBLY OF BRAKE (REFER TO MOTOR END INSTALLATION DRAWING 1.10135)

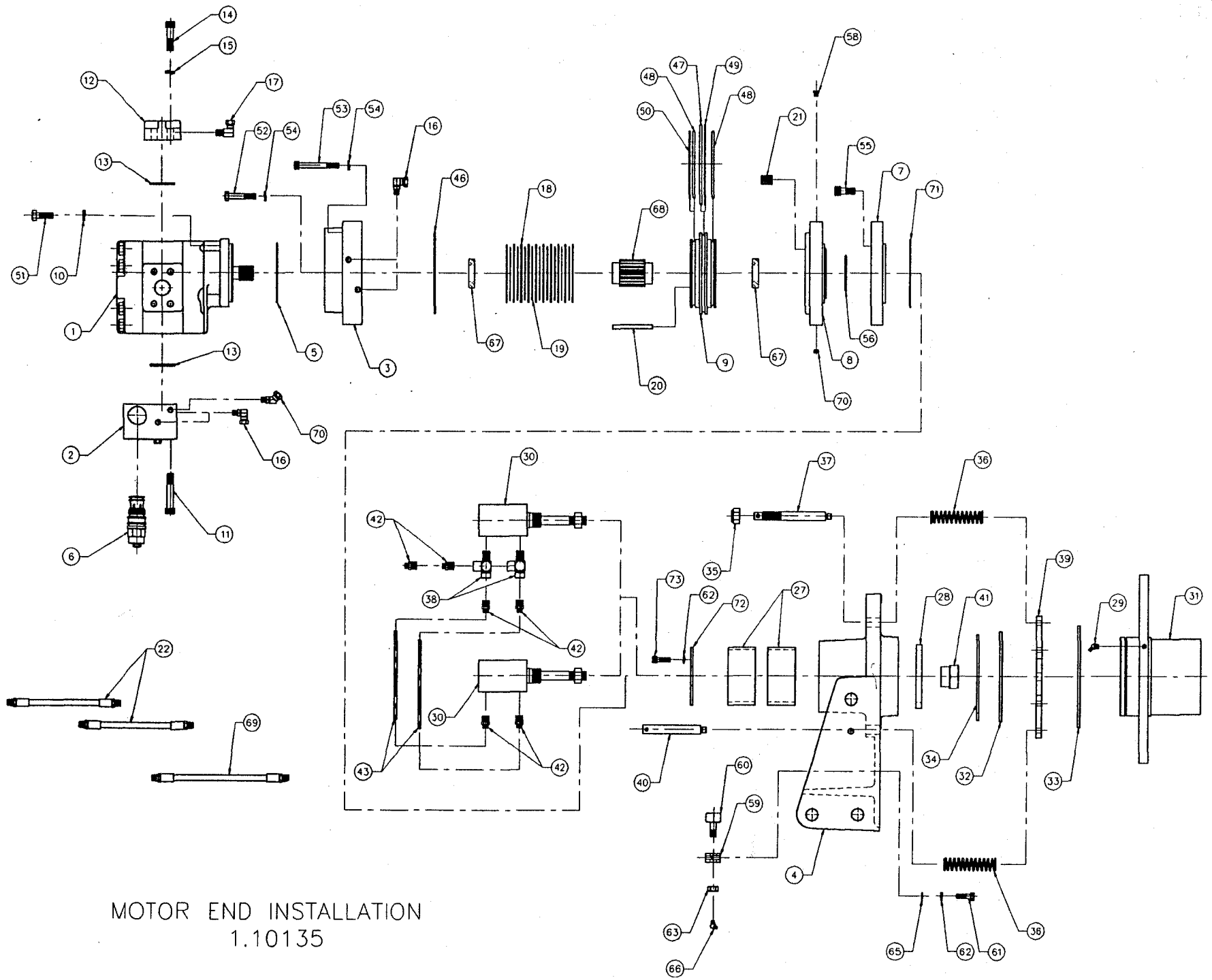
1. Disconnect brake hoses (item 22) at connections (item 16) on brake housing (item 3). wrap hose ends to prevent dirt contamination.
2. Disconnect motor (item 1) from brake housing (item 3) by removing four capscrews (item 51), lock washers (item 10). Allow oil to drain.
3. Remove outer brake housing (item 3) by removing four socket head capscrews (item 53), two hex head capscrews (item 52), and six lock washers (item 54).
CAUTION: Since housing is under spring loading of approximately 3,500 lbs., the capscrews should be loosened evenly until spring force has been relieved.
4. In removing housing (item 3), the bearing (item 67) may come with it or remain on brake shaft (item 68), or the brake shaft may also slide out.
5. Remove o-ring (item 46) from mid-brake housing (item 8).
6. Remove friction plates (item 18), drive plates (item 19), and dowel pins (item 20) from piston (item 9).
7. Remove piston (item 9) from mid-brake housing (item 8) being careful not to damage o-rings on piston. Next, remove o-rings and back-up rings (item 47, 48, 49, & 50) from piston.
8. Finally, remove springs (item 21) and bearing (item 67) from mid-brake housing (item 8).

ASSEMBLY OF BRAKE

1. Lubricate all o-rings and back-up rings with clean hydraulic oil used in the system.
2. Clean all parts thoroughly and visually examine for cuts, dents or other damage before assembly. Repair or replace parts with such defects.
3. Install bearing (item 67) into mid-brake housing (item 8), and insert twelve springs (item 21) into holes in housing. Next install shaft (item 68) into bearing (item 67).
4. Insert dowel pins (item 20) into respective holes in mid-brake housing (item 8).
5. Assemble o-rings and back up rings (item 47, 48, 49, & 50) on piston (item 9). Position back up rings as shown.
6. Insert piston (item 9) fitted with seals into mid-brake housing (item 8) and over dowel pins (item 20) and tap down until piston face is resting against springs (item 21).
7. Insert a friction plate (item 18) alternating with a drive plate (item 19) into piston (item 9) and over shaft (item 68) until all plates are in place in sequence illustrated.
8. Next, place bearing (item 67) onto brake shaft (item 68).
9. Place o-ring (item 46) in position on mid-brake housing (item 8). Finally and with care not to pinch o-ring seals on piston, slide the housing (item 3) into place over the dowel pins (item 20) and tap down until firm. Install lock washers (item 54) and capscrews (item 52 & 53) in place until all six shoulder up. proceed to tighten evenly against spring pressure until housing face (item 3) is in full contact and capscrews are torqued to 50 ft. lbs.
10. The motor (item 1) can now be reinstalled on the housing (item 3). Place o-ring (item 5) on pilot dia. of motor (item 1). Then insert into brake housing (item 3) and secure with capscrews (item 51), lock washers (item 10). Reconnect brake hoses (item 22) as shown on winch plumbing diagram.
11. Refill winch with oil through gear end cover fill port (refer to gear end cover installation drawing). Allow time for oil to travel through brake end.
12. Before running winch, loosen adapter connections (item 16) at brake slightly to bleed air from brake release hoses (item 22) with hydraulic oil under pressure. Retighten connections and winch is ready to operate.
(Note: pressure should not exceed 100 psi during bleeding.)

BRAKE TROUBLE SHOOTING

1. Brake will not release:
 - (a) Insufficient system pressure to brake.
 - (b) Damaged o-rings or back up ring seals (items 47, 48, 49, or 50).
 - (c) Damaged piston (item 9).
 - (d) Damaged seal surfaces within housing (item 3) or mid-brake housing (item 8).
 - (e) Damaged bearing (item 67).
 - (f) Friction or drive plates (items 18 or 19) warped or heat damaged.
2. Brake will not apply or applies but torque low:
 - (a) Damaged springs (item 21), either broken or heat damaged and having taken a permanent set.
 - (b) Friction plates (item 18) worn out.
3. Oil leaks externally from brake:
 - (a) Damaged o-ring seal (item 46).



MOTOR END INSTALLATION
 1.10135

1.10135 PARTS LIST
MOTOR END INSTALLATION

<u>LOC.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	73036	MOTOR - HYDRAULIC	1
2	11541	VALVE - COUNTERBALANCE	1
3	12489	HOUSING - BRAKE	1
4	11299	SUPPORT - MOTOR END	1
5	9620	O-RING - 5 I.D. x 3/32 SECTION	1
6	70034	CARTRIDGE - VALVE	1
7	12280	ADAPTER - BRAKE	1
8	12279	HOUSING - BRAKE - MID	1
9	11443	PISTON - BRAKE	1
10	1495	WASHER - LOCK - 1/2	5
11	1457	CAP SCREW - SOCKET HEAD - 1/2-13 NC x 3 - GRADE 8	4
12	10506	FLANGE - 4 BOLT - SAE 1-1/2	1
13	9962	O-RING - 1-7/8 I.D. x 2-1/8 O.D.	1
14	1459	CAP SCREW - SOCKET HEAD - 1/2-13 NC x 2 - GRADE 8.	4
15	1144	WASHER - LOCK - HI COLLAR - 1/2	4
16	76511	ADAPTER - SWIVEL - 90° - #4 - 1/4	4
17	76503	ADAPTER - SWIVEL - 90° - 1/4 - 1/4	1
18	11603**	PLATE - DISC - FRICTION	10
19	3159**	PLATE - DRIVE - BRAKE	9
20	3263	PIN - DOWEL - 5/16 DIA. x 3-1/2 LG.	2
21	2319**	SPRING - COMPRESSION - 3/4 O.D. x 1 LG.	12
22	75006	HOSE - 1/4 - 10 - R1	2
24	1179*	CAPLUG - PLASTIC - 20 S.I.D.	1
25	1157*	CAPLUG - #4 - RED - 1/4 NPT	3
27	11372	BEARING - BRONZE - 4-1/2 I.D.	2
28	9808	SEAL - SHAFT	1
29	1001	FITTING - GREASE - 45° - 1/8 NPT	2
30	72016	CYLINDER - AIR	2
31	10967	HUB - DRIVE	1
32	10957	BEARING - THRUST - 7-3/4 O.D. x 1/4 W.	1
33	10958	BEARING - THRUST - 8-3/4 O.D. x 1/4 W.	1
34	3099	RING - RETAINING - 6-5/16 I.D.	1
35	1693	NUT - LOCK - 3/4 NF	3
36	2316	SPRING - 1-1/8 O.D. x 4-1/2 LG.	6
37	10964	PIN - GUIDE - SPRING	3
38	2088	TEE - SERVICE - 3/8 NPT	2
39	10954	PLATE - SHIFTER	1
40	10975	PIN - GUIDE - SPRING - SHORT	3
41	10991	NUT - SHOULDER - CYLINDER - AIR	2
42	3233	FITTING - STR. - 1/4 TUBE - 3/8 NPT	6
43	77800	TUBE - NYLON - 1/4	5
44	10708*	TAG - WARNING	1
45	3112*	TIE - CABLE	2
46	9844#	O-RING - 6-3/4 I.D. x 1/8 SECTION	1
47	9853#	O-RING - 6-1/2 I.D. X 3/16 SECTION	1

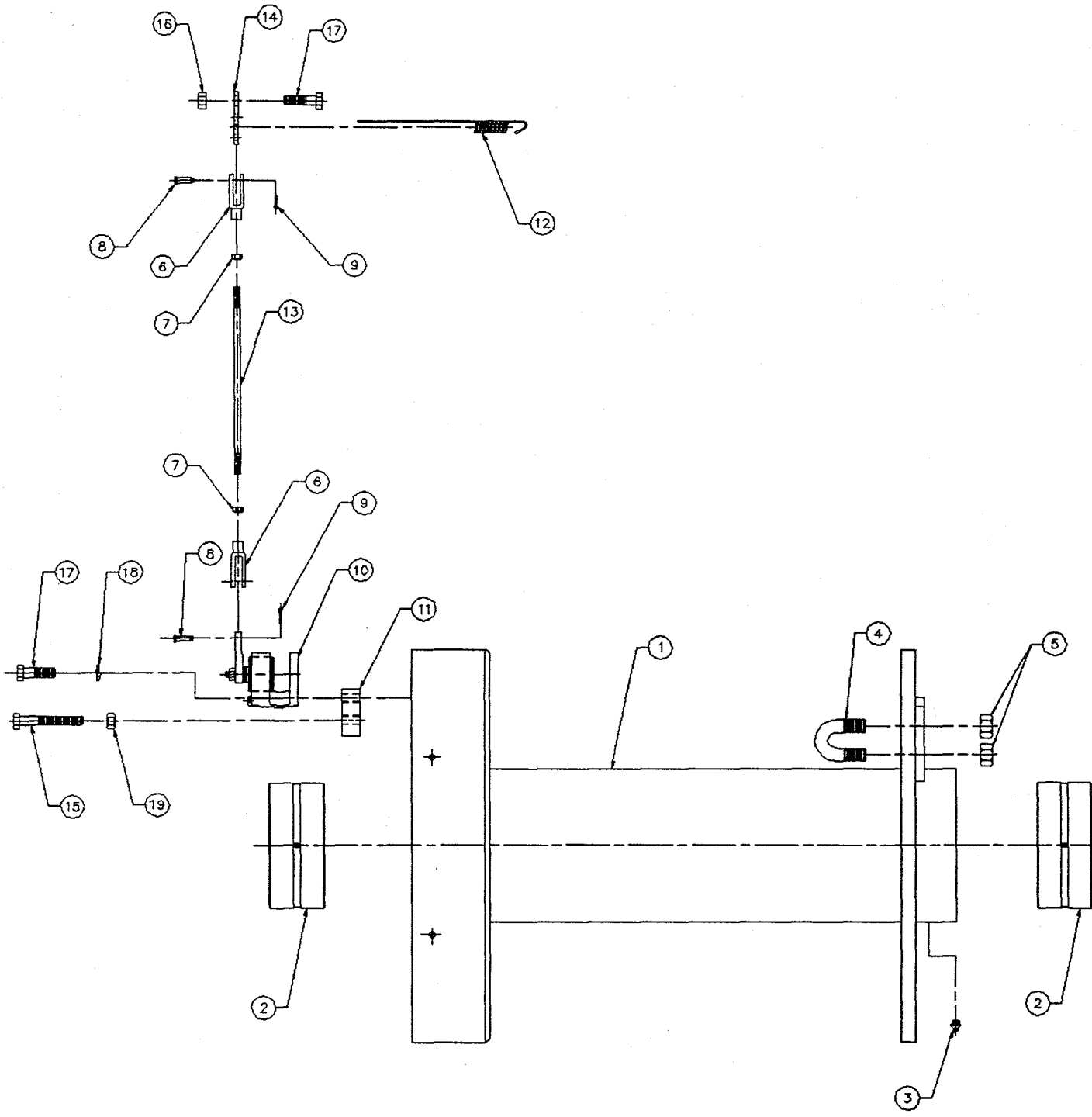
1.10135 PARTS LIST (CONT'D)
MOTOR END INSTALLATION

<u>LOC.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
48	9851#	O-RING - 5-3/8 I.D. x 3/16 SECTION	2
49	9854#	RING - BACK-UP - 6-1/2 I.D.	1
50	9852#	RING - BACK-UP - 5-3/8 I.D.	1
51	1403	CAP SCREW - HEX HEAD - 1/2-13 NC x 1-1/2 - GRADE 5	4
52	1376	CAP SCREW - HEX HEAD - 7/16-14 UNC x 2-1/2 - GR. 8	6
53	1375	CAP SCREW - S.H. - 7/16-14 UNC x 3-1/2 - GR.8	4
54	1388	WASHER - LOCK - 7/16	6
55	1454	CAP SCREW - S.H. - 1/2-13 NC x 1-1/4 - GR. 8	4
56	9602	O-RING - 2-3/4 I.D. x 1/8 SECTION	1
58	3059	VENT - RELIEF	1
59	11600	SUPPORT - FOLLOWER - CAM	1
60	81518	FOLLOWER - CAM	1
61	1303	CAP SCREW - HEX HEAD - 3/8-16 NC x 1-1/4 - GR. 5	2
62	1395	WASHER - LOCK - 3/8	5
63	1491	NUT - HEX - 1/2 - 20 NF	1
65	1398	WASHER - FLAT - 3/8	3
66	3284	FITTING - GREASE	1
67	81434	BEARING - BALL - 1-3/4 I.D.	2
68	11688	SHAFT - BRAKE	1
69	75009	HOSE - 1/4 - 12 - R1	1
70	76516	ADAPTER - 45° - SAE #4	1
71	1162	GASKET	1
72	11577	PLATE - THRUST	1
73	1340	CAPSCREW - SOCKET HEAD - 3/8 x 1	3

* NOT SHOWN ON EXPLODED DRAWING

**THESE ITEMS SOLD IN 9400 KIT ONLY

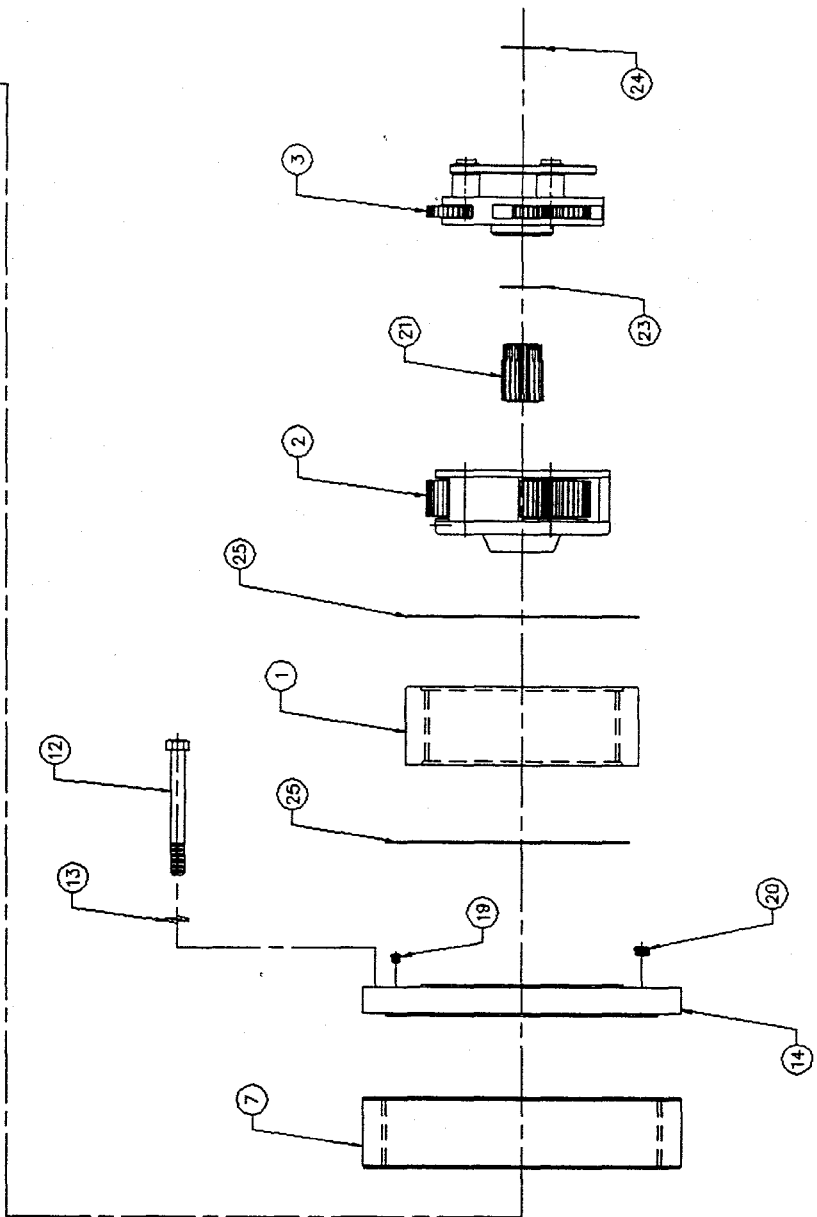
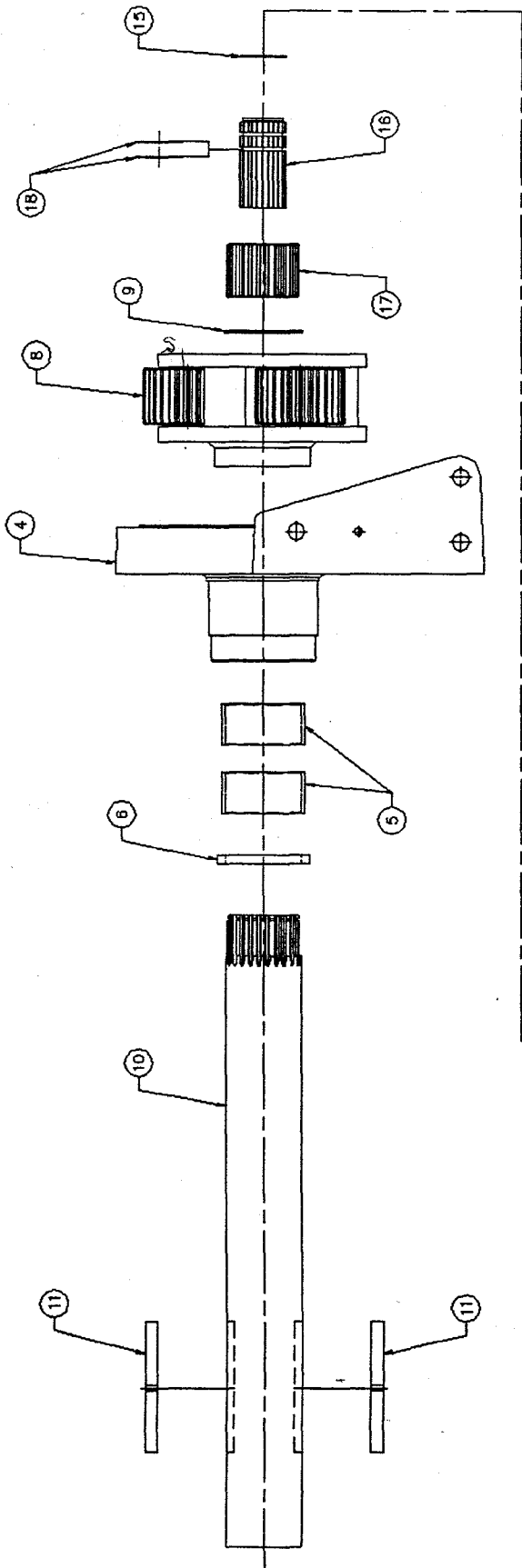
THESE ITEMS SOLD IN 9406 KIT ONLY



DRUM INSTALLATION
1.20035

1.20035 PARTS LIST
CABLE DRUM INSTALLATION

<u>LOC.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	10970	DRUM	1
2	10977	BEARING - BRONZE - 6-1/2 I.D. x 3 W.	2
3	1000	FITTING - GREASE - STR. - 1/8 NPT	1
4	10782	U - BOLT - 1"	1
5	1690	NUT - HEX - 3/4 - 10 NC	2
6	1073	YOKE - CLEVIS - 5/16 NF	2
7	1281	NUT - HEX - 5/16 - 24 NF	2
8	3117	PIN - YOKE - 5/16	2
9	1006	PIN - COTTER - 3/32 DIA. x 1/2 LG.	2
10	11300	BRAKE - DISC	1
11	11287	BRACKET - BRAKE	1
12	2306	SPRING - TENSION - BRAKE	1
13	11294	ROD - CONTROL - BRAKE	1
14	11296	PLATE - SECTOR - BRAKE - CONTROL	1
15	11290	SCREW - ADJUSTMENT - BRAKE	2
16	1492	NUT - LOCK - 1/2 - 13 NC	1
17	1404	CAP SCREW - HEX HEAD - 1/2-13 NC x 1-3/4 - GR. 8	3
18	1495	WASHER - LOCK - 1/2	2
19	1490	NUT - HEX - 1/2 - 13 NC	2



GEAR END INSTALLATION
1.30086

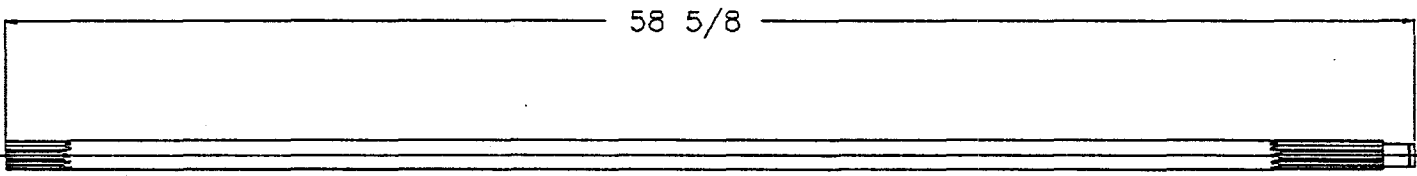
1.30086 PARTS LIST
GEAR END INSTALLATION

<u>LOC.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	81121	RING - GEAR	1
2	3034	ASSEMBLY - CARRIER - SECONDARY	1
3	12754	ASSEMBLY - CARRIER - PRIMARY	1
4	11655	SUPPORT - END - GEAR	1
5	11372	BEARING - BRONZE - 4-1/2 I.D.	2
6	9808	SEAL - SHAFT - 4-1/2 I.D. x 5-1/2 O.D. x 1/2 W.	1
7	10997	GEAR - RING - 17-1/2 DIA.	1
8	11101	ASSEMBLY - CARRIER - 4.5 x 1	1
9	3060	RING - RETAINING - 4 I.D.	1
10	10955	SHAFT - OUTPUT	1
11	11369	DRUM - KEY	2
12	1618	CAP SCREW - HEX HEAD - 3/4-10 NC x 7 - GRADE 5	12
13	1695	WASHER - LOCK - 3/4	12
14	10742	COVER - ADAPTER	1
15	3041	RING - RETAINING - 2-5/16 I.D. x 2-11/16 O.D.	1
16	11585	SHAFT - OUTPUT	1
17	10998	GEAR - SUN - 4.5 x 1	1
18	3148	RING - RETAINING - 2 SECTION	2
19	3059	VENT - RELIEF	1
20	3048	PLUG - MAGNETIC - 1/2 NPT	1
21	10989	GEAR - SUN - 20 TEETH	1
22	10848*	LABEL - WARNING	1
23	3056	RING - RETAINING - 2-1/8 I.D. x 2-7/16 O.D.	1
24	3057	RING - RETAINING - 2 I.D. x 2-5/16 O.D.	1
25	9998	GASKET - COVER - LARGE	2

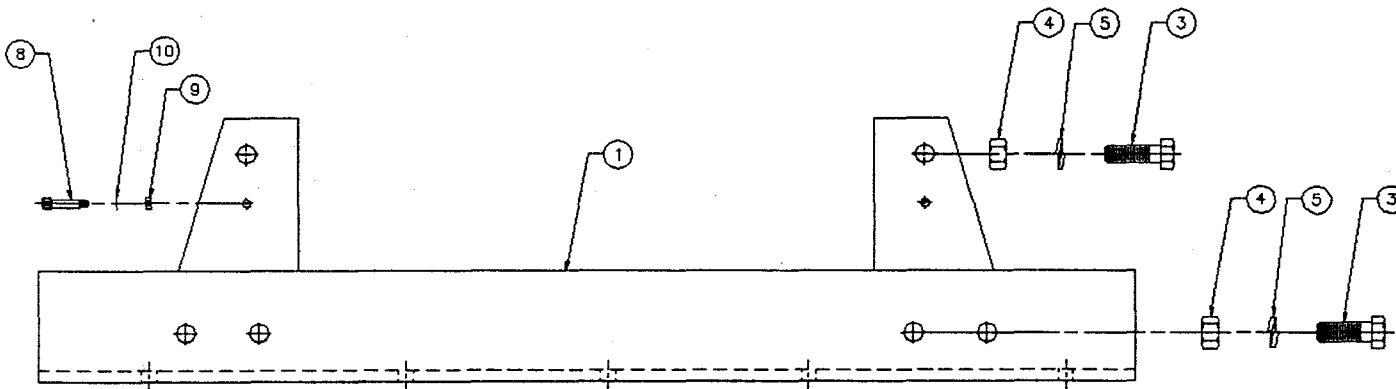
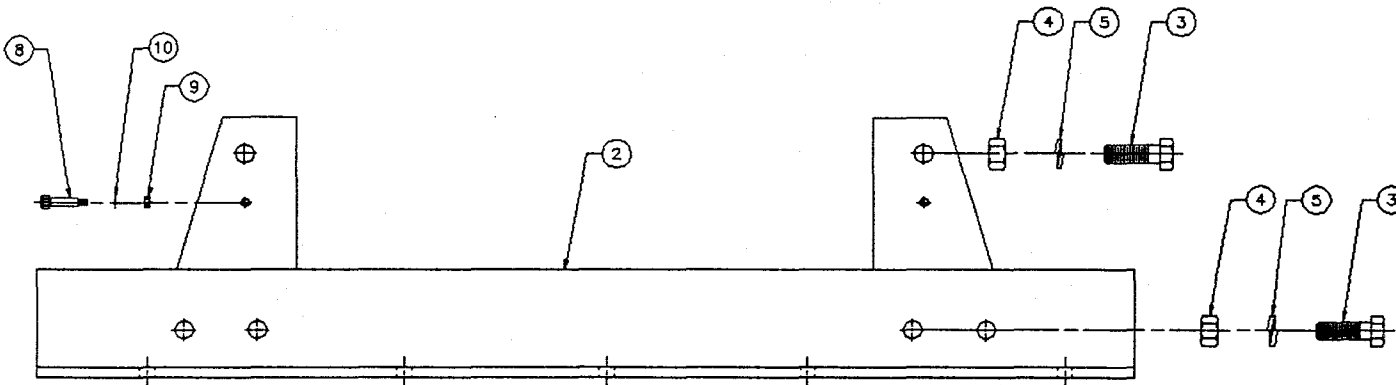
*NOT SHOWN ON EXPLODED DRAWINGS

1.40150 PARTS LIST
INPUT SHAFT INSTALLATION

<u>LOC.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	12462	INPUT SHAFT	1



INPUT SHAFT INSTALLATION
1.40150

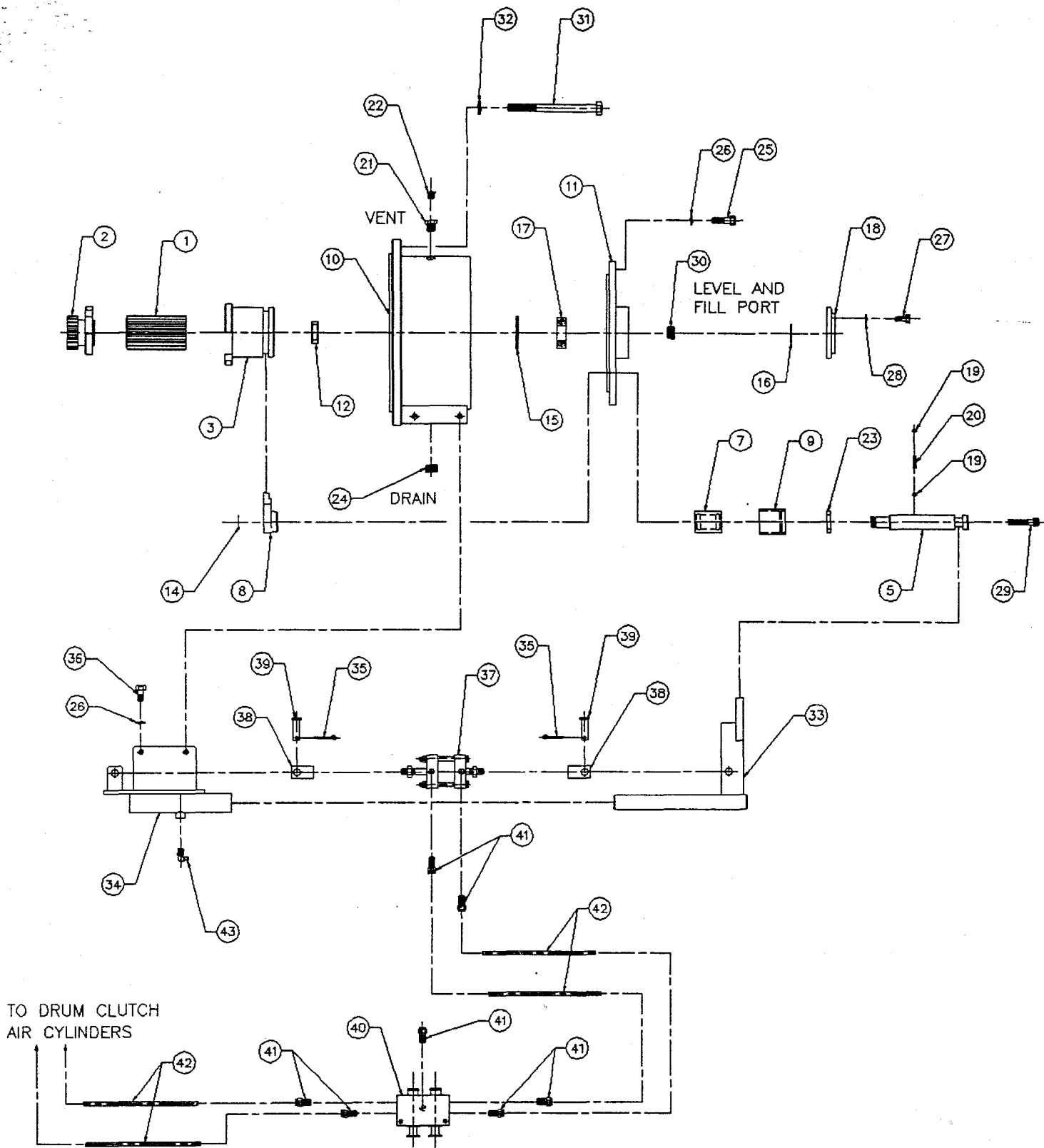


BASE MOUNT INSTALLATION
1.50026

1.50026 PARTS LIST
BASE MOUNT INSTALLATION

<u>LOC.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	11301	ANGLE - BASE	1
2	11305	ANGLE - BASE - LEFT HAND	1
3	1806	CAP SCREW - HEX HEAD - 1 - 8 NC x 3 - GRADE 5	12
4	1890	NUT - HEX - 1 - 8 NC	12
5	1895	WASHER - LOCK - 1"	12
6	10466*	PLATE - ID - WINCH	1
7	1165*	RIVET - TYPE - U	4
8	1476	SHOULDER BOLT - S.H. - 1/2 x 1-1/2 LG.- 3/8-16 THD.	4
9	1390	NUT - HEX - 3/8 - 16 NC	4
10	1394	WASHER - FLAT - 3/8	4

*NOT SHOWN ON EXPLODED DRAWING



TWO SPEED AIR/HYDRAULIC KICKOUT
 GEAR END COVER INSTALLATION
 1.60078

1.60078 PARTS LIST
GEAR END COVER INSTALLATION

<u>LOC.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	11151	SLEEVE - DRIVE	1
2	11152	GEAR - SUN	1
3	11153	HUB - DRIVE	1
5	11155	SHAFT - SHIFTER	1
7	11248	DETENT - SHIFTER	1
8	11158	SHIFTER - 2 SPEED	1
9	11159	HOUSING - SHIFTER	1
10	11160	HOUSING - GEAR - END	1
11	11161	COVER - END - LARGE	1
12	11162	SPACER - BEARING	1
14	3115	RING - RETAINING - 11/16 I.D.	1
15	3104	RING - RETAINING - 2-1/4 O.D.	1
16	3103	RING - RETAINING - 7/8 I.D.	1
17	81426	BEARING - BALL - 1 I.D. x 2-1/16 O.D.	1
18	11105	COVER - SMALL	1
19	3116	BEARING - BALL - 1/4 DIA.	2
20	2318	SPRING - COMPRESSION	1
21	2141	BUSHING - HEX - STL. - 3/8 x 1/8 NPT	1
22	3059	VENT - RELIEF	1
23	9809	SEAL - SHAFT	1
24	3049	PLUG - MAGNETIC - 3/8 NPT	1
25	1303	CAP SCREW - HEX HEAD - 3/8-16 NC x 1-1/4 - GR. 5	12
26	1395	WASHER - LOCK - 3/8	16
27	1190	CAP SCREW - HEX HEAD - 5/16-18 NC x 3/4 - GR. 5	4
28	1168	WASHER - LOCK - 5/16	4
29	1083	CAP SCREW - S.H. - 3/8-16 NC x 1-3/4 - GRADE 8	2
30	1988	PLUG - PIPE - 1/2 NPT	1
31	1417	CAP SCREW - HEX HEAD - 1/2-13 NC x 6 - GRADE 5	12
32	1495	WASHER - LOCK - 1/2	12
33	11221	YOKE - SHIFT	1
34	11220	BRACKET - CYLINDER	1
35	1013	PIN - COTTER - 1/8 x 1	2
36	1301	CAP SCREW - HEX HEAD - 3/8-16 NC x 3/4 - GRADE 5	4
37	72018	CYLINDER - AIR	1
38	3132	CLEVIS - 1/2"	2
39	3133	PIN - CLEVIS - 1/2"	2
40	71016	VALVE - AIR	1
41	3134	ADAPTER - STR. - PUSH ON - 1/4 TUBE - 1/8 NPT	7
42	77800	HOSE - PLASTIC - 1/4 x .040 W	50FT.
43	1002	FITTING - GREASE - 90° - 1/8 NPT	1

BOLT TORQUES

<u>SIZE</u> THREADS / IN. ↓	<u>GRADE 5</u> <i>ft.lb.</i>	<u>GRADE 8</u> <i>ft.lb.</i>
1/4 - 20	6	9
5/16 - 18	13	18
3/8 - 16	23	35
7/16 - 14	35	55
1/2 - 13	55	80
9/16 - 12	80	110
5/8 - 11	110	170
3/4 - 10	200	280
7/8 - 9	320	460
1 - 8	480	680
1-1/8 - 7	600	960
1-1/4 - 7	840	1360
1-3/8 - 6	1100	1780

NOTE: SUGGESTED TIGHTENING VALUES ONLY

UNLESS OTHERWISE NOTED.

WARRANTY

DP Manufacturing, Inc. warrants each product manufactured by it to be free from defects in material or workmanship for a period not to exceed one year from the date of shipment.

This warranty is limited to replacing any part or parts manufactured by DP manufacturing, Inc. and found, upon examination at our factory, to be defective due to materials or workmanship. Freight, express and/or installation charges shall be borne by the purchaser. Provided further, that the purchaser gives written notice to the factor of such defects, and that during said period the product was properly cared for and operated under normal conditions.

DP Manufacturing, Inc. will not warrant any part that has failed as a result of abuse, negligence, misuse, accident or installation made by other, nor to any part made inoperative because of wear occasioned by use, nor any product which has been altered in any way so in our judgment affect its operation or reliability.

DP Manufacturing, Inc. will not be liable for loss of time to the purchaser while the product is out of service, nor for any labor or other expense, damage or loss, statutory or otherwise, occasioned, or claimed to be occasioned, by such defective parts or failure. The correction of such defects by repair or replacement shall constitute a fulfillment of all the company's obligation to the purchaser.

No employee, agent, distributor, or dealer of DP Manufacturing, Inc. shall have the right to modify or change this warranty without written authorization signed by an officer of DP Manufacturing, Inc. This warranty is in lieu of all warranties expressed or implied and any and all other obligations or liabilities on its part contractual or otherwise.

DP Manufacturing, Inc. reserves the right to make changes and improvements in its product without incurring any obligation to install any such changes or improvements upon its products previously manufactured.

HOW TO ORDER PARTS

IMPORTANT: To insure satisfactory product performance after repairs, always use genuine DP Manufacturing replacement parts.

1. MODEL IDENTIFICATION

Always furnish the DP Model Number and Serial Number when ordering parts. This information is found on the Products nameplate.

2. PART NUMBER AND DESCRIPTION

In addition to the serial number, always give the part number and description of each part ordered. If there is any doubt as to the correct part number and description, furnish a dimensional sketch or return the part to be replaced, transportation charges prepaid.

Your cooperation in furnishing as much information as possible will assist us in filling your orders correctly in the shortest possible time.

Send orders to:

dp Manufacturing, Inc.
PO Box 471710
Tulsa, Oklahoma 74147
(918) 250-2450

OIL SPECIFICATIONS

HYDRAULIC SYSTEM

<u>AMBIENT TEMP. RANGE</u>	<u>HYDRAULIC OIL</u>
120°F To -15°F	SAE 10W HYDRAULIC
40° F To -50°F	MIL-L-46167 (OEA)

Filtration Level: 25 Micron or lower

Control Valve Type: 3-position-4-way Motor Spool

LUBRICATION

<u>AMBIENT TEMP. RANGE</u>	<u>GEAR LUBRICANT*</u>
120°F TO 10°F	SAE 50
40°F TO -25°F	75W90
30°F TO -50°F	Conoco DN600 or Equiv.

Initial Change: After 6 weeks or 10 hours of operation.

Periodic Change: Lube should be changed on an annual basis or every 50 hours of operation.

* Maintain amount of lube at level plug.

* If unit is not mounted horizontally, consult factory for fill and drain.