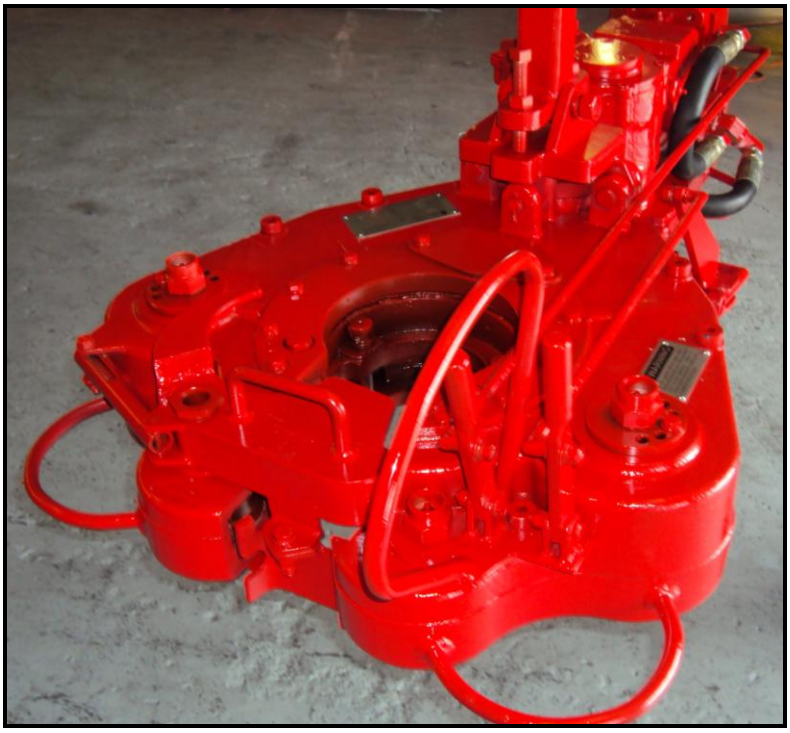
Model RSX Tubing Tong
Installation, Operation, Service and Parts Book Manual



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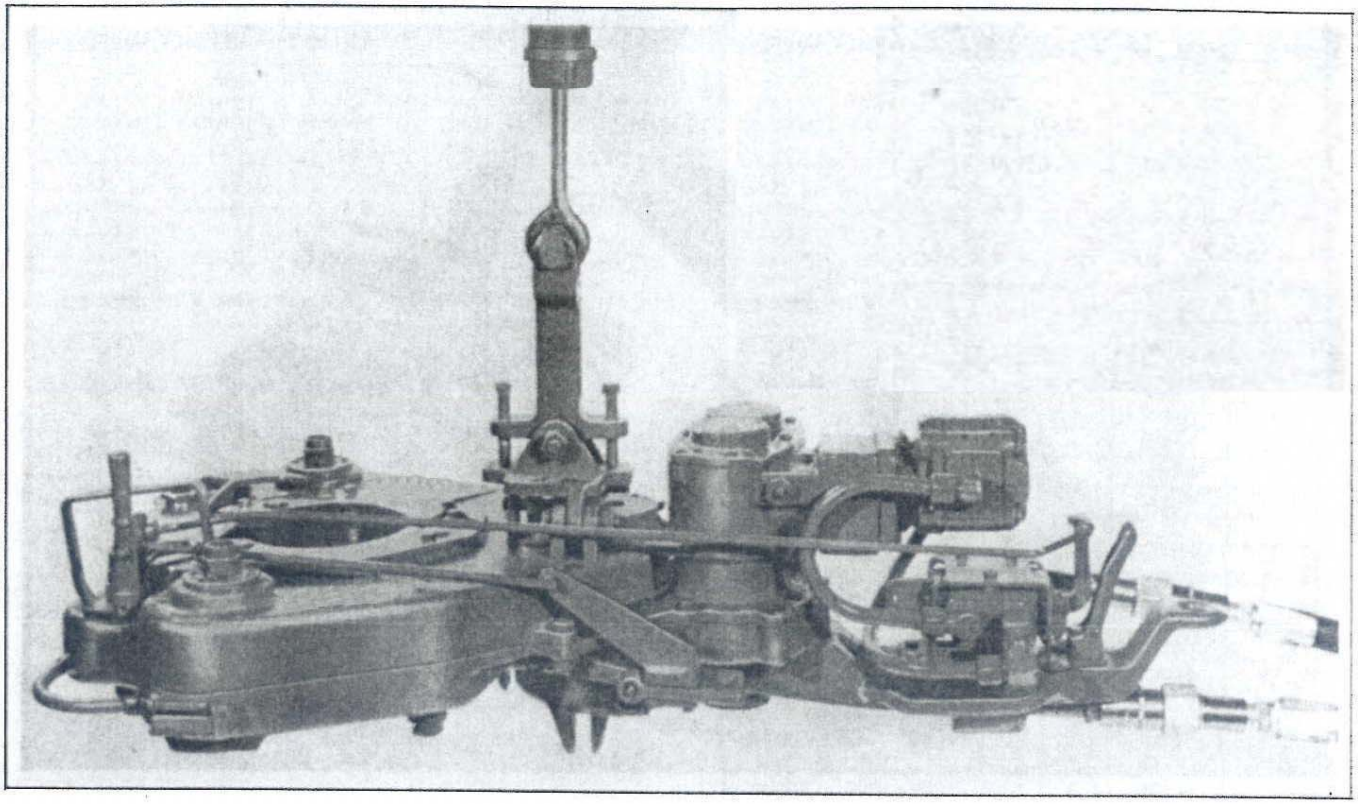
SECTION I — INTRODUCTION



The RS model is a gate-type tong with a four-way control valve that allows the tong to be reversed without roll-over.

PERFORMANCE SPECIFICATIONS

Tubing Size Range: 1.050" through 4 1/2" OD

	STANDARD MOTOR	HIGH TORQUE MOTOR
Tong Speeds (rpm) @ 35 GPM:		
High Gear	100	80
Low Gear	26	21
Tong Torque @ 2000 psi (ft-lbs):		
High Gear	1200	1700
Low Gear	4650	6650

SECTION II —
THE CAM AND ROLLER GRIPPING MECHANISM

The primary feature of this gripping mechanism is its high initial gripping force which prevents any possibility of slippage, and its low final gripping force which prevents crimping. This is accomplished by the angle on the cam surface of the jaw which decreases the ratio of the die force in relation to the torque as the tong tightens up on the tubing.

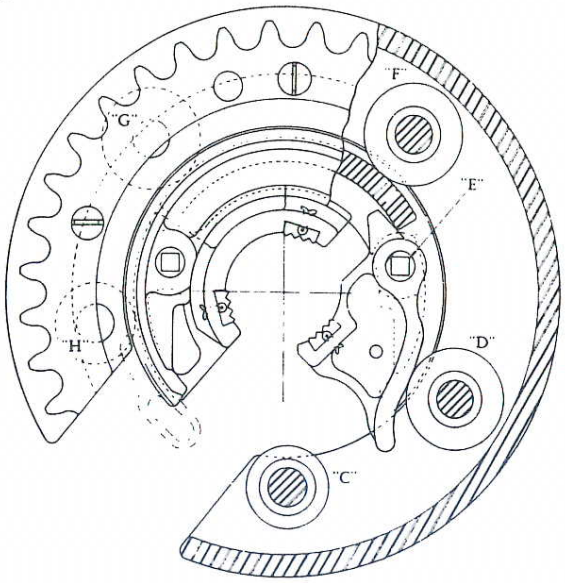


FIGURE 1
The jaw and bushing installed for right-hand rotation as would be the case when going into the hole.

In Figure 1 note that the bushing and jaw are part of the inner ring assembly which in turn is actuated by the outer ring assembly. The bushing is stationary in the inner ring while the jaw is hinged to point E so that, as the outer ring rotates forward with respect to the inner ring assembly, the roller D will roll along the cam surface of the jaw and cause it to move in contact with the tubing. In order to develop a positive force of the jaw against the tubing, it is necessary to restrain the movement of the inner ring assembly while the outer ring forces the jaw inward. This is accomplished by using a brake band, anchored to the top of the frame cover, and a brake drum on top of the inner ring. (The spring force in the brake band automatically maintains the proper drag on the inner ring assembly.) As soon as the initial force is developed on the jaw, as controlled by the brake band, the inner ring and outer ring assemblies will rotate as a unit. The brake band will continue to retard the inner ring assembly enough to maintain the minimum die force necessary to grip the tubing under all conditions. This feature is particularly valuable while drilling or reaming, when "hanging up" would normally tend to break the hold of the tong. When the tong is removed from the tubing, the outer ring is reversed and the brake band holds the inner ring assembly while the roller D releases its force on the jaw as it moves toward point E. Roller C then retracts the front end of the jaw and holds it in the full open position. The inner ring and outer ring assemblies then rotate as a unit until their openings line up with the opening in the frame to permit the tong to come off the tubing. Note that rollers H, G, and F resist the load caused by roller D against the jaw. They also eliminate most of the friction between the outer ring and inner ring assemblies. Roller C holds the jaw in full open position. If, however, the jaw and bushing are reversed by changing them to the opposite sides, which would be the case in counterclockwise rotation, then rollers C, D, and F support the inner ring assembly, roller G actuates the jaw, and roller H then holds the jaw in the full open position.

Figure 2 shows how the chain drives the gripping mechanism. Note how the chain spans the opening in the outer ring with no less than 15 teeth on the sprocket to drive it. A hydraulic motor or air motor can furnish the power. A gear box reduces the motor speed to the sliding gear shaft speed in the ratio of 10.5:1. A simple two-speed transmission, sealed in an oil bath, combined with the chain drive, further reduces the speed from the motor to the tubing for a ratio of 27:1 in high gear and a ratio of 102:1 in low gear.

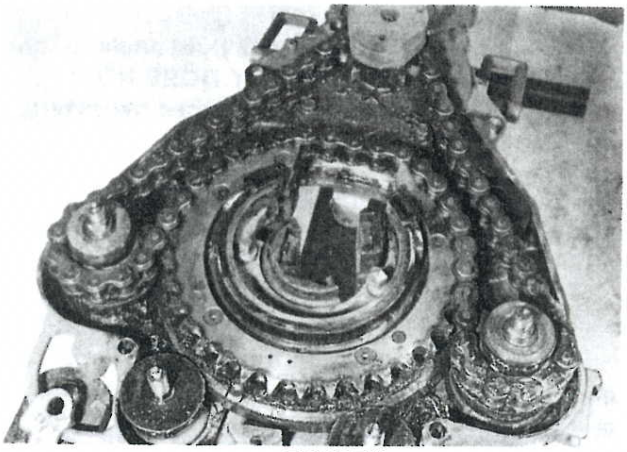


FIGURE 2
Chain spanning the opening in the outer ring as it drives the gripping mechanism.

SECTION III — TONG INSTALLATION

HANGING LINE

Hang the tong on a suitable line (usually a 9/16" wire rope is used) from a point high enough to allow the tong to swing easily. The tong may be hung over a sheave either on a fixed line or a counterweighted line. There is a spring in the suspension assembly which will allow the tong to move vertically while the joint is being made up or broken out — even if the tong is suspended on a fixed line.

BACKUP LINE

The backup line must be long enough, and anchored high enough to be level with the tong (at a 90° angle to the tail end of the tong). See Figure 3.

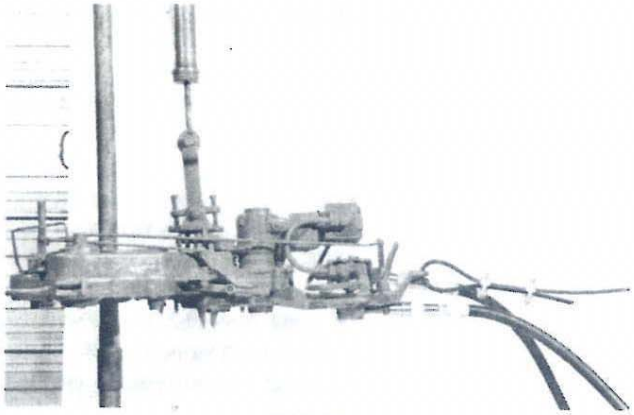


FIGURE 3
Backup line must be level with and at right angles to the tong.

IMPORTANT:
The backup line MUST pull at a right angle to tong and be level with the tong. IF IT DOES NOT:

1. **Tubing will be marked more than necessary.**
2. **Die life will be greatly shortened.**
3. **Tong may tend to slip.**

The backup line may be either a 9/16" wire rope or a stiff-arm attachment fabricated from tubing. A backup line that is too long will be awkward to use. A line that is too short will tend to pull the tong off the tubing and may cause the tong to slip. A line that is anchored too low or too high will cause the tong to twist, which in turn may affect the smooth rotating action of the gripping mechanism. This twisting movement may also change the distribution of the load on the dies to such an extent that only a portion of the die length penetrates the tubing, thereby resulting in short die life and excessive die penetration.

BALANCE ADJUSTMENT

Adjust the balance of the tong by turning the balancing screw at the top of the hanger and the hanger set screws at the bottom of each hanger arm.

HOSE CONNECTIONS

All Model RS tongs have the pressure hose from the pump connected to the **right** side of the tong (viewed from the back and up-right position).

The hose to the tank is connected to the **bottom** of the Model RS.

IMPORTANT: The pressure hose and return-line hose **must** be properly connected to the tong for the correct operation of the control valve. If the hoses are not properly connected to the tong, the throttle will "seize" itself and the tong will not shut off. (All models will operate with the hoses reversed, but they will tend to jerk or "creep" without stopping completely. They will also run more slowly than normal.)

SELF-SEALING COUPLINGS

IMPORTANT: Check all hoses to make certain that the self-sealing couplings are completely engaged and that there is no blockage or shutoff in the hydraulic system.

OIL TANK LEVEL

Check the oil tank level to make certain there is plenty of oil in the system.

OIL CIRCULATION AND WARMUP

With the hoses properly hooked up to the tong, engage the pump and allow the oil to circulate for a few minutes before operating the tong. In cold weather, allow time for warm-up as you would for an internal combustion engine.

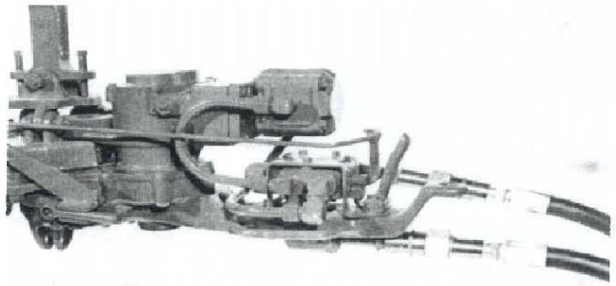


FIGURE 4
Throttle and hose hookup.

SECTION IV — TONG OPERATION

THROTTLE AND GEAR SHIFT CONTROLS

Motor Actuation. The motor is actuated by moving the throttle lever either forward or backward, depending on the desired direction of rotation.

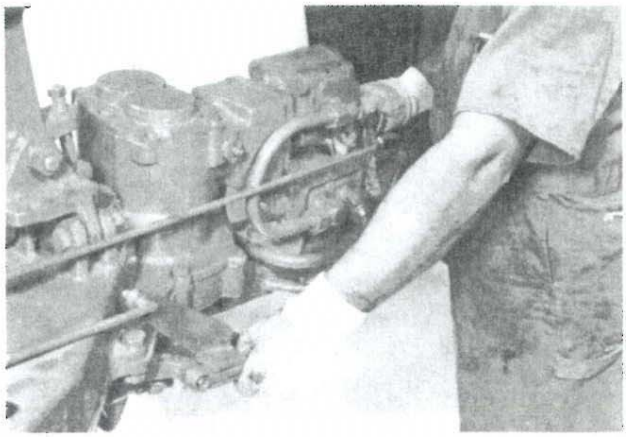


FIGURE 5
Operating the throttle and gear shift lever from the back of the tong.

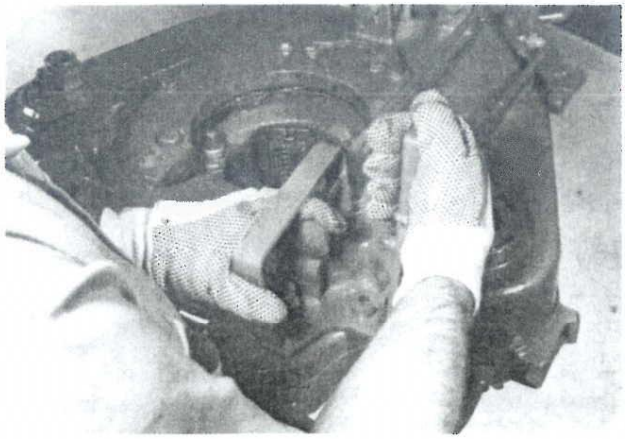


FIGURE 6
Operating the throttle and gear shift lever from the front of the tong.

Removing Tong from Tubing. To remove the tong from the tubing, simply push the throttle lever in the direction opposite of that required to close the jaws and the tong will position itself to be swung off the tubing. When the throttle lever is released it automatically returns the throttle valve to a neutral position — if the hoses are hooked up properly.

Low and High Gears. Low gear is used for breaking tight joints. As soon as a tight joint begins to free up — indicated by the pull on the backup line — slow the tong speed and shift into high gear; then accelerate to the desired speed. Use high gear for spinning and makeup, unless desired torque requires low gear for extra high torque makeup.

CAUTION: Be careful with the first joint until you are sure on which side of the tong to stand, because the tong will swing in a direction to tighten the backup line.

CHANGING DIRECTION OF TUBING ROTATION

When starting on the job it may be necessary to change the jaw and bushing to the correct side. The methods of changing or reversing the jaw and bushing are explained below. Instead of reversing the jaw and bushing the same result can be accomplished by simply turning the tong over in the hanger — provided the tong is equipped with a roll-over hanger. The method you choose will depend upon the job ahead and whether you prefer to have the motor on the top or the bottom of the tong for most of the work. All RS tubing tongs equipped with a positioning valve and check valve **must** be turned over to change the direction of tubing rotation. If a tong is not equipped with a positioning valve and a check valve, it will bite in either direction by changing the jaw and bushing from one side to the other.

Tong Fails to Go on Tubing. If the tong fails to go onto the tubing, it is probably because the jaw is partially closed. In this case, run the motor in the direction that will fully open the jaw and then proceed to install the tong on the tubing. If this fails to work, check both the jaw and bushing for proper size and installation.

Jaw and Bushing Sizes. Jaw and bushing sizes are stamped according to the actual O.D. of the tubing that they will fit — **not** the nominal size of the tubing.

Nominal	Stamped	Nominal	Stamped
3/4"	1.050"	2-1/2"	2-7/8"
1"	1.315"	3"	3-1/2"
1-1/4"	1.660"	3-1/2"	4"
	1.750"	4"	4-1/4"
1-1/2"	1.900"		4-1/2"
1-3/4"	2" & 2-1/16"		5"
2"	2-3/8"		5-1/2"

CHANGING OR REVERSING JAW AND BUSHING

The jaw and bushing on all tongs that are not equipped with a positioning valve are reversible as described above, depending upon the desired direction of rotation. If the jaw is installed on the left side (standing in front of the tong: as you look into the opening of the tong with the motor up), the tong will rotate the tubing to the left. When the jaw is installed on the right side, it will rotate the tubing to the right (the direction of tubing rotation when going into the hole).

Removal of Jaw and Bushing. Position the tong as if it were to go onto the tubing. Remove the bushing as indicated in Figure 7. Then, reverse the motor and move the outer ring slightly, as shown in Figure 8. This will remove any force against the pivot pin of the jaw so it will come out easily. Finally, remove the pivot pin and jaw.

NOTE: Remember that it is difficult to remove or to install the jaw while the bushing is still in place.

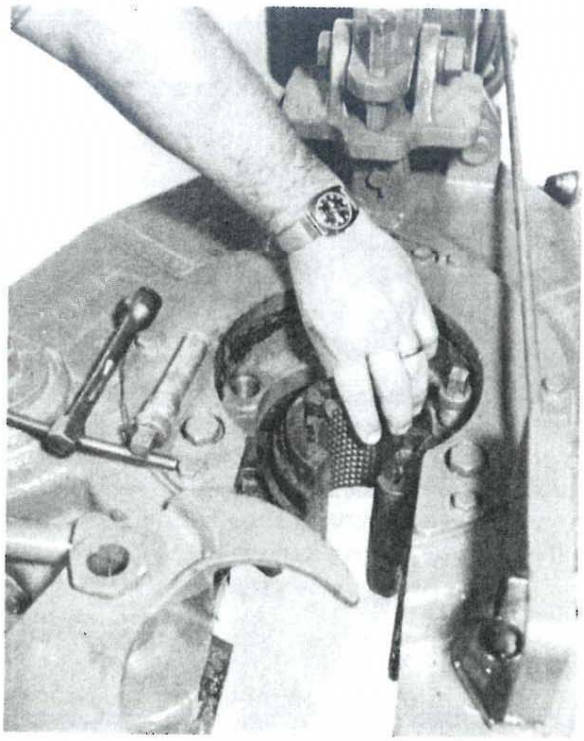


FIGURE 7
To remove the jaw and bushing, remove the bushing first.

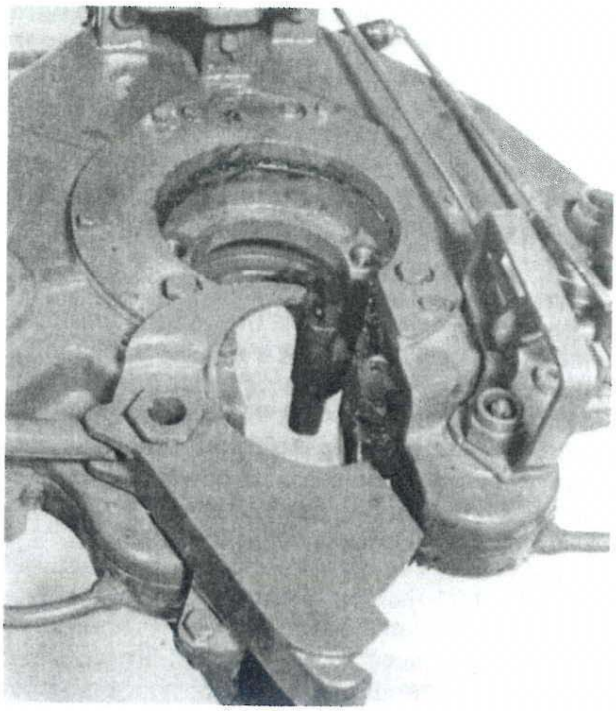


FIGURE 8
Removing or installing the jaw.

Reversal of Jaw and Bushing. Remove the jaw and bushing as outlined above. Move the outer ring slightly so there will be room to get the **lip of the jaw in back of the front roller** of the outer ring. Note the difference in the position of the outer ring in Figures 8 and 9. In Figure 9 the outer ring protrudes

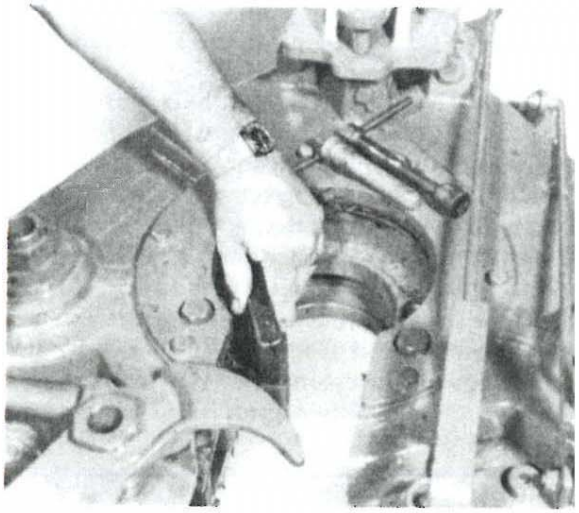


FIGURE 9
Removing or installing the jaw for left-hand rotation.

from the left. In Figure 8 it protrudes from the right. Make certain that the jaw and bushing are the correct size. Then install the jaw as shown in Figure 9; install the bushing as shown in Figure 10.

CHANGING DIRECTION OF TUBING ROTATION WHEN TONG IS EQUIPPED WITH A POSITIONING VALVE AND A ROLLOVER HANGER

The jaw and bushing of the Model RS tubing tongs are never reversed if the tong is equipped with a positioning valve and a rollover hanger. The jaw **must** be installed on the right side (viewed from the front with the motor up). When the motor is up, the tong turns the tubing clockwise. When the tong is turned over and the motor is down, the tong will turn the tubing counterclockwise — the motion of the tubing when coming out of the hole.

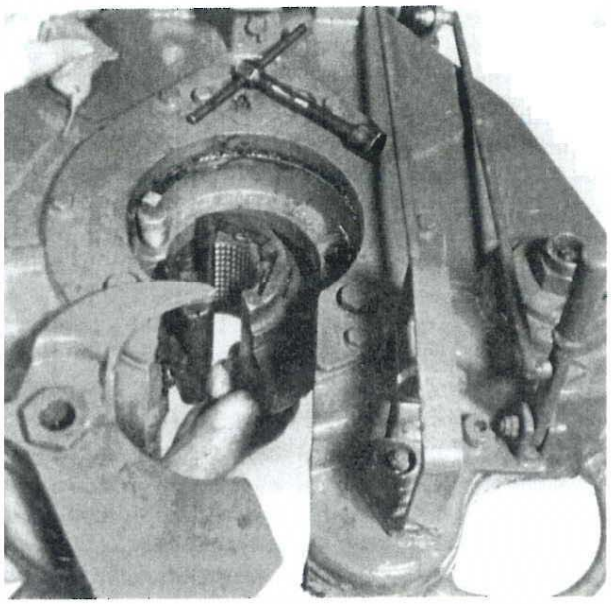


FIGURE 10
To REMOVE the jaw and bushing — remove the bushing first.
To INSTALL the jaw and bushing — install the bushing last.

SECTION V — TONG MAINTENANCE

HYDRAULIC PUMP SIZE FOR TRAILER-MOUNTED POWER UNIT

A pump is recommended which is capable of no less than 30 gallons per minute (gpm). The speed of the tong is directly proportional to the volume output of the pump. For example, in high gear the tong speed will be 100 rpm at 35 gpm.

HYDRAULIC PUMP PRESSURE FOR TRAILER-MOUNTED POWER UNIT

The maximum pump pressure to be used is 2000 psi. In the pressure range of 1000-2000 psi, the pump volume can be cut in half by unloading one half of the pump in the case of a dual pump, or remain at full volume in the case of a single pump. An adjustable relief valve that will operate in the range of 800-2000 psi is essential for proper makeup torque on the tubing. Most tubing manufacturers will furnish a chart giving the recommended torque for various grades of tubing.

OIL TANK FOR TRAILER-MOUNTED POWER UNIT

The minimum size of the oil tank should be not less than 50 gallons and should contain not less than 35 gallons of good hydraulic oil. The oil tank is an important part of the hydraulic system, and must be designed properly so it will dissipate heat, not foam, and will deliver clean oil to the pump suction unit without undue friction loss. An oil filter is usually installed inside the tank on the suction line to the pump. This filter should be inspected periodically and cleaned when necessary.

HOSES

The power and return hoses should be 1" x 50' for use on a trailer power unit and 1" x 15' for use on a well service rig. Quick-connect couplings should be installed on the ends of the hoses and the tong for ease of connection and conservation of hydraulic oil.

LUBRICATION

There are six grease fittings that lubricate the idler roller bearings carrying the outer ring, five grease fittings that lubricate the rollers between the inner and outer rings, and one grease fitting on top of the drive sprocket. These points should be lubricated every eight hours. The bearings are well protected, but on wet jobs dirt and sand will eventually work into them if they do not receive grease regularly. This is particularly true if rotary mud is used in the hole on work-over jobs. Grease added regularly to these points is a very effective way to keep the dirt and sand pushed away from them.

Occasional grease should be added to the following:

1. One grease fitting on the right-angle gear box (upper transmission).
2. One grease fitting on the hydraulic motor.
3. Two grease fittings on the throttle cable of the Model CTS Tong.
4. One grease fitting on each gear shift handle.

Jaw and Bushing Pins. Use grease on the jaw and bushing pins and oil on all contact points between the inner ring and the outer ring. (Failure to keep these points lubricated will have a tendency to cause the tong to slip, as explained in the **Trouble Shooting** section of this manual.)

Hanger Pins and Balancing Screw Bolt. Lubricate the two hanger pins, the two hanger bolts, and the balancing screw bolt with light oil and note how easily the tong turns over. These points are often neglected.

Transmission Oil. Use any good grade of S.A.E. 90 transmission oil in the transmission. Check the oil level and add oil when necessary. Approximately one gallon of oil is required.

Right-Angle Gear Box (Upper Transmission). The right-angle gear box is packed at the factory and should not need repacking under ordinary circumstances. However, the gear box should be checked about every 3 to 4 months to make sure that nothing unusual has happened to necessitate repacking. To provide an air bleed, remove the bearing cover capscrew farthest from the grease fitting in the side of the right-angle gear box. Pump the grease through the grease fitting until it begins to show through the capscrew hole.

SECTION VI — TROUBLE SHOOTING

JAWS SLIP ON TUBING

The initial grip or die force is governed by the effective drag of the brake band. The brake band causes the "knifing in" action of the jaw assembly. (The brake band also supplies the force that opens the jaw when it is removed from the tubing.)

Brake Band Effectiveness. The effectiveness of the brake band can be lessened by any one of the following:

1. Too much oil on the brake band lining.
2. Lack of lubrication on the jaw pivot pin.
3. Lack of lubrication between the inner ring and outer rings. Make sure that the rollers between the inner and outer rings are lubricated and turn freely.
4. Lack of clearance between the inner and outer rings.
5. A permanent set or opening up of the brake band.
6. A worn out brake band lining.

Inspection of Tong Not Holding Properly. An inspection of a tong that is not holding properly should include the following:

1. If the dies are bad, change them. Be certain that the buttress teeth are facing in the proper direction: the buttress teeth should face away from the pivot pin in both the jaw and the bushing. If the dies look good, postpone changing them until everything else is checked.

2. Check the inner ring for wear and make sure that it has clearance. It may be necessary to remove the brake band pins to do this. If the inner ring is tight, there is either foreign matter between the inner ring and outer rings, or the inner ring is sprung. (It is not likely that the inner ring will be sprung.)

3. Remove the jaw and bushing. Make sure both jaw and bushing are the correct size. Replace them **properly** after lubricating the pivot pins. The pivot pin and the pivot pin holes in the jaw and bushing are sometimes worn so that a sloppy fit results; the jaw will then slip on the tubing. All worn parts must be replaced.

4. Check the brake band lining and end connections. It may be necessary to wipe off excess oil or grease with a rag soaked in solvent, distillate or kerosene. If the brake band has taken a "set" it may be necessary to change it. (The recommended procedure for changing the brake band is given in Section VII: **Shop Repairs.**) A new brake band not under tension (i.e., when off the drum) will measure 3" from one end connector to the other. A new brake band under tension measures 5" when on the drum, which means that it has been stretched 2" from its relaxed position to the position it will take on the drum.

Since the band is made of heavy spring steel it requires 150 lbs. of pull to open the band 2" between the end connectors. If a band measured 4" when off the drum and 5" when on the drum it would have only 1" stretch in it — which would give half the gripping force, or about 75 lbs. This would probably not be enough force under severe conditions. Considering other factors such as alloy tubing, wet jobs and human judgment (men have different ideas about when dies are dull), the decision to change a brake band must be left to the discretion of the servicemen.

5. Check the wear on the outer ring rollers, pins, and bushings. Replace all worn parts.

DRIVE CHAIN IS TOO LOOSE

Loosen the nut on the bottom of the idler sprocket shaft. Remove the small capscrew in the idler sprocket adjustment plate, and remove the adjustment plate. Having lined up the opening of the outer ring with the opening in the frame of the tong, turn the idler sprocket shaft until it starts to lift the outer ring at the back. Then slack off slightly. If the chain is too loose for a single adjustment to take the slack out of it, turn the idler sprocket shaft until the crosscut notch on one corner of the square faces frontwards. Replace the adjustment plate and capscrew, and adjust the other shaft. A worn chain may run somewhat loose after it is adjusted for maximum take-up. If this seems objectionable because the chain will drag on the case, it is usually possible to shorten the chain by a half link.

MOTOR FAILS TO RUN, RUNS SLOWLY, OR LACKS POWER

The hydraulic motor used on the Power Tubing Tongs is a positive displacement gear type motor.

The characteristics of this motor are that it will turn a given number of revolutions for a given quantity of power oil delivered to it, and will develop a given amount of torque for a given pressure. Most losses in speed or power can be traced back to the pump system supplying oil to the motor.

MOTOR TURNS, BUT TONGS DOES NOT TURN

If the motor turns (as determined by listening to the motor) but the tong does not turn, first check to see if the transmission is fully engaged. If the transmission is engaged and the tong still does not turn, it is likely that a key or shaft is sheared, or that teeth are broken from a gear, or that the chain is broken. Preliminary inspection to determine the location of the trouble requires removing the upper bearing covers to see which shaft may not be turning. If the trouble is found at this point, it may only be necessary to remove the gear case cover in order to make repairs; if the trouble is not found, it will be necessary to dismantle the tong as described on pages 17 to 22.

TRANSMISSION JUMPS OUT OF GEAR

Loose Gear Shift Handles. Nuts holding the gear shift handles to the shaft should be made up tightly (a 7/8" box wrench is a suitable tool for the purpose). If this causes the tong to shift with difficulty, it means that the gear shift handle lock pins are rubbing the case too hard. Either the pins or springs are frozen or the shift handles are bent. Do not loosen the handles to correct this situation; loosened handles permit the square hole in the handles to wear so that the tong does not fully engage in gear.

Bent Gear Shift Handles. Bent gear shift handles do not permit the gears to be properly enmeshed when the gear shift handle lock pins drop into their recesses in the frame. Remove the handles from the gear shift shaft one at a time; heat them with a torch and bend them until the shift lock pins fit in place properly when the tong is fully engaged in both high and low gears.

Gear Shift Lock Pins Frozen. If grease cannot be worked into the shift lock pins in order to free them, remove the handle and the grease fitting and drive out the pins and springs with a small punch. The gear shift lock pins are made of stainless steel, and a little cleaning should make them work freely again.

Worn Shifting Fingers. Bent gear shift handles, due to rough usage (such as loading out, transporting, or unloading), may cause the shifting fingers to run in a bind while in one gear or the other. Extensive use of the tong in this condition causes the gear shifting fingers to wear excessively and may necessitate replacing them. To change worn shifting fingers, drain the oil from the transmission case and remove the frame cover. Remove the chain and right angle gear box assembly. Replace any worn fingers. Make sure the finger pins clear the inside contour of the yoke and do not bind either on the side or the bottom of the groove in the highspeed driven gear. Inspect both the high-speed driven gear and the high-speed driver gear for wear, and replace them in necessary. Before attempting to replace the right-angle gear box assembly, knock out both bearings in the bottom of the lower transmission. After bolting down the right-angle gear box assembly, turn the tong over and replace the bottom bearings. Replace gaskets before securing the bearing cover plates. For more detailed instructions, see the **Shop Repairs** section of this manual.

Worn Key or Key Lodged Deep in Gear Shift Shaft. To change the key on the gear shift shaft, proceed as above for changing the gear shift fingers. Only one gear shift handle need be removed to permit the shaft to slide out. Before replacing the key, make certain that the "O" rings are in good condition.

TONG DOES NOT POSITION CORRECTLY

Too Much or Not Enough Oil on the Brake Band. If the brake band is soaked with oil, it may not hold well enough to keep the gripping mechanism from running past the opening in the frame. Either wipe the oil off with a rag, or clean the lining of the brake band with a rag soaked in cleaning solvent. A dry brake band may cause the tong to stop too quickly. A little oil added to the dry band should make it function properly.

Positioning Valve Not Adjusted. The height of the positioning valve should be such that as the cam on the outer ring sprocket comes under the valve, the rotation of the outer ring is **almost** stopped. The

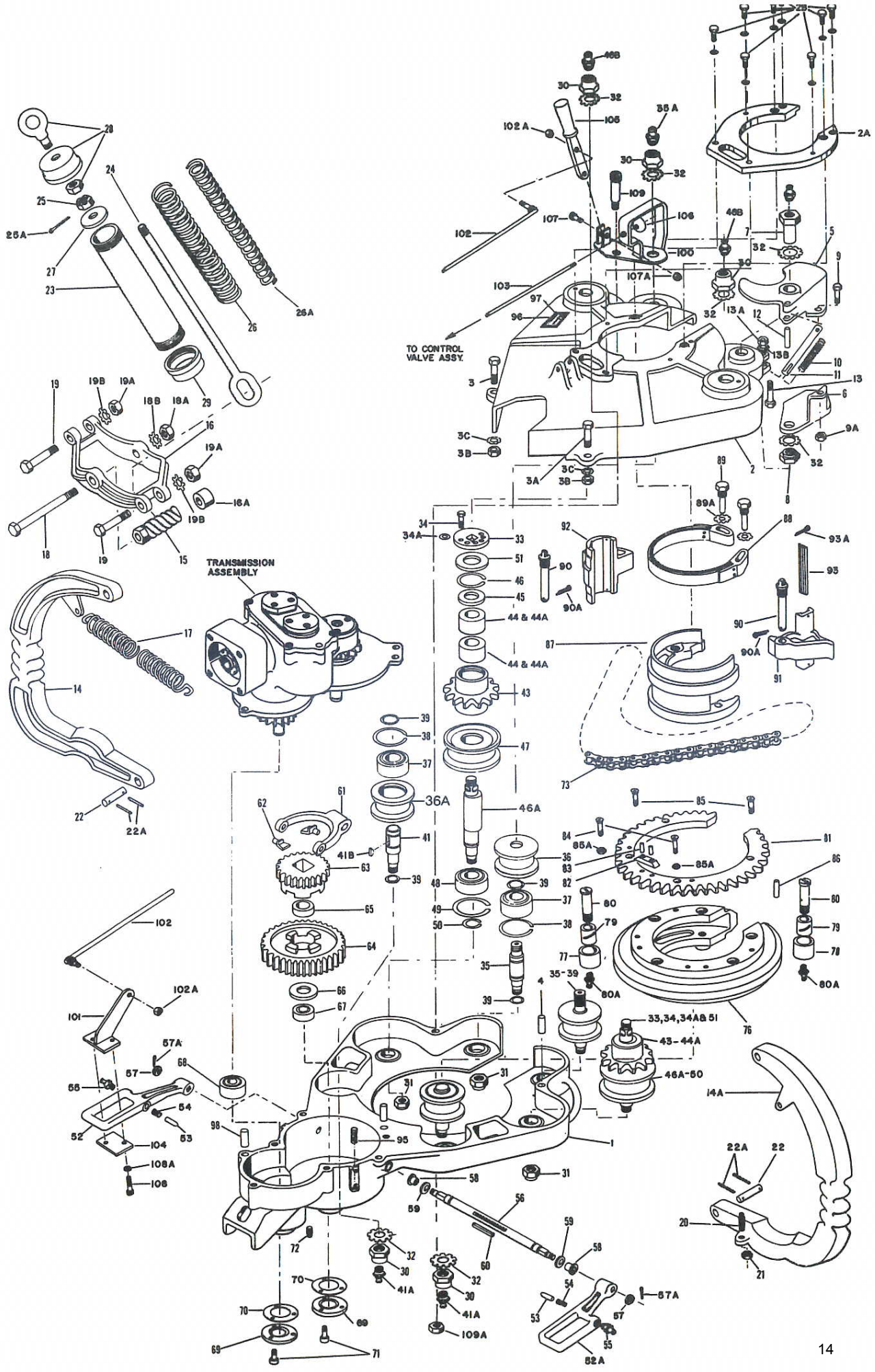
tong is designed so that the outer ring will "creep" slightly when the positioning valve is closed by the cam. Thus, if the cam happens to fall directly under the valve when a joint is completely made up, it can "creep" out from under the valve, and the outer ring can continue the reverse rotation necessary to release the jaw from the tubing. If the valve is set too low the tong will not "creep". If the valve is set too high the tong will not stop. By backing out the two set screws that lock the body of the valve to the flange, the flange can be screwed up or down and locked in half turn increments until the proper height is obtained. (In case the positioning valve body has been removed, the "In" port of the valve body is on the right for the Model RS Tong, when viewed from the front.)

OIL IS LEAKING FROM TRANSMISSION CASE

Oil Leaking Heavily. If oil is leaking heavily around the sliding gear shaft when the tong is upside-down, remove the right angle gear box assembly and replace the sliding gear shaft seal. This necessitates the disassembly procedure described earlier, in the section entitled **Worn Shifting Fingers.**

Oil Leaking Lightly. If oil is leaking lightly from the lower transmission, the right-angle gear box weep hole, or if after removing the transmission fill plug you see that the transmission case is full of hydraulic oil — either remove the hydraulic motor and replace the oil seal, or install a new motor. (When the motor oil seal begins to leak, it usually indicates that the motor is worn out and should be replaced.)

REPLACEMENT PARTS AND EXPLODED DIAGRAMS
MODEL RS POWER TUBING TONGS

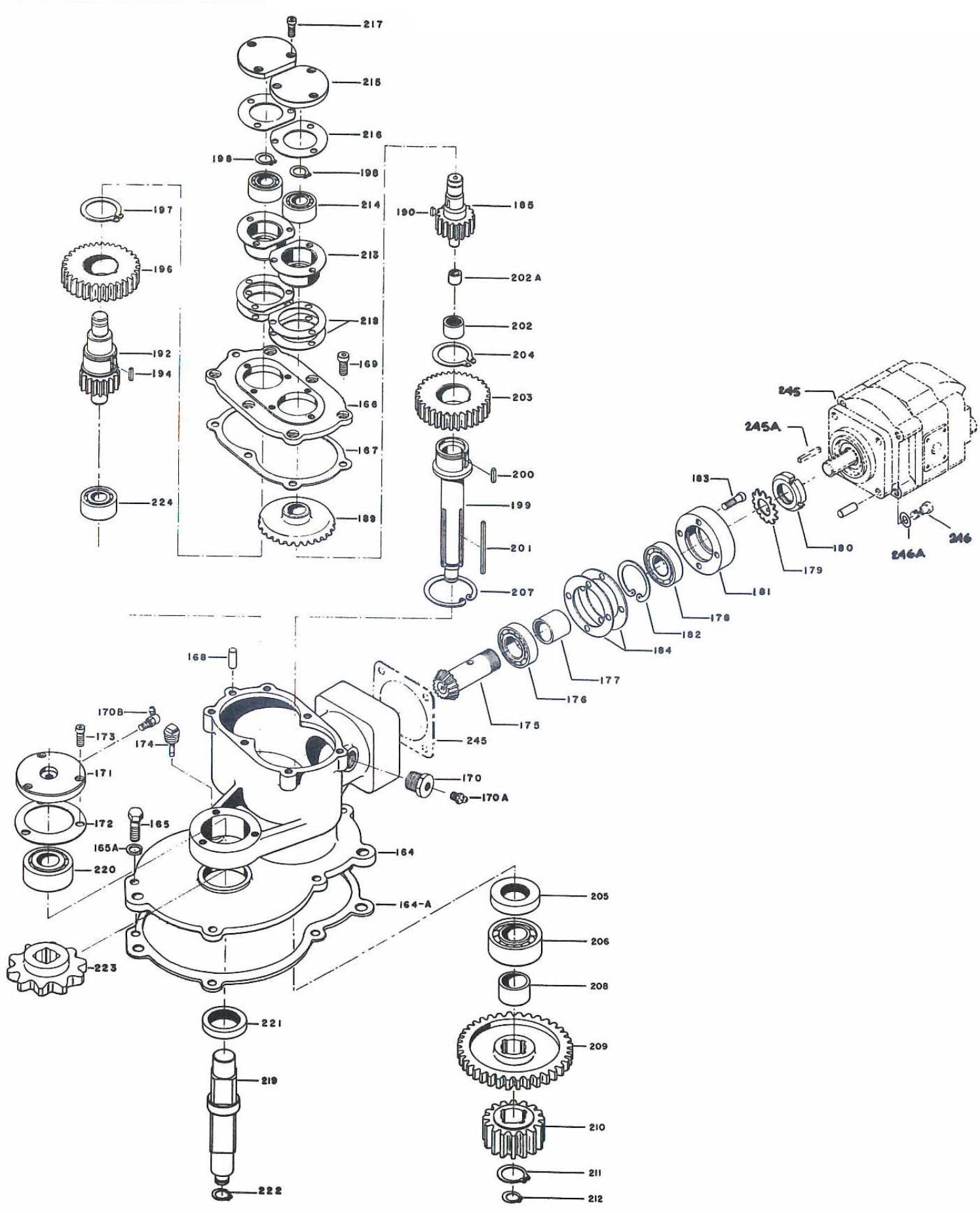

TO CONTROL VALVE ASSY.
TRANSMISSION ASSEMBLY

ITEM	PART NUMBER	QTY.	PART DESCRIPTION
	34892		Model RS tong complete with positioner and roll-over hanger; less jaws, bushings, hoses and quick-connect couplings
	34891		Model RS tong complete with rigid hanger; without positioner, jaws, bushings, hoses and quick-connect couplings
1	34893	1	Frame weldment
2	34898	1	Frame cover
2A	35129	1	Brake band cover
2B	939084-3	8	Capscrew, brake band cover
2C	939349-3	8	Lock washer, brake band cover capscrew
3	939067-55	2	Frame cover bolt, 5/8" x 2"
3B	939207-6	2	Frame cover nut
3C	939644-11	2	Frame cover lock washer
4	943631-70	1	Frame cover dowel pin, ¾" x 2"
-	30837	1	Guard assembly, top half (Ref. 5, 11, 12)
5	30871	1	Guard, top half
6	30872	1	Guard, bottom half
7	15495-1	1	Top guard nut
8	15495-2	1	Bottom guard nut
9	939067-44	1	Guard capscrew, ½" x 1 ¾"
9A	941439-5	1	Flexloc nut
10	16448	1	Guard spring
11	30874	1	Guard spring housing
12	16481	1	Guard spring housing pin, 3/8" x 2 ¼"
13	939067-53	1	Guard spring bolt, 3/8" x 2"
13A	939207-4	1	Nut, 3/8" x 2"
13B	939644-7	1	Lockwasher
-	30685-1	1	Roll-over hanger assembly (Ref. 14-29)
14	16352	2	Hanger
15	15532	1	Hanger balancing screw
16	34729	1	Hanger rocker arm
16A	34731	1	Hanger spacer
17	16497	1	Hanger locking spring
18	940917-273	1	Hanger balancing screw bolt, ¾" x 8"
18A	939212-7	1	Nut
18B	939349-6	1	Washer
19	940917-151	2	Hanger rocker arm bolt, 5/8" x 3-1/2"
19A	939212-6	2	Nut
19B	939349-64	2	Washer
20	939169-62	2	Hanger set screw, ½" x 1 ¾"
21	939248-5	2	Hanger set screw jam nut
22	16355	2	Hanger pin, 5/8" x 3 1/8"
22A	947128-140	4	Spirol pin
-	16377	1	Suspension spring assembly (Ref. 23-29)
23	16683	1	Suspension spring housing
24	16378	1	Suspension spring shank
25	939484-8	1	Suspension spring shank nut
25A	939667-28	1	Cotter
26	16446	1	Suspension spring, outer
26A	27955	1	Suspension spring, inner

ITEM	PART NUMBER	QTY.	PART DESCRIPTION
27	16682	1	Suspension spring washer
28	16379-1	1	Suspension spring housing
			Upper cap with eye bolt and nut
29	16380	1	Suspension spring housing lower cap
30	15495	5	Roller shaft alemite nut
31	939537-61	3	Roller shaft elastic stop nut, ¾”
32	939644-13	7	Roller shaft washer, 7/8”
33	16480	2	Idler sprocket adjustment plate
34	939067-3	2	Idler sprocket adjustment plate capscrew, 3/8” x ¾”
-	30835	2	Front idler roller assembly (Ref. 35-39)
35	15494-5	1	Front idler roller shaft assembly
36	30870	1	Idler roller (front)
36A	15491	1	Idler roller (back)
37	979103-4	1	Idler roller bearing
38	944157-281	1	Idler roller bearing retaining ring
39	942685-118	2	Idler roller assembly retaining ring
-	30361	2	Back idler roller shaft assembly (Ref. 41 and 36A-39)
41A	940895-606	1	Key
-	15493-1	2	Idler sprocket assembly (Ref. 43-46)
43	15493	1	Idler sprocket
44	942384-36	2	Outer idler sprocket bearing
44A	942394-42	2	Inner idler sprocket bearing
45	15498	1	Idler sprocket bearing retaining washer
46	941157-231	1	Idler sprocket bearing retaining ring
-	15492-2	2	Idler sprocket roller shaft assembly (Ref. 46A-50)
46A	15496-5	1	Idler sprocket shaft assembly
47	15492	1	Idler sprocket roller
48	979103-4	1	Idler sprocket roller bearing
49	941157-281	1	Idler sprocket roller bearing retaining ring
50	942685-114	1	Idler sprocket roller assembly retaining ring
51	15500	2	Idler sprocket spacer
52	15533	2	Gear shift handle
53	15516	2	Gear shift handle lock pin
54	16977	2	Gear shift handle lock pin spring
55	940323-4	2	Gear shift handle grease fitting
56	15534	1	Gear shift shaft
57	939484-5	2	Gear shift shaft slotted nut, 5/8”
57A	939667-17	2	Cotter
58	23056	2	Gear shift shaft bushing
59	942271-11	2	Gear shift shaft “O” ring
60	939995-812	1	Gear shift shaft key
61	15501	1	Gear shift actuator yoke
62	15502	2	Gear shift finger
63	15512	1	High speed driven gear
-	15511-1	1	Low speed driven gear assembly (Ref. 64-65)
64	15511	1	Low speed driven gear
65	15537	1	Low speed driven gear bushing
66	15507	1	Low speed driven gear thrust washer
67	979054-304	1	Sliding gear shaft lower bearing

ITEM	PART NUMBER	QTY.	PART DESCRIPTION
68	9791025304	1	Drive shaft lower bearing
69	15505	2	Frame (bottom) gear box bearing plate
70	16979	2	Frame (bottom) gear box bearing plate gasket
71	941271-25	6	Bearing plate capscrew, ¼" x ½"
72	940251-2	1	Gear case drain plug, ¼"
73	947915-11	1	Roller chain assembly with connecting link and offset link, 1 ¼" x 82 ½"
-	17906-2	1	Outer ring assembly (Ref. 76-80)
76	17906	1	Outer ring
77	17916	3	Outer ring large roller
78	17917	2	Outer ring small roller
79	17918	5	Roller bushing
80	17919	5	Roller pin
80A	940308-1	5	Grease fitting
-	17921-1	1	Outer ring sprocket assembly (Ref. 81-83)
81	17921	1	Outer ring sprocket
82	15519	1	Positioning valve cam
83	439723-39	2	Positioning valve cam rivet
84	941237-75	4	Outer ring sprocket bolt (short), ½" x 1 1/4"
85	941237-108	2	Outer ring sprocket bolt (long), ½" x 2"
85A	941442-5	2	Lock nut
86	943631-92	2	Outer ring sprocket dowel pin, 5/8" x 3"
87	17907	1	Inner ring
88	15527-1	1	Brake band assembly
89	15528	2	Brake band pin
90	17920	2	Jaw and bushing pin
			JAW & BUSHING ASSEMBLIES
91	23446-1	1	1.050 jaw assembly
92	23447-1	1	1.050 bushing assembly
91	29373-1	1	1.315 jaw assembly
92	29374-1	1	1.315 bushing assembly
91	29310-1	1	1.660 jaw assembly
92	29307-1	1	1.660 bushing assembly
91	29802-1	1	1.750 jaw assembly
92	29801-1	1	1.750 bushing assembly
91	29309-1	1	1.900 jaw assembly
92	29306-1	1	1.900 bushing assembly
91	29308-1	1	2 and 2-1/16 jaw assembly
92	29305-1	1	2 and 2-1/16 bushing assembly
91	27477-1	1	2 3/8 jaw assembly
92	27645-1	1	2 3/8 bushing assembly
91	27481-1	1	2 7/8 jaw assembly
92	27660-1	1	2 7/8 bushing assembly
91	17912-1	1	3 ½ jaw assembly
92	17913-1	1	3 ½ bushing assembly
91	23624-1	1	4 jaw assembly
92	23623-1	1	4 bushing assembly
91	24553-1	1	4 ½ jaw assembly
92	24552-1	1	4 ½ bushing assembly

ITEM	PART NUMBER	QTY.	PART DESCRIPTION
			DIES
93	29378	3	1.315 die
93	29313	3	1.660 die
93	29312	3	1.900 die
93	29311	3	2 and 2-1/16 die
93	27494-1	3	2-3/8 die
93	27498-1	3	2-7/8 die
93	6473	3	3-1/2 and 4 die
93	24554	3	4-1/2 die
98	943631-69	2	Gear box cover dowel pin, 5/8" x 2"
-	32331	1	Front end control assembly
100	31312	1	Control bracket weldment
101	28019	1	Shift bracket weldment
102	28022	1	Shifter rod weldment
102A	941439-2	2	Flexloc nut
103	28023	1	Throttle rod weldment
103A	939370-9	1	Washer
103B	939667-10	1	Cotter pin
104	28020	1	Clamp plate
105	28021	1	Shifter lever
106	942723-13	1	Throttle rod ball
107	941271-93	1	Capscrew, 3/8" x 1-1/2"
107A	941439-3	1	Nut
108	941271-93	2	Capscrew, 3/8" x 1-1/2"
108A	939369-9	2	Lockwasher
109	940584-86	1	Shoulder screw, ¾" x 3"
109A	941442-6	1	Nut-shoulder screw, 5/8"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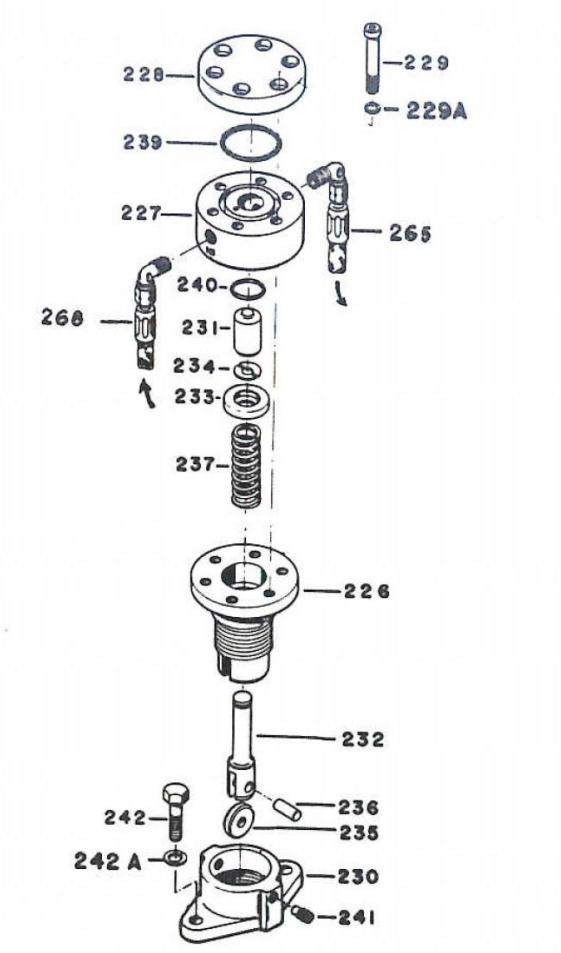
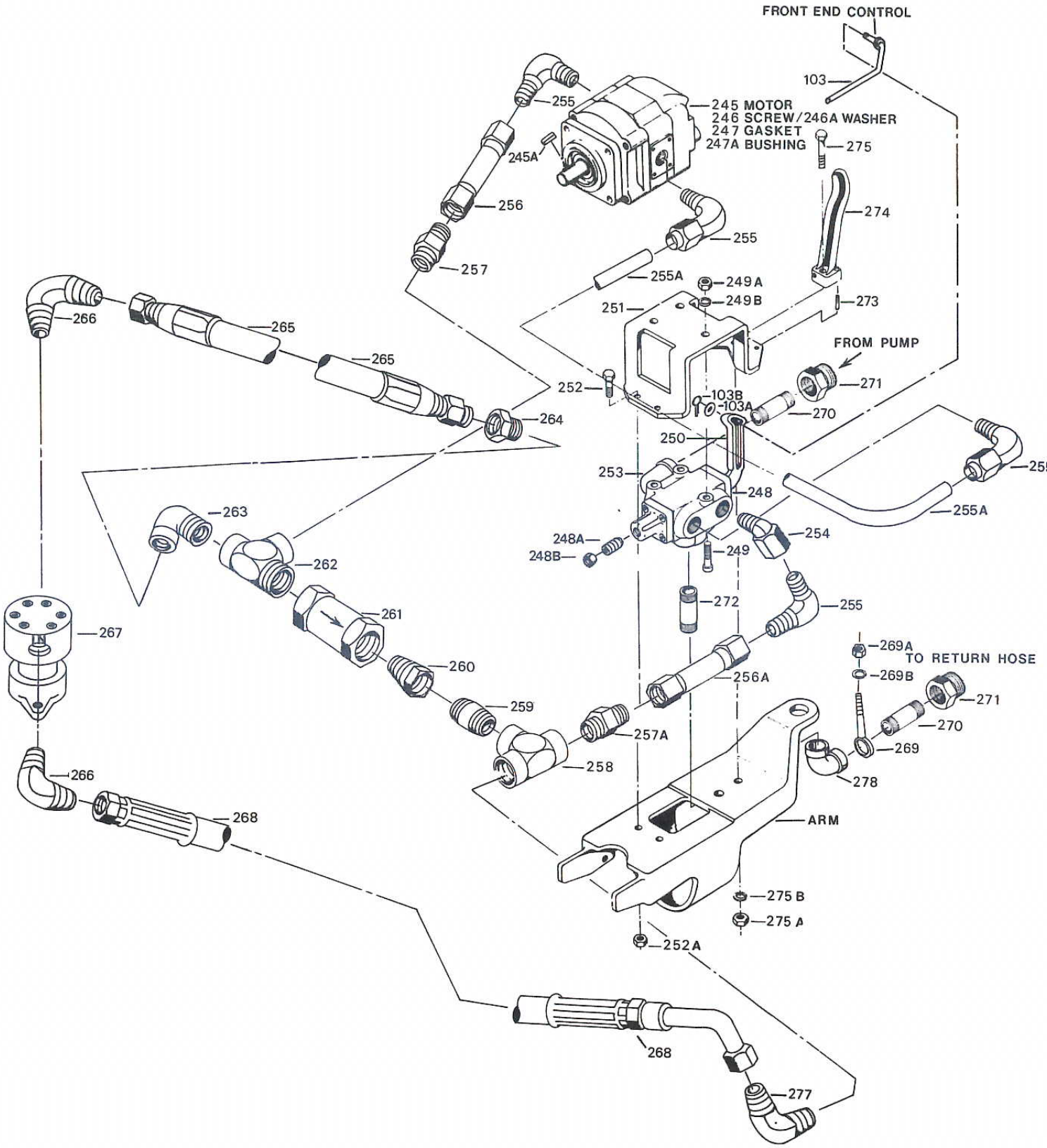
ITEM	PART NUMBER	QTY.	PART DESCRIPTION
-	24900	1	Hydratorc & Super Powairmatic transmission assembly (Ref. 164-224)
164	24907	1	Transmission case
164A	16980	1	Gear box cover gasket
165	929067-14	5	Transmission case capscrew, ½" x 1"
165A	939644-9	5	Lockwasher, ½"
166	24908	1	Transmission case cover
167	24913	1	Transmission case cover gasket
168	943631-34	1	Transmission case cover dowel pin
169	941271-27	6	Transmission case cover capscrew, 3/8" x ½"
170	940207-6	1	Transmission case bushing (standard), ¾" x 1/8"
170A	940308-1	2	Grease fitting alemite
171	15504	1	Gear box cover bearing plate
172	16978	1	Gear box cover bearing gasket
173	941271-47	3	Gear box cover bearing plate capscrew, ¼" x ¾"
174	940257-4	1	Gear case oil plug
-	25940	1	Bevel pinion cage assembly (Ref. 175-184)
175	24909	1	Bevel pinion
176	979136-8	1	Bevel pinion inboard bearing
177	24920	1	Bearing spacer
178	979454-2	1	Bevel pinion outboard bearing
179	940406-7	1	Lockwasher
180	940395-7	1	Bevel pinion locknut
181	24919	1	Bevel pinion bearing cage
182	941157-244	1	Bevel pinion bearing cage snap ring
183	941271-756	4	Bearing cage capscrew, 5/16" x 1-14"
184	24922	1	Bearing case shim set
-	25972	1	Bevel gear shaft assembly (Ref. 185-191)
185	27372	1	Bevel gear shaft
189	24910	1	Bevel gear
190	940895-606	2	Bevel gear key
191	941145-78	1	Bevel gear shaft upper bearing snap ring
-	27371-1	1	Counter shaft assembly (Ref. 192-198)
192	27371	1	Counter shaft
194	940017-816	1	Drive pinion key
196	24915	1	Driven gear
197	941145-175	1	Driven gear snap ring
198	941145-78	1	Counter shaft upper bearing snap ring
-	24945-1	1	Drive shaft assembly (Ref. 199-212)
199	24911	1	Drive shaft
200	940017-816	1	Driveshaft key (short)
201	16720	4	Drive shaft key (long)
202	942390-52	1	Bevel gear shaft lower bearing, outer race
202A	942394-9	1	Bevel gear shaft lower bearing, inner race
203	24915	1	Driven gear
204	9541145-175	1	Driven gear snap ring
205	940295-215	1	Drive shaft oil seal
206	979093-8	1	Drive shaft upper bearing
207	941157-281	1	Drive shaft oil seal retaining ring

ITEM	PART NUMBER	QTY.	PART DESCRIPTION
208	24921	1	Drive shaft upper bearing spacer
209	15515	1	High speed driven gear
210	15535	1	Low speed driver gear
211	941145-137	1	Low speed driver gear retaining ring
212	941145-78	1	Drive shaft bearing retaining ring
-	25946	2	Upper bearing cage assembly (Ref. 213-218)
213	24918	1	Upper bearing cage
214	979093-5	1	Upper bearing
215	24917	1	Upper bearing cover
216	24926	1	Upper bearing cover gasket
217	941271-753	3	Upper bearing cover capscrew, 5/16" x ¾"
218	24924	1	Upper bearing cage shim set
219	15506	1	Sliding gear shaft
220	979103-4	1	Sliding gear shaft upper bearing
221	940295-214	1	Sliding gear shaft oil seal
222	941145-78	1	Sliding gear shaft bearing retaining ring
223	15513	1	Drive sprocket
224	979093-6	1	Counter shaft bottom bearing

ITEM	PART NUMBER	QTY.	PART DESCRIPTION
-	25020	1	Hydratorc Positioning valve assembly (Ref. 226-242)
226	25026	1	Positioning valve body
227	25025	1	Positioning valve cylinder
228	25024	1	Positioning valve cylinder cap
229	941271-760	6	Positioning valve cylinder cap capscrew
229A	939353-2	6	Washer, 5/16" x 1-3/4"
230	25027	1	Positioning valve flange
231	25028	1	Positioning valve piston
232	25029	1	Positioning valve roller plunger
233	25034	1	Positioning valve roller plunger washer
234	25030	1	Positioning valve split washer
235	25031	1	Positioning valve roller
236	25032	1	Positioning valve roller pin
237	25330	1	Positioning valve spring
239	942271-26	1	Positioning valve large "O" ring
240	942271-15	1	Positioning valve small "O" ring
241	939554-61	2	Positioning valve set screw
242	939067-23	2	Positioning valve capscrew
242A	939644-7	2	Washer
265	950260-195	1	Hose assembly
268	950259-171	1	Hose assembly

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246 SCREW/246A WASHER
247 GASKET
247A BUSHING
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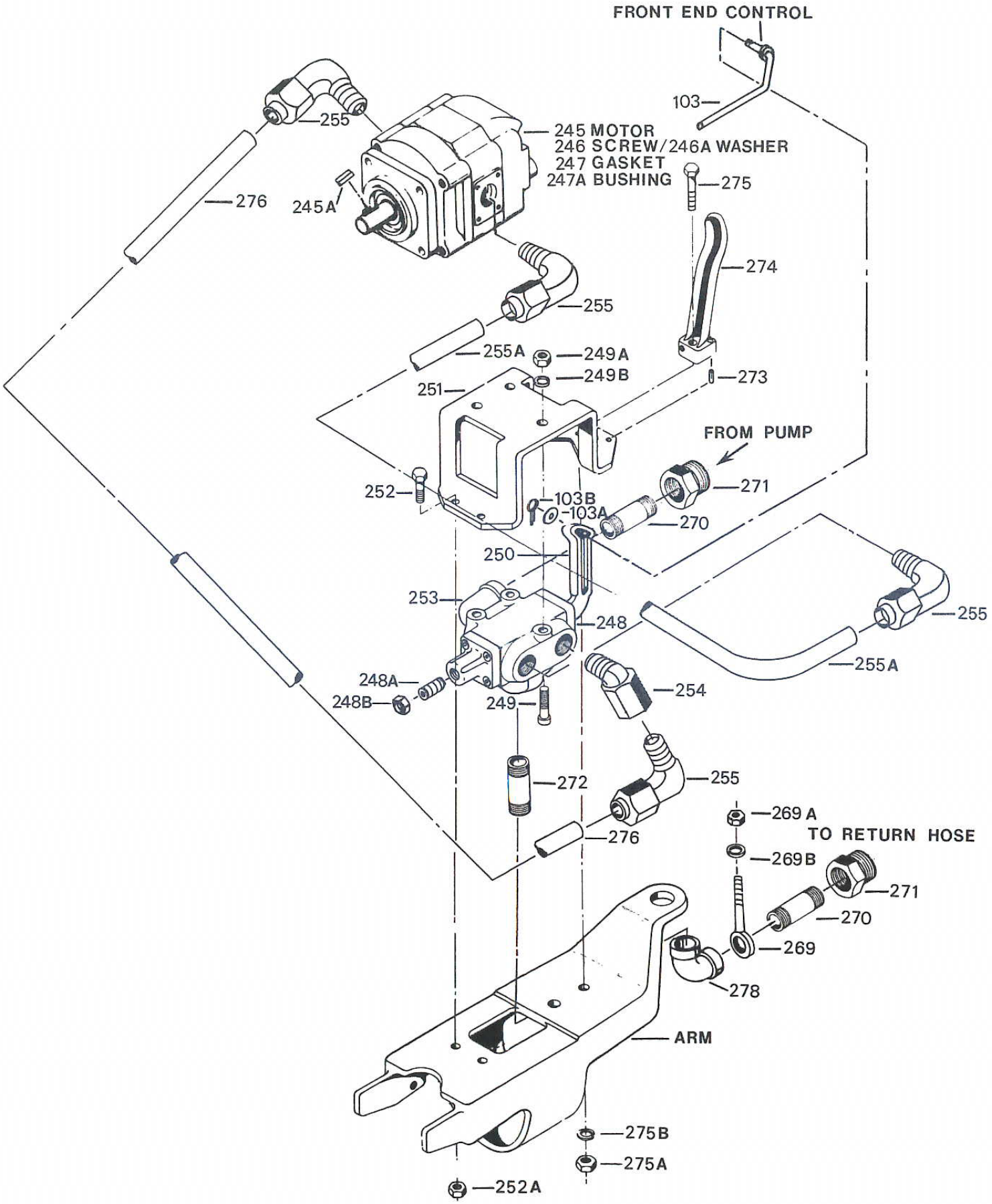
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247A BUSHING
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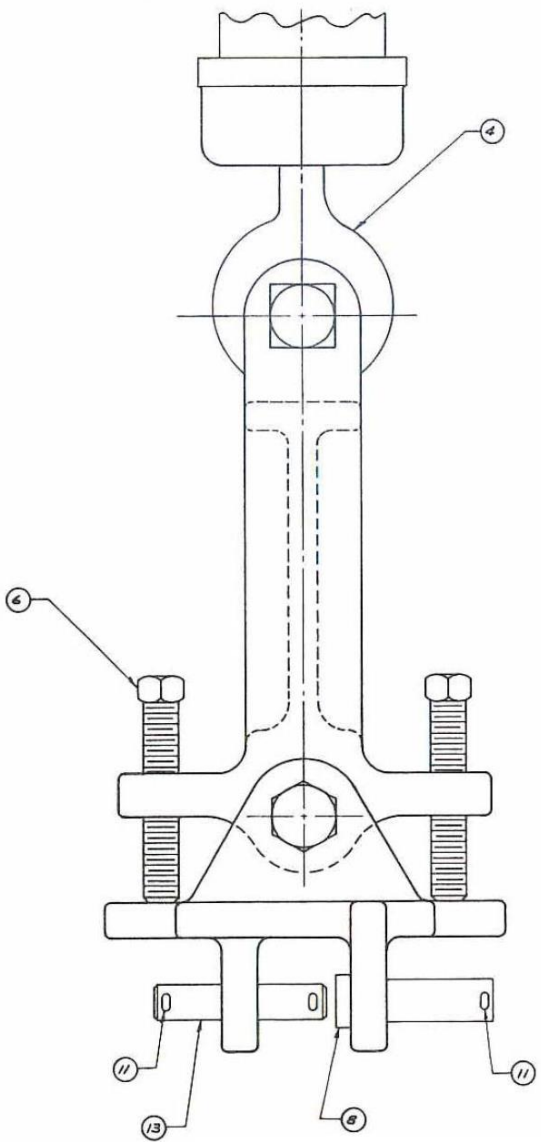
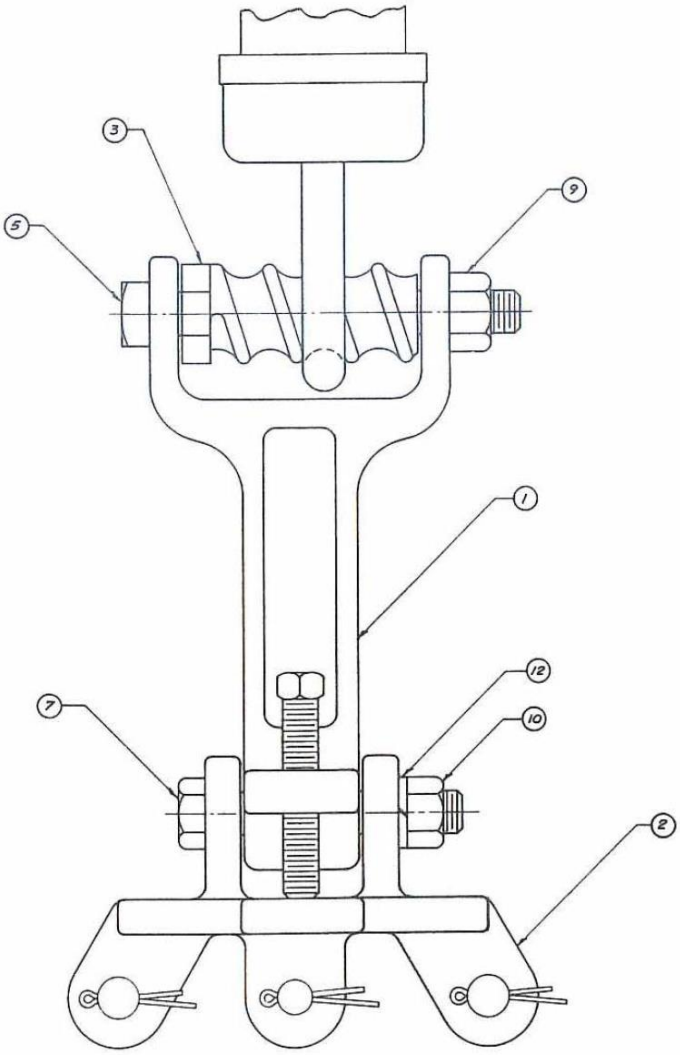
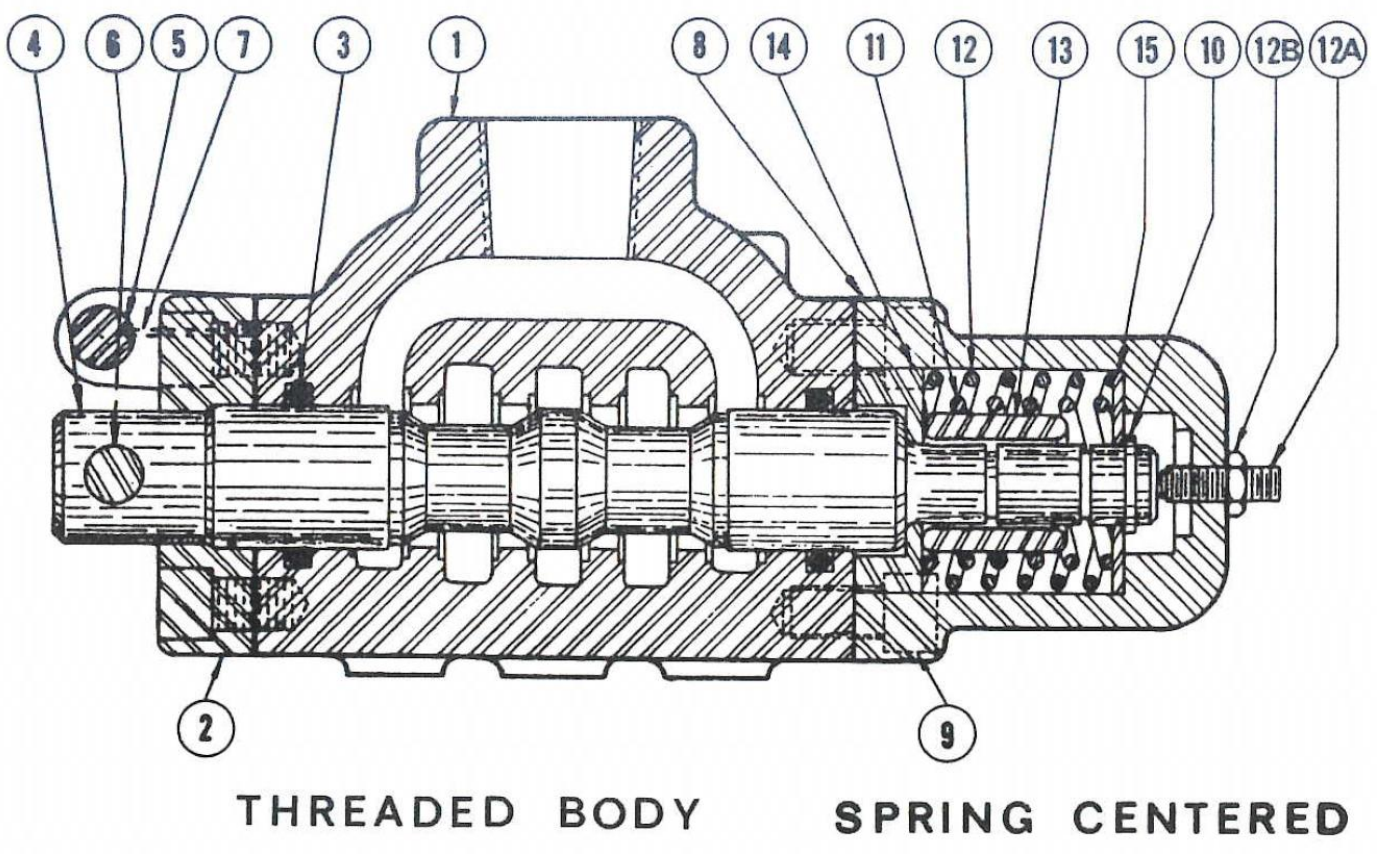
ITEM	PART NUMBER	QTY.	PART DESCRIPTION
245	970250-6	1	Standard hydraulic motor
245	971003-5	1	High torque hydraulic motor
245A	9704991247	1	Key
246	939084-33	4	Motor mounting capscrew, 3/8" x 1"
246A	939370-9	4	Motor mounting washer
247	24927	1	Motor gasket
247A	31101	4	Motor bushing
248	943972-2	1	Control valve
248A	939566-106	1	Set screw
248B	939246-2	1	Jam nut
249	941271-763	3	Control valve mounting bolt
249A	939212-3	3	Nut
249B	939349-59	3	Lock washer
250	25356	1	Control valve lever
251	27499	1	Control valve support
252	939084-23	2	Front support mounting bolt, 3/8" x ¼"
252A	941442-3	2	Flexloc nut
253	940102-20	1	90 degree street elbow, ¾" pipe
254	940103-18	1	45 degree street elbow, ¾" pipe
255	946301-38	4	90 degree male elbow, ¾" pipe
255A	34900	1	Tube assembly, control valve to motor
256	35054	1	Tube assembly, motor to check valve
256A	35053	1	Tube assembly, control valve to check valve
257	946281-38	1	Male adapter, ¾" pipe to tube
257A	946281-28	1	Male adapter, ½" pipe to tube
258	940143-8	1	Female tee, ½" pipe
259	940225-49	1	Nipple, ½" pipe
260	940212-10	1	Reducing bushing, ¾" to ½"
261	943992-7	1	Check valve, ¾" pipe
262	940148-12	1	Street tee, ¾" pipe
263	940102-20	1	90 degree street elbow, ¾" pipe
264	940212-9	1	Reducing bushing, ¾" to 3/8" pipe
265	950260-195	1	Hose assembly, outlet
266	946301-6	2	90 degree male elbow (brass)
267	25020	1	Positioning valve
268	950259-171	1	Hose assembly, inlet
269	945973-4	1	Eye bolt
269A	939212-15	1	Nut
269B	939352-29	1	Washer
270	940225-131	2	Nipple, ¾" pipe
271	940212-14	2	Bushing, ¾" x 1" pipe
272	940225-59	1	Nipple, ¾" pipe
273	941066-86	1	Dowel pin
274	27500	1	Throttle lever guard assembly
275	939084-64	1	Guard retaining bolt
275A	939212-5	1	Hex nut
275B	939349-4	1	Lock washer
276	34902	1	Tube assembly, long, control valve to motor
277	946301-24	1	90 degree male elbow, ½" pipe to hose
278	940081-5	1	90 degree female elbow, ¾" pipe

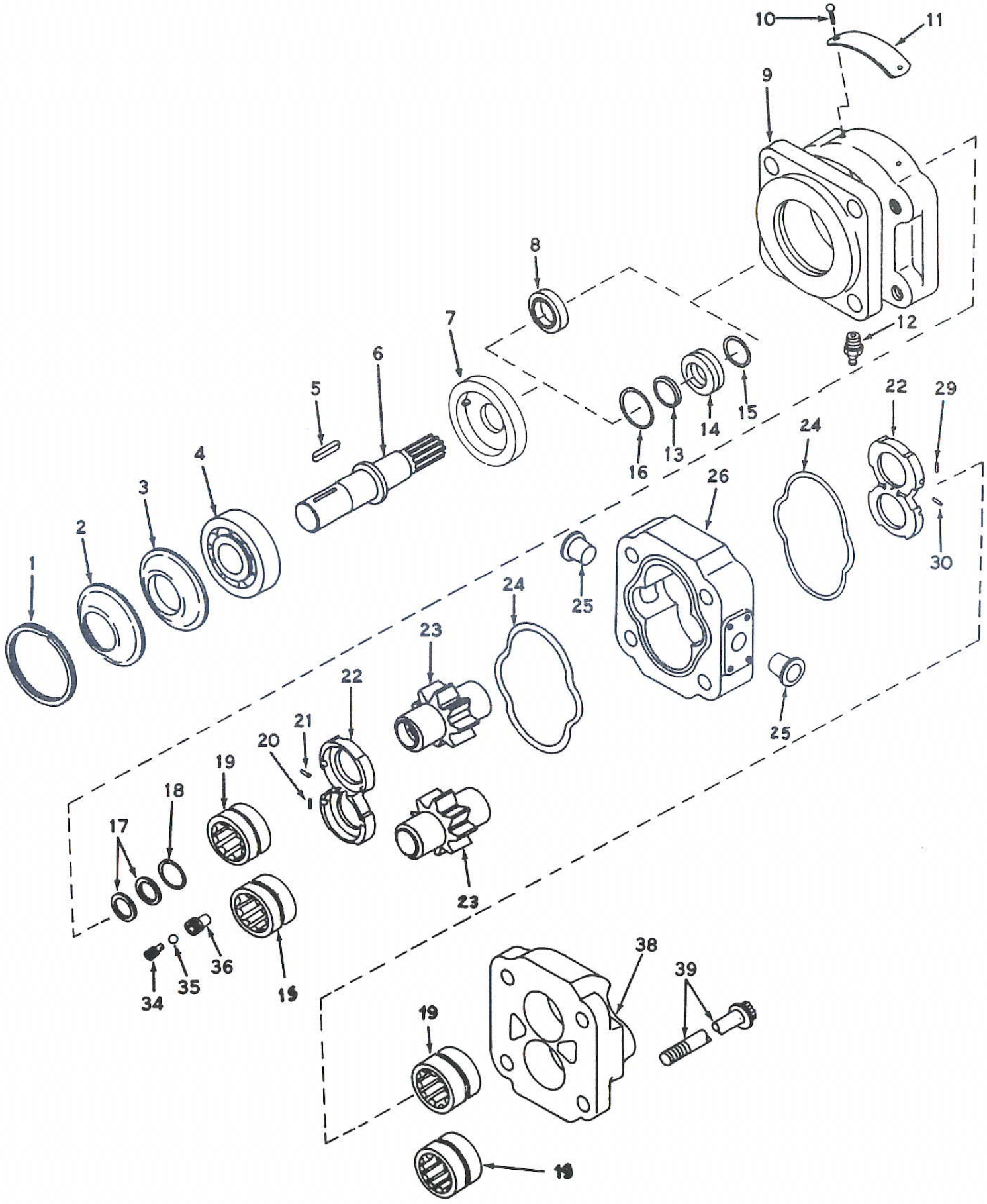
ITEM	PART NUMBER	QTY.	PART DESCRIPTION
-	34895	1	Hanger assembly
1	34896	1	Hanger
2	34897	1	Hanger adapter
3	15532	1	Balancing screw
4	16377	1	Suspension spring assembly
5	939107-506	1	Square head bolt
6	939168-131	2	Square head set screw
7	939053-156	1	Hex head bolt
8	939502-142	2	Clevis pin
9	939142-8	1	Nut
10	939212-7	1	Nut
11	939672-28	4	Cotter pin
12	939352-6	1	Lock washer
13	16355	1	Hanger pin





ITEM	PART NUMBER	QTY.	PART DESCRIPTION
-	943972-2	1	Control valve
1	9439811001	1	Valve body
2	9439811002	1	Lever cap
3	942271-19	2	"O" ring
4	9439811003	1	Spool-open center
5	9439811004	1	Lever pin
6	9439811005	1	Spool pin
7	9439811006	1	Lever pin retaining pin
8A	9439811007	1	Cap
9	941271-49	8	Capscrew
10	941145-56	1	Spool retaining ring
11	9439811008	1	Compression spring (small)
12	9439811009	1	Compression spring (large)
12A*	939566-106	1	Set screw
12B*	939246-2	1	Jam nut
13	9439811010	1	Stop spacer
14	9439811011	1	Cup spacer
15	9439811012	1	Washer

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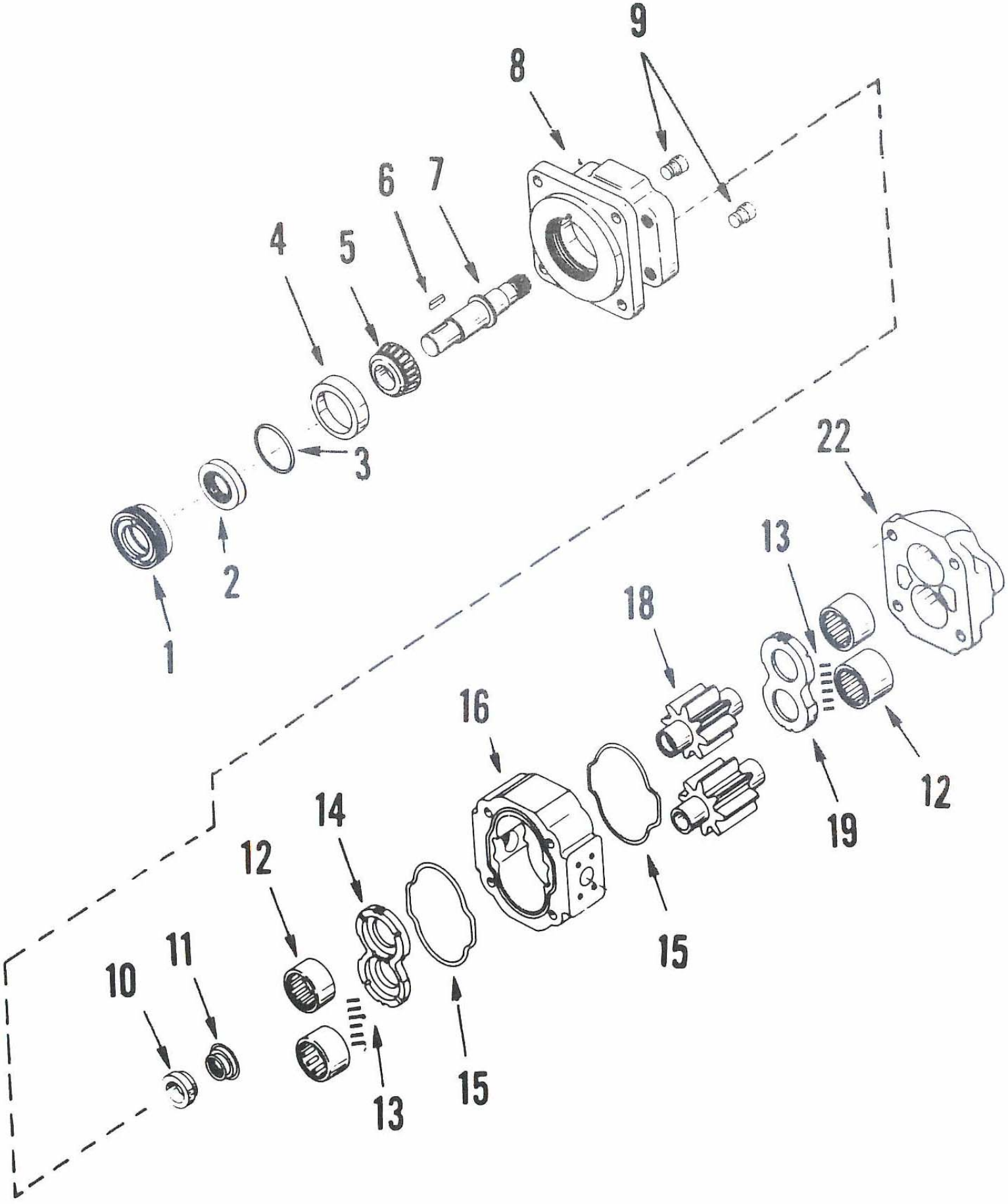
ITEM	PART NUMBER	QTY.	PART DESCRIPTION
-	970250-6	1	Standard hydraulic motor assembly (Ref. 1-39)
-	970499-5	1	Shaft end cover (Ref. 1-7, 9-19, 33-36)
1	9704991005	1	Snap ring
2	9704991003	1	Bearing shield
3	9704991004	1	Bearing seal
4	9704991002	1	Shaft ball bearing
5	9704991247	1	Shaft key
6	9704991034	1	Shaft
7	9704991009	1	Bearing spacer
8	9704991011	1	Motor shaft seal
9	9704991001	1	Shaft end cover
10	9704991016	2	Drive screw
11	9704991015	1	Nameplate
12	940308-1	1	Grease fitting
13	9704991007	1	Back-up ring
14	9704991006	1	Bronze insert
15	9704991008	1	“O” ring
16	9704991017	1	“O” ring gasket
17	9704991007	2	Back-up ring
18	9704991008	1	“O” ring
19	9704991021	4	Roller bearing
-	970499-272	1	Gear housing (Ref.20-22, 24, 26-30)
20	9704991127	12	Pocket seals
22	9704991026	2	Thrust plate
23	9704991034	1	Driven gear
24	9704991029	2	Ring gasket
26	9704991225	1	Gear housing
34	9704991013	2	Check ball retainer
35	9704991012	2	Check ball
36	9704991014	2	Check valve seat
38	9704991220	1	Port end cover
39	9704991061	4	Capscrews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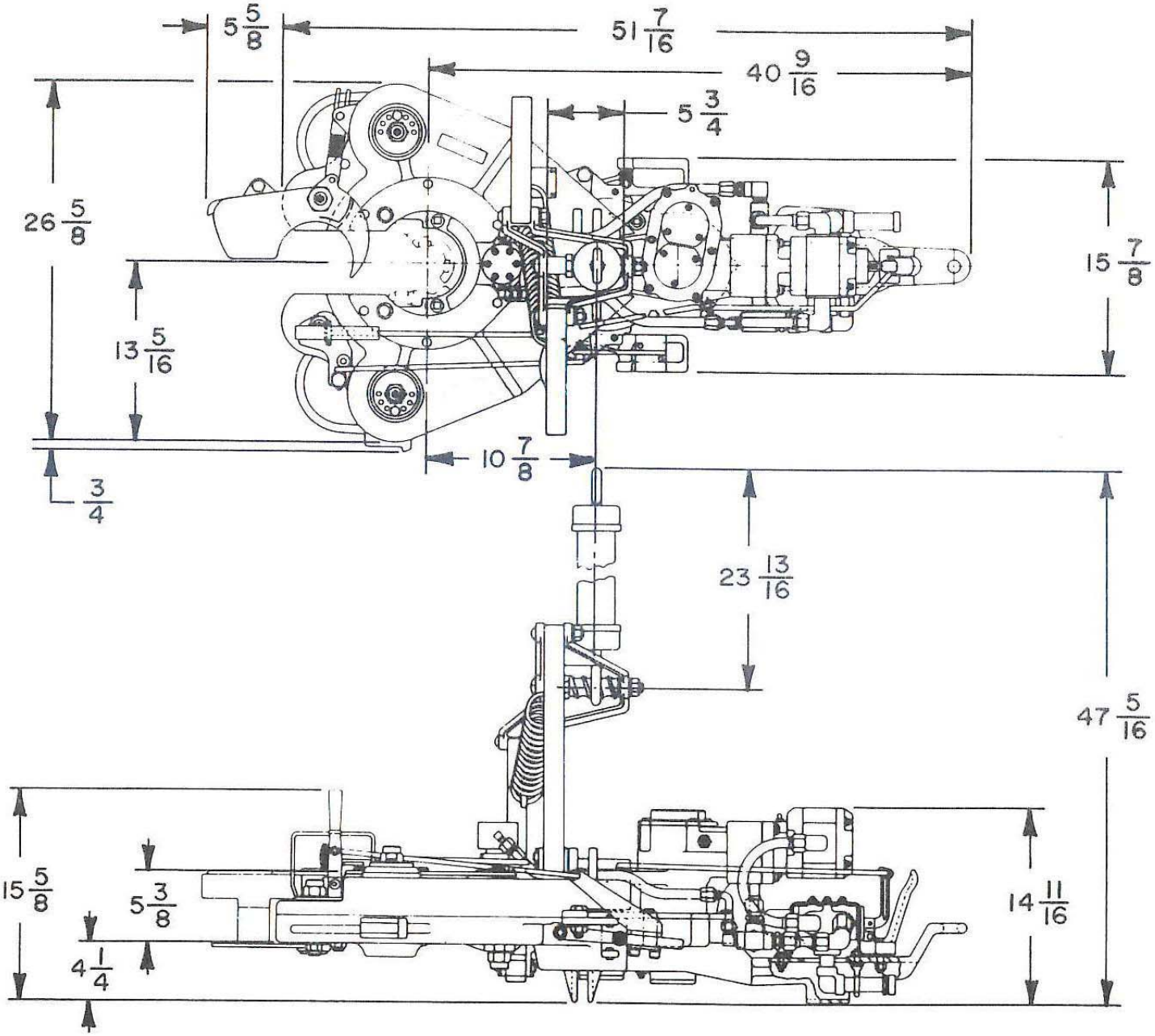
ITEM	PART NUMBER	QTY.	PART DESCRIPTION
-	971003-5	1	High torque motor assembly (Ref. 1-22)
-	971499-33	1	Shaft end cover
1	9714991012	1	Seal retaining ring
2	9714991011	1	High pressure motor shaft seal
3	9714991004	1	“O” ring
4			Bearing cup (comes with bearing)
5	9714991006	1	Tapered bearing
6	9704991247	1	Drive shaft key
7	9714991058	1	Drive shaft
8	9714991056	1	Shaft end cover
9	9714991010	2	Check assembly
10	9714991036	1	Bronze shaft bushing
11	9714991037	1	Conical spring
12	9714991038	4	Roller bearings
13	9714991039	12	Pocket seal
14	9714991040	2	Thrust plate
15	9714991041	2	“O” ring
16	9714991055	1	Gear housing
18	9714991144	1	Driven gear set
22	9714991070	1	Port end cover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51 7/16
40 9/16
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26 5/8
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13 5/16
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23 13/16
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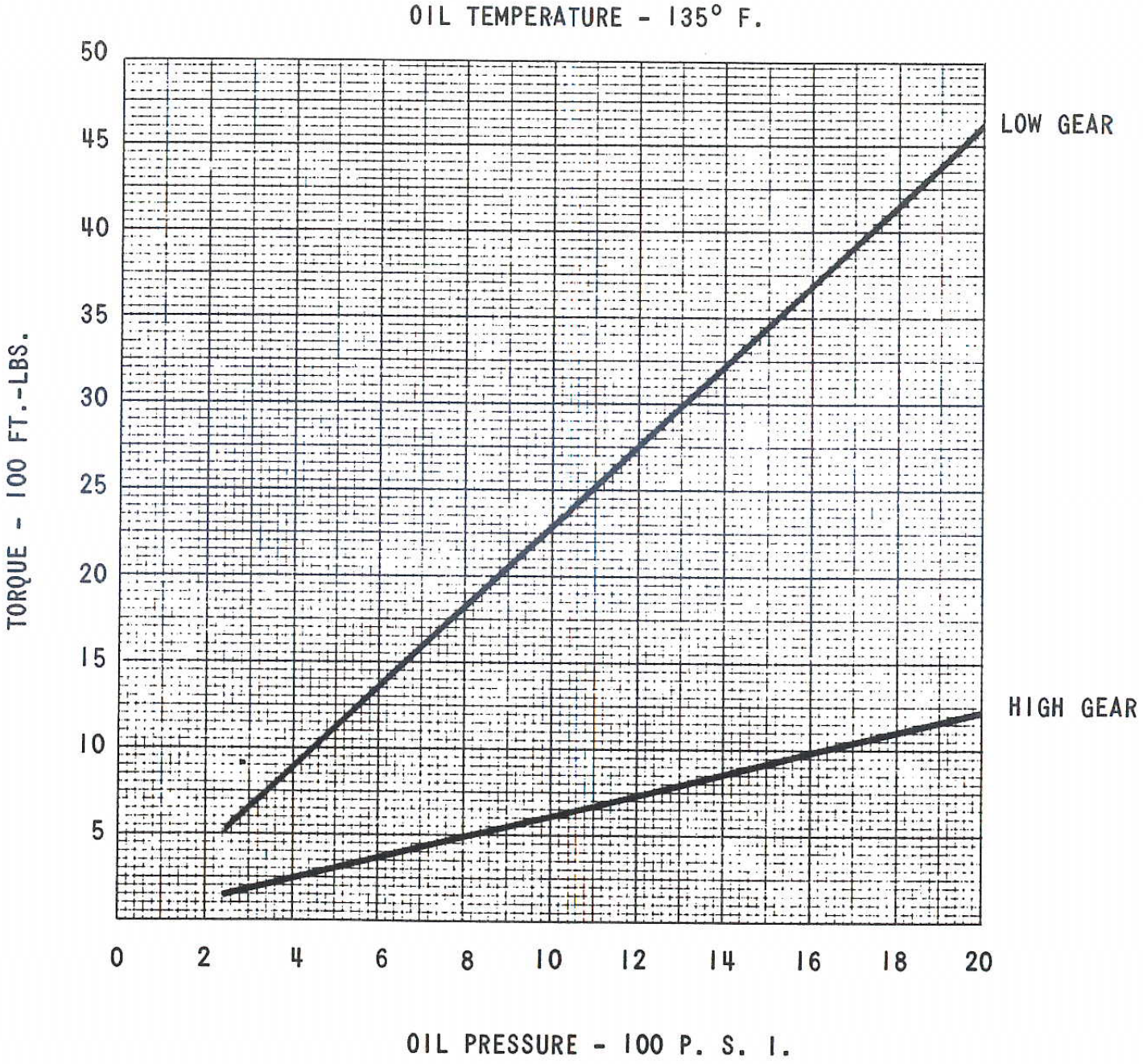
14 11/16

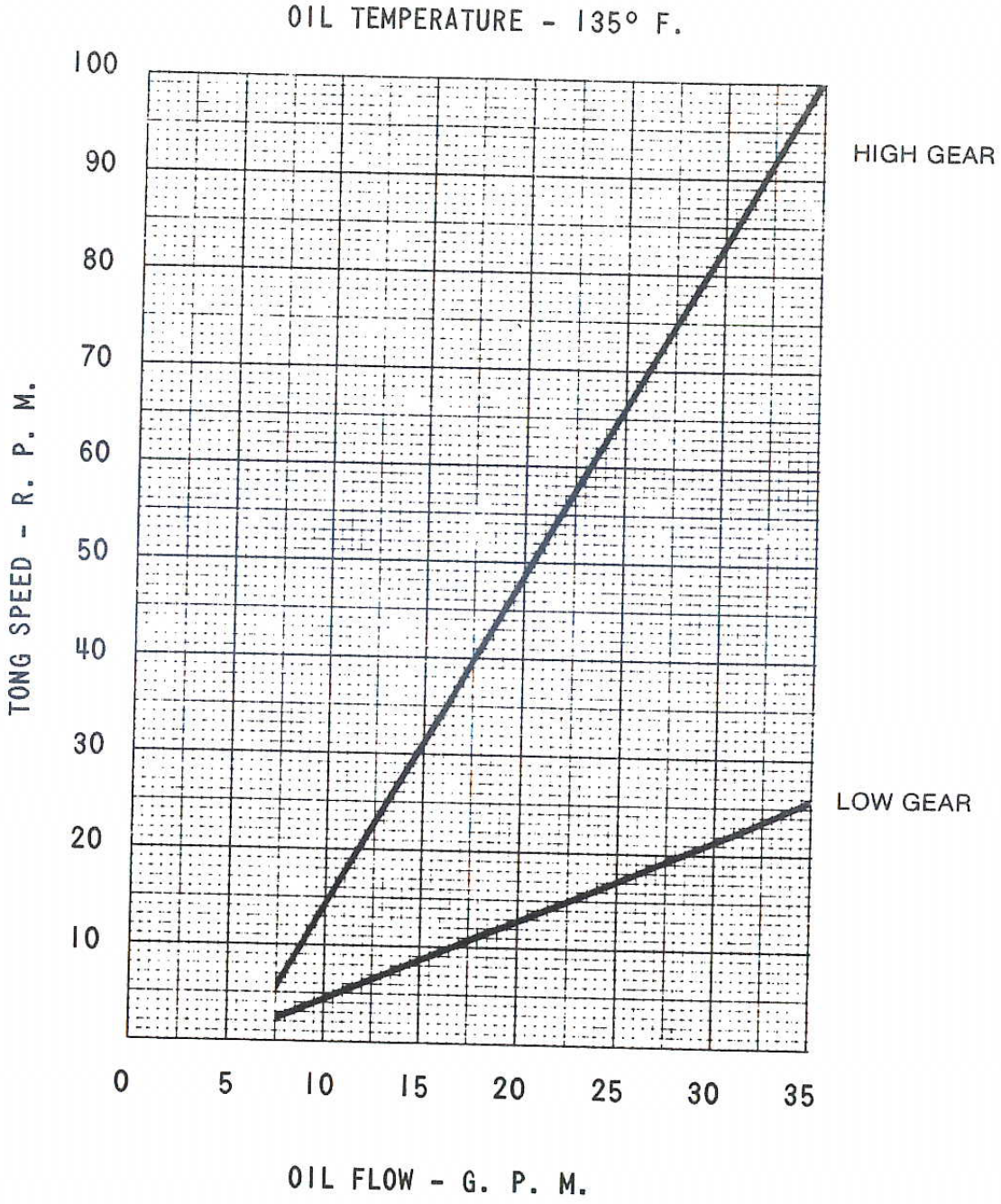
SPARE PARTS FOR ONE YEAR OF OPERATION FOR MODEL RS WITH POSITIONER

PART NUMBER	QTY.	PART DESCRIPTION
25020	1	Positioner valve assembly
15527-1	2	Brake band
15502	2	Gear shift finger
15507	1	Low speed driven gear thrust washer
23056	2	Gear shift shaft bushing
15528	4	Brake band pin
17920	2	Jaw & bushing pin
16448	1	Guard spring
24927	1	Motor gasket
16979	2	Frame bottom gear box bearing plate gasket
16980	1	Gear box cover gasket
970250-6	1	Hydraulic motor
943972-2	1	Control valve
947915-11	1	Roller chain
9791025304	1	Double row bearing
949054-304	1	Bearing
939995-812	1	Key 3/16” square x 2”
941145-78	2	Snap ring
942271-11	2	“O” ring
939667-17	2	Cotter pin
939667-10	1	Cotter pin, 3/32” x 1”
939643-13	7	Shakeproof lock washer, 7/8”
939370-9	1	Plain washer, 3/8”
939537-61	3	Elastic stop nut, ¾” – 10”
15500	2	Idler sprocket spacer
15537	1	Low speed driven gear bushing
940308-1	6	Grease fitting, 1/8”
16978	1	Gear box cover bearing plate gasket
979103-4	7	Bearing
940295-214	1	Seal
17916	3	Outer ring large roller
17917	2	Outer ring small roller
17918	5	Spacer
17919	5	Roller pin
942685-118	14	Roller assembly snap ring
941157-281	6	Snap ring
941157-231	2	Snap ring
942394-42	4	Inner race idler sprocket bearing
942384-36	4	Outer race idler sprocket bearing
941237-75	4	Flat head socket capscrew, ½” x ¼”
941237-108	2	Flat head socket capscrew, ½” x 2”
944419-8	2	Flexloc nut, ½”

TORQUE CURVE
HYDRAULIC STANDARD 15H 1 3/4" MOTOR

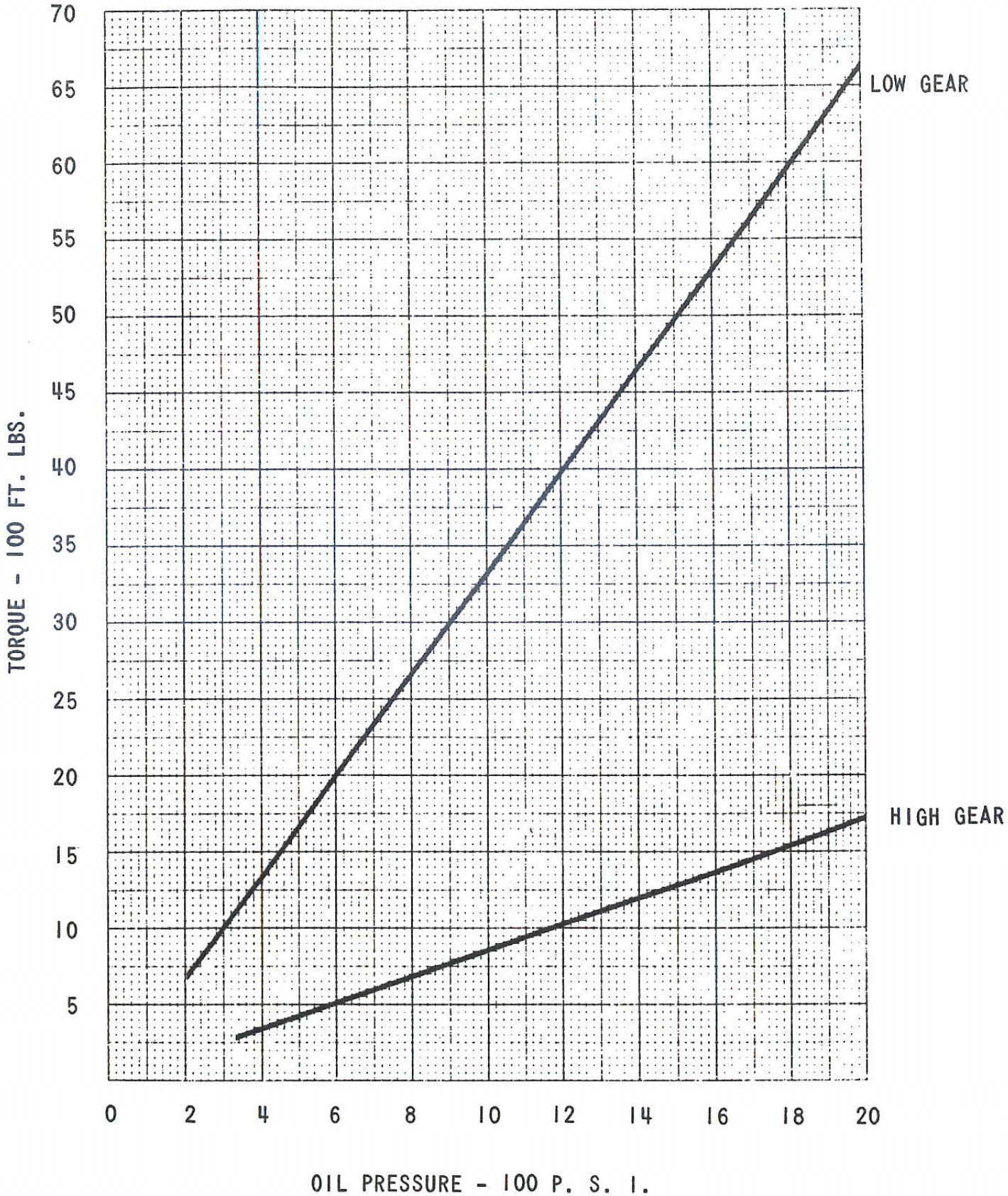


SPEED CURVE
HYDRAULIC STANDARD 15H 1 3/4" MOTOR

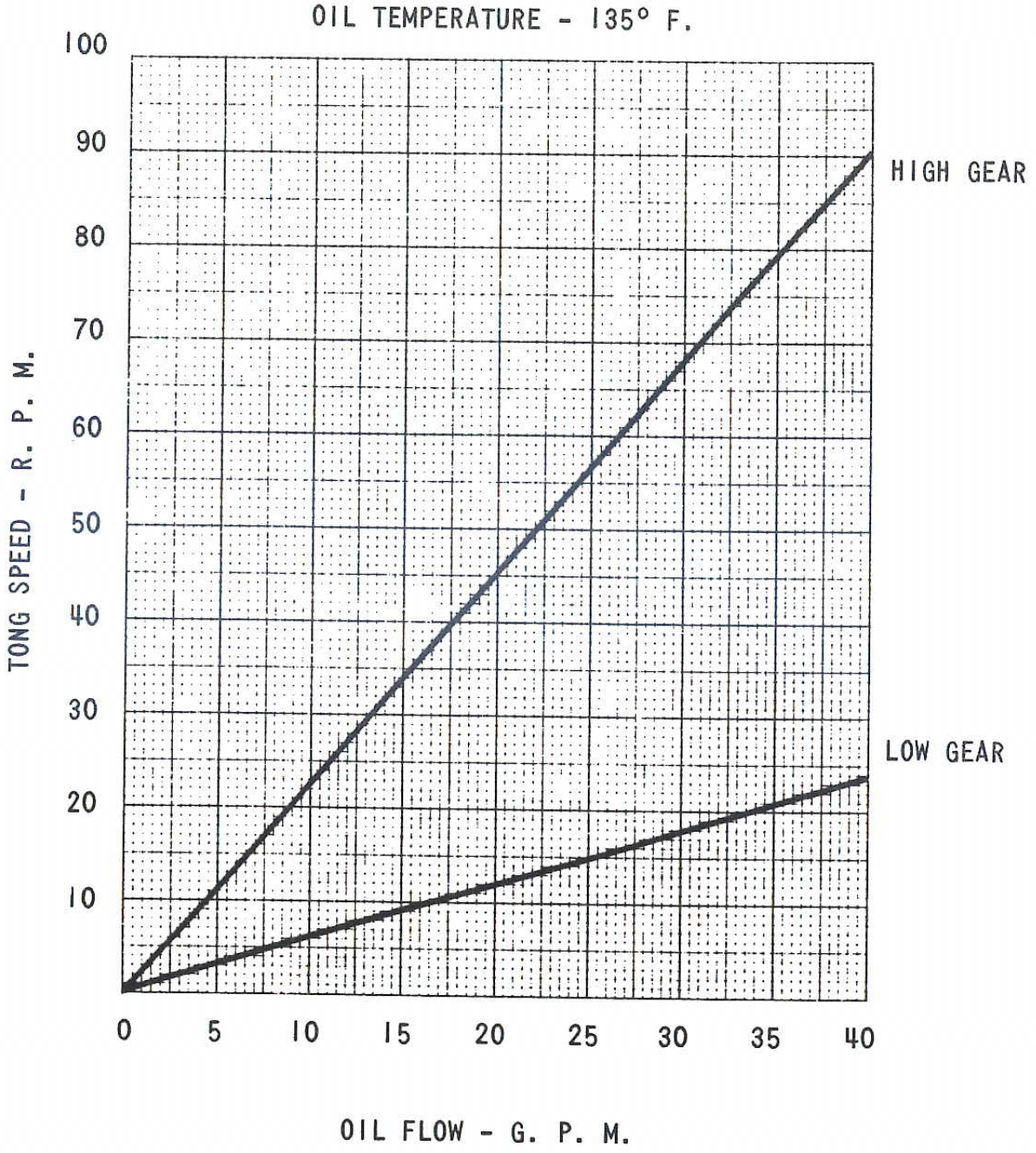


TORQUE CURVE
HYDRAULIC HIGH TORQUE 25X 1 1/2" MOTOR

OIL TEMPERATURE - 135° F.



SPEED CURVE
HYDRAULIC HIGH TORQUE 25X 1 1/2" MOTOR



8401 Industrial Drive, Pearland, TX 77584
Phone: (281) 992-2064, Fax: (281) 992-2076
E-Mail: sales@wpiwellkin.com
Web: www.wpiwellkin.com

WPI WELLKIN Inc. (WPI WELLKIN) Terms and Conditions

1. All WPI WELLKIN packing slips and invoices must show Buyer's purchase order number.

2. All shipments MUST contain packing slips.

3. CONTRACT: This order will become a binding contract upon receipt by WPI WELLKIN of Buyer's PO, receipt by Buyer of a written acknowledgement by WPI WELLKIN and receipt by WPI WELLKIN of a down payment in the amount specified in the contract.

4. This contract may be modified as mutually agreed by the Buyer and WPI WELLKIN.

5. PAYMENT TERMS: The payment terms are specified on the commercial offer from WPI WELLKIN. The Buyer agrees to the payment terms by acceptance of the bid.

6. DELIVERY: Time is of the essence. WPI WELLKIN will attempt to deliver the material early if possible. WPI WELLKIN will make best efforts to supply all material on a timely basis. If the delivery will run over the contract delivery date, WPI WELLKIN will notify the Buyer giving reason for delay. The current delivery estimate is specified on the commercial offer. The Buyer agrees to the delivery terms by acceptance of the bid.

When necessary, WPI WELLKIN will notify the Buyer in advance of completion of the order and Buyer will appoint an authorized representative or employee to inspect the material on a date and site as designated by WPI WELLKIN. Transportation, lodging and all other expenses portal to portal for Buyer representative or employee to witness and accept the material is the expense of the Buyer.

All costs associated with preparation, crating, insurance and ocean freight of the goods to the final destination to be at Buyer's expense.

7. CANCELLATION: This contract is considered to be special order and not subject to cancellation. Both parties hereto shall be given consideration in case of delays in delivery caused by fire, strike, riot, war, act of God, delay of carriers, governmental order or regulation, complete or partial shutdown of plant by reason of inability to obtain sufficient raw materials or power or any other similar or different contingency beyond the reasonable control of the respective parties.

8. WARRANTIES AND REMEDIES: WPI WELLKIN expressly warrants that all supplies, materials and parts covered by this contract will conform to the specifications in the contract as applicable and will meet or exceed industry standards for such equipment. WPI WELLKIN will supply Buyer with operations manuals and parts books for the material where applicable. Certificates of Compliance are available upon request.

MANUFACTURED ITEMS: WPI WELLKIN manufactured items must be free of material and workmanship defects for a period of 6 months from the date of delivery. If any items fail because of a manufacturing defect within that period of time, then that item will be replaced by WPI WELLKIN. Expendable / wear items are not covered under warranty. Examples of such items include, but are not limited to, the following - dies, inserts, brake bands, rollers, gears, chains, filters, belts, flexible couplings, slip bodies, spider bowls.

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Replacement of parts will be accomplished at WPI WELLKIN's facility or at a designated service point. WPI WELLKIN's liability is limited to replacement of defective parts only and does not include the cost of labor, communications, transportation or handling connected to the replacement of these parts. WPI WELLKIN will in no event be liable for consequential damages or contingent liabilities arising out of the failure of any parts to operate properly. No expressed, implied or statutory guarantee other than herein set forth is made or authorized to be made by WPI WELLKIN.

DISTRIBUTED ITEMS: Items distributed by WPI WELLKIN are subject to the warranty provided by the Original Equipment Manufacturer (OEM). Upon request, WPI WELLKIN will furnish Buyer with a warranty statement from the OEM for the applicable material. The OEM warranty will start on the items' delivery date.

9. COMMISSIONING: On request, WPI WELLKIN can supply a representative for material commissioning. The Buyer is responsible for portal to portal transportation costs and the current WPI WELLKIN day rate.

10. BUYER'S PROPERTY: All equipment or material furnished by WPI WELLKIN shall be the property of the Buyer after the WPI WELLKIN invoice is paid in full.

11. PATENTS: WPI WELLKIN holds the Buyer harmless from all claims, for infringement or alleged infringement of any patents arising out of the sale or use of the goods furnished pursuant to this contract.

12. INDEPENDENT CONTRACT: In the event that any goods ordered hereunder require in connection with the installation thereof, the services of a contractor engaged by WPI WELLKIN or a supervisor, engineer, or other employee connected with or employed by WPI WELLKIN, and WPI WELLKIN agrees to furnish same, either with or without charge, such contractor, supervisor, engineer, or other employee in performing such services shall not be deemed to be the agent or employee of the Buyer.

13. INSURANCE: WPI WELLKIN agrees to carry General Operations and Liability Insurance and other coverage as required in accordance with applicable state and federal laws of the U.S.A.

14. COMPLIANCE WITH LAWS: WPI WELLKIN warrants that in its performance of this contract it will comply with all applicable Federal, State and Local laws, regulations, rulings and orders of the U.S.A.

15. ASSIGNMENT: This contract may not be assigned without the written consent of the Buyer and any attempted assignment thereof shall be void.

16. PROPRIETARY INFORMATION: All plans, drawings, specification and the subject matter contained therein and all other information given to WPI WELLKIN in connection with performance on this Purchase Order involve valuable property rights of the Buyer and shall be held confidential by WPI WELLKIN, shall remain the property of the Buyer and shall not be used by WPI WELLKIN for any purpose other than those for which they have been prepared or supplied. WPI WELLKIN agrees that, as far as possible, it will keep confidential the making of this order and the terms hereof. WPI WELLKIN agrees not to use for publicity purposes any information as to notice of receipt of order, photographs, drawings and/or materials in connection with performance of the Order without obtaining the prior written consent of the Buyer.