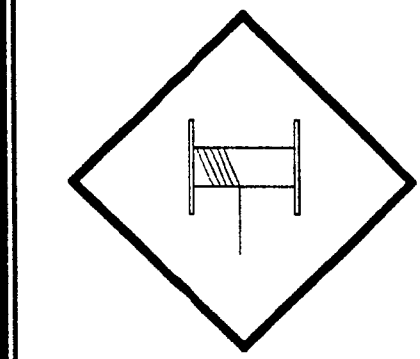
HYDRAULIC WINCHES
20BCX4L2G
AND
20BCX4R2G

1/4/99

TABLE OF CONTENTS

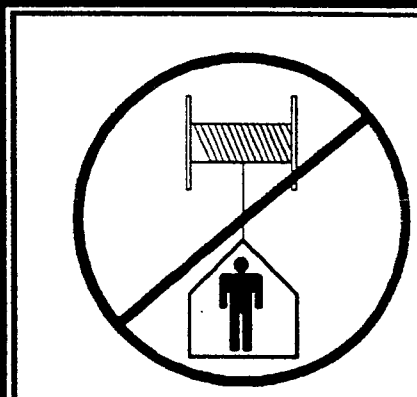
DANGER

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.

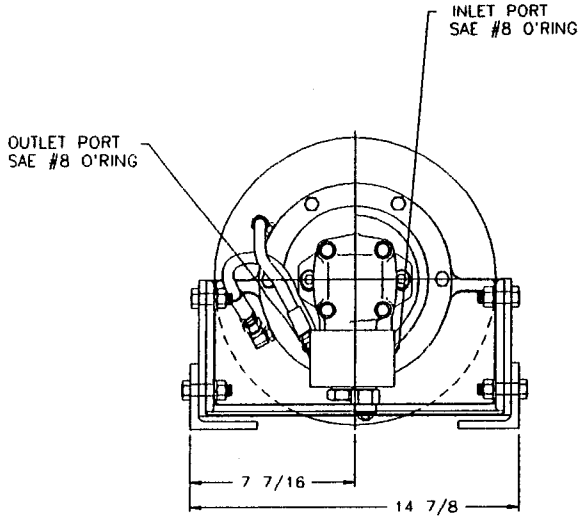
High Gear to Low Gear:

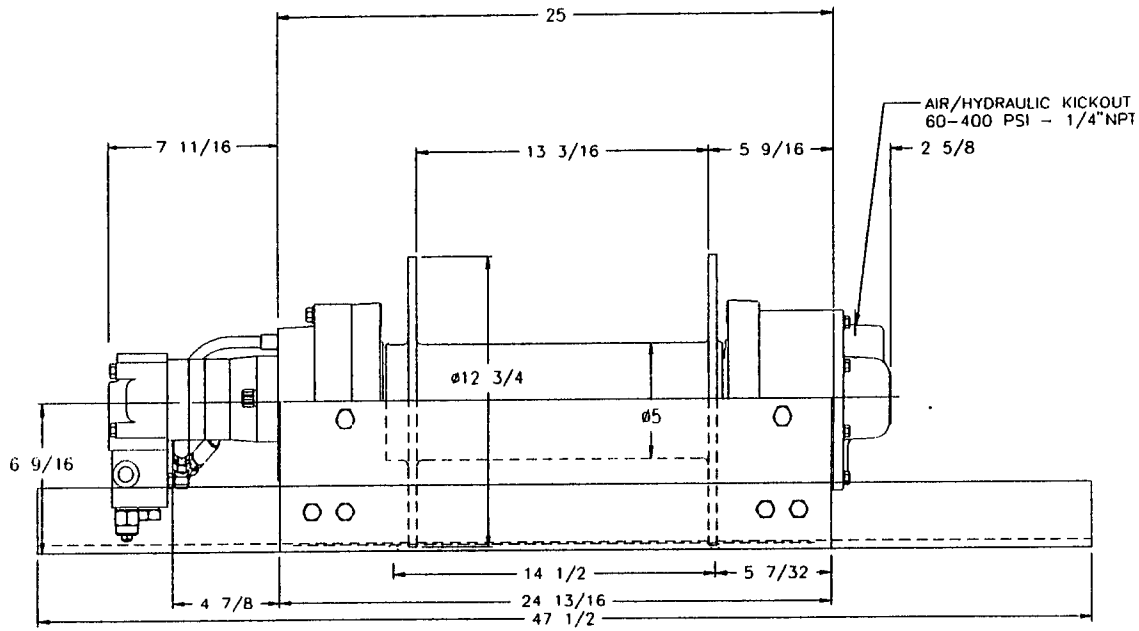
1. Winch must be "at rest" and have **no** load on cable.
2. Shift winch from high gear to low gear and **slowly** rotate drum 90° in pay out direction, and then **stop** rotation. Next, **slowly** rotate drum in pay in direction to insure gears are fully engaged and **begin** paying in of load.

*** 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.





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.

WINCH PERFORMANCE

LAYER	9/16 ø CABLE CAP.	LINE PULL	LINE SPEED
1	31	20000	27
2	68	16600	32
3	111	14200	37
4	160	12500	43
5	216	11100	48
6	278	9950	54

THE RATED LINE PULLS SHOWN ARE FOR THE WINCH ONLY. CONSULT THE WIRE ROPE MANUFACTURER FOR WIRE ROPE RATINGS.
LINE SPEED IS BASED ON 20 GPM FLOW RATE (MAX FLOW OF 20 GPM).
LINE PULL IS BASED ON 2200 PSI. OPTIONAL LOWER PRESSURE MOTORS ARE ALSO AVAILABLE.
CABLE CAPACITIES ARE IN ACCORDANCE WITH SAE J706, WITH THE EXCEPTION OF THE LAST WRAP.
(ACTUAL CAPACITIES ARE USUALLY UP TO 10% GREATER THAN THOSE SHOWN).

20BCX4L2G & 20BCX4R2G WINCHES

12/13/96

COMMERCIAL INTERTECH MOTOR

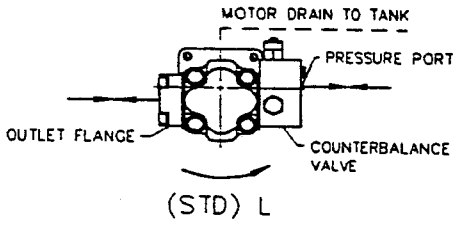
TO REVERSE WIRE ROPE PULL IN DIRECTION

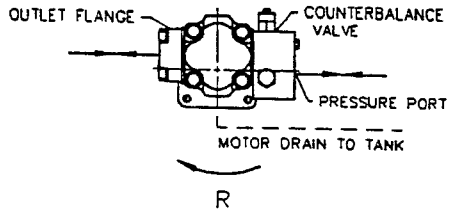
METHOD 1

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.



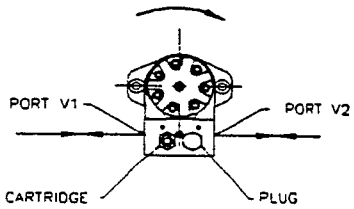


CHAR-LYNN MOTORS

(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.

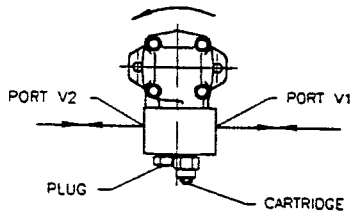
TO REVERSE WIRE ROPE PULL DIRECTION, SWITCH POSITIONS OF CARTRIDGE AND PLUG.



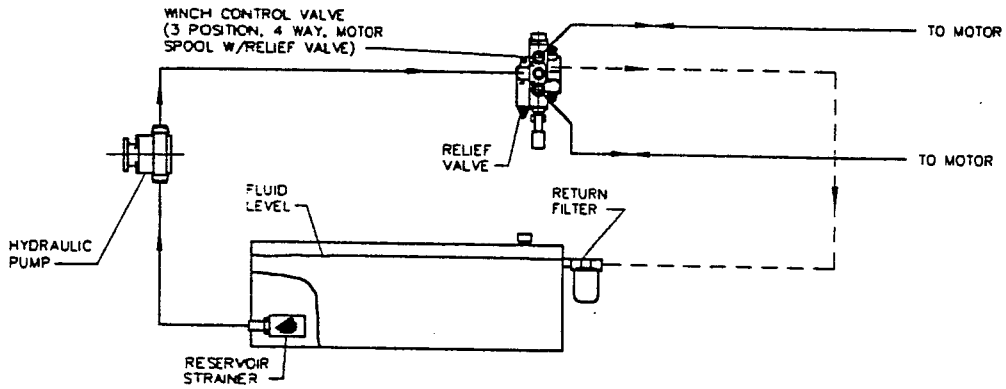
(STD) L PRESSURE TO V1 ROTATES WINCH DRUM COUNTER CLOCKWISE WHEN VIEWED FROM MOTOR END.

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.



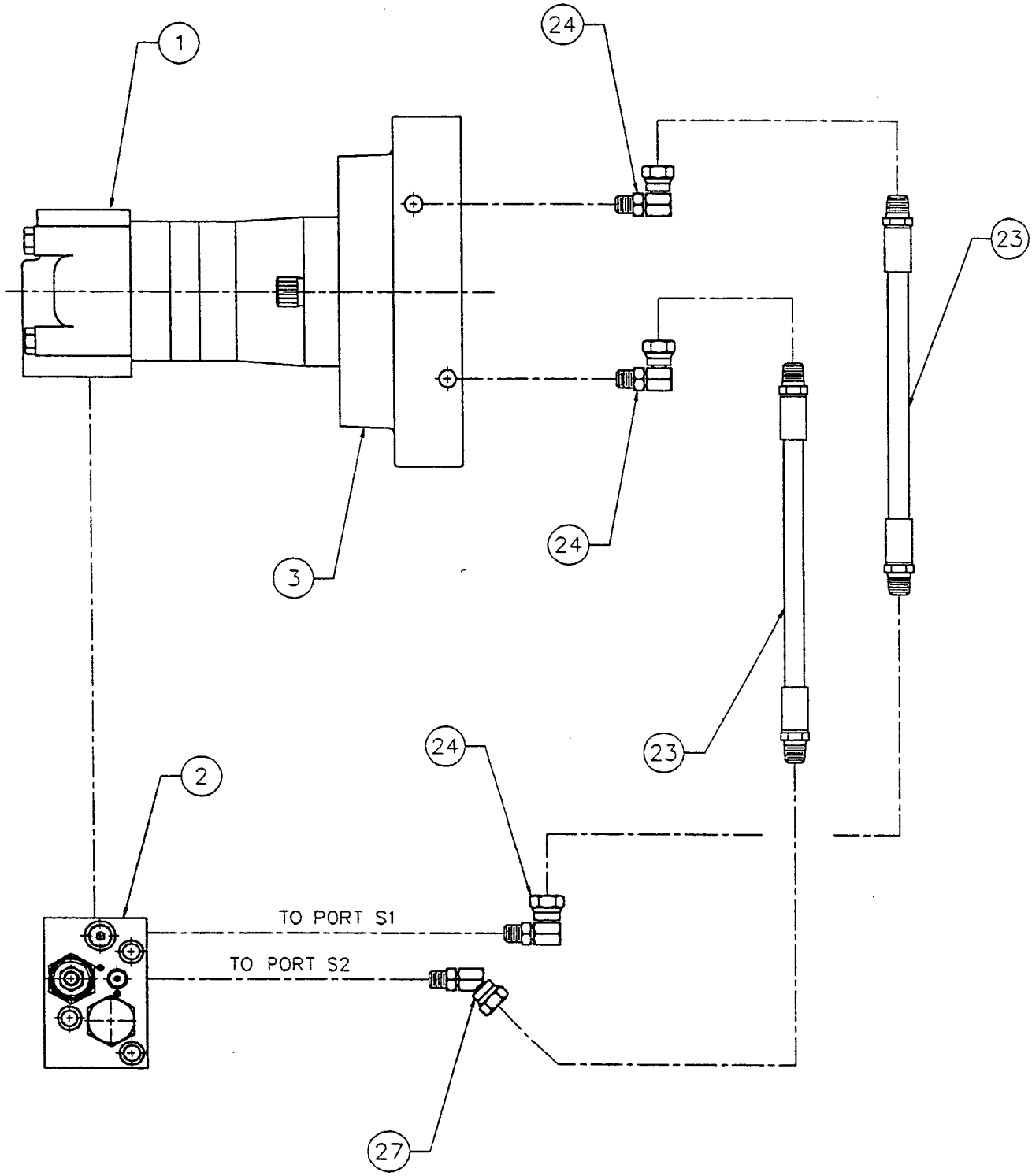
TYPICAL WINCH HYDRAULIC SYSTEM



ALL UTILITY UNITS ARE BI-DIRECTIONAL WITHOUT MANIPULATION OF CARTRIDGE, AND OR PLUG LOCATIONS.

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 1.10111 MOTOR END PARTS LIST

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 1.10111)

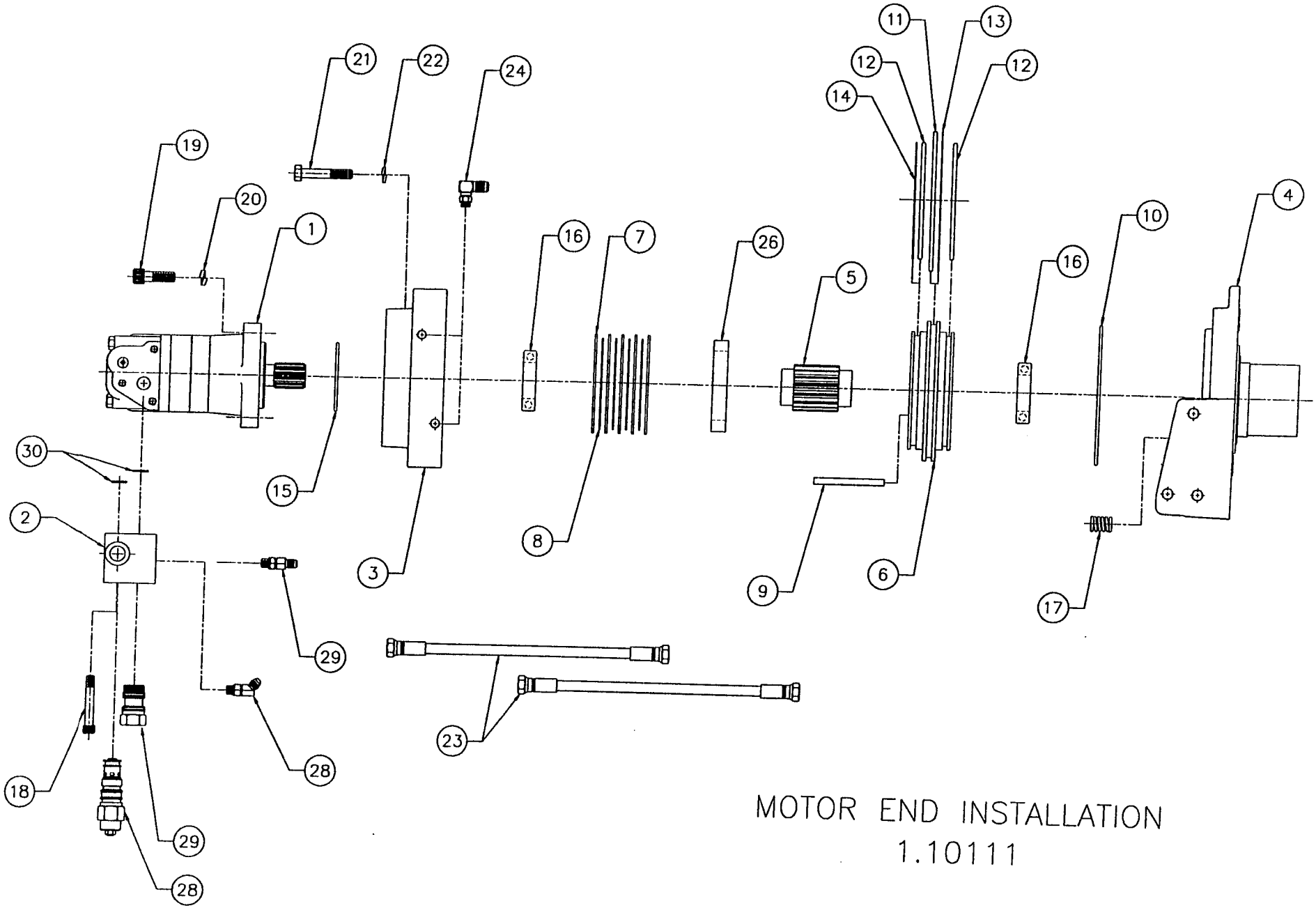
1. Disconnect brake hoses (item 23) at connections (item 24) on brake housing (item 3). wrap hose ends to prevent dirt contamination.
2. Disconnect motor (item 1) from brake housing (item 3) by removing two capscrews (item 19), lock washers (item 20). Allow oil to drain.
3. Remove outer brake housing (item 3) by removing six capscrews (item 21) and lock washers (item 22). **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 16) may come with it or remain on brake shaft (item 5), or the brake shaft may also slide out.
5. Remove o-ring (item 10) from end support (item 4).
6. Remove friction plates (item 7), drive plates (item 8), spacer ring (item 26), and dowel pins (item 9),from piston (item 6).
7. Remove piston (item 6) from end support (item 4) being careful not to damage o-rings on piston or end support. Next, remove o-rings and back-up rings (item 11, 12, 13, & 14) from piston.
8. Finally, remove springs (item 17) and bearing (item 16) from end support (item 4).

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 16) into end support (item 4). Then insert twelve springs (item 17) into holes in end support. Next, insert shaft (item 5) into bearing (item 16).
4. Insert dowel pins (item 9) into respective holes in end support (item 4).
5. Assemble o-rings and back up rings (item 11, 12, 13, & 14) on piston (item 6). Position back up rings as illustrated.
6. Insert piston (item 6) fitted with seals into end support (item 4) and over dowel pins (item 9) and tap down until piston face is resting against springs (item 17).
7. Insert spacer ring (item 26), then insert a friction plate (item 7) alternating with a drive plate (item 8) into piston (item 6) and over shaft (item 5) until all plates are in place in sequence illustrated.
8. Next, place bearing (item 16) onto brake shaft (item 5).
9. Place o-ring (item 10) in position on end support (item 4). Finally and with care not to pinch o-ring seals on piston, slide the housing (item 3) into place over the dowel pins (item 9) and tap down until firm. Install lock washers (item 22) and capscrews (item 21) 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) and o-ring (item 30) can now be reinstalled on the housing (item 3). Then insert into brake housing (item 3) and secure with capscrews (item 19), lock washers (item 20). Reconnect brake hoses (item 23) 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 24) at brake slightly to bleed air from brake release hoses (item 23) 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

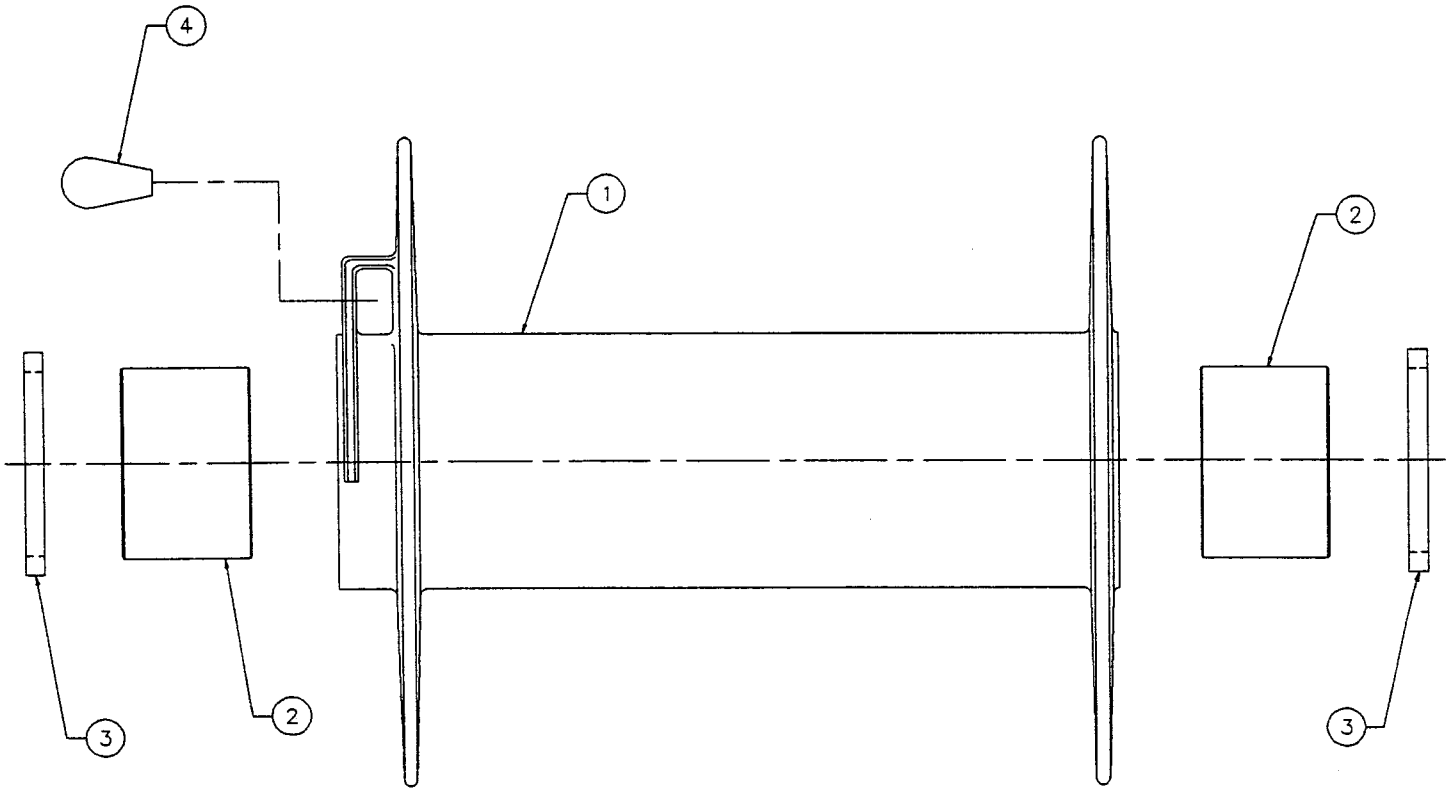
1. Brake will not release:
   (a) Insufficient system pressure to brake. (b) Damaged o-rings or back up ring seals (item 11, 12, 13, or 14).
   (c) Damaged piston (item 6). (d) Damaged seal surfaces within housing (item 3).
   (e) Damaged bearing (item 16). (f) Friction or drive plates (items 7 or 8) warped or heat damaged.
2. Brake will not apply or applies but torque low:
   (a) Damaged springs (item 17), either broken or heat damaged and having taken a permanent set.
   (b) Friction plates (item 7) worn out.
3. Oil leaks externally from brake: (a) Damaged o-ring seal (item 10).


MOTOR END INSTALLATION
1.10111

1.10111 PARTS LIST
MOTOR END INSTALLATION

LOC.	PART NO.	DESCRIPTION	QTY
1	73067	MOTOR–HYDRAULIC	1
2	11604	VALVE – COUNTERBALANCE	1
1.	9817	0–RING – 13/16 I.D. x 3/32 SECTION	2
3	11535	HOUSING – BRAKE – OUTER	1
4	11995	SUPPORT – MOTOR END	1
5	11750	SHAFT – BRAKE	1
6	11443	PISTON–BRAKE	1
7	11603**	PLATE – DISC – FRICTION	5
8	3159**	PLATE – DRIVE – BRAKE	4
9	3263	PIN – DOWEL – 5/16 x 3 ½	2
10	9844#	O–RING – 6 ¾ I.D. x 7 O.D. x 1/8 SECTION	1
11	9853#	O–RING – 6 ½ I.D. x 3/16 SECTION	1
12	9851#	O–RING – 5 3/8 I.D. x 3/16 SECTION	2
13	9854#	RING – BACKUP – 6 ¼ I.D. x .183	1
14	9852#	RING – BACKUP – 5.278 I.D. x .076	1
16	81434	BEARING – BALL – 1 ¾ I.D.	2
17	2319**	SPRING – COMPRESSION – ¾	12
18	1345	CAP SCREW – SOCKET HEAD – 3/8 – 16UNC x 2 ½	3
19	1143	CAP SCREW – SOCKET HEAD – ½ – 13NC x 1 ½	2
20	1144	WASHER – LOCK – HI COLLAR – ½	2
21	1376	CAP SCREW – HEX HEAD – 7/16–UNC x 2 ½ – GRADE 8	6
22	1388	WASHER – LOCK – 7/16	6
23	75038	HOSE – ¼ – R1 x 12"	2
24	76017	ADAPTER – 90° – SWIVEL	2
25	10708*	TAG – WARNING	1
26	11486	SPACER	1
27	76029	ADAPTER – 45°	1
28	3177	CARTRIDGE – COUNTERBALANCE	1
29	70035	PLUG ASSEMBLY – VALVE – C'BAL	1
30	9880	O–RING – 3 I.D. x 1/8 SECTION	1
31	76027	ADAPTER	1

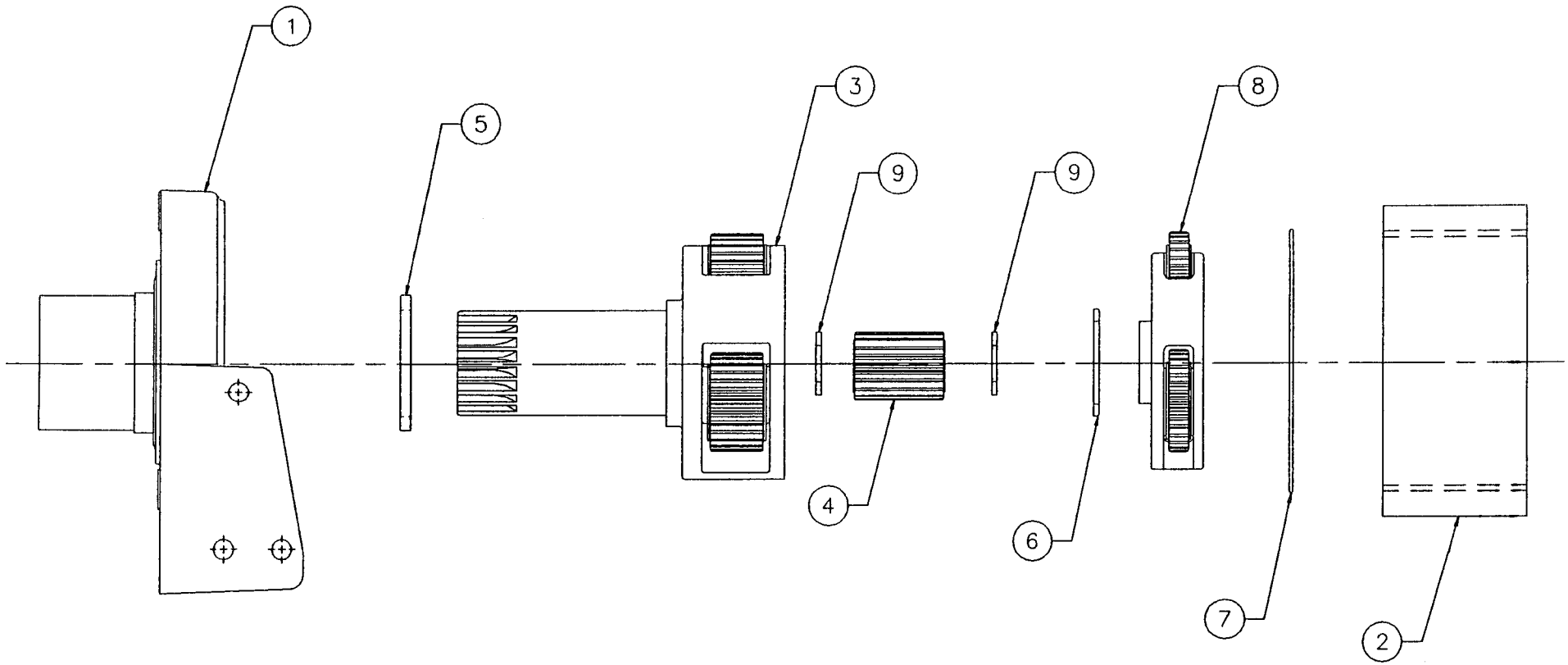
* NOT SHOWN IN EXPLODED DRAWING.
** THESE ITEMS SOLD IN 9401 KIT ONLY.
# THESE ITEMS SOLD IN 9406 KIT ONLY.



DRUM INSTALLATION
1.20084

1.20084 PARTS LIST
CABLE DRUM INSTALLATION

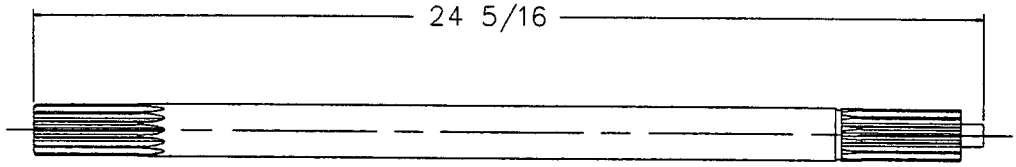
LOC.	PART NO.	DESCRIPTION	QTY.
1	12350	DRUM	1
2	11947	BEARING – BRONZE – 3 ½ I.D. x 3 ¾ O.D.	2
3	9929	SEAL – SHAFT – 3 5/8 I.D. x .357	2
4	10529	WEDGE – CABLE – 7/16	1



GEAR END INSTALLATION
1.30121

1.30121 PARTS LIST
GEAR END INSTALLATION

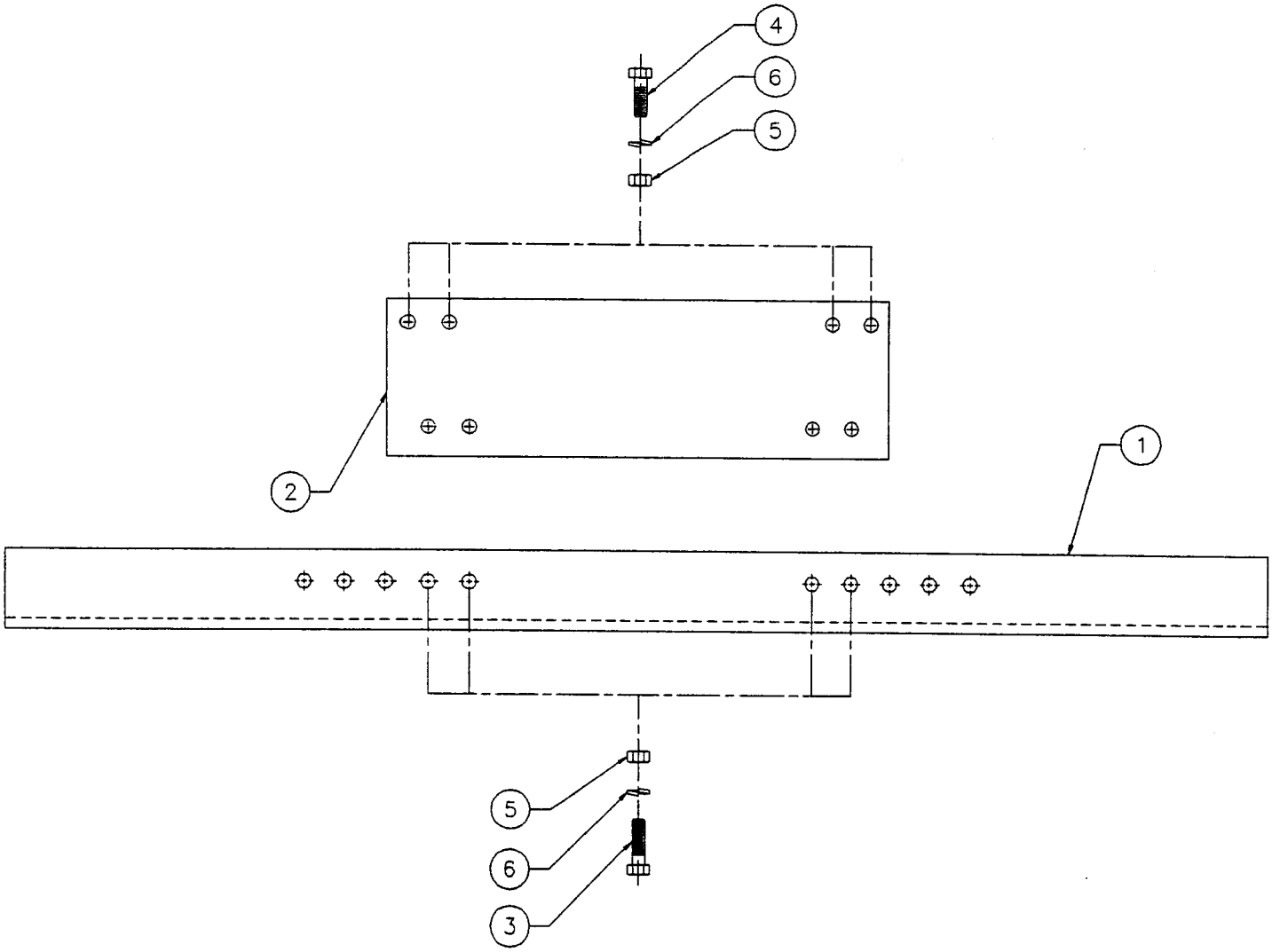
LOC.	PART NO.	DESCRIPTION	QTY.
1	13374	SUPPORT – GEAR END	1
2	81107	GEAR – RING	1
3	13379	ASSEMBLY – CARRIER – SECONDARY	1
4	13380	GEAR – SUN – SECONDARY	1
5	12572	WASHER – THRUST – NYLON	1
6	12083	WASHER – THRUST – NYLON – PRIMARY	1
7	9897	O–RING – 6 ½ I.D. x 3/32 SECTION	1
8	3412	CARRIER – PRIMARY	1
9	13385	WASHER – THRUST	1
			2



INPUT SHAFT INSTALLATION
1.40231

1.40231 PARTS LIST
INPUT SHAFT INSTALLATION

LOC.	PART NO.	DESCRIPTION	QTY.
1	13384	INPUT SHAFT	1



BASE MOUNT INSTALLATION
1.50267

1.50267 PARTS LIST
BASE ANGLE INSTALLATION

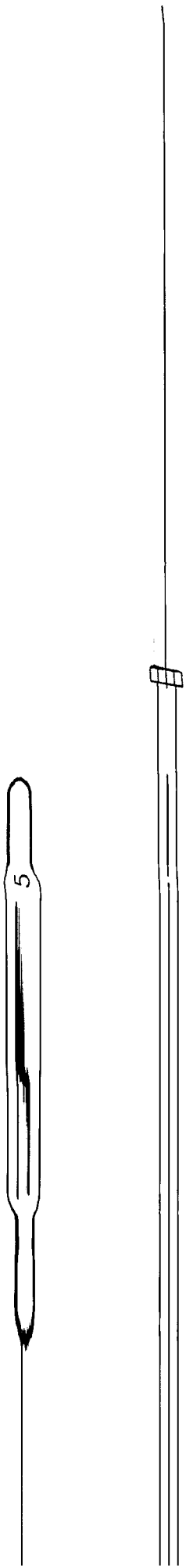
LOC.	PART NO.	DESCRIPTION	QTY.
1	11570	BASE ANGLE	2
2	13587	SPACER – PLATE	2
3	1404	CAP SCREW – HEX HEAD – ½ – 13NC x 1 ¾ – GRADE 8	8
4	1403	CAP SCREW – HEX HEAD – ½ – 13NC x 1 ½ – GRADE 5	8
5	1490	NUT – HEX – ½ – 13NC – GRADE 2	16
6	1495	WASHER – LOCK – ½	16
7	10466*	PLATE – ID – WINCH	1
8	1165*	RIVET – TYPE – U	4

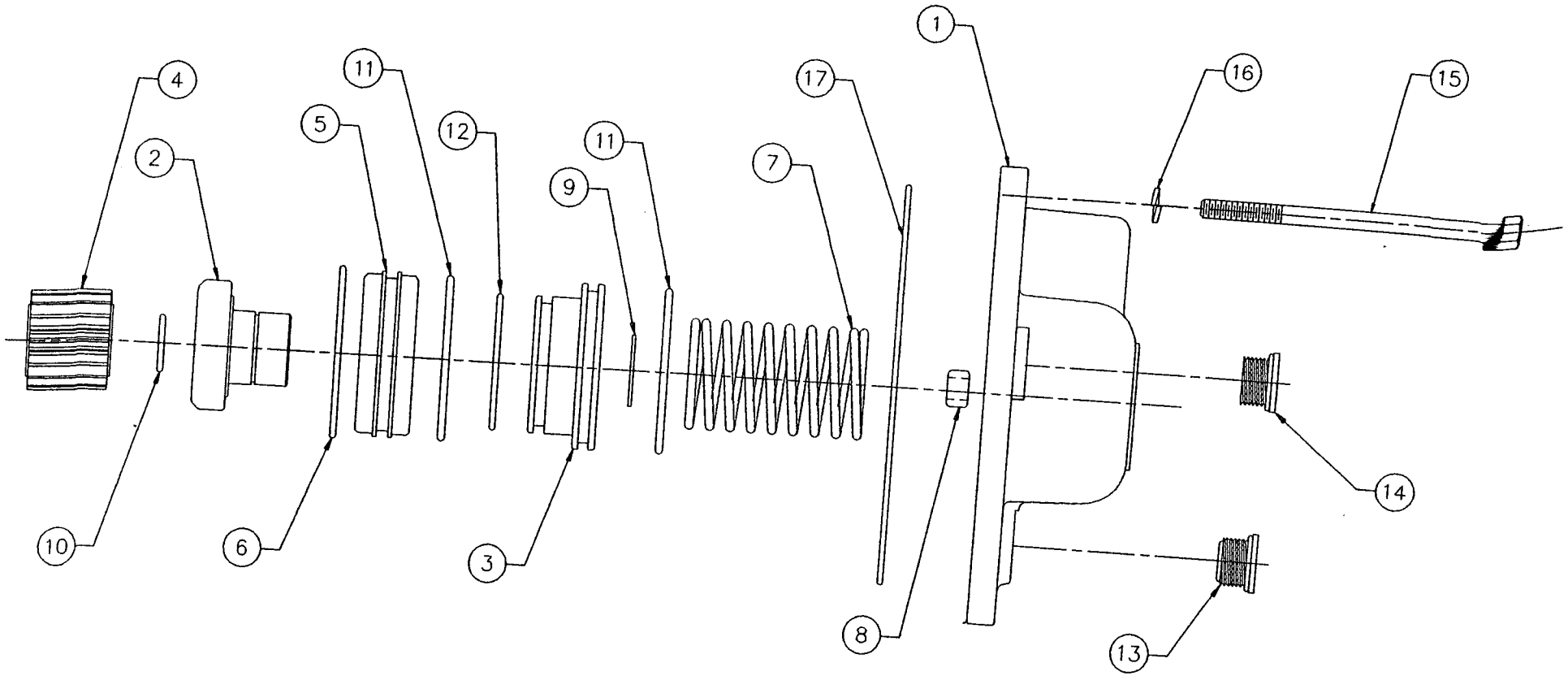
* NOT SHOWN ON EXPLODED DRAWING.

1.60108 PARTS LIST
GEAR END COVER INSTALLATION

LOC.	PART NO.	DESCRIPTION	QTY.
1	13370	COVER – GEAR END	1
2	13372	COUPLING – DRIVE	1
3	13373	PISTON – AKO	1
4	13386	GEAR – SUN	1
5	13296	CYLINDER – PISTON	1
6	3632	RING – RETAINER – ROUND – 3 O.D. x 3.4 GAGE	1
7	2309	SPRING – COMPRESSION	1
8	81612	BUSHING – BRONZE – 5/8 O.D. x 3/8" I.D. x 3/8	1
9	3303	RING – RETAINER – 1 ¼ x .05 THICK	1
10	3321	RING – RETAINER – 7/8 x .08 – THICK – ROUND SECTION	1
11	9672	O–RING – 2 5/8 I.D. x 1/8 SECTION	1
12	9704	O–RING – 2 1/8 I.D. x 2 3/8 O.D. SECTION	1
13	76343	PLUG – SOCKET HEAD – O–RING – BOSS – MAGNETIC #10	2
14	76344	PLUG – O–RING – BOSS – #10 – SOCKET HEAD – 7/8 – 14	1
15	3004	CAP SCREW – HEX HEAD – 5/16" – 18 x 4 ¾ – GRADE 8	1
16	1168	WASHER – LOCK – 5/16	1
17	9897	O–RING – 6 ½ I.D. x 3/32 SECTION	8
18	1157*	CAPLUG – #4 RED – ¼ NPT	8
			1
			1

* NOT SHOWN ON EXPLODED DRAWING.


5



AIR KICKOUT
GEAR END COVER INSTALLATION
1.60108