NEW LEADER

MODEL L3020

*UNIT SERIAL NUMBER*_____

MANUAL NUMBER: 55400-G

EFFECTIVE 11/97

HIGHWAY EQUIPMENT COMPANY
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BUILDING THE BEST SINCE 1939

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WARRANTY

HIGHWAY EQUIPMENT COMPANY is hereafter called HECO.

The products manufactured by HECO, exclusive of used or rebuilt machinery or equipment, are subject to the following warranty.

(A) Warranty

HECO warrants all products manufactured by it to be free from defects in material and manufacture at the time of shipment and for six (6) months from date of delivery to customer, provided this total period does not exceed twelve (12) months. HECO will furnish to the dealer without charge, f.o.b. Cedar Rapids, Iowa, replacements for such parts as HECO finds to have been defective at the time of shipment, upon request such parts are returned, transportation prepaid, to the factory at Cedar Rapids, Iowa.

This warranty shall not apply to any product which has been subject to misuse, misapplication, neglect (including but not limited to improper maintenance), accident, improper installation, modification (including but not limited to use of unauthorized parts or attachments), adjustment or repair. Engines, motors, and any accessories furnished with HECO'S products, but which are not manufactured by HECO, are not warranted by HECO but are sold only with the express warranty, if any, of the manufacturers thereof. THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED (INCLUDING THOSE OF MERCHANTABILITY AND FITNESS OF ANY PRODUCT FOR A PARTICULAR PURPOSE), AND OF ANY OTHER OBLIGATION OF LIABILITY ON THE PART OF HECO.

(B) Limitation of Liability

It is expressly understood that HECO'S liability for its products, whether due to breach of warranty, negligence, strict liability, or otherwise, is limited to the furnishing of such replacement parts. HECO will not be liable for any other injury, loss, damage, or expense, whether direct or consequential, including but not limited to loss of use, income, profit, or production, or increased cost of operation, or spoilage of or damage to material, arising in connection with the sale, installation, use, or inability to use, or the repair or replacement of HECO'S products.

Any operation expressly prohibited in the operating instructions or safety manual furnished with the machine, or any adjustment, or assembly procedures not recommended or authorized in the operating or service instructions shall void such warranty.

(C) THIS WARRANTY IS VOID UNLESS "DEALER'S SALE REPORT TO THE FACTORY" CARD IS COMPLETED AND RETURNED TO THE FACTORY AT CEDAR RAPIDS, IOWA, WITHIN 30 DAYS AFTER DELIVERY OF UNIT TO THE CUSTOMER.

PREFACE

PLEASE ! ALWAYS THINK SAFETY FIRST !!

The purpose of this manual is to familiarize the person (or persons) using this unit with the information necessary to properly install, operate, and maintain this system. These instructions cannot replace the following: the fundamental knowledge that must be possessed by the installer or operator, the knowledge of a qualified person, or clear thinking necessary to install and operate this equipment. Since the life of any machine depends largely upon the care it is given, we suggest that this manual be read thoroughly and referred to frequently. If for any reason you do not understand the instructions, please call your authorized dealer or our Cedar Rapids, Iowa, Service Department at (319) 363-8281.

It has been our experience that by following these installation instructions, and by observing the operation of the spreader, you will have sufficient understanding of the machine enabling you to troubleshoot and correct all normal problems that you may encounter. Again, we urge you to call your authorized dealer or our Cedar Rapids Service Department if you find the spreader is not operating properly, or if you are having trouble with repairs, installation, or removal of this machine.

We urge you to protect your investment by using genuine HECO parts and our authorized dealers for all work other than routine care and adjustments.

Highway Equipment Company reserves the right to make alterations or modifications in this equipment at any time. The manufacturer shall not be obligated to make such changes to machines already in the field.

When this manual was originally supplied, it was accompanied by the Highway Equipment Company *Operating and Maintenance Safety Manual*. The Safety Manual should be read thoroughly and referred to frequently. If you do not have the Safety Manual, we recommend that you obtain one from your dealer or from Highway Equipment Company before any installation, operation or maintenance of the spreader is attempted.

ACCIDENTS HURT !!!

ACCIDENTS COST !!!

ACCIDENTS CAN BE AVOIDED !!!

SAFETY

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND THAT OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

In this manual and on the safety signs placed on the unit, the words "DANGER," "WARNING," "CAUTION," and "IMPORTANT" are used to indicate the following:

DANGER!

Indicates an imminently hazardous situation that, if not avoided, WILL result in death or serious injury. This signal word is to be limited to the most extreme situations and typically for machine components that, for functional purposes, cannot be guarded.

WARNING!

Indicates a potentially hazardous situation that, if not avoided, COULD result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION!

Indicates a potentially hazardous situation that, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.

IMPORTANT!

Is used for informational purposes in areas which may involve damage or deterioration to equipment but generally would not involve the potential for personal injury.

The need for safety cannot be stressed strongly enough in this manual. At Highway Equipment Company, we urge you to make safety your top priority when operating any equipment. We firmly advise that anyone allowed to operate this machine be thoroughly trained and tested, to prove they understand the fundamentals of safe operation.

The following guidelines are intended to cover general usage and to assist you in avoiding accidents. There will be times when you will run into situations that are not covered in this section. At those times the best standard to use is common sense. If, at any time, you have a question concerning these guidelines, please call your authorized dealer or our factory at (319) 363-8281.

SAFETY

AVOID ACCIDENTS

Most accidents, whether they occur in industry, on the farm, at home, or on the highway, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason, most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safeguarded against without interfering with reasonable accessibility and efficient operation.

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT. THE COMPLETE OBSERVANCE OF ONE SIMPLE RULE WOULD PREVENT MANY THOUSAND SERIOUS INJURIES EACH YEAR. THAT RULE IS:

NEVER ATTEMPT TO CLEAN, OIL OR ADJUST A MACHINE WHILE IT IS IN MOTION.

NATIONAL SAFETY COUNCIL

CAUTION! If spreader is used to transport chemicals, check with your chemical supplier regarding DOT (Department of Transportation) requirements.

SAFETY DECALS

MAINTENANCE INSTRUCTIONS

1. Keep safety decals and signs clean and legible at all times.
2. Replace safety decals and signs that are missing or have become illegible.
3. Replaced parts that displayed a safety sign should also display the current sign.
4. Safety decals or signs are available from your dealer's Parts Department or our Cedar Rapids factory.

INSTALLATION INSTRUCTIONS

1. Clean Surface
   Wash the installation surface with a synthetic, free rinsing detergent. Avoid washing the surface with a soap containing creams or lotion. Allow to dry.
2. Position Safety Decal
   Decide on the exact position before application. Application marks may be made on the top or side edge of the substrate with a lead pencil, marking pen, or small pieces of masking tape.
   NOTE: Do not use chalk line, china marker, or grease pencil. Safety decals will not adhere to these.
3. Remove the Liner
   A small bend at the corner or edge will cause the liner to separate from the decal. Pull the liner away in a continuous motion at a 180 degree angle. If the liner is scored, bend at score and remove.
4. Apply Safety Decal
   a. Tack decal in place with thumb pressure in upper corners.
   b. Using firm initial squeegee pressure, begin at the center of the decal and work outward in all directions with overlapping strokes.
      NOTE: Keep squeegee blade even, nicked edges will leave application bubbles.
   c. Pull up tack points before squeegeeing over them to avoid wrinkles.
5. Remove Premask
   If safety decal has a premask cover remove it at this time by pulling it away from the decal at an 18 degree angle.
   NOTE: It is important that the premask covering is removed before the decal is exposed to sunlight to avoid the premask from permanently adhering to the decal.
6. Remove Air Pockets
   Inspect the decal in the flat areas for bubbles. To eliminate the bubbles, puncture the decal at one end of the bubble with a pin (never a razor blade) and press out entrapped air with thumb moving toward the puncture.
7. Re-Squeegee All Edges

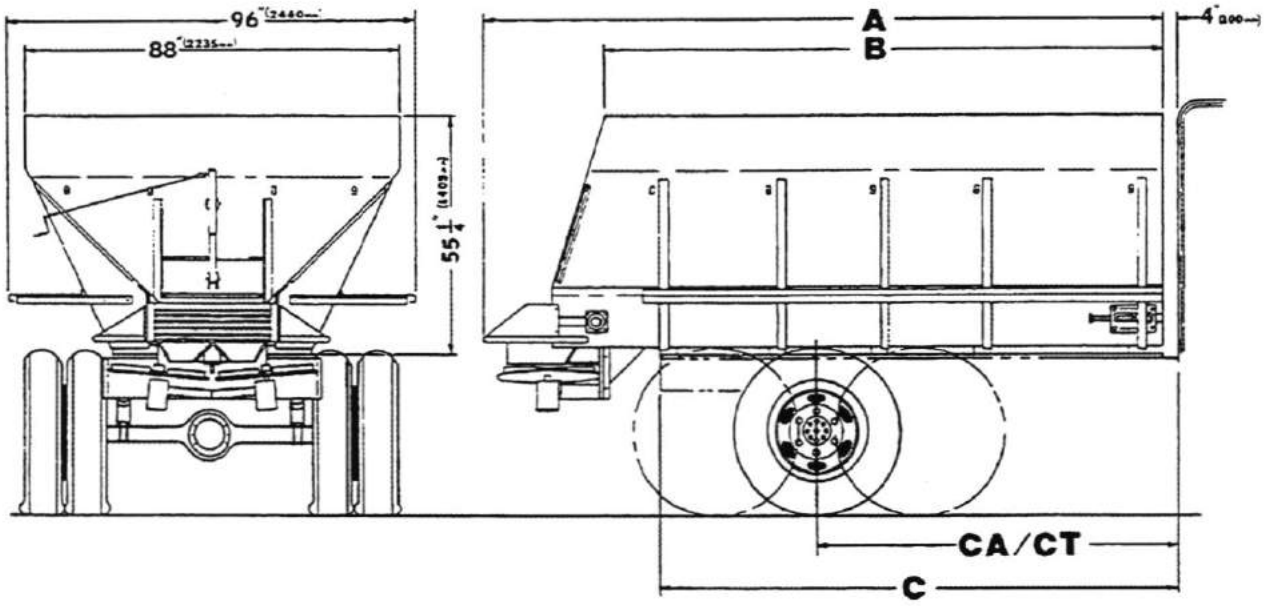
GENERAL DESCRIPTION

The Model L3020 is a hopper-type spreader intended for spreading free-flowing granular agricultural materials, such as chemical fertilizers, agricultural limestone and gypsum. It is intended for truck chassis or flotation vehicle mounting.

The unit is powered hydraulically and provides independent variable speed control for the spinner and full automatic ground speed control for the conveyor by means of the Synco-Matic Mark II control system. The hydraulic pump which provides the hydraulic power is a gear-type pump and it is driven by means of a transmission PTO.

The conveyor runs the full length of the hopper bottom to deliver material to the spinners through an adjustable metering gate at the rear of the hopper body. It is driven by two orbital type hydraulic motors integrally mounted to a 6 to 1 ratio spur gear box. The standard chain conveyor is a number two type having parallel strands of pintle-type chain joined by cross bars every other link.

The distributor spinner assembly has two 24 inch diameter discs canted upward at outer edges by 5°. Each disc has three formed and heat treated fins that are adjustable at to radial angle. Spinners are fed through an adjustable material flow divider.



GENERAL DESCRIPTION CONT'D

Weights and Dimensions				
Body Length	Over-All A	Inside B	Frame C	Cab to Axle C.A.
10'	148" (3759 mm)	120" (3048 mm)	111" (2819 mm)	84" (2134 mm)
11'	160" (4064 mm)	132" (3353 mm)	123" (3124 mm)	84" (2134 mm)
12'	172" (4368 mm)	144" (3657 mm)	135" (3429 mm)	102" (2591 mm)
13'	184" (4674 mm)	156" (3962 mm)	147" (3734 mm)	102-108" (2591-2743 mm)
14'	196" (4978 mm)	168" (4267 mm)	159" (4038 mm)	120" (3048 mm)
15'	208" (5283 mm)	180" (4572 mm)	171" (4343 mm)	120" (3048 mm)
16'	220" (5588 mm)	192" (4877 mm)	183" (4648 mm)	138" (3505 mm)
Capacities-Struck — Cubic Yards (Meters^3) Cubic Feet				
Body Length	Standard	With 6" Lower Sides	With 6" Higher Sides	Basic Spreader Weight-Approx.
10'	7.0 (5.4) 188	5.6 (4.3 152	8.3 (6.4) 225	2865 lbs. (1300 kg)
11'	7.7 (5.9) 208	6.2 (4.8) 168	9.2 (7.0) 249	3152 lbs. (1430 kg)
12'	8.5 (6.5) 228	6.8 (5.2) 184	10.0 (7.7) 272	3432 lbs. (1557 kg)
13'	9.2 (7.0) 248	7.4 (5.7) 201	11.0 (8.4) 296	3725 lbs. (1690 kg)
14'	9.9 (7.6)268	8.0 (6.1) 217	11.8 (9.0) 319	4011 lbs. (1819 kg)
15'	10.7 (8.2) 288	8.6 (6.6) 233	12.7 (9.7) 343	4298 lbs. (1950 kg)
16'	11.4 (8.7) 308	9.2 (7.1) 249	13.6 (10.4) 366	4584 lbs. (2079 kg)

INSTALLATION INSTRUCTIONS

SELECTION OF FRICTION WHEEL, PUMP AND PTO

Since the amount of material per acre to be spread depends upon the match between friction wheel size, rear axle ratio, rear tire size, pump size, pump speed (which depends upon engine speed and PTO percent), conveyor delivery rate and feedgate opening, it is essential that a correct match between these factors be made. This matching is called "sizing".

SIZING DATA REQUIRED

1. Correct sizing requires accurate and complete information.
   A. PTO Data
      1. Make and model of PTO.
      2. PTO percentage of engine RPM.
      3. Direction of PTO Rotation (Engine direction or opposite of engine direction).
   B. Propeller Shaft Diameter.
   C. Rear Axle Ratio. If two-speed, give ratio in which spreading is to be done.
   D. Auxiliary Transmission (if so equipped) gear ratio to be used while spreading.
   E. Rear Tire Size and Type. From tire size and type, tire revolutions per mile may be obtained from a tire manual or tire distributor. The following lists some typical values:

HIGHWAY TIRES		
Tube Type	Tubeless Type	Tire Revolutions Per Mile
8.25 x 20	9.0 x 22.5	543
9.00 x 20	10.0 x 22.5	523
10.00 x 20	11.0 x 22.5	507
11.00 x 20		492
10.00 x 22	11.0 x 24.5	488
	16.5 x 19.5	511
	18.5 x 19.5	498
	15.0 x 22.5	495
18.00 x 20		457
	48.0 x 25.0	450
	48.0 x 31.0	450
	66.0 x 43.0	315
	67.0 x 34.0	310

   F. Engine RPM range while spreading. IMPORTANT: Excessive engine speed will cause more hydraulic oil to be pumped than is required to drive spinners and conveyor and may result in overheating the oil. Too low an engine speed may not provide sufficient hydraulic oil flow to keep conveyor running at speed required to deliver desired quantity of material being spread. For popular medium duty V-8 engines recommended operating range would be 2800 to 3200 engine RPM.

INSTALLATION INSTRUCTIONS CONT'D

NOTE: With lower speed engines, such as diesels and heavy duty gasoline engines, it may be necessary to select a higher percentage PTO or a larger pump than standard. Consult your dealer in such cases. It is desirable to install a tachometer in order to maintain proper engine speeds.

2. Friction Wheel Diameter determination:
   From the data obtained in 1 above, the Friction Wheel Diameter is obtained using the following formula:

$$FWD = \frac{TRM \times RA \times PSD}{K}$$

Where: FWD = Friction Wheel Diameter in inches.
TRM = Tire Revolutions per Mile.
RA = Rear Axle ratio for trucks without an auxiliary transmission or for trucks with an auxiliary transmission where the friction wheel is mounted behind the auxiliary transmission (between auxiliary transmission and rear axle). Rear Axle ratio times the auxiliary transmission ratio if a truck is equipped with an auxiliary transmission and the friction wheel is mounted between the main transmission and the auxiliary transmission. RA is the gear reduction behind the point where the friction wheel is mounted. NOTE: The above rear axle ratio and auxiliary transmission ratio (if applicable) are the ratio(s) in which spreading is to be done.

IMPORTANT!	Do Not change the rear axle from the one used in determining friction wheel diameter, as this will change spread rates. This also applies to the auxiliary transmission when the friction wheel is mounted between the main transmission and the auxiliary transmission.

PSD = Propeller Shaft Diameter in inches at the point where the friction wheel contacts the shaft. (Hint: If the propeller shaft diameter is not available, take a piece of string and wrap it around the shaft. Then measure the string and divide the length by 3.14. This will give you the shaft diameter. Example: If the length of the string is 11 inches, you would have a 3.5 inch diameter shaft: (11 ÷ 3.14 = 3.5").

K = 2596 for #2 or #4 conveyor.

Example: If truck to be used has 10.00 x 20 tubeless type tires, TRM would be 507. If it has a two-speed rear axle with a high speed ratio of 6.50:1 and a low speed ratio of 8.85:1 and spreading is to be done in low speed ratio, RA would be 8.85. If the propeller shaft diameter is 3.5 inches, PSD would be 3.5. K would be 2596. Friction Wheel Diameter would be calculated as follows:

$$FWD = \frac{507 \times 8.85 \times 3.5 = 6.05}{2596}$$

Select the nearest diameter—in this case 6 inches. NOTE: Friction Wheels are available in the following diameters: 3", 3 1/2", 4", 5" and 6". Also available are a step-up (2.00) and a step-down (.500) adapter which would be used, for example, when FWD is 8.12. You would select a 4" wheel with a (.500) step-down adapter.

INSTALLATION INSTRUCTIONS CONT'D

3. Pump PTO Selection:
   Determine the maximum engine speed of the truck to be used. On the high speed engine truck PTO-Pump Match Graph, locate the maximum speed on the Engine RPM scale. Draw a line up from this point until it reaches the 2000 horizontal line of the PTO-Pump RPM scale. Determine the theoretical PTO percent by reading the percent scale marked off along the 2000 RPM horizontal line where the vertical line from the maximum engine speed intersects. The recommended PTO percent is the closest available at or below the percent found.

   For example, if the maximum engine speed of the truck being used is 3600 RPM, the heavy dotted line drawn vertically intersects the PTO-Pump 2000 PRM line at the 56% point. This theoretically correct PTO percentage would be 56%; if the closest available PTO percent below 56% is 54%, this would be the PTO to use. By drawing a line through the 54% point with a slope lying between the 50% and 60% lines, this 54% line will intersect the vertical heavy dotted line at 3600 engine RPM to show a PTO-Pump RPM of approximately 1900. Drawing a horizontal line at 1900 PTO-Pump RPM over to intersect the slanted pump number 22396 line and then drawing a vertical line from this intersection down to the PUMP OUTPUT scale will indicate that at 1900 RPM the pump will deliver 39 GPM.

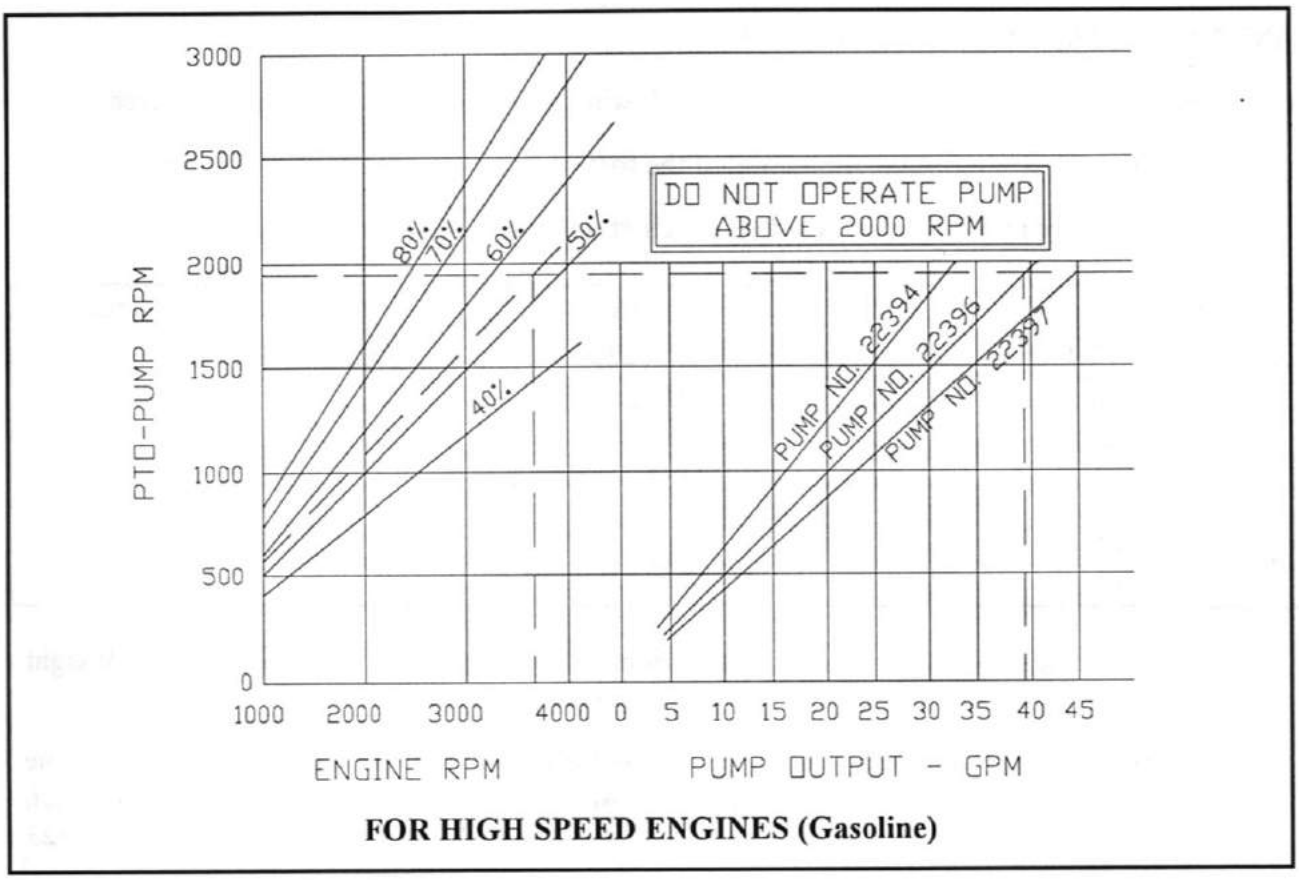
   Correct pump delivery range for the L-3020 hydraulic system is 35 to 40 GPM. With a 22396 pump, this range corresponds to a PTO-Pump speed range of 1750 to 1975 RPM. In the example given, using a 54% PTO, this PTO-Pump speed range would require operating the engine at speeds from 3200 to 3650 RPM.

   If a lower speed engine, such as a diesel, is used and has a maximum speed of 2100 RPM, use the low speed engine truck PTO-Pump Match Graph. Draw a vertical line from the 2100 Engine RPM point upward to the 2000 PTO-Pump RPM level. On the 1400 RPM level the vertical line intersects at 67%. If the closest available PTO below 67% has a 66% speed, this would be a satisfactory PTO but will require the use of the optional pump number 22398 in order to deliver the required 35 to 40 GPM. On the 1800 RPM level the vertical line intersects at 88%. If the closest available PTO below 88% is 87% this would also be a satisfactory PTO and furthermore will allow the standard number 22397 pump to be used.

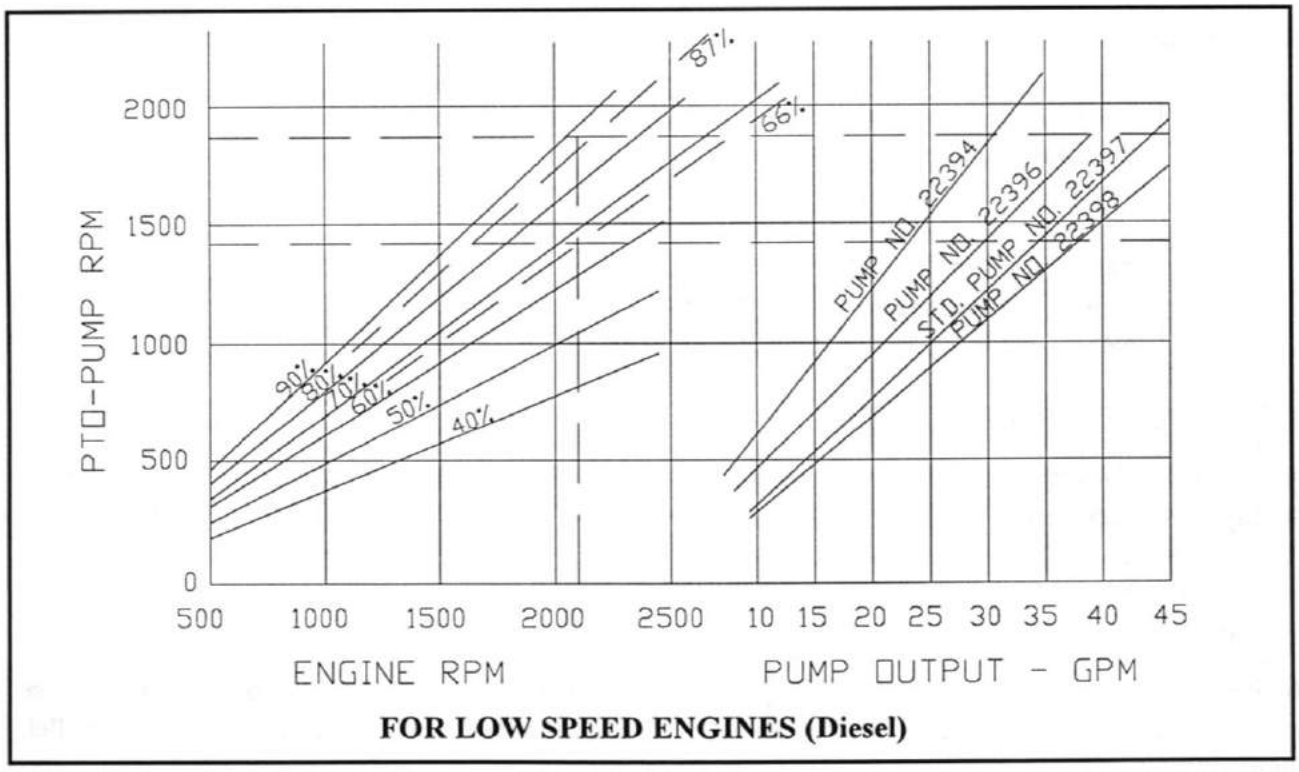
   By drawing in the 66% and 87% sloped lines (as described in the previous example for 54%), it will be found that with the 66% PTO and optional pump the engine must be operated in the 1950 to 2225 RPM range to maintain a 35 to 40 GPM Pump output range, while with the 87% PTO and standard pump the engine would have to be operated in the 1700 to 1925 RPM range. Thus it can easily be seen that two choices of Pump-PTO combination may be available and will give equal results. Choice will depend upon relative costs, availability and convenience of installation.

   If PTO-Pump matching will not fit into the speed and delivery volumes recommended, refer to your New Leader dealer.

INSTALLATION INSTRUCTIONS CONT'D



FOR HIGH SPEED ENGINES (Gasoline)



FOR LOW SPEED ENGINES (Diesel)

INSTALLATION INSTRUCTIONS CONT'D

GENERAL INSTALLATION INSTRUCTIONS

In mounting the L-3020 spreader on a truck, the following major questions must be considered:

1. Is the CA (Cab to Axle) dimension of the truck correct for the length of the spreader?

   To answer this question, the following chart will assist in matching spreader to truck.

Spreader Inside Body Length - Ft.	Single Rear Axle Truck CA Dimension - In.	Tandem Rear Axle Truck CA (CT) Dimension - In.
10 - 11	84	
12	102	102
13	108	102
14		120
15		120
16		138

2. Is the truck's GAWR (Gross Axle Weight Rating) and GVWR (Gross Vehicle Weight Rating) adequate to carry the fully loaded spreader.

   To answer this question refer to your New Leader dealer. He knows where to find the GAWR and GVWR for most trucks and how to calculate the weight distribution on each axle and total loaded vehicle weight. [Reference New Leader Spred-O-Gram #23 (Revised).]

Recommended sequence of installation is:

1. Mounting of pump and pump drive.
2. Installation of friction wheel.
3. Installation of cab controls.
4. Mounting of spreader.
5. Installation of hydraulic hose and electrical wiring.
6. Installation of optional attachments.
7. Filling of hydraulic tanks and lubrication.
8. Checking for leaks and proper functioning.

HYDRAULIC PUMP INSTALLATION

A mounting bracket for the hydraulic pump is shipped with the spreader. It may be necessary to modify this bracket to fit your truck since many variable factors, such as PTO make and model, muffler position, transmission make and model, etc., all affect the mounting position. DO NOT WELD THE BRACKET TO THE TRUCK FRAME. To do so may void the truck manufacturer's warranty.

Position the mounting bracket so that the pump drive shaft will be as straight as possible. In no case should the angle of any universal joint exceed 15°. The pump shaft and PTO shaft should be parallel. (Figure 1)

INSTALLATION INSTRUCTIONS CONT'D

HYDRAULIC PUMP DRIVESHAFT INSTALLATION

The pump driveshaft included may be too long for some installations. It may be cut and redrilled as necessary. When redrilling the shaft, be sure that universal joints are properly "timed" as shown in Figure 1.

Install the slip joint at the end of the pump driveshaft. Failure to install the slip joint will result in bearing failure in pump, PTO or both.

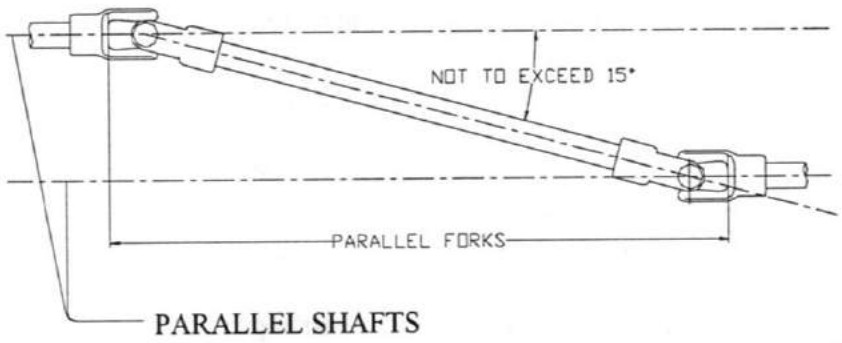


Figure 1 - Timing Of Universal Joints

FRICTION WHEEL INSTALLATION

The friction wheel assembly is bolted to the inside web of the truck frame left hand rail. DO NOT WELD TO TRUCK FRAME and DO NOT BOLT TO TOP OR BOTTOM FRAME RAIL FLANGES.

Position the assembly so that the friction wheel will contact the truck propeller (drive) shaft as close to rear of the transmission as possible. The assembly should be tilted down toward the rear of the truck so that the friction wheel shaft is parallel to the centerline of the propeller shaft. Use the four pipe spacers behind the mounting plate to insure that these shafts are parallel and to allow mounting plate to clear any rivets, bolts, brake lines or other obstructions. Clamp the assembly in position and drill four mounting holes. Keep holes away from frame rail flanges as far as possible. Be careful to avoid damaging any wires, brake lines or other parts. Bolt securely to frame. There should be adequate spring force on the wheel when it is engaged with propeller shaft to avoid slippage. On units with auxiliary transmissions, determine where the friction wheel is to be mounted. (See Friction Wheel Diameter determination section). If it is to be mounted behind the auxiliary transmission, locate about 2" to 3" behind the universal or slip joint immediately behind the auxiliary transmission. Mount bracket in a convenient location between the main transmission and the auxiliary transmission if that is the desired mounting arrangement.

CONTROL INSTALLATION

In selecting the location of the control valve handle and indicator panel (hydraulic actuated) or the control panel (electric actuated), the following must be considered:

1a. The ON-OFF valve handle must be conveniently for the operator to use with adequate clearance provided for the valve below the cab floor for transmission, exhaust, etc. After this location has been determined, mount the valve assembly as follows:

INSTALLATION INSTRUCTIONS CONT'D

1. Drill a 1 3/8" diameter hole through the cab floor for the control handle.
2. Install the grommet in the floor.
3. Assemble valve and fittings and attach to valve mounting bracket.
4. Assemble valve handle parts and push through the grommet to valve assembly below the cab floor.
5. Drill two 3/8" diameter holes through the cab floor and secure valve mounting bracket to valve handle mounting bracket.

NOTE: Refer to the Parts Listings for assembly diagram.

1b. The ON-OFF switch for the electric actuated friction wheel must be conveniently located for the operator to use.

2. The panel must be located so that it will not get in the way of the entrance or exit of the truck cab.
3. Be sure that the panel will not interfere with the operation of other controls of either truck or other equipment being used.
4. Check that panel will not catch or snag parts of body or clothing of operator or passengers.
5. Check to insure wiring and hoses to control panel can be run without interference.

CAUTION! All holes in the truck cab walls, floor and firewall for control wires, hoses and cables are to be grommetted, plugged and sealed to prevent entrance of engine fumes, dust, dirt, water and noise.

MOUNTING OF SPREADER BODY

Truck Frame Length

In many cases with a new truck, the truck frame must be shortened. The length from the rear of the cab to the rear end of the frame should be approximately as shown on the Dimensions and Capacity Chart on Page 9 under "C".

Wood Filler Strips

Hardwood filler strips (not supplied with spreader) 1" by 3" must be installed the length of the frame behind the truck cab. Cut the filler strip to length and place on top of the truck frame rails. With a heavy hammer strike directly above each rivet head to mark the position of the rivet, if frame has rivets in top flange. Remove the filler strips and counterbore for rivet head clearance. Replace the filler strips and hold them in place by bending anchor clips as shown in Figure 2. If the truck frame has fishplates on the top flange, it will be necessary to provide a level top surface by adding steel shim bars or strips of the same thickness as the fishplates and as wide as the frame channel top flange. These shim bars or strips must be drilled out clear any rivet or bolt heads. DO NOT WELD these bars or strips the truck frame. Place the wood filler strips on top of them and secure both steel shims and wood strips by means of bending the anchor clips around them and the frame top flange as shown in Figure 2. Each steel shim bar or strip and each separate wood filler strip should have three anchor clip. Locate anchor clips between spreader body cross sills. Secure each anchor clip by driving 1/4" sheet metal screw through clip into wood filler strip as shown in Figure 2.

INSTALLATION INSTRUCTIONS CONT'D

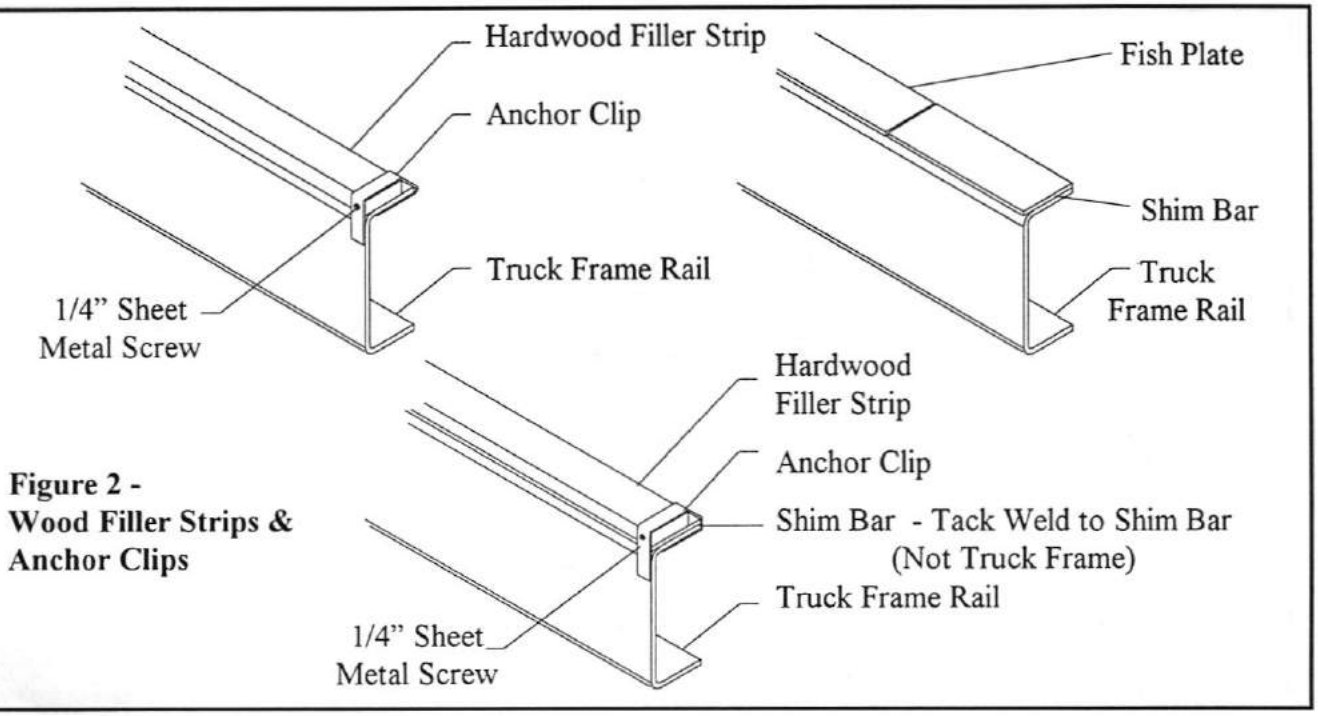


Figure 2 - Wood Filler Strips & Anchor Clips

Positioning Body

Place the spreader body on the truck frame. Position body centrally with respect to the truck frame rails and approximately 4" to the rear of the cab. Check the position of the spreader at the rear to insure that the rear mounting angle can be properly positioned on truck frame and centered on rear cross sill.

Installing Rear Mounting Angles

Position the rear mounting angles with the slotted faces against the side of the truck frame and centered on the rear cross sill. Mark the location of the slots on the truck frame. Drill two 9/16" diameter holes through the truck frame at the bottom end of the slots. (Figure 3)

Installing Front Mounting Angles

Position the rear mounting angles with the slotted faces against the side of the truck frame centered on the second cross sill from the front of the spreader. Mark the location of the slots on the truck frame. Drill two 9/16" diameter holes through the truck frame 1 1/4" from the bottom of the slots. (Figure 3)

Installing Center Mounting Angles (12 Foot through 16 Foot Bodies only)

Position the center mounting angles at a convenient location near the center of the body with the slotted faces against the truck frame and mark the location of the slots on the truck frame. Drill two 9/16" diameter holes through the truck frame approximately 3/4" from the bottom of the slot. (Figure 3)

NOTE: The position of the center mounting angles will vary from truck to truck due to obstruction, such as spring shackles, etc.

INSTALLATION INSTRUCTIONS CONT'D

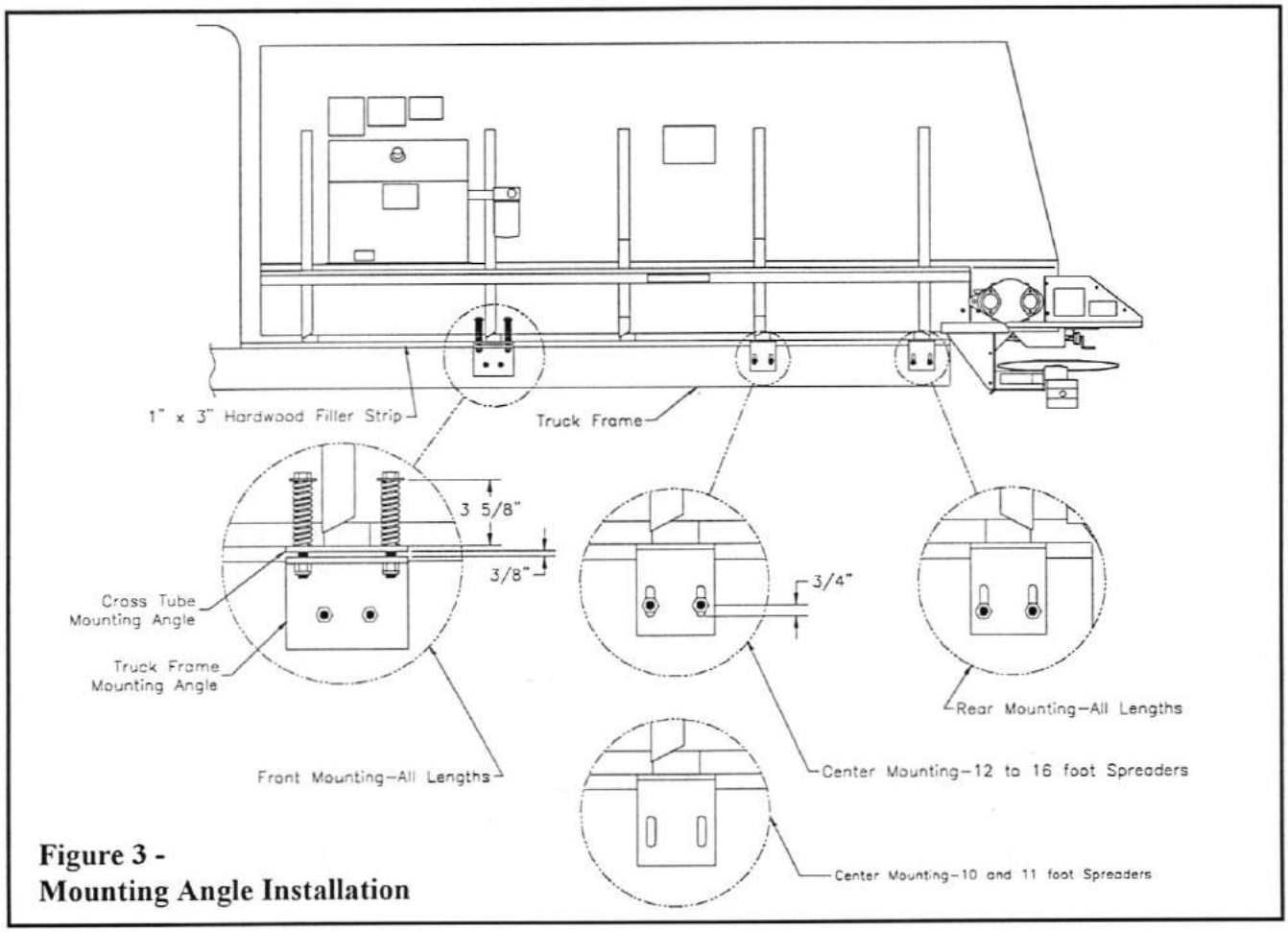


Figure 3 -
Mounting Angle Installation

Securing Spreader Body to Frame

Install the mounting angles and tighten the mounting bolts. Position the angles as described in the steps listed above. Weld the mounting angles to the spreader cross sills by welding them on the front, outer and rear sides. (Figure 4)

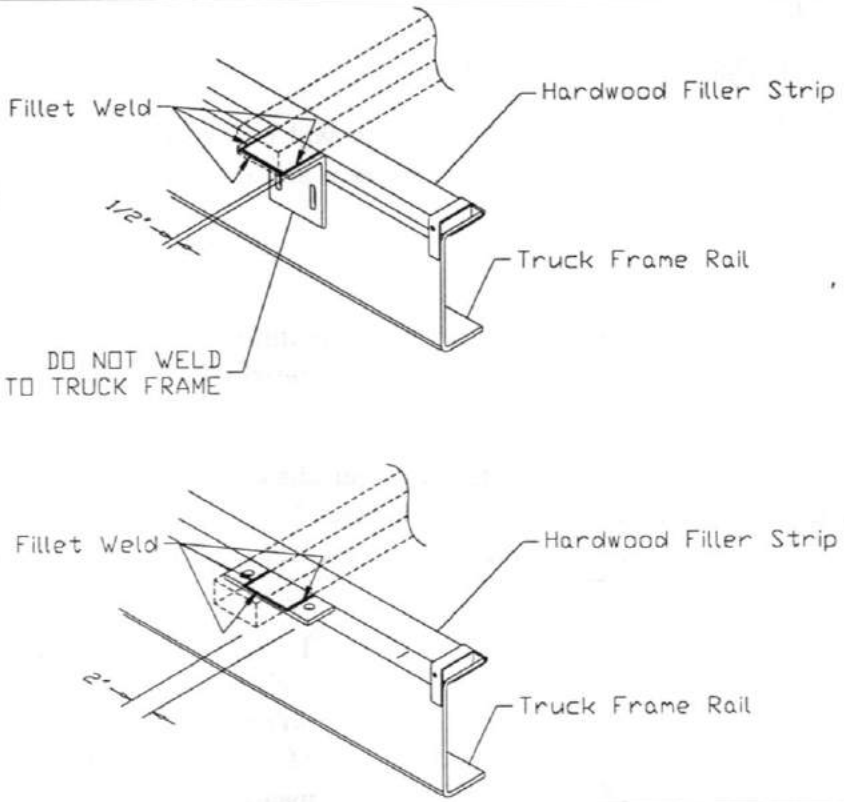
Do not weld on vehicle frame, as such welding can lead to fatigue cracking and must be avoided. When drilling holes in frame members, drill only through vertical web portions—do not put holes into top or bottom flanges. Refer to truck manufacturer's recommendations.

Be sure welds between mounting bars and sill or between mounting angles and spreader cross sills are sound full fillet welds. Center mounting angles so good fillet welds can be made on three sides. An edge bead weld is not satisfactory weld for this service. Use dry E6013 or E7018 rod for normal steels. On stainless steel bodies, use SAE Grade 5 bolts. Welding is recommended if type 308 welding rod is available. (Figure 4)

Check for vehicle visibility, especially toward the rear. Reposition or add mirrors so adequate rearward visibility is maintained. Check installation completely to be sure all fasteners are secure and that nothing has been left undone.

INSTALLATION INSTRUCTIONS CONT'D

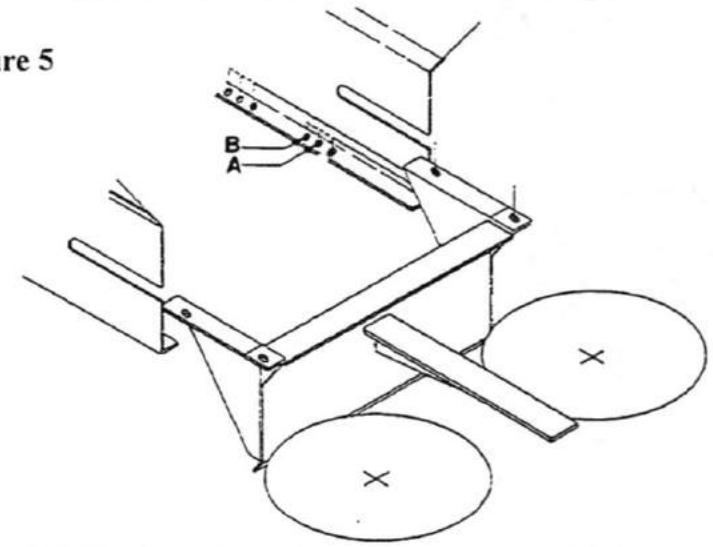
Figure 4 - Welding Instructions



SPINNER ASSEMBLY INSTALLATION

Using any suitable hoist or jack, lift spinner assembly into position on top of the sills. See Figure 5 to determine which set of mounting holes to use. Tighten nuts finger tighten only with the assembly in place on top of the sills. Measure diagonally from the corner of the chain shield to spinner hub. (Figure 6) Shift the assembly sideways as necessary to equalize the two measurements. Tighten the assembly securely and recheck the diagonal measurements.

Figure 5



Position A (Middle) -
To be used when mounting a 24" Twin Spinner Assembly with a standard Flow Divider.

Position B (Forward) -
To be used when mounting a 24" Twin Spinner Assembly with a Red-E-Vider.

INSTALLATION INSTRUCTIONS CONT'D

FLOW DIVIDER INSTALLATION

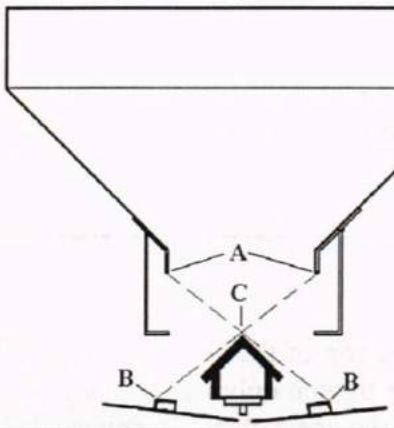
Standard Flow Divider

Slide flow divider onto tee-bar until locking pin will engage seventh hole from rear end. Engage locking pin and anchor with hair pin. This is a starting position. Further adjustment may be necessary.

Red-E-Vider

Slide lower section onto the tee-bar and secure by bolting through the rear two holes in the tee-bar. Assembly should be level with the conveyor and centered with respect to the chain shields. (Figure 6)

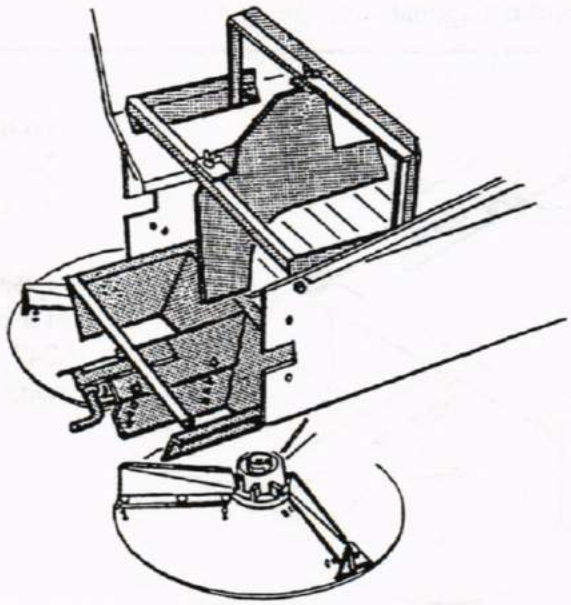
Bolt upper section in place using the last two rear chain shield bolts on each side. Center member must be vertical and centered on conveyor. (Figure 7)



To center flow divider and spinners with conveyor. Measure diagonally points A to B, and points A to C. Move accordingly to obtain equal measurements.

Figure 6 - Aligning Spinner & Flow Divider

Figure 7



INSTALLATION INSTRUCTIONS CONT'D

HYDRAULIC HOSE INSTALLATION

Determine the pressure port of the pump. Install the pressure hose into this port as shown in Figure 8. Connect the suction hose to the opposite port and to the tank outlet on the reservoir. If necessary, use plastic tie straps to support hoses so that they will not catch on field obstructions, contact the muffler or moving parts.

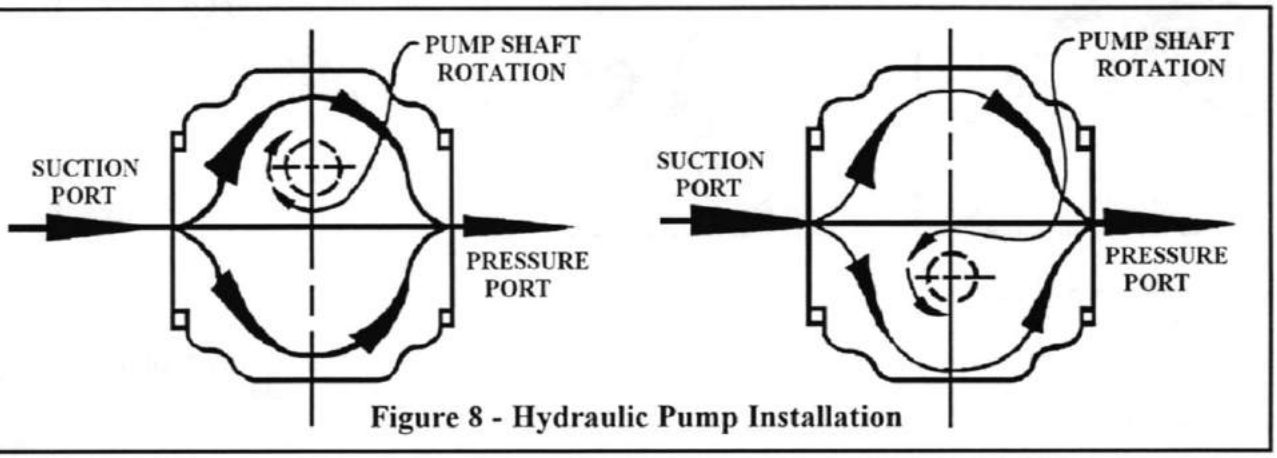


Figure 8 - Hydraulic Pump Installation

Use thread sealer on all fittings, except "O" ring and JIC adapter, "O" ring valves and motors, etc. When using thread sealer, do not put it on the first three threads of the fitting. Too much on the fitting or on the first three threads of the fitting. Too much on the fitting or on the first three threads will force it into the oil stream where it could damage the system.

CAUTION! If a threaded connection is tightened to tightly, the fitting or housing into which the fitting is placed could be distorted and an unstoppable leak could occur.

Assemble the system as shown in the schematic. Place the hose clamps as needed to keep hoses away from hot or moving parts. Do not let hoses hang so low as to be snagged. Do not stretch hoses tight.

The Hydraulic Hoses supplied are as follows:

Pressure line - Two wire braid hose, one end fitting crimped on, other end fitting to be field installed after cutting hose to length. See assembly instructions on the following page.

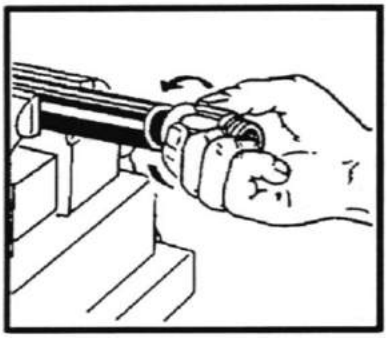
Suction line - Single spiral wire reinforced to be cut to length. Fittings to be assembled with double hose clamps.

All return lines - Double cotton braid to be cut to length as necessary. Fittings to be assembled with single hose clamps.

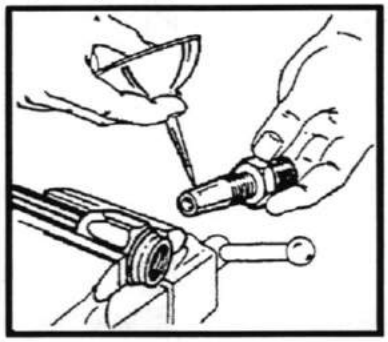
INSTALLATION INSTRUCTIONS CONT'D

ASSEMBLY INSTRUCTIONS - AEROQUIP REUSABLE NON-SKIVE TYPE ENDS

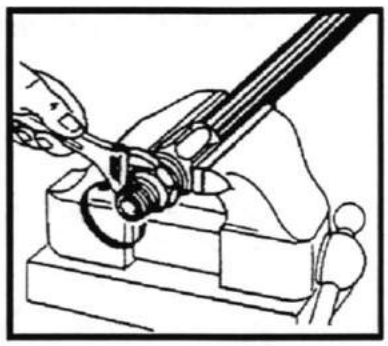
Thru-the-cover style reusable fittings (2663, 2793)



Step 1
Liberally oil hose cover with Aeroquip lube oil, place hose in vise just tight enough to prevent it from turning. Screw socket onto hose counter-clockwise until it bottoms. Back off 1/2 turn.



Step 2
Oil nipple threads and inside of hose liberally.



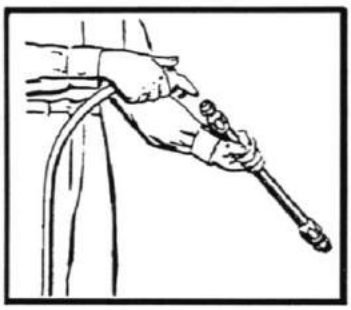
Step 3
Screw nipple clockwise into socket and hose. Leave 1/32" to 1/16" clearance between nipple hex and socket. Clean and inspect all assemblies.

Disassemble in reverse order.

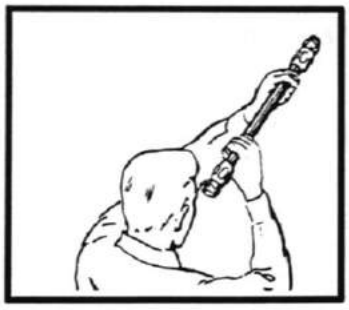
CAUTION

Do not use one manufacturer's hose with another manufacturer's fittings. Such use will void any warranty and may cause premature burst or leak of hydraulic fluids. Such bursting or leaking may cause severe injury and/or fire.

Cleaning, inspection, testing and storage



Clean
Clean assembly by blowing out with clean compressed air. Assemblies may be rinsed out with oleum spirits if the tube stock is compatible with oil, otherwise hot water at 180°F. max. may be used. Consult Aeroquip for special cleaning equipment.



Inspect
Examine hose assembly internally for cut or bulged tube, obstructions and cleanliness. For segment style fittings, be sure that the hose butts up against the nipple shoulder, band and retaining ring are properly set and tight, and segments are properly spaced. Check for proper gap (1/32" to 1/16") between nut and socket or hex and socket. Nuts should swivel freely. Check the layline of the hose to be sure that the assembly is not twisted. Cap the ends of the hose with plastic covers to keep clean.

Maintenance
Hose assemblies in operation should be inspected frequently for leakage, kinking, abrasion, corrosion or any other signs of wear or damage. Worn or damaged hose assemblies should be replaced immediately.

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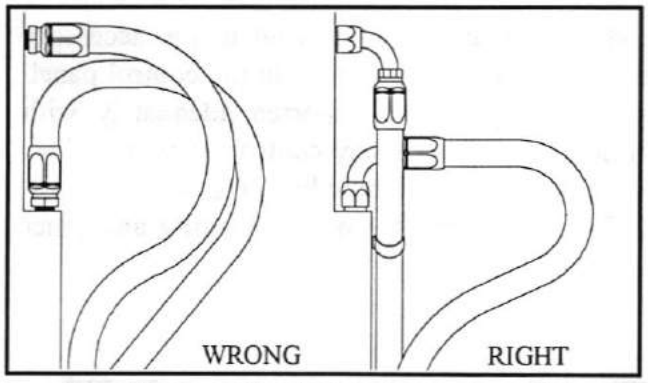
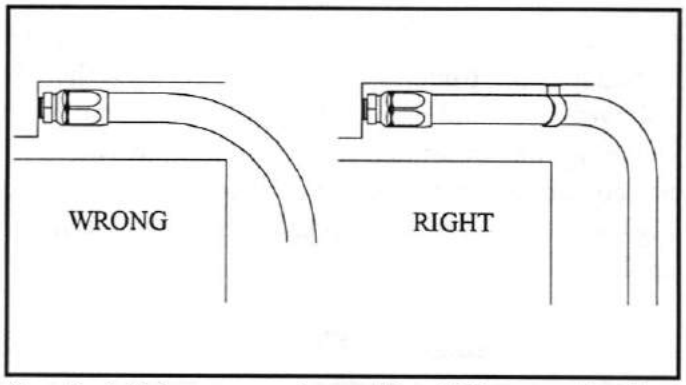
INSTALLATION INSTRUCTIONS CONT'D

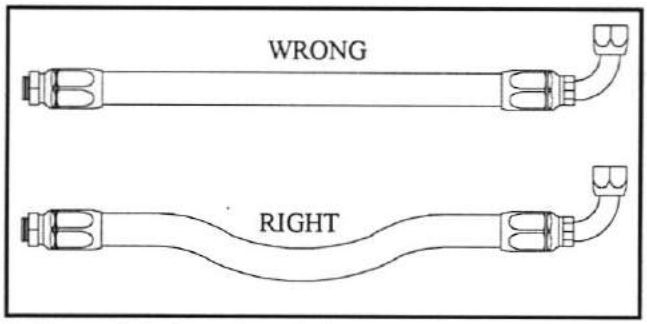
INSTALLATION GUIDE



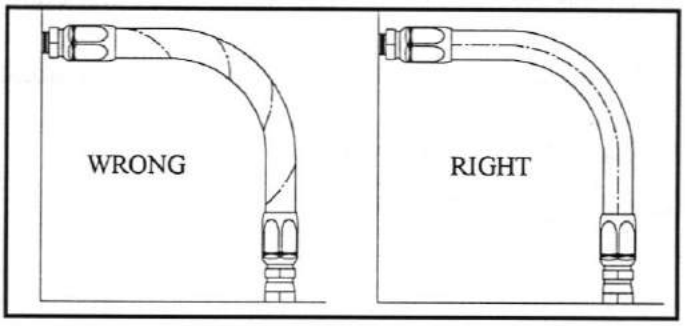
1. Use elbows and adapters in the installation to relieve strain on the assembly, and to provide easier and neater installations that are accessible for inspection and maintenance. Remember that metal end fittings cannot be considered as part of the flexible portion of the assembly.



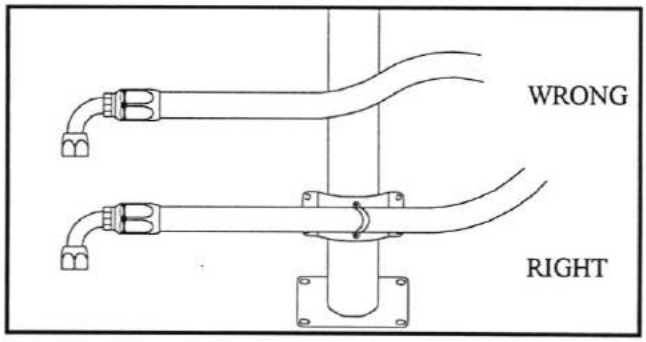
2. Install hose runs to avoid rubbing or abrasion. Clamps are often needed to support long runs of hose or to keep hose away from moving parts. It is important that the clamps be of the correct size. A clamp that is too large will allow the hose to move in the clamp causing abrasion at this point.



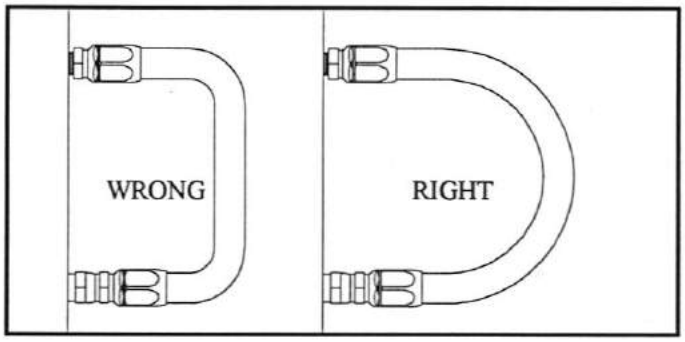
3. In straight hose installations allow enough slack in the hose line to provide for changes in length that will occur when pressure is applied. This change in length can be from +2% to -4%.



4. Do not twist hose during installation. This can be determined by the printed layline on the hose. Pressure applied to a twisted hose can cause hose failure or loosening of the connections.



5. Keep hose away from hot parts. High ambient temperature will shorten hose life. If you cannot route it away from the heat source, insulate it.



6. Keep the bend radii of the hose as large as possible to avoid hose collapsing and restriction of flow. Follow catalog specs on minimum bend radii.

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INSTALLATION INSTRUCTIONS CONT'D

ELECTRICAL CONNECTIONS

Connect all electrical control circuits. The supply conductor should be connected to the accessory terminal of the truck ignition switch through the 15 amp. circuit breaker provided in the control panel. All wiring should be approved automotive insulated wire, should be supported adequately with insulating ties or straps, should be located where it will not interfere with any control or access, does not contact any moving part or sharp edge and is kept away from any hydraulic line or any heated part. Lights and reflectors are provided to meet FMVSS 108 requirements but not necessarily any other applicable local, regional or national codes.

FILLING HYDRAULIC SYSTEMS

IMPORTANT!	DO NOT ATTEMPT TO RUN PUMP WITHOUT FIRST FILLING HYDRAULIC OIL RESERVOIR AND OPENING SUCTION LINE GATE VALVE or pump may be ruined.

Fill reservoir with hydraulic oil as specified in the Lubrication Specifications section of this manual. Be sure oil is clean, free from dirt, water and other contaminants.

Lubricate all points requiring lubrication per Lubrication Chart in this manual.

CHECKING INSTALLATION

See "Initial Start-Up" Procedure.

INITIAL START-UP

Check over entire unit to be sure all fasteners are in place and properly tightened per "Fastener Torque Chart" in this manual. Disengage transmission PTO driving pump. Check friction wheel to be sure it is in the raised (disengaged) position.
NOTE: Stand clear of moving machinery. Do not load spreader with material.

1. Check to see that no loose parts are in the body or on the conveyor or spinner. Be sure to remove any loose pieces.
2. Open feedgate until it is completely clear of conveyor.
3. Fill the hydraulic reservoir with oil Refer to the "Lubricant Specification" section of this manual for proper oil. Open the gate valve under the reservoir fully (rotate counterclockwise to open).
4. Place Synco-Matic Mark II Function Knob in "Automatic" position and spinner control valve in "O" position.
5. Start truck engine and set throttle so engine runs at about 1000 RPM. Engage PTO driving pump. Allow pump to run and circulate oil for several minutes. In cold weather increase warm-up time.
6. Move spinner control valve to position "3". Spinner should run at slow speed. Allow to run until it is operating smoothly and all air has been purged. Move spinner control valve to "O" position.
7. Pull out inner Function Knob (white nylon) located adjacent to conveyor gear drive box on Synco-Matic Mark II control valve assembly to disengage automatic ground control feedback. Slowly rotate this knob until all air is purged and conveyor is operating smoothly.
8. Move spinner control valve to position "5" and allow both spinner and conveyor to run. Shut down system. When all parts have come to rest, check all hydraulic system connections for leaks.

> **CAUTION!** Do not check leaks with hands while system is operating as high pressure leaks are very dangerous! Do not check for leaks adjacent to moving parts while system is operating as there may be danger of entanglement.

9. With pump PTO disengaged, push the inner Function Knob on the Synco-Matic in while rotating it slowly so that it fully engages in the "automatic" position. When properly engaged it should seat fully and rotation of knob will stop. DO NOT FORCE! Place the Two-Speed Shift Knob (white nylon), located at the outer end of they Synco-Matic Mark II housing, in the central or neutral position (fully in is "Low" position—fully out is "High" position). Engage PTO and run engine at low speed. Slowly rotate Two-Speed Shift Knob counter-clockwise. Conveyor should run while knob is being turned, stop when knob is stopped. If knob is rotated in a clockwise direction, conveyor will move in an intermittent manner—moving quickly for a short distance then stopping until knob has been turned about 1 1/4 turns, then running rapidly for a short period, etc. This action is normal and merely indicates that Two-Speed Shift Knob is being turned in the wrong direction. When turning knob in this direction (clockwise), the buzzer and warning light on the control panel will also be actuated intermittently (each time knob is rotated about six turns).
10. Check hydraulic oil reservoir and refill to "full" mark on dipstick. Unit is now ready for road testing.

ROAD TESTING

Prior to first use of machine, prior to each spreading season's use, and following major overhaul or repair work, the unit should be road testing to verify that all components and systems are functioning properly. Road testing may be done over any suitable course which will allow vehicle to be driven at speeds to be used while spreading. The following procedure is given as a guide:

1. Be sure unit has been properly serviced, that oil reservoir is full and gate valve under reservoir is fully open. Do not put any load in spreader.
2. Turn Function Knob on inner side of Synco-Matic Mark II housing into "Automatic" by pushing in and rotating until it seats.
3. Turn Two Speed Shift Knob on outer end of Synco-Matic Mark II housing into "Low" position by pushing in and rotating until it seats.
4. Set spinner control valve at position number 5.
5. Start truck engine. Engage PTO and allow to run at fast idle for 5 - 10 minutes to bring hydraulic oil up to operating temperature. Spinners should revolve at moderate speed and conveyor should not move.
6. Engage friction wheel to truck propeller shaft by:
   a. turning the friction wheel valve handle (hydraulic-actuated). Check indicator light on control panel to insure friction wheel is in the down position.
   b. flipping switch on control panel upward (electric-actuated).
7. Start forward travel. Conveyor should start immediately and should continue to run at speeds which should vary directly with vehicle's road speed; i.e. conveyor should speed up as truck speed increases and slow down as truck speed reduces. Spinner speed should remain constant when engine speed is above minimum operating range.

CAUTION! To observe conveyor and spinner speeds while vehicle is in motion, proper safety precautions should be observed. These may include use of suitable mirrors clamped to permit observation by a safely seated observer, following the spreader in another vehicle at a safe distance or other suitable means. Do Not stand on fenders, in body, or on any part of spreader as there is danger of falling off vehicle or into moving machinery. Use great care in performing this test.

8. Pull out on Two Speed Shift Knob to "High" position and repeat above tests. All functions should be the same except that conveyor should run three times as fast. Observe Caution in 7 above.

NOTE: Avoid operating truck in "Reverse" with cab control in "On" position.

GENERAL OPERATING PROCEDURES

To operate the L-3020 Synco-Matic Mark II spreader, the following sequence should be followed:

1. Be sure unit has been properly serviced and is in good operating condition.
2. Close feedgate, turn valve or switch to the "Off" position to disengage the friction wheel. Disengage pump drive PTO.
3. Fill body with material to be spread.
4. Push in Function knob on Mark II control, rotating it until it fully engages into "Automatic" position.
5. On Mark II Two-speed knob, push in and rotate until it engages fully into "Low" position for low rate applications (ie fertilizer), or pull out while rotating until it engages fully into "High" position for high rate applications (ie lime).
6. Drive to location where spreading is to be done.
7. Adjust spinner control valve to setting required for material used to give spread width desired. See Spinner Adjustment (page 28).
8. Adjust material flow divider of Red-E-Vider to give spread pattern desired. See Spread Pattern Adjustment (pages 27 - 30).
9. Using Spread Rate Charts on pages 32 and 33, set feedgate opening to obtain yield desired for spread width, material and material weight per cubic foot used.
10. If truck has a two-speed rear axle place it into "Low" range.
11. Be sure shut-off valve on hydraulic reservoir is fully open.
12. Start truck engine.
13. Depress clutch pedal, engage pump drive PTO and shift into transmission gear at which spreading is to be done.
14. Engage friction wheel. Spreading will start as soon as truck moves.
15. Drive at speeds which will allow high speed engines (gasoline) to turn at about 3000 RPM, or low speed engines (diesel) to turn at about 2000 RPM. These speeds should not exceed 10 MPH with Mark II two-speed in "High" position or 30 MPH in "Low" position.
16. To shut off delivery momentarily, while turning or for other reasons, disengage friction wheel for about three seconds and then re-engage friction wheel.

CAUTION! Drive only at speeds which permit good control of vehicle. For "High" range materials, use only lower transmission gears and do not drive above 10 MPH.

For "Low" range materials, higher transmission gears may be used with speeds to 30 MPH. If lower speeds must be used, shift transmission into lower gears so that engine speed can be maintained to allow adequate hydraulic oil delivery from pump.

GENERAL OPERATING PROCEDURES CONT'D

ADJUSTING THE SPREAD PATTERN

Spread pattern is affected by many factors—among the more significant of these are:

1. Spinner speed.
2. Material weight per cubic foot.
3. Material granule size.
4. Material flow characteristics.
5. Rate of delivery of material.
6. Point of delivery of material on spinner discs.
7. Balance between deliveries to both spinner discs.
8. Angle to the distributor fins on the spinner discs.
9. Cleanliness of the spinner fins and discs.
10. Level of spreader.
11. Wind.
12. Spacing of swaths.

Since many of these factors will vary for each job, trial and experience must be used to determine the adjustments which must be made to obtain the spread width and spread pattern desired. The following instructions are given to cover the adjustments available and the effect that each will have on the spread pattern.

⚠ **CAUTION!**	As contact with spinners and other moving parts is very dangerous, great caution must be used while working around the spreader. Do not adjust while machinery is moving, wear eye protection, and avoid discharge from spinners. Do not ride on moving spreader.

A. SPINNERS

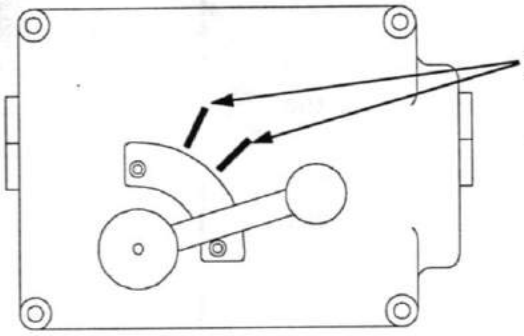
IMPORTANT!	Spinner discs and fins must be kept clean and polished. Even a small build-up on a spinner fin has disastrous effects on the spread pattern. Rusty, rough fins will produce poor spread patterns.

Fan speed is adjustable from approximately 400 to 800 RPM. This is accomplished by moving the spinner speed control valve lever.

Proper fan speed adjustment is very important in obtaining good spread patterns. The best fan speed to use will depend entirely on the material being spread and must be determined by trial and error. Once established for the materials you use, paint marks should be made on the control valve body as shown.

GENERAL OPERATING PROCEDURES CONT'D

Figure 9 - Spinner Control Valve



Paint marks on your valve to indicate fan speed for the materials you spread.

Maximum pattern width is determined by particle size. This may vary anywhere from 25 feet for very finely ground dry lime up to 80 feet or even more for extremely large fertilizer pellets.

For every particle size and density there is a critical fan speed. In other words, there is a speed which will result in the maximum width obtainable. Going beyond this, speed will not increase spread width, but will result in poor patterns.

Too high a fan speed will result in a heavy deposit behind the truck. This upper speed limit will be quite low for finely powdered material and very high for extremely course materials. In general, the critical speed will fall somewhere between 500 and 650 RPM for ordinary materials. (Figure 10)

One way to adjust fan speed is to stand on the fender and watch the material leaving the fans. At slow speed the material leaves the blades in bands. At medium speed it forms wide bands in the air. At somewhat higher speeds the bands close into a uniform blur. At very high speeds, a ridge of material flows over the tops of the blades and falls directly behind the spreader. Normally, the proper fan speed is just higher than when the bands close to a blur.

CAUTION! DO NOT STAND ON FENDER WHILE VEHICLE IS IN MOTION.

B. MATERIAL DIVIDER CENTERING

Material divider must be properly centered to avoid a pattern which is heavier on one side that on the other. (Figure 11)

C. MATERIAL DIVIDER ADJUSTMENT

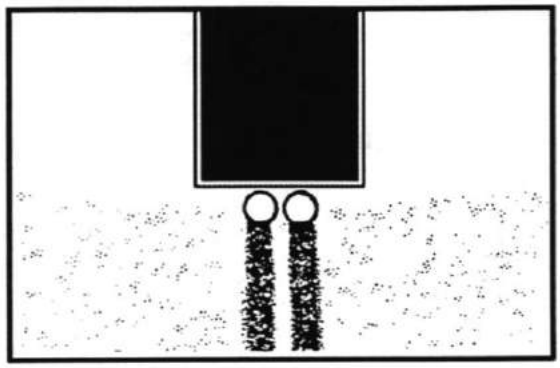
Moving the divider forward will increase the amount of material deposited behind the truck. Moving to the rear will decrease it. (Figures 11 and 12)

D. DIVIDER BACK PLATE ADJUSTMENT

First adjust Material Divider per "C" above. Then adjusting the divider to a wider position (moving back plate rearward) will throw material to the outside of the pattern. Adjusting to a narrower position (moving back plate forward) will throw it to the center. (Figures 15 and 16)

GENERAL OPERATING PROCEDURES CONT'D

Figure 10:
PATTERN - Two heavy swaths located directly behind the fans; material is seen blowing over the tops of the fans.
CAUSE - Fan speed too fast, material blows over the tops of the fans and falls to the ground directly behind the unit.
CURE - Decrease fan speed.



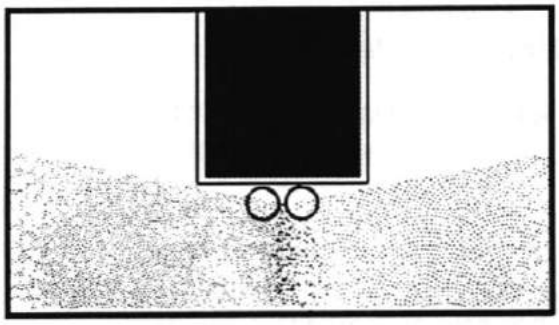
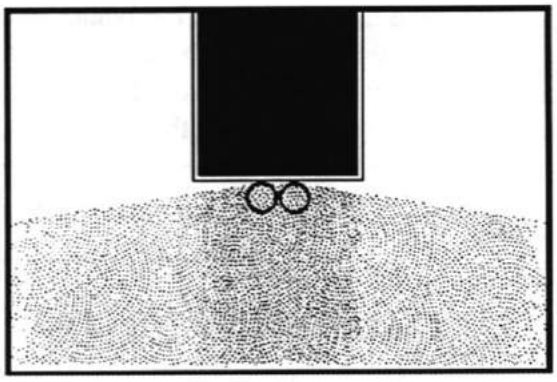


Figure 11:
PATTERN - Heavy on one side only.
CAUSE -
1. More material is being deposited on one fan.
2. Material has collected on divider panels.
CURE -
1. Measure accurately the position of the material divider. These units must be centered and the fans must be parallel to the spreader's sills.
2. Keep the divider scraped clean of material build-up.

Figure 12:
PATTERN - Heavy in center 30% of total spread width. No material exits ahead of fans.
CAUSE -
1. Divider is too far forward.
2. Divider back plate is to far forward.
CURE -
1. Move divider rearward.
2. Move back plate rearward.



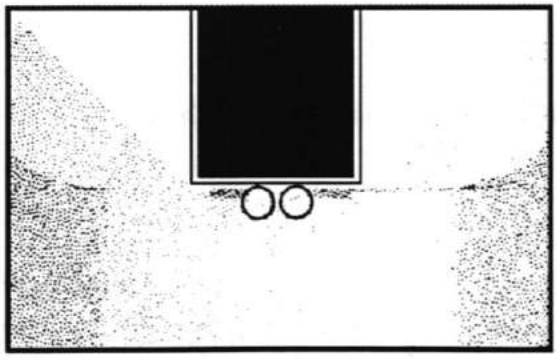


Figure 13:
PATTERN - Heavy at outer edges. Excessive material strikes front deflector panels.
CAUSE -
1. Deflector is too far rearward.
2. Fan speed to fast.
3. Back plate is to far rearward.
CURE -
1. Adjust divider forward.
2. If adjusting divider does not work, decrease fan speed.
3. Move back plate forward.

GENERAL OPERATING PROCEDURES CONT'D

E. DISTRIBUTOR FIN ANGLE ADJUSTMENT

Angling the outer ends of the fins forward (in the direction of rotation) will increase the deposit at the outside of the pattern. Angling backward (opposite the direction of rotation) will decrease deposits at the outside of the pattern.

CAUTION! Be sure cap screws and nuts are in good condition when tightening per torque chart in this manual. If fasteners are damaged, worn or corroded, replace immediately with new SAE Grade 5 or Grade 8 fasteners.

Spreader is equipped with adjustable fins. These may be adjusted as required, according to the following:
If material deposit is excessive at the outside of the pattern, with a great deal of material striking the deflector plates, rotate the outer end of the fin in the opposite direction of rotation of the spinner to assist in correcting this problem.

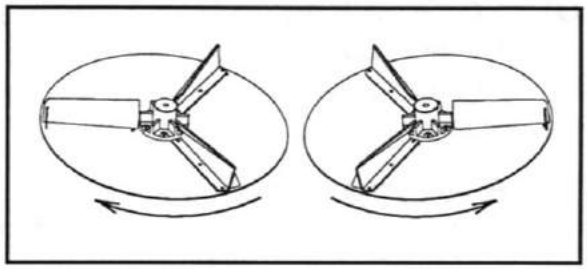
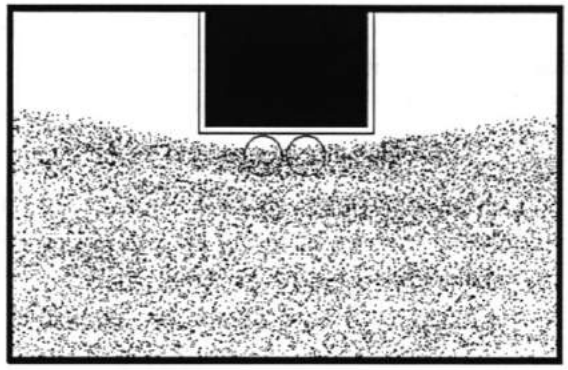


Figure 14:
PATTERN - Good pattern.
CAUSE - Proper fan speed and divider setting.
EFFECT - Material exits on an arc from near fan to near front deflector. Pattern density tapers off to nothing at outer 10% on each side of total spread width.



F. PROPER ADJUSTMENT

With correct spinner speeds and flow divider settings, uniform material distribution should be obtained. (Figure 14)

GENERAL OPERATING PROCEDURES CONT'D

SPREAD RATE CHARTS

How to use these charts:

1. Select the chart for the material to be spread.
2. At the top of this chart locate the section headed by the weight per cubic foot of material being spread.
3. In this section locate the column headed by the spread width to be used.
4. In this column find the line with the spread rate in pounds per acre desired.
5. On this line in the column at the left edge of the chart, read the feedgate opening required to obtain this spread rate.

NOTE: These charts are based on the rear tire size of the vehicle, the propeller shaft diameter, and (normally) the "LO" side of the rear axle (if vehicle is equipped with a two-speed rear axle) for selection of the friction wheel diameter. If the rear axle is shifted into "HI" range, the chart values must be corrected as follows:

A. Determine "Rear Axle Ratio" originally used to calculate friction wheel size.
B. Determine "Rear Axle Ratio" to be used while spreading.
C. Multiply chart values by ratio in step B and divide by ratio in step A. The result will be corrected chart values for the different rear axle ratio to be used.

If the vehicle is equipped with an auxiliary transmission and the friction wheel is mounted behind the auxiliary transmission, no chart correction will be required when auxiliary transmission shifts are made. If friction wheel is mounted ahead of auxiliary transmission, charts must be corrected when auxiliary is shifted, as follows:

D. Determine Auxiliary Transmission Ratio used when friction wheel size was determined.
E. Determine Auxiliary Transmission Ratio to be used when spreading.
F. Multiply chart values by ratio in step E and divide by ratio in step D. Result will be corrected chart values for the different auxiliary transmission ratio to be used.

Changes in friction wheel diameters will also affect delivery rates. To correct chart values of such changes, multiply chart values by original friction wheel diameter and divide by new friction wheel diameter.

NOTE: These charts and chart corrections are theoretical only. Variations in weights per cubic foot of material, flow of material, tire inflation, tire slippage and embedment, overlap, spread uniformity, wind, equipment and other factors beyond the control of Highway Equipment Company will affect the actual delivery rates obtained. For more precise data, unit should be tested using the metering device.

THEORETICAL SPREAD RATE CHART

Synco-Matic Mark II in "LO"
FERTILIZER - POUNDS PER ACRE

GATE OPENING	50 LB./CU. FT. MATERIAL SPREAD WIDTH				55 LB./CU. FT. MATERIAL SPREAD WIDTH				60 LB./CU. FT. MATERIAL SPREAD WIDTH			
(Inches)	50	55	60	65	50	55	60	65	50	55	60	65
1	150	136	125	115	165	150	138	127	180	164	150	138
1 1/4	188	176	156	144	206	188	172	159	225	205	188	173
1 1/2	225	205	188	173	248	225	206	190	270	245	225	208
1 3/4	263	239	219	202	289	263	241	222	315	286	263	242
2	300	273	250	231	330	300	275	254	360	327	300	277
2 1/4	338	307	281	260	371	338	309	286	405	368	338	312
2 1/2	375	341	313	288	413	375	344	317	450	409	375	346
2 3/4	413	375	344	317	454	413	378	349	495	450	413	381
3	450	409	375	346	495	450	413	381	540	491	450	415
3 1/4	488	443	406	375	536	488	447	413	585	532	488	450
3 1/2	525	477	438	404	578	525	481	444	630	573	525	485
3 3/4	563	511	469	433	619	563	516	476	675	614	563	519
4	600	545	500	462	660	600	550	508	720	655	600	554
4 1/4	638	580	531	490	701	638	584	539	765	695	638	588
4 1/2	675	614	563	519	743	675	619	571	810	736	675	623
4 3/4	713	648	594	548	784	713	653	603	855	777	713	658
5	750	682	625	577	825	750	688	635	900	818	750	692
5 1/4	788	716	656	606	866	788	722	666	945	859	788	727
5 1/2	825	750	688	635	908	825	756	698	990	900	825	762
5 3/4	863	784	719	663	949	863	791	730	1035	941	863	796

GATE OPENING	65 LB./CU. FT. MATERIAL SPREAD WIDTH				70 LB./CU. FT. MATERIAL SPREAD WIDTH			
(Inches)	50	55	60	65	50	55	60	65
1	195	177	163	150	210	191	175	162
1 1/4	244	222	203	188	263	239	219	202
1 1/2	293	266	244	225	315	286	263	242
1 3/4	341	310	284	263	368	334	306	283
2	390	355	325	300	420	382	350	323
2 1/4	439	399	366	338	473	430	394	363
2 1/2	488	443	406	375	525	477	438	404
2 3/4	536	488	447	413	578	525	481	444
3	585	532	488	450	630	573	525	485
3 1/4	634	576	528	488	683	620	569	525
3 1/2	683	620	569	525	735	668	613	565
3 3/4	731	665	609	563	788	716	656	606
4	780	709	650	600	840	764	700	646
4 1/4	839	753	691	638	893	811	744	687
4 1/2	878	798	731	675	945	859	788	727
4 3/4	926	842	772	713	998	907	831	767
5	975	886	813	750	1050	955	875	808
5 1/4	1024	931	853	788	1103	1002	919	848
5 1/2	1073	975	894	825	1155	1050	963	888
5 3/4	1121	1019	934	863	1208	1098	1006	929

NOTE: Spread width is defined as the effective spread pattern width or the driving centers in the field.

THEORETICAL SPREAD RATE CHART

Synco-Matic Mark II in "HI"
LIME - TONS PER ACRE

GATE OPENING	80 LB./CU. FT. MATERIAL SPREAD WIDTH				85 LB./CU. FT. MATERIAL SPREAD WIDTH				90 LB./CU. FT. MATERIAL SPREAD WIDTH			
(Inches)	35	40	45	50	35	40	45	50	35	40	45	50
1	0.51	0.45	0.40	0.36	0.55	0.48	0.43	0.38	0.58	0.51	0.45	0.41
1 1/2	0.77	0.68	0.60	0.54	0.82	0.72	0.64	0.57	0.87	0.76	0.68	0.61
2	1.03	0.90	0.80	0.72	1.09	0.96	0.85	0.77	1.16	1.01	0.90	0.81
2 1/2	1.29	1.13	1.00	0.90	1.37	1.20	1.06	0.96	1.45	1.27	1.13	1.01
3	1.54	1.35	1.20	1.08	1.64	1.44	1.28	1.15	1.74	1.52	1.35	1.22
3 1/2	1.80	1.58	1.40	1.26	1.91	1.67	1.49	1.34	2.03	1.77	1.58	1.42
4	2.06	1.80	1.60	1.44	2.19	1.91	1.70	1.53	2.32	2.03	1.80	1.62
4 1/2	2.32	2.03	1.80	1.62	2.46	2.15	1.91	1.72	2.61	2.28	2.03	1.82
5	2.57	2.25	2.00	1.80	2.73	2.39	2.13	1.91	2.90	2.53	2.25	2.03
5 1/2	2.83	2.48	2.20	1.98	3.01	2.63	2.34	2.11	3.18	2.79	2.48	2.23
6	3.09	2.70	2.40	2016	3.28	2.87	2.55	2.30	3.47	3.04	2.70	2.43
6 1/2	3.35	2.93	2.60	2.34	3.55	3.11	2.76	2.49	3.76	3.29	2.93	2.63
7	3.60	3.15	2.80	2.52	3.83	3.35	2.98	2.68	4.05	3.55	3.15	2.84
7 1/2	3.86	3.38	3.00	2.70	4.10	3.59	3.19	2.87	4.34	3.80	3.38	3.04
8	4.12	3.60	3.20	2.88	4.38	3.83	3.40	3.06	4.63	4.05	3.60	3.24
8 1/2	4.38	3.83	3.40	3.06	4.65	4.07	3.62	3.25	4.92	4.31	3.83	3.45
9	4.63	4.05	3.60	3.24	4.92	4.31	3.83	3.45	5.21	4.56	4.05	3.65
9 1/2	4.89	4.28	3.80	3.42	5.20	4.55	4.04	3.64	5.50	4.81	4.28	3.85
10	5.15	4.50	4.00	3.60	5.47	4.79	4.25	3.83	5.79	5.07	4.50	4.05
10 1/2	5.40	4.73	4.20	3.78	5.74	5.02	4.47	4.02	6.08	5.32	4.73	4.26

GATE OPENING	95 LB./CU. FT. MATERIAL SPREAD WIDTH				100 LB./CU. FT. MATERIAL SPREAD WIDTH			
(Inches)	35	40	45	50	35	40	45	50
1	0.61	0.53	0.48	0.43	0.64	0.56	0.50	0.45
1 1/2	0.92	0.80	0.71	0.64	0.97	0.84	0.75	0.68
2	1.22	1.07	0.95	0.86	1.29	1.13	1.00	0.90
2 1/2	1.53	1.34	1.19	1.07	1.61	1.41	1.25	1.13
3	1.83	1.60	1.43	1.28	1.93	1.69	1.50	1.35
3 1/2	2.14	1.87	1.66	1.50	2.25	1.97	1.75	1.58
4	2.45	2.14	1.90	1.71	2.57	2.25	2.00	1.80
4 1/2	2.75	2.41	2.14	1.93	2.90	2.53	2.25	2.03
5	3.06	2.67	2.38	2.14	3.22	2.82	2.50	2.25
5 1/2	3.36	2.94	2.61	2.35	3.54	3.10	2.75	2.48
6	3.67	3.21	2.85	2.57	3.86	3.38	3.00	2.70
6 1/2	3.97	3.48	3.09	2.78	4.18	3.66	3.25	2.93
7	4.28	3.74	3.33	3.00	4.50	3.94	3.50	3.15
7 1/2	4.58	4.01	3.57	3.21	4.83	4.22	3.75	3.38
8	4.89	4.28	3.80	3.42	5.15	4.50	4.00	3.60
8 1/2	5.20	4.55	4.04	3.64	5.47	4.79	4.25	3.83
9	5.50	4.81	4.28	3.85	5.79	5.07	4.50	4.05
9 1/2	5.81	5.08	4.52	4.06	6.11	5.35	4.75	4.28
10	6.11	5.35	4.75	4.28	6.43	5.63	5.00	4.50
10 1/2	6.42	5.62	4.99	4.49	6.76	5.91	5.25	4.73

NOTE: Spread width is defined as the effective spread pattern width or the driving centers of the field.

GENERAL OPERATING PROCEDURES CONT'D

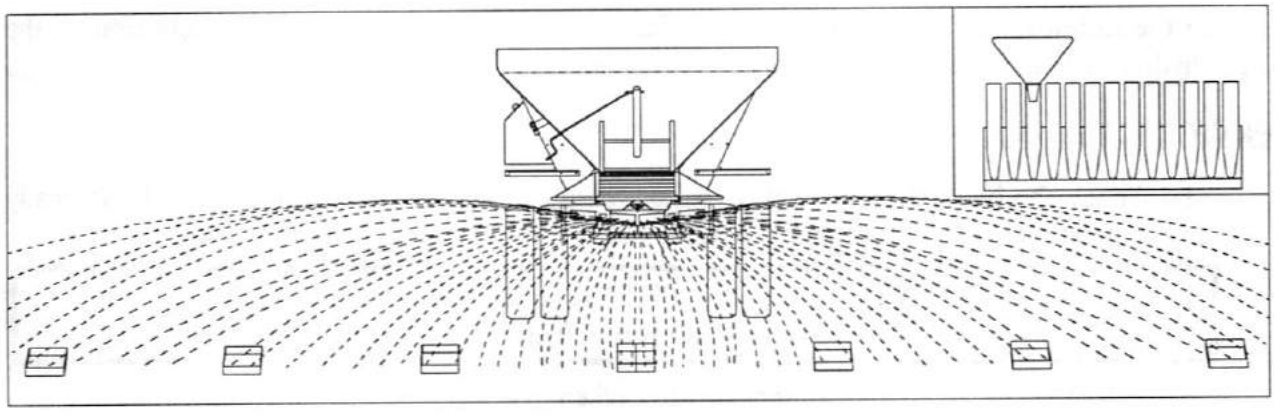
HOW TO CHECK YOUR SPREADER PATTERN

It is highly recommended that a spread pattern test be performed for all products you handle.

We at NEW LEADER have developed a Spread Pattern Test Kit. This kit is available from all NEW LEADER DEALERS and can be ordered under part number 70889.

The kit contains all the necessary devices, along with instructions and data sheets which will allow you to perform the most professional of tests.

Once initial testing is completed, testing should be repeated at the beginning of every season, or any time repair work is performed on any component affecting spread patterns.



LUBRICATION AND MAINTENANCE

PREVENTATIVE MAINTENANCE PAYS!

The handling and spreading of commercial fertilizers is a most severe operation with respect to metal corrosion. Unless a frequent, periodic preventative maintenance program is established, rapid damage to spreading equipment can occur. Proper cleaning, lubrication and maintenance will give you longer life, more satisfactory service and more economical use of your equipment.

HYDRAULIC SYSTEM

The use of proper oil in the hydraulic system is one of the most important factors for satisfactory operation. Utmost cleanliness in handling the oil cannot be stressed enough. Keep the hydraulic oil in original closed containers, clean top of container before opening and pouring, and handle in extremely clean measures and funnels.

Refer to the Lubricant and Hydraulic Oil Specifications section of this manual for selection of the proper hydraulic fluid for use in the hydraulic system.

SERVICE SCHEDULE

1. Check the hydraulic oil daily by means of dipstick. Add oil if required. Periodically inspect the hoses and fittings for leaks.
2. CHANGE THE HYDRAULIC OIL FILTER AFTER THE FIRST WEEK (OR NOT MORE THAN 50 HOURS) OF OPERATION ON A NEW UNIT.
3. After the first filter change, replace filter when indicator reaches Red Zone.
4. The reservoir should be drained through drain plug (Not through suction outlet), flushed, and refilled and filter element changed annually, or the oil and filter should be changed if oil shows any signs of breaking down under continued high-pressure operation. Discoloration of oil is one sign of breakdown.

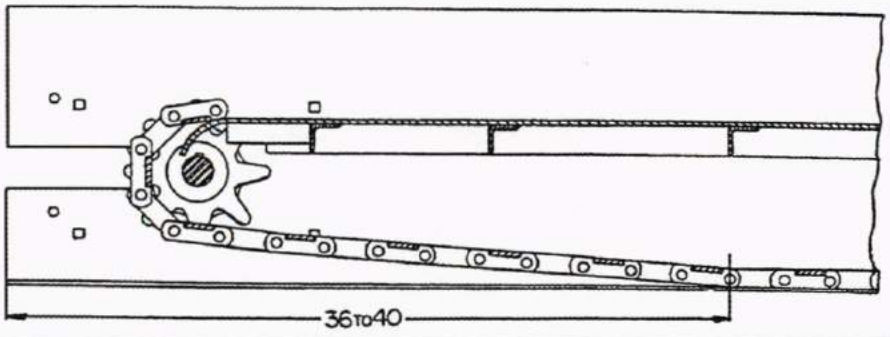
CONVEYOR GEAR CASE

The oil in a new unit should be drained at the end of the first two weeks (or not more than 100 hours) of operation and the case should be thoroughly flushed with light oil. Refill gear case with one (1) pint (.47 liters) of recommended lubricant. After the initial change, the oil should be changed every 2000 hours of operation or annually, whichever occurs first. Check the level of the gear case monthly.

Figure 10

Chain Tension to be Measured from Rear of Sill

Proper Tension 36" to 40"



LUBRICATION AND MAINTENANCE CONT'D

CONVEYOR CHAIN

Hose down the machine and remove any material build-up on the sprockets or beneath the chain. If material is allowed to build up, the chain may ride up and damage the body.
NOTE: If material builds up under the chain, the chain will ride on the material instead of the bottom panel. The more material allowed to build up, the closer the chain will come to the chain shields. If the chain should catch a chain shield, it could permanently distort the chain, the chain shields, or the body. In the same manner, if material is allowed to build up on the sprockets, the chain will have a larger diameter to follow. The more material allowed to build up, the closer the chain will run to the chain shields, until damage has occurred. Do not remove material while conveyor or spinner is running.

The conveyor chain should be lubricated at least once every week. Use a mixture of 75% fuel oil and 25% SAE 10 oil in a pressurized hand spray can.

CAUTION! When conveyor is running stay out of body—stay clear of all moving parts. Entanglement of clothes, any body part or anything you have in your hands can cause serious injury. Do not use a bar, rod or hammer on conveyor while it is moving—if it gets caught it could be very dangerous. With the spinner shut down and the conveyor running slowly, spray the mixture of oil between the links of the chain by spraying through openings at rear ends of sill, or from front outside body when access clearance is adequate. Do this at least once a week and after each time the machine is washed down. Allow to become dry before lubricating.

If a chain oiler is used, the oiler reservoir should be filled daily with a mixture of 75% fuel oil and 25% SAE 10 oil. Before each filling of spreader with material to be spread, open petcock and run conveyor until full length of chain has bee oiled, then shut petcock.

Proper chain tension is also a factor in chain and sprocket life. The proper chain tension is illustrated on the following page. Be sure the chain is tensioned equally on both sides. This adjustment is made on each side of the unit at the idler bearings.

Conveyor chains that are too tight will tend to stretch. This will cause excess sprocket wear and eventually cause breakage. Excess slack presents the possibility of the chain catching on sub-frame parts. Bent or distorted chain bars will cause damage to the body also. Straighten or replace bent or distorted chain bars immediately.

LUBRICATION OF BEARINGS

Grease in a bearing acts to prevent excessive wear of parts, protecting ball races and balls from corrosion and aids in preventing excessive heat within the bearing. It is very important the grease maintains its proper consistency during operation. It must not be fluid and it must not channel.

Bearings should be lubricated by pumping grease in slowly until a slight bead forms around the seals. This bead indicates adequate lubrication and also provides additional protection against the entrance of dirt. NOTE: Be sure all fittings are thoroughly cleaned before grease is injected. Points to be lubricated by means of a grease gun have standard grease fittings.

LUBRICATION AND MAINTENANCE CONT'D

CLEAN UP

To maintain minimum maintenance operation, this equipment should be thoroughly washed every two or three days during the operating season. Hose the unit down under pressure to free all sticky and frozen material.

It is important that the machine be thoroughly cleaned at the end of each operating season. All lubrication and maintenance instructions listed in this section should be closely followed. Repaint worn spots to prevent formation of rust.

FASTENERS

Tighten all screw fasteners to recommended torque after first week of operation and annually thereafter. If loose fasteners are found at any time, tighten to recommended torque. Replace any lost or damaged fasteners, or other parts immediately upon finding such damage or loss. Check body mounting bolts every week.

CONVEYOR BELT MAINTENANCE

The standard belt for the #4 chain has a nylon fabric that is impervious to moisture, weathering, or normal chemical action except oil, The optional high-temperature oil resistant belting is highly recommended where an asphalt mix is going to be run through the spreader. Inspect the belting fastener occasionally for wear or raveling of the belt grip area.

HIGH TEMPERATURE BELTING

In order to obtain maximum life from the high temperature belting, the following recommendation should be followed.

1. Spray your belt with oil often to assure flexibility of the rubber and to ease cleaning. Spray the underpart of the conveyor as well, as dry heat is very detrimental to the life of the belt.
2. Keep the belt free from buildup of asphalt or other material. Keep it clean.
3. Keep the asphalt temperature below 350° F. and the belt running as much as possible when loaded. A hot sitting load is more detrimental since it does not allow a cooling cycle for the belt.
4. Allow the belt to flex and warm up in cold weather before loading it with any extremely hot products.
5. Do not operate the belt in temperatures below -10° F. Operating in temperatures below -10° F. will cause the belt to crack prematurely.

SYNCO-MATIC CONTROL REPLACEMENT

SYNCO-MATIC MARK II AND MARK III REMOVAL

Repairs to Synco-Matic control boxes and valve assembies require special techniques and should not be attempted in the field. The complete unit should be removed in one piece and returned to your dealer for repair or replacement. The following instructions cover removal: (Figures 11 and 12)

1. Thoroughly clean Synco-Matic unit and area around it.
2. Unscrew cable connection at "A" (drive cable on Mark II/electrical cable on Mark III) and remove.
3. On Mark II only, cut signal wire coming from top of gear train housing at "E".
   NOTE: Leave at least 6" of wire on housing so that wire can be respliced.
4. Remove two hydraulic hose connections at top of control block at "B". Cap ports to keep dirt out of block.
5. Loosen four cap screws in saddle under hydraulic motor at "C".
6. Remove two screws from cog-belt housing at "D".
7. Holding unit in both hands, move up and down to release from any sealant between unit and other parts. Remove by drawing off motor.

REPLACEMENT

1. Using clean wiping cloth and a not-toxic, non-flammable degreasing solvent, thoroughly clean mating surfaces between control block, hydraulic motor and cog-belt housing.
2. Replace "O" rings in hydraulic motor ports. Be sure threaded inset sleeves in motor ports are slightly below flush with surface. These sleeves must not protrude at all. (Do not push "O" rings into slot at motor port—"O" rings should only be set on top of slots. This way the valve body will seat when installed.)
3. Apply a narrow line of sealing compound around edges of cog-belt housing and flat upper surface of motor where control block will seat. Be careful not to use too much.
4. Slip unit into place on motor and into cog-belt housing, being sure shaft engages cogged pulley in cog-belt housing and shaft slot engages cross-pin.
5. Start four cap screws through saddle and into underside of control block.
6. Tighten the two pan head screws at "D" and then uniformly tighten the four cap screws at "C".
7. Connect hydraulic hoses at "B".
8. On Mark II only, splice wire at "B". Either solder splice of use crimped sleeve. Tape over splice.
9. Insert connection at "A" and tighten firmly.
10. Road test unit per "Road Testing" procedure in this manual to check unit for proper functioning.

REMOVAL OF COMPLETE SYNCO-MATIC CONTROL WITH CONVEYOR GEAR CASE ASSEMBLY

1. Thoroughly clean Synco-Matic unit and area around it.
2. Unscrew cable connection at "A" (drive cable on Mark II/electrical cable on Mark III) and remove.

SYNCO-MATIC CONTROL REPLACEMENT CONT'D

3. On Mark II only, cut signal wire coming from top of gear train housing at "C". NOTE: Leave at least 6" of wire on housing so that wire can be respliced.
4. Remove two hydraulic hose connections at top of control block at "B". Cap ports to keep dirt out of block.
5. Remove the conveyor gear case torque arm pin, and slide the complete assembly off the conveyor drive pulley shaft.
6. Reverse steps to reinstall. Carefully position the key inside the gear case before installation. Key must line up with shaft of conveyor will not operate.

Figure 11 - Synco-Matic Mark II Assembly

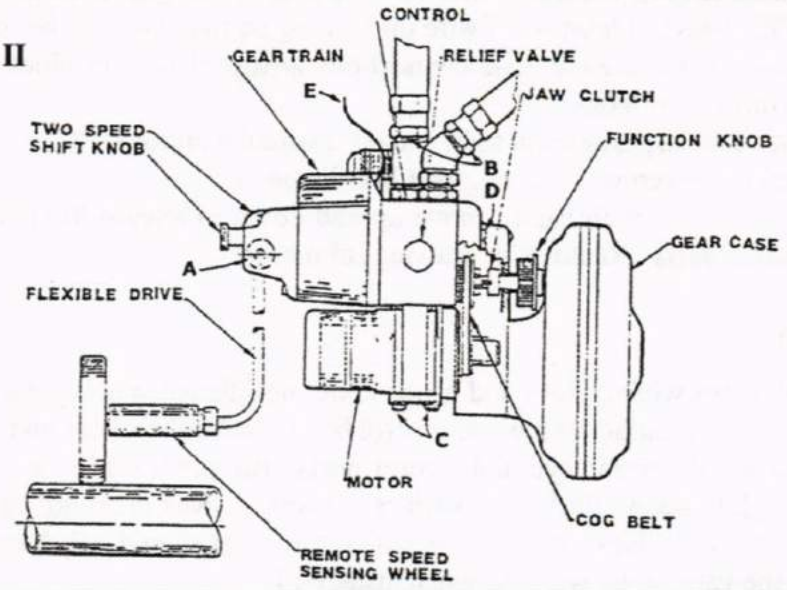
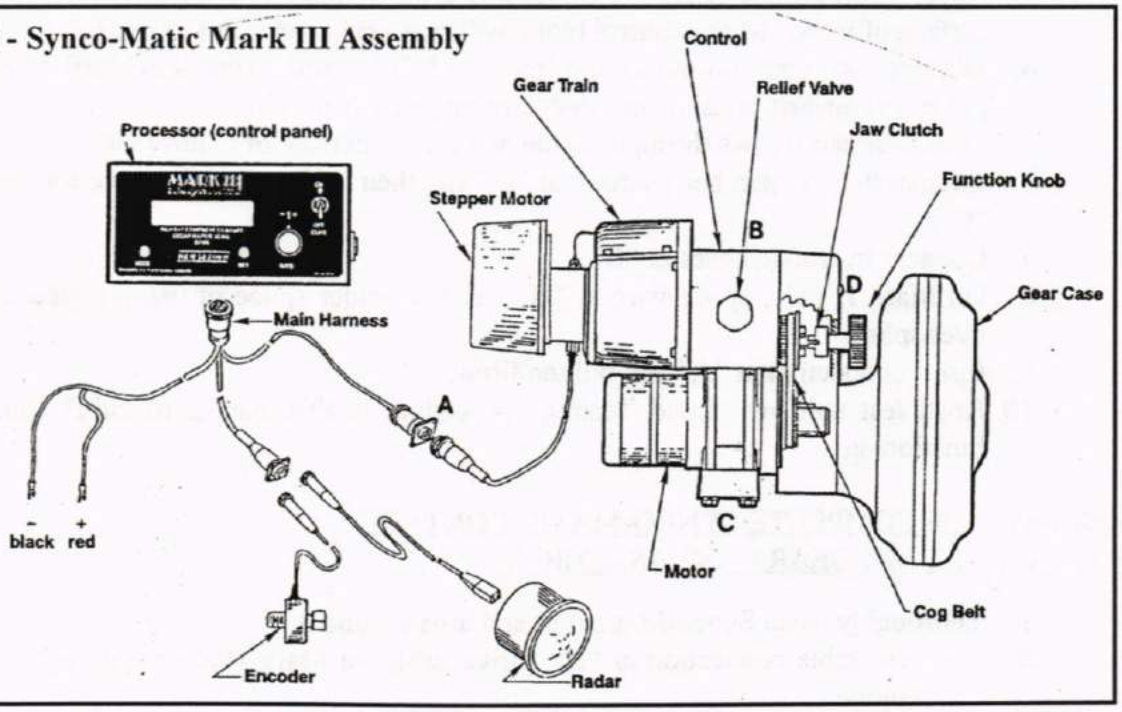


Figure 12 - Synco-Matic Mark III Assembly



LUBRICANT AND HYDRAULIC OIL SPECIFICATIONS CONT'D

IMPORTANT!	The lubricant distributor and/or supplier is to be held responsible for the results obtained from their products. Procure lubricants from distributors and/or suppliers of unquestioned integrity, supplying known and tested products. Do not jeopardize your equipment with inferior lubricants. No specific brands of oil are recommended. Use only products qualified under the following oil viscosity specifications and classification recommended by reputable oil companies.

HYDRAULIC SYSTEM

The following are the recommended procedures for selecting the proper hydraulic fluid for use in the hydraulic system. Select a major brand industrial PREMIUM QUALITY (anti-wear type) hydraulic oil to provide viscosity between 100-200 SSU at operating temperature. Premium hydraulic oils with viscosity indexes of 95 or above will provide the following temperature ranges:

INDUSTRY IDENTIFICATION VISCOSITY GRADE	OPERATING TEMPERATURE	VISCOSITY
150 SSU	122° F. 84° F.	100 SSU 200 SSU
225 SSU	140° F. 107° F.	100 SSU 200 SSU
300 SSU	150° F. 116° F.	100 SSU 200 SSU
450 SSU	165° F. 130° F.	100 SSU 200 SSU
600 SSU	182° F. 145° F.	100 SSU 200 SSU

If, because of necessity or convenience, it is desirable to use an automotive engine oil, multi-viscosity oils of SC rating (formerly MS Quality), providing 100 to 200 SSU at operating temperature, can be used. These will provide proper viscosity over a wide range. See following example:

SAE VISCOSITY GRADE	OPERATING TEMPERATURE	VISCOSITY
10W-30	130° F.	100 SSU
	100° F.	200 SSU
10W-40	190° F.	100 SSU
	140° F.	200 SSU

The above recommendations cover the normal system operating temperatures. For system temperatures above or below those shown in the charts above, contact the Service Department of Highway Equipment Company. For additional information contact your Highway Equipment Company dealer. (Refer to Hi-Way/New Leader Bulletin H-24 NL-32.)

LUBRICANT AND HYDRAULIC OIL SPECIFICATIONS CONT'D

GEAR BOX LUBRICANT

Lubricate these assemblies with a non-corrosive type SAE 90 E.P. (Extreme Pressure) gear oil conforming to MIL-L 2105B multi-purpose gear lubricating oil requirements (API Service GL 4) with ambient temperatures from 40° to 100° F. Ambient temperatures below 40° F. require an SAE 80 E.P. lubricant; above 100° F. use an SAE 140 E.P. grade oil.

PRESSURE GUN LUBRICANT

Use a ball and roller bearing lithium base lubricant with a minimum melting point of 300° F. This lubricant should have a viscosity which assures easy handling in the pressure gun at prevailing atmospheric temperatures. The lubricant must be waterproof. The grease should conform to NLGI No. 2 consistency.

CHAIN OILER LUBRICANT

Use a mixture of 75% No. 1 or No. 2 Diesel fuel or kerosene mixed with 25% SAE 10 engine oil.

FRICTION WHEEL ACTUATOR LUBRICANT

Use a light penetrating oil dispensed by aerosol or atomizer spray.

WARNING! Shut off all power and allow all moving parts to come to rest before performing any maintenance operation.

LUBRICATION CHART

The spreader should be regularly lubricated with the lubricants recommended in this manual in accordance with the following chart:

LOCATION	PLACES	METHOD	FREQUENCY
Hydraulic Pump Drive			
Transmission PTO - Slip Yoke	1	Grease	Weekly
Transmission PTO - Universal Joint	2	Grease Gun	Monthly
Reservoir	1		Check Daily. Change Annually
Filter	1	Check Indicator. Change when indicated (Red).	
Friction Wheel			
Shaft Housing - Friction Wheel Ass'y	1	Grease Gun	Weekly
Tube Spacer - Friction Wheel Ass'y	1	Grease Gun	Weekly
Actuator - Operating Mechanism	1	Spray Oil	Monthly
Speedometer Cable - Friction Wheel to Synco-Matic 2-Speed	1	Grease	Annually
Conveyor			
Dragshaft Bearings	2	Grease Gun	Weekly
Idler Shaft Sprockets	2	Grease Gun	Daily
Idler Adjusting	2	Hand Grease	Weekly
Chain	2 Strands	Spray Oil	Weekly
Chain Oiler (If so equipped)	1	Oil	Daily
Gear Case	1	Gear Box Oil	Check Monthly. Change Annually
Feedgate			
Jack Assembly - Gears	1	Hand Grease	Annually
Jack Assembly - Tube	1	Grease Gun	Monthly

NOTE: Unusual conditions, such as excessive dust, temperature extremes or excessive moisture, may require more frequent lubrication of specific parts.

*See Lubricant and Hydraulic Oil Specifications for types of lubricants and oil to be used.

TROUBLESHOOTING PROCEDURES

Reason:	Correction:
1. **Symptom**: Spinner motors do not turn when spinner control valve is in running position or conveyor does not run when function knob is pulled out and manually rotated.	
A. Hydraulic oil level low	Fill reservoir.
B. Shut off valve on oil reservoir not open	Open valve fully by turning counter-clockwise until it stops.
C. Hydraulic pump is not rotating	1. PTO is disengaged. Shift into engagement. 2. Drivline has failed. Repair or replace. 3. Key in pump shaft has failed. Replace key. 4. U-joint pin or key has failed. Replace pin or key.
D. In-line relief valve set too low	In-line relief valve pressure should be 2500 PSI. Set spinner control valve to "O". Disconnect the hydraulic pressure line at Synco-Matic Mark II control, which comes from the rear port on the spinner control valve. Reconnect this line to flowmeter inlet port. Disconnect the return line from the Mark II Control where it joins the return tube running to the reservoir. Connect the flowmeter load valve to the return tube. Open the load valve fully, run truck engine at about 2500 RPM. Slowly close load valve until pressure reaches 2500 PSI. If this pressure cannot be reached, valve adjustment should be set up until gauge reads 2500 PSI. CAUTION: DO NOT set pressure above 2500 PSI.
E. Worn pump	With flow meter arranged to check relief valve setting above, open load valve fully. Read flow rate with truck engine running at 2500 RPM. Close load valve until pressure reads 1000 PSI. Flow rate should not fall off more than three (3) GPM. If flow loss is greater, replace pump.
F. Jammed or frozen spinner motors, conveyor or conveyor motor	Free up. If not possible, replace as required.

TROUBLESHOOTING PROCEDURES CONT'D

Reason:	Correction:
2. **Symptom**: Spinners turn but conveyor does not run when function knob is pulled out and manually rotated.	
A. Mark II relief valve open to return line	Using relief valve testing adapter and flow meter, test valve for opening pressure. If not 1500 PSI, replace relief valve.
B. Jammed or frozen conveyor	Free up conveyor.
C. Jammed or frozen conveyor hydraulic motor	Replace motor.
D. Conveyor hydraulic motor shaft key sheared	Replace key.
E. Mark II control gears stripped or unpinned	Remove Mark II control cover. When function knob is rotated manually, idler arm should rotate. If it doesn't, examine for stripped gears or unpinned gears. Replace as required. Check also for jammed valve spool. If jammed, replace control unit.

3. **Symptom**: Spinner speed does not stay constant.	
A. Pump speed is not adequate to provide sufficient flow to maintain spinner speed	Increase engine speed.
B. Worn pump	Use method for testing of worn pump given in Symptom 1. Replace pump is worn.
C. In-line relief valve setting too low	Use method for testing of in-line relief valve given in Symptom 1. Setting should be 2500 PSI.
D. Insufficient hydraulic oil flow at normal driving speeds	Check PTO-Pump matching. If insufficient flow results, install higher percent PTO or use larger pump (Special).
E. Defective spinner control valve	Replace valve metering spool spring. If no improvement, replace spinner control valve.

4. **Symptom**: Spinners run with cab control in "Off" position.	
Cab control is for conveyor only—spinners run anytime vehicle engine is running. PTO is engaged and spinner control valve is in a running position	None required. This is a normal condition. To stop spinners, set spinner control valve at "O" position, disconnect PTO, or shut off vehicle engine.

TROUBLESHOOTING PROCEDURES CONT'D

Reason:	Correction:
5. **Symptom**: Hydraulic oil overheats (200° F. or hotter).	
A. Oil level is low	Add hydraulic oil up to "Full" mark.
B. Excessive oil is being pumped	PTO-Pump match provides excess oil flow. Install correct PTO-Pump arrangement.
C. Worn motor (spinner or conveyor)	Motor heats up at an excessive rate (check for this heating when system is cold). Replace motor.
D. Improper or deteriorated hydraulic oil	Replace hydraulic oil with proper specification oil and replace filter.
E. Relief valve set too low—allows oil to throttle through valve and generate heat	Check in-line relief valve as described in Symptom 1 and Mark II relief valve as in Symptom 2. Reset or replace as required.
F. Pinched or obstructed hose, hydraulic line or fitting	Clear obstruction or replace part. Straighten kinked hoses.
G. Driving too fast, especially with Mark II 2-speed in "High" range	Do not drive over 10 MPH with Synco-Matic Mark II 2-speed in "High" range.

6. **Symptom**: Red light flashes on control panel and buzzer sounds intermittently. Conveyor runs in jerks.	
A. Driving too fast	Shift truck transmission to a lower gear. Will not normally occur if Mark II 2-speed is in "Low" range.
B. Synco-Matic Mark II cog-belt drive has failed	With function knob pushed fully in and engaged in automatic position with spreader shut down, knob should not be able to be turned by hand. Cog-belt is broken or disengaged. Reset or replace. Cog drive pulleys may be unpinned—re-pin to shaft. Function knob clutch may be stripped—replace.
C. Synco-Matic Mark II control gear has failed	Examine gears for stripping or being disconnected. Replace.

7. **Symptom**: Red light flashes and buzzer sounds either continuously or erratically.	
Electrical ground in control panel or in wire running back to Mark II control	Insulate against grounding at control panel or on wire.

8. **Symptom**: Conveyor runs when control switch in cab is in "Off" position.	
Pump is delivering excess amount of oil	1. Pressure drop in Mark II valve is sufficient to run lightly loaded conveyor motor. Shut off pump drive by disengaging PTO shaft. 2. PTO-Pump match provides excess oil flow. Install correct PTO-Pump arrangement.

TROUBLESHOOTING PROCEDURES CONT'D

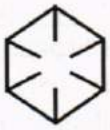
Reason:	Correction:
9. **Symptom**: Conveyor does not run with cab control "On", PTO engaged and vehicle driving forward.	
A. Friction wheel slips on truck propeller shaft	Increase spring tension so that friction wheel bears more firmly. Friction wheel shaft is not parallel to propeller shaft. Adjust mounting so that shafts are parallel.
B. Friction wheel does not engage propeller shaft when cab control is put in "On" position	1. Friction wheel actuator is defective. Replace. 2. "On-Off" switch is defective. Replace. 3. Electric wires to actuator broken or loose. Splice wires or reconnect loose or broken connections.
C. Flexible cable from friction wheel to Mark II control does not transmit rotation of friction wheel	1. Flexible cable broken. Replace. 2. Flexible cable rotating element disengaged from traction wheel shaft of Mark II connection. Rotating element engaged too deeply at one end allowing other end to disengage. Engagement of "tang" should by 5/8". If greater, plug central hole with short pin to limit engagement to 5/8".
D. Mark II 2-speed gear box worn, stripped or out of engagement	1. Two-speed knob must not be in "neutral." Pull out fully while rotating it to put it into "High" position. Push in knob while rotating it to put it into "Low" position. 2. Open 2-speed gear box and check gears. Replace worn or stripped gears. Replace loose or sheared pins. Replace defective pin-jaw clutches.
E. Mark II function knob in "Manual" (disengaged) position	Push in knob while rotating it to engage it into "Automatic" position.
F. Defective gear train in Mark II control	Pull function knob out to "Manual" position. Remove cover from Mark II control. Rotate function knob slowly by hand. Idler arm should rotate around connection gear. If not, replace gear train.
G. Locked spool in Mark II control valve	Check as for defective gear train (F). If arm does not rotate, check for stripped gears in gear train. Replace gears if stripped. With new gears, if function knob will not turn with hand pressure, check for locked valve spool. Replace Mark II control if spool is jammed. Check for damaged 2-speed gears and replace as required.

STANDARD TORQUES NATIONAL COARSE (NC) CAPSCREWS

CAPSCREW GRADE IDENTIFICATION - MARKINGS ON HEAD

SAE GRADE 2  NO MARKINGS

SAE GRADE 5  THREE MARKS - 120 DEGREES APART

SAE GRADE 8  SIX MARKS - 60 DEGREES APART

USE GRADE 2 TORQUES FOR STAINLESS STEEL FASTENERS AND CARRIAGE BOLTS.

CAPSCREW SIZE	TORQUE - FOOT\POUNDS					
	GRADE 2		GRADE 5		GRADE 8	
	DRY	LUBE	DRY	LUBE	DRY	LUBE
1/4"	5	4	8	6	12	9
5/16'	11	8	17	13	25	18
3/8"	20	15	30	23	45	35
7/16"	30	24	50	35	70	55
1/2"	50	35	75	55	110	80
9/16"	65	50	110	80	150	110
5/8"	90	70	150	110	220	170
3/4"	100	120	260	200	380	280
7/8"	140	110	400	300	600	460
1"	220	160	580	440	900	650

INSTRUCTIONS FOR ORDERING PARTS

Use only genuine NEW LEADER parts and order from the **AUTHORIZED DEALER** in your area.

1. **Always give the pertinent model and serial number of the spreader.**
2. **Give part name, part number and the quantity required.**
3. **Give the correct street address to where the parts are to be shipped, and the carrier if there is a preference.**

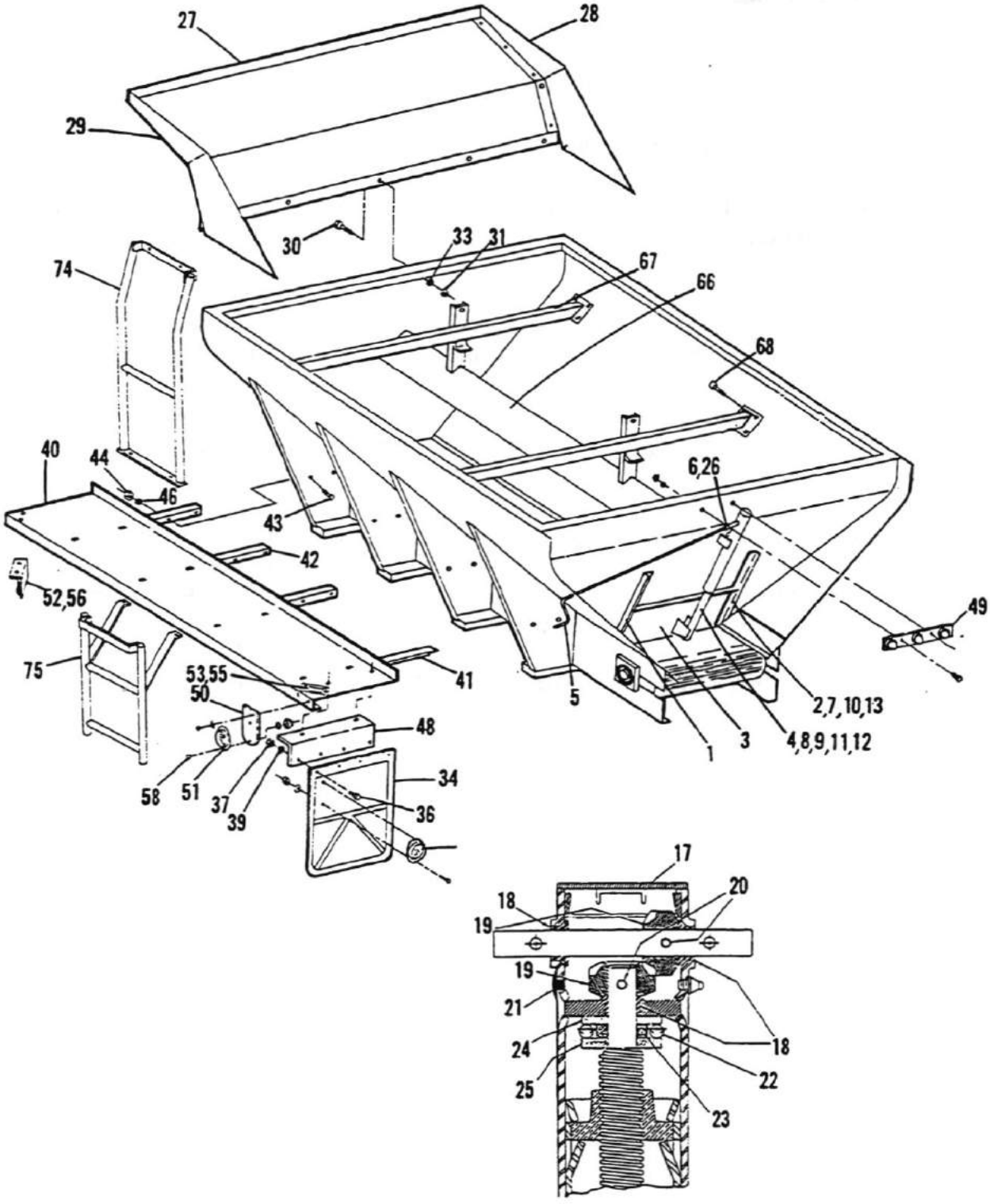
Unless claims for shortages or errors are made immediately upon receipt of goods they will not be considered. Any part returns should be directed through the dealer from which they were purchased.

When broken goods are received, a full description of the damage should be made by the carrier agent on the freight bill. If this description is insisted upon, full damage can always be collected from the transportation company.

No responsibility is assumed for delay or damage to merchandise while in transit. Our responsibility ceases upon delivery of shipment to the transportation company from whom a receipt is received showing that shipment was in good condition when delivered to them. Therefore, claims (if any) should be filed with the transportation company and not with Highway Equipment Company.

If your claims are not being handled (by the transportation company) to your satisfaction, please call the Parts Manager at Highway Equipment Company (319) 363-8281 for assistance.

FEEDGATE & JACK, CAB PROTECTOR, MUDFLAPS, FENDERS, LIGHTS, INVERTED VEE, LADDER



FEEDGATE & JACK

ITEM	PART NO.	DESCRIPTION	QTY
1	2884	Slide - Feedgate, LH	1
2	2885	Slide - Feedgate, RH	1
3	14261	Assembly - Feedgate, Consisting of:	1
	14262	Weldment - Feedgate	1
	27296	Belt - Sealer	1
	27297	Retainer - Sealer	1
	20621	Screw - Machine	7
	20642	Nut - Hex	7
	20710	Washer - Lock	7
4	40735	Assembly - Jack	1
5	14382	Handle	1
6	20986	Pin - Roll	2
7	20005	Screw - Cap	6
8	20074	Screw - Cap	1
9	20136	Screw - Cap	1
10	20642	Nut - Hex	6
11	20678	Nut - Lock	1
12	20680	Nut - Lock	1
13	20710	Washer - Lock	6
14	*13898	Indicator - Feedgate	1
15	40734	Kit - Repair, Jack Assembly (Includes Items 6, 16-26)	1
16	*40707	Cap - Tube, Lower	1
17	40708	Cap - Tube, Upper	1
18	40709	Bearing - Flange	3
19	40710	Gear - Bevel	2
20	40725	Pin - Roll	2
21	40726	Grommet	1
22	40727	Bearing	1
23	40731	Spacer	1
24	40732	Washer - Thrust	1
25	40733	Washer - Support	1
26	40705	U-Joint	1

* - Not Shown

GROUP - CAB PROTECTOR

ITEM	PART NO.	DESCRIPTION	QTY
	55923	Assembly Group - Cab Protector, 57" Cab Height	
	55924	Assembly Group - Cab Protector, 63" Cab Height	
	55925	Assembly Group - Cab Protector, 69" Cab Height	
27	55926	Panel - Shield, 57" Cab Height	1
	55927	Panel - Shield, 63" Cab Height	1
	55928	Panel - Shield, 69" Cab Height	1
28	31788	Weldment - RH Support, 57" Cab Height	1
	39813	Weldment - RH Support, 63" Cab Height	1
	39819	Weldment - RH Support, 69" Cab Height	1
29	31789	Weldment - LH Support, 57" Cab Height	1
	39815	Weldment - LH Support, 63" Cab Height	1
	39821	Weldment - LH Support, 69" Cab Height	1
30	20067	Screw - Cap, 3/8-16 UNC x 1	A.R.
31	20644	Nut - Hex, 3/8-16 UNC	A.R.
32	*20693	Washer - Flat, 3/8	A.R.
33	20712	Washer - Lock, 3/8	A.R.

GROUP - MUDFLAPS

	46564	Assembly Group - Mudflaps	
34	7793	Mudflap - NEW LEADER	2
35	*36844	Rod - Mudflap	2
36	20067	Capscrew, 3/8-16UNC x 1	8
37	20644	Nut - Hex, 3/8-16UNC	8
38	*20693	Washer - Flat, 3/8	8
39	20712	Washer - Lock, 3/8	8

* - Not Shown
A.R. - As Required

GROUP - FENDERS

ITEM	PART NO.	DESCRIPTION	QTY
40	73037	Assembly Group-Fenders (10' Unit)	
	73038	Assembly Group-Fenders (11' Unit)	
	73039	Assembly Group-Fenders (12' Unit)	
	73040	Assembly Group-Fenders (13' Unit)	
	73041	Assembly Group-Fenders (14' Unit)	
	73042	Assembly Group-Fenders (15' Unit)	
	73043	Assembly Group-Fenders (16' Unit)	
	73044	Fender--R.H., 10' Unit	1
	73059	Fender--L.H., 10' Unit	1
	73045	Fender--R.H., 11' Unit	1
	73060	Fender--L.H., 11' Unit	1
	73046	Fender--R.H., 12' Unit	1
	73061	Fender--L.H., 12' Unit	1
	73047	Fender--R.H., 13' Unit	1
	73062	Fender--L.H., 13' Unit	1
	73048	Fender--R.H., 14' Unit	1
	73063	Fender--L.H., 14' Unit	1
	73049	Fender--R.H., 15' Unit	1
	73064	Fender--L.H., 15' Unit	1
	73050	Fender--R.H., 16' Unit	1
	73065	Fender--L.H., 16' Unit	1
41	55852	Angle-Mounting, R.H.	A.R.
42	55853	Angle-Mounting, L.H.	A.R.
43	20318	Bolt-Carriage, 3/8-16 x 1	A.R.
44	20644	Nut-Hex, 3/8-16UNC	A.R.
45	20693	Washer-Flat, 3/8	A.R.
46	20712	Washer-Lock, 3/8	A.R.
	20067	Screw-Cap, 3/8-16UNC x 1	4
	20693	Washer-Flat, 3/8	4
	20712	Washer-Lock, 3/8	4
	20644	Nut-Hex, 3/8-16UNC	4
47	55854	Bracket-Mudflap, R.H.	2
48	55855	Bracket-Mudflap, L.H.	2

A.R. - As Required

GROUP - LIGHTS

ITEM	PART NO.	DESCRIPTION	QTY
	39830	Kit - Lights	
49	6114	Lamp - Cluster, Red	1
50	3824	Mount - Belt, Reflector	4
51	6107	Reflector - Red	4
52	6108	Clearance Lamp - Amber	2
53	6110	Clearance Lamp - Red	2
54	*21580-600	Wire - 14 ga. (Black)	1
55	3775	Bracket - Clearance Lamp	2
56	38611	Bracket - Clearance Lamp	2
57	*20003	Capscrew, 1/4-20UNC x 3/4	24
58	20572	Screw - Machine, 3/16-24UNC x 3/4	33
59	*20641	Nut - Hex, 3/16-24UNC	33
60	*20642	Nut - Hex, 1/4-20UNC	24
61	*20691	Washer,-1/4	24
62	*20709	Washer - Lock	33
63	*20710	Washer - Lock	8
64	* 6198	Clip - Wire	21
65	*21986	Grommet - Rubber, 3/16	10

GROUP - INVERTED VEE

	56035	Assembly - Inverted Vee (10' unit)	
	56036	Assembly - Inverted Vee (11' & 12' units)	
	56037	Assembly - Inverted Vee (13' & 14' units)	
	56038	Assembly - Inverted Vee (15' & 16' units)	
66	56024	Weldment - Adjustable Vee (10' unit)	1
	56025	Weldment - Adjustable Vee (11' & 12' units)	1
	56026	Weldment - Adjustable Vee (13' & 14' units)	1
	56027	Weldment - Adjustable Vee (15' & 16' units)	1
67	37240	Weldment - Hanger	A.R.
68	20067	Capscrew, 3/8-16UNC x 1	A.R.
69	*20128	Capscrew, 1/2-13UNC x 1-1/4	A.R.
70	*20644	Nut - Hex, 3/8-16UNC	A.R.
71	*20646	Nut - Hex, 1/4-20UNC	24
72	*20712	Washer - Lock, 3/8	A.R.
73	*20714	Washer - Lock, 1/2	A.R.

* - Not Shown
A.R. - As Required

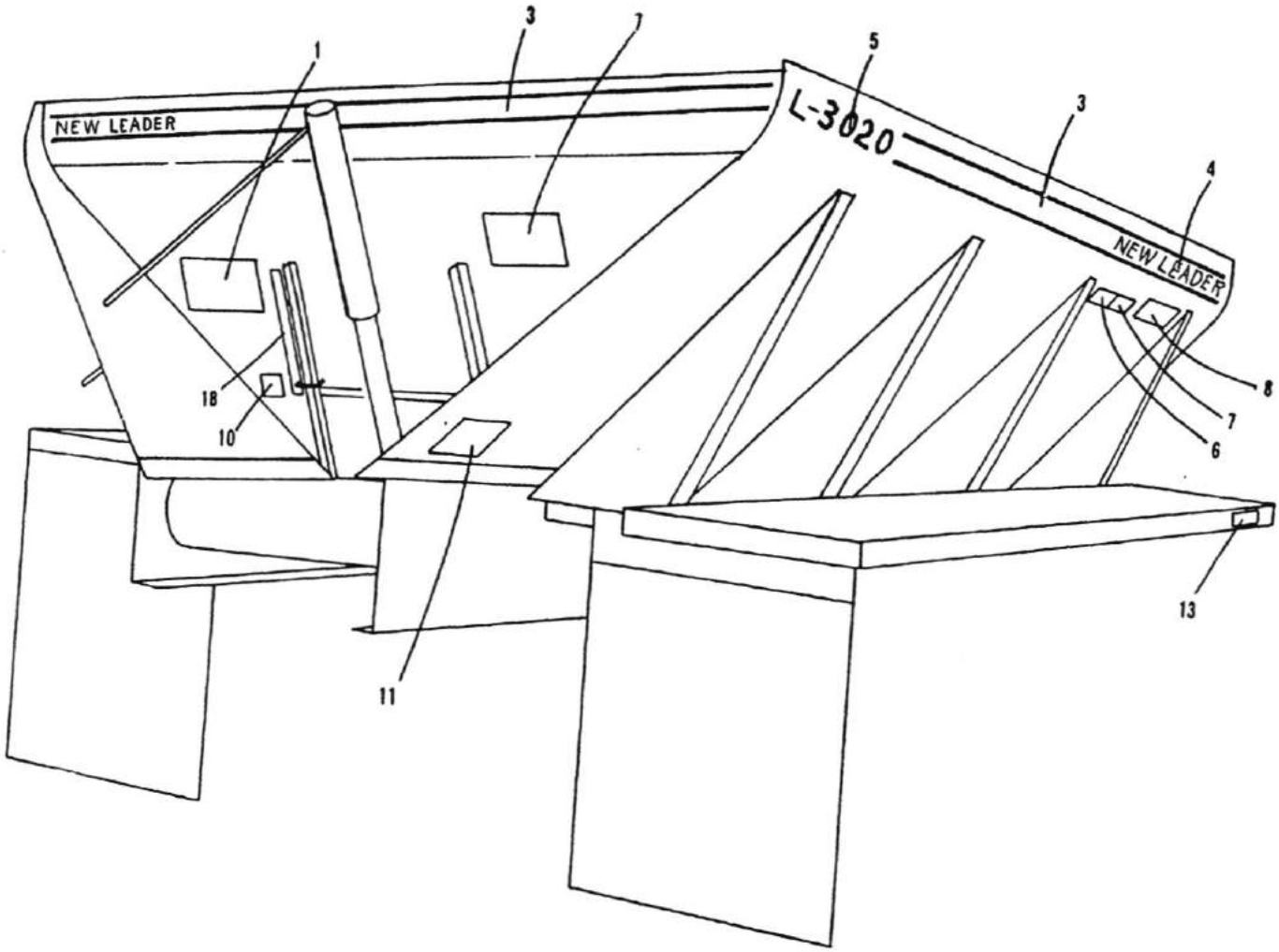
GROUP - LADDER

ITEM	PART NO.	DESCRIPTION	QTY
	55915	Group - Ladder	
74	55917	Ladder - Upper	1
75	46452	Ladder - Lower	1
76	*46459	Hardware Group	1

* - Not Shown

Sealer and Wiper Group page 60

GROUP - PAINT & DECAL



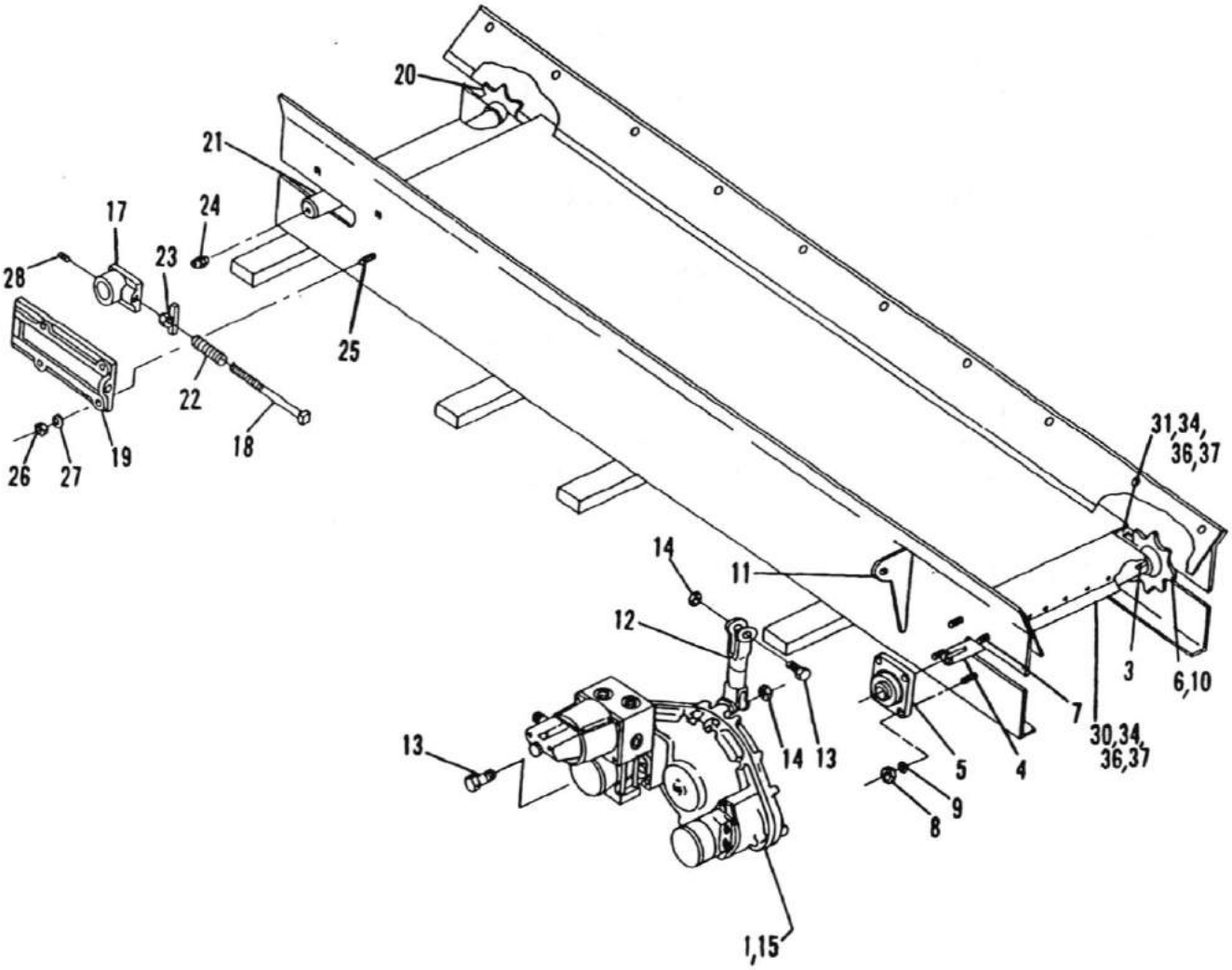
ITEM	PART NO.	DESCRIPTION	QTY
1	71526	Decal-Important, Adjust Spinner (On Divider)	1
2	*71527	Decal-Important, Adjust Spinner	1
3	58935-470	Decal-Scotchcal White	1
	58936-470	Decal-Scotchcal Red	1
4	58937	Decal - New Leader, White	3
	58938	Decal - New Leader, Red	3
5	58945	Decal-L-3020, White	2
	58946	Decal-L-3020, Red	2

GROUP - PAINT & DECAL CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
6	150034	Decal-Caution, Improper Operation	1
7	321	Decal-Caution, Material To Be Spread	1
8	364	Decal-Warning, Stay Out of Box	2
9	368	Decal-Flying Material	1
10	6541	Decal-Oil Lube Chart	1
11	21476	Decal-Important, Conveyor Chain Life (Use with Chain Conveyor)	1
12	-----		-
13	39200	Decal-Fender Capacity	2
14	*55630	Decal-Warning, No Step	2
15	*55631	Decal-Warning, Guard is For Your Protection	1
16	* 8664	Decal-Caution, Keep Valve Open	1
17	* 8665	Decal-Caution, Hydraulic Oil Only	1
18	23769	Decal-Feedgate Slide Scale	1
	31736	Paint-Touch Up, New Leader Red	A.R.
19	*39379	Decal-Filter	1
20	* 308	Decal-Synco Matic	1

* - Not Shown
A.R. - As Required

GROUPS - CONVEYOR DRIVE AND IDLER



GROUP - CONVEYOR DRIVE WITH SYNCO

ITEM	PART NO.	DESCRIPTION	QTY
1	See Chart	Assembly - Gear Case w/Synco	1
2	-----		-
3	6131	Key - Square	2
4	38600	Shaft - Drag	1
5	6465	Bearing	2
6	27275	Sprocket - Drive	2
7	20262	Screw - Cap 5/8	8
8	~~20646~~ 20648	Nut - Hex 5/8	8
9	~~20714~~ 20716	Washer - Lock 5/8	8
10	20748	Screw - Set	2
11	38597	Plate - Eye	1
12	38590	Weldment - Torque Arm	1
13	20131	Capscrew	2
14	20680	Nut - Lock	2
15	*38980	Screw - Allen Head	1

GROUP - CONVEYOR DRIVE WITHOUT SYNCO

1	37985	Assembly - Gear Case	1
2	55970	Motor - Hydraulic	2
3	6131	Key - Square	2
4	38600	Shaft - Drag	1
5	6465	Bearing	2
6	27275	Sprocket - Drive	2
7	20366	Bolt - Carriage	8
8	20646	Nut - Hex	8
9	20714	Washer - Lock	8
10	20748	Screw - Set	2
11	38597	Plate - Eye	1
12	38590	Weldment - Torque Arm	1
13	20131	Capscrew	2
14	20680	Nut - Lock	2
15	*38980	Screw - Allen Head	1

* - Not Shown

GROUP - CONVEYOR IDLER

ITEM	PART NO.	DESCRIPTION	QTY
16	-----		-
17	2121	Bearing - Idler	2
18	2124	Bolt - Machine, 5/8-11UNC x 11-1/2	2
19	2126	Bracket - Bearing	2
20	2130	Sprocket - Idler, 8T, 1-1/2" Bore	2
21	10015	Shaft - Idler	1
22	2704	Spring - Take-Up	2
23	3908	Weldment - Tightener Nut	2
24	6071	Zerk - Grease, 90° x 1/8NPT	2
25	20294	Bolt - Carriage, 5/16-18UNC x 1-1/2	8
26	20643	Nut - Hex, 5/16-18UNC	8
27	20711	Washer - Lock, 5/16	8
28	20779	Screw - Set, 3/8-16UNC x 1-1/2	2
29	*20836	Pin - Cotter, 1/4 x 2-1/2	2

SEALER AND WIPER BELTS

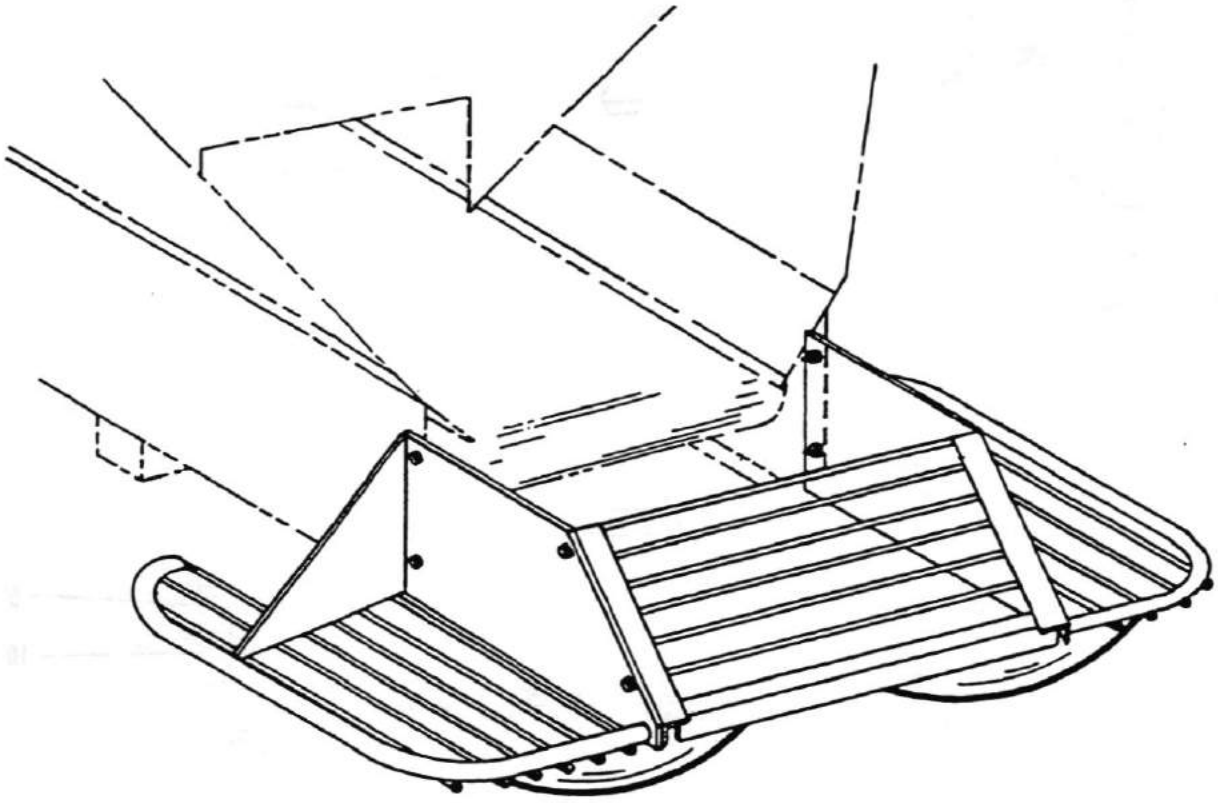
30	27243	Belt - Rear Wiper	1
31	33207	Belt - Sealer	2
32	*14743	Belt - Front Wiper	1
33	*14742	Retainer - Front Wiper Belt	1
34	20619	Screw - Machine	11
35	*20583	Screw - Machine	5
36	20642	Nut - Hex	16
37	20692	Washer - Flat	11
38	*20710	Washer - Lock	5

* - Not Shown

CHART

PART NO.	TYPE	MOTOR SIZE	PRESSURE
57304	Manual-Twin Pinion	1.5"	
57305	Manual-Twin Pinion	2"	
57812	Mark II-Twin Pinion	1"	2000 PSI
70395	Mark II-Twin Pinion	1.5"	1500 PSI
71345	Mark II-Twin Pinion	1.5"	2000 PSI
71346	Mark II-Twin Pinion	2"	1500 PSI
71347	Mark II-Twin Pinion	2"	2000 PSI
55973	Mark II-Twin Pinion	1"	1500 PSI

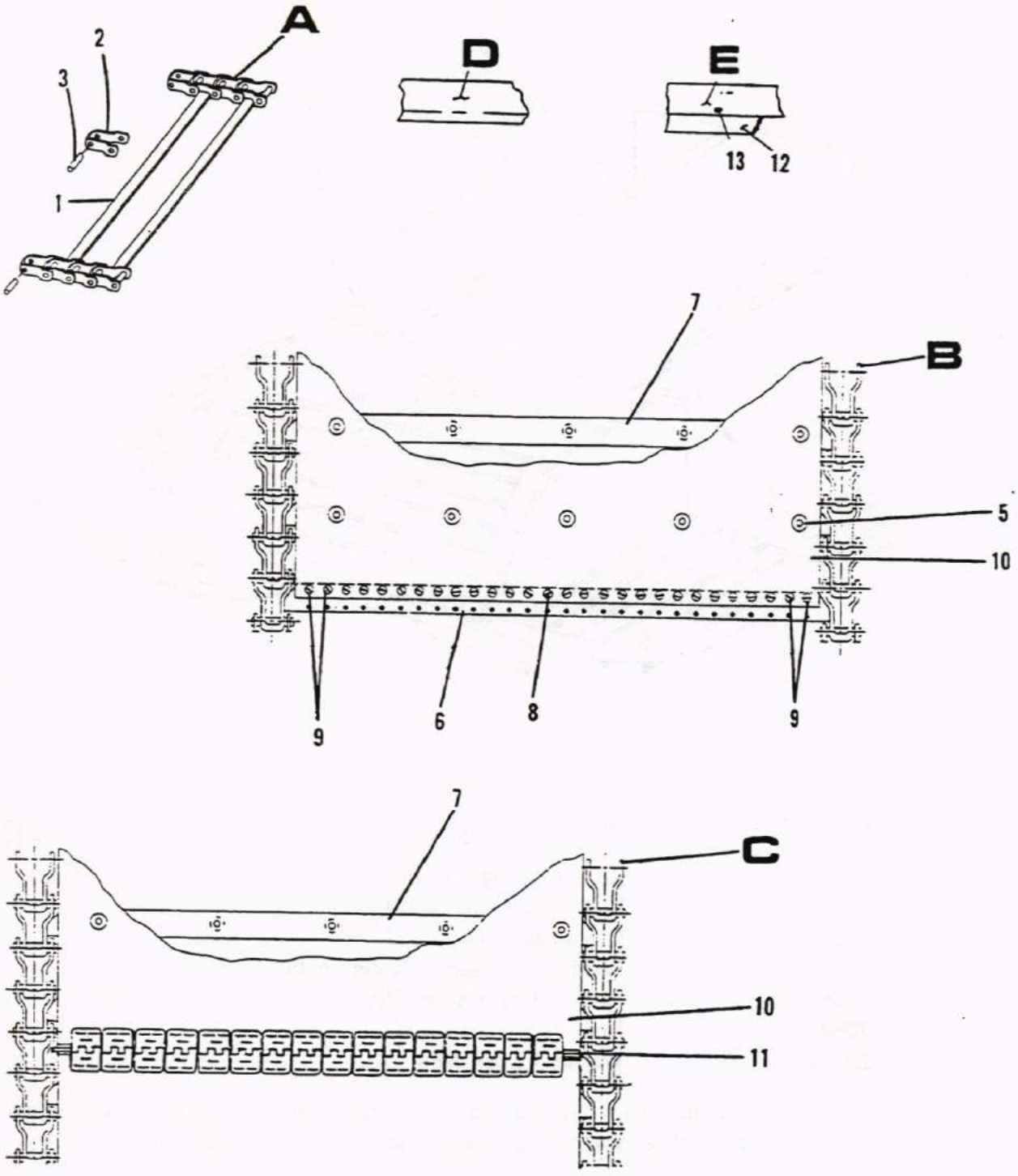
KIT - SHIPPING, SPINNER GUARD



ITEM	PART NO.	DESCRIPTION	QTY
	55217	Kit - Shipping, Spinner Guard	
1	47328	Weldment - Guard R.H.	1
2	55218	Weldment - Guard L.H.	1
3	47337	Weldment - Guard, Center Section	1
4	20067	Screw - Cap 3/8-16 UNC x 1	8
5	20644	Nut - Hex 3/8-16 UNC	8
6	20714	Washer - Lock 3/84	8

NOTE: Guards shown are intended to reduce hazard of entanglement with machinery and injury. All guards MUST be installed per these drawings before spreader is put into operation.

GROUP - CONVEYOR CHAIN



GROUP - CONVEYOR CHAIN CONT'D

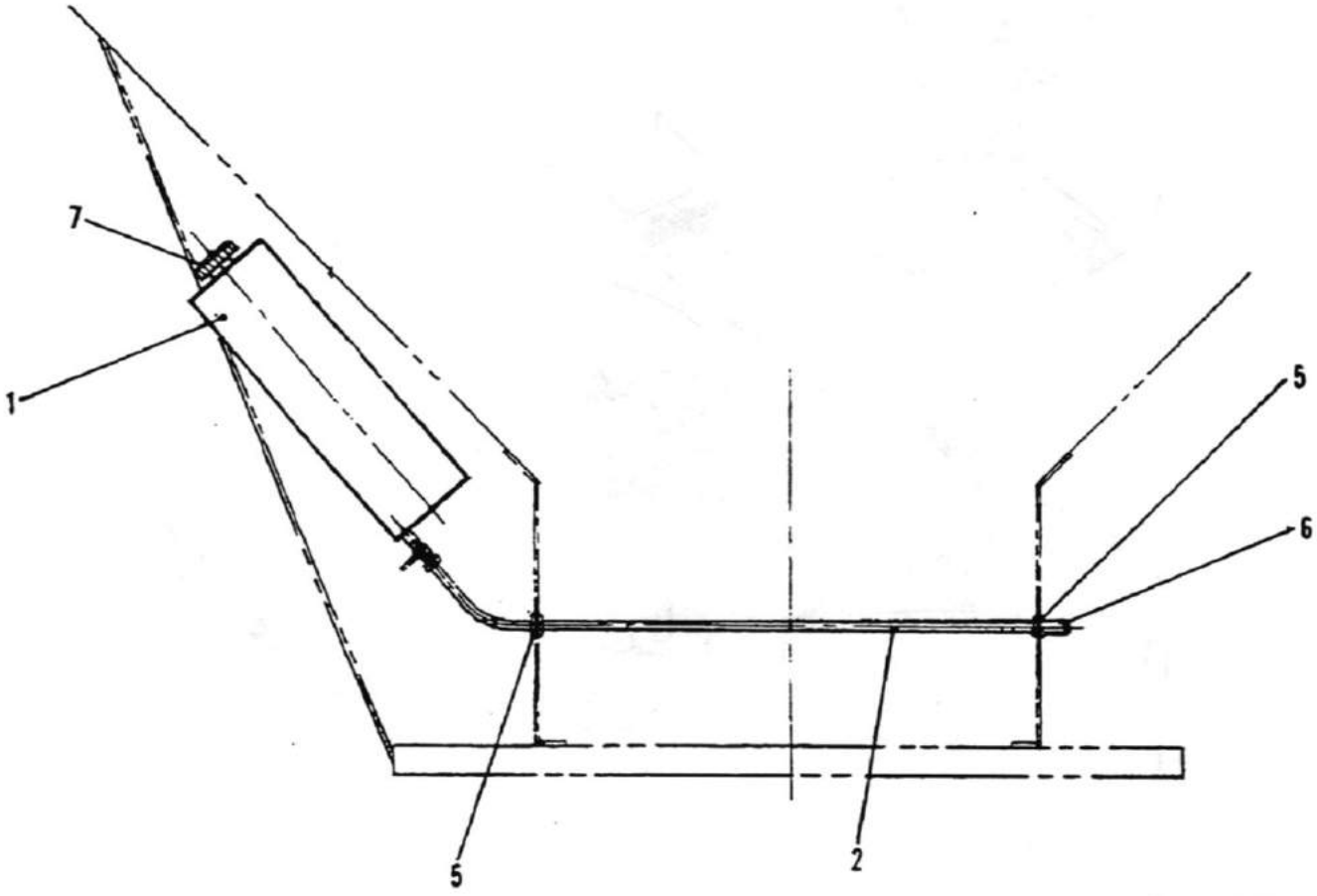
ITEM	PART NO.		DESCRIPTION	QTY
A			Assembly - Conveyor Chain #2 Pintle for:	
	55765		10' Unit	1
	55766		11' Unit	1
	55767		12' Unit	1
	55768		13' Unit	1
	55769		14' Unit	1
	55770		15' Unit	1
	55771		16' Unit	1
B			Assembly Group - Conveyor Chain #4 Pintle for:	
	55795		10' Unit	1
	55796		11' Unit	1
	55797		12' Unit	1
	55798		13' Unit	1
	55799		14' Unit	1
	55800		15' Unit	1
	55801		16' Unit	1
C			Assembly Group - Conveyor Chain #4 Pintle HiTemp for:	
	56939		10' Unit	1
	56940		11' Unit	1
	56941		12' Unit	1
	56942		13' Unit	1
	56943		14' Unit	1
	56944		15' Unit	1
	56945		16' Unit	1
1	55772		Weldment - Cross Bar	A.R.
2	36699		Link - Pintle Chain	A.R.
3	36697		Pin - Pintle Chain	A.R.
4	*20817		Pin - Cotter	A.R.
5	6245		Rivet	A.R.
6	55788		Weldment - Splice Bar	1
7	56947		Weldment - Cross Bar with Rivet Holes	A.R.
8	20624		Screw - Truss Head	40
9	20617		Screw - Flat Head	8
10	55794	Hi Temp	Belt - Conveyor (Specify Body Length & Type of Belt)	A.R.
	18027	Std.		
11	56946		Kit - Splicer	1

GROUP - CHAIN AND BELT SHIELD

ITEM	PART NO.	DESCRIPTION	QTY
D		#2 Chain Shield for:	
	39615	10' Unit	1
	39616	11' Unit	1
	39617	12' Unit	1
	39618	13' Unit	1
	39619	14' Unit	1
	46297	15' Unit	1
	46298	16' Unit	1
E		Assembly - #4 BOC Shield for:	
	37367	10' Unit	1
	37368	11' Unit	1
	37369	12' Unit	1
	37370	13' Unit	1
	39625	14' Unit	1
	37371	15' Unit	1
	46302	16' Unit	1
F		Assembly - #4 BOC Shield for:	
	54808	10'Unit	1
	54809	11' Unit	1
	54810	12' Unit	1
	54811	13' Unit	1
	54812	14' Unit	1
	54813	15' Unit	1
	54814	16' Unit	1
12	38349	Belt - Sealer, Hi-Temp (Specify Body Length & Type of Belt)	A.R.
	7687	Belt - Sealer, Standard	A.R.
13	6245	Rivet - For Standard Belt	A.R.
	20879	Rivet - For HiTemp Belt	A.R.
14	*20318	Bolt - Carriage	A.R.
15	*20644	Nut - Hex	A.R.
16	*20712	Washer - Lock	A.R.

* - Not Shown
A.R. - As Required

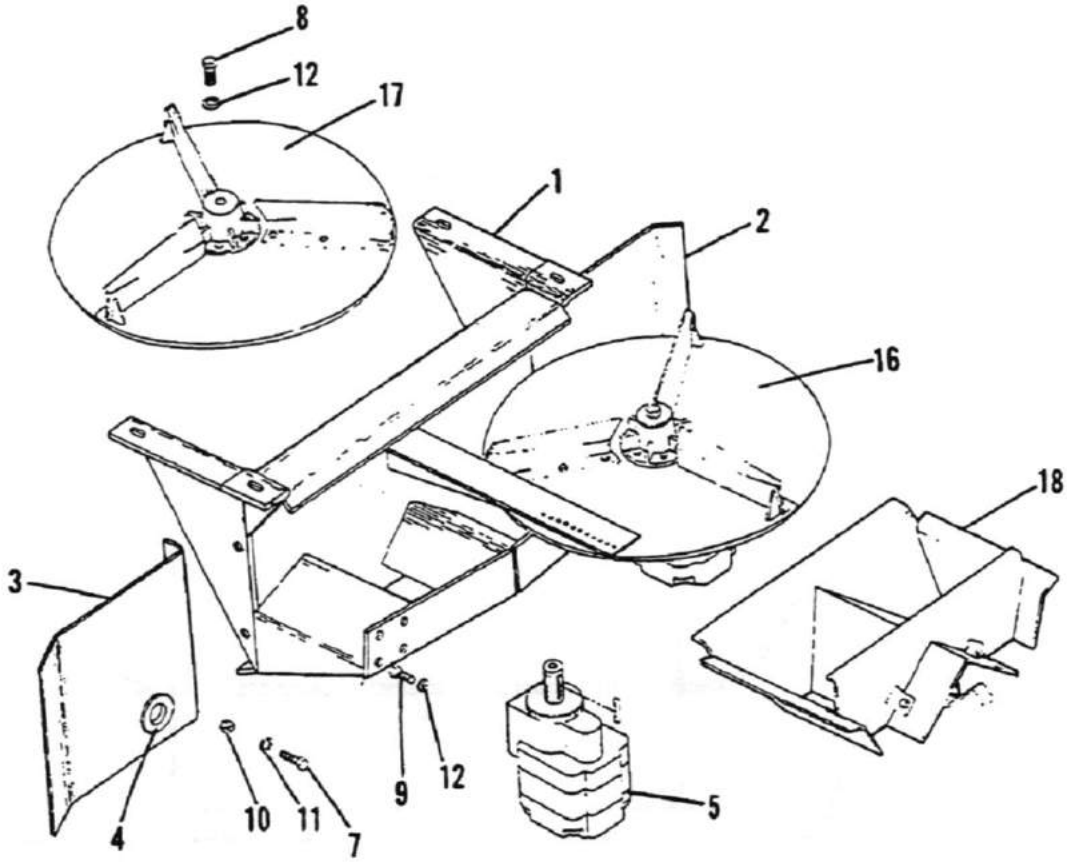
CONVEYOR CHAIN OILER



ITEM	PART NO.	DESCRIPTION	QTY
	44574	Assembly - Conveyor Chain Oiler	
1	1571	Assembly - Oiler Tank	1
2	1583	Tube - Oiler 30" Bottom	1
3	*20004	Screw - Cap, 1/4 x 20 UNC x 7/8	4
4	*20710	Washer - Lock, 1/4	4
5	21983	Grommet - Rubber	2
6	21984	Sleeve - Plug	1
7	21980	Cap - Tank (Included in Item 1)	1

* - Not Shown

24" HYDRAULIC FANS



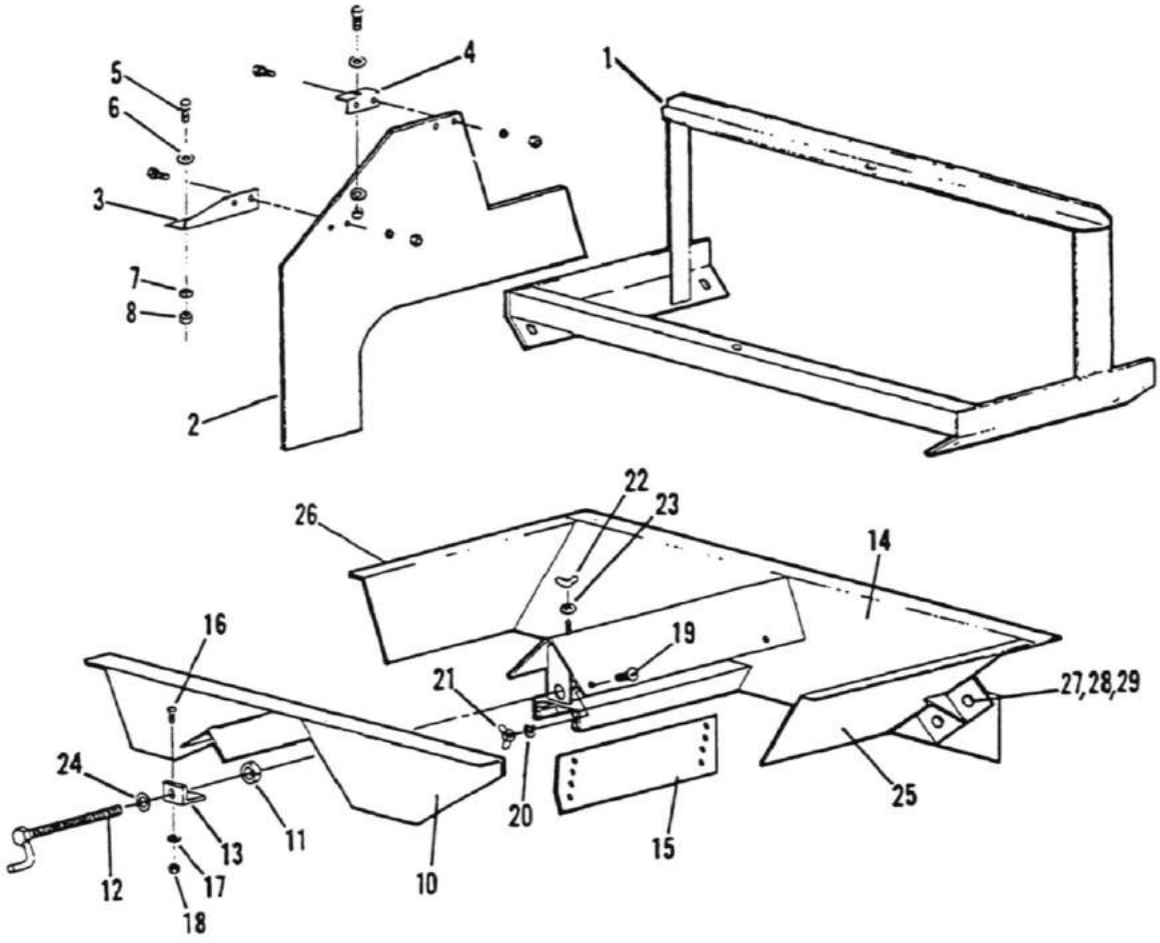
ITEM	PART NO.	DESCRIPTION	QTY
	**55892	Assembly - 24" Hydraulic Fans	
1	55871	Weldment - Frame	1
2	55908	Shield Extension, R.H.	1
3	55909	Shield Extension, L.H.	1
4	21653	Grommet - Rubber	2
5	36580	Motor - Hydraulic	2
6	*38932	Bracket - Valve Mounting	1
7	20067	Screw - Cap, 3/8-16 NC x 1	4
8	20127	Screw - Cap, 1/2-13 NC x 1	2
9	20129	Screw - Cap, 1/2-13 NC x 1-1/2	8
10	20644	Nut - Hex, 3/8-16 NC	4
11	20712	Washer - Lock, 3/8	4
12	20714	Washer - Lock, 1/2	10
13	*20013	Screw - Cap, 1/4-20 NC x 3	2
14	*20642	Nut - Hex, 1/4-20 NC	2
15	*20710	Washer - Lock, 1/4	2

24" HYDRAULIC FANS CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
16	14372	Assembly - Fan, R.H., Including:	1
	27056	Disc	1
	25870	Weldment - Fin, R.H.	3
	10877	Weldment - Hub	1
	20004	Screw - Cap, 1/4-20 NC x 7/8	6
	21431	Screw - Cap, 5/16-18 NC x 3/4	9
	20676	Nut - Lock, 1/4-20 NC	6
	20677	Nut - Lock, 5/16-18 NC	9
17	14373	Assembly - Fan, L.H., Including:	1
	27056	Disc	1
	25871	Weldment - Fin, L.H.	3
	10877	Weldment - Hub	1
	20004	Screw - Cap, 1/4-20 NC x 7/8	6
	21431	Screw - Cap, 5/16-18 NC x 3/4	9
	20676	Nut - Lock, 1/4-20 NC	6
	20677	Nut - Lock, 5/8-18 NC	9
18	34427	Weldment - Flow Divider (Not included in 55892)	1

* - Not Shown
** - 55892 Fan Assembly includes hoses and fittings.

HILLSIDE FLOW DIVIDER AND RED-E-VIDER



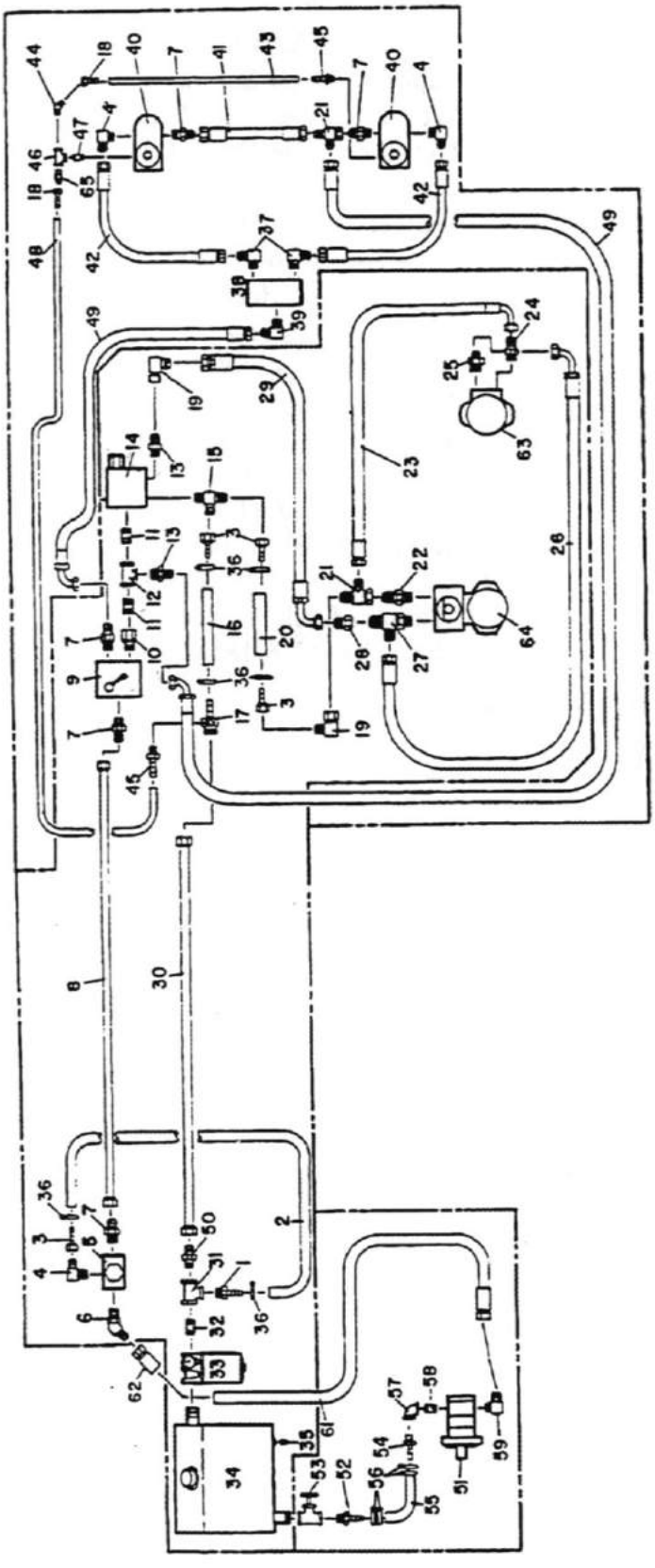
ITEM	PART NO.	DESCRIPTION	QTY
	56883	Kit - Shipping, Red-E-Vider	
	38960	Assembley - Hillside Flow Divider	
1	38961	Weldment - Support	1
2	37497	Panel - Divider	1
3	37498	Bracket - Clamp	1
4	37499	Angle - Clamp	1
5	20003	Capscrew, 1/4-20NC x 3/4	6
6	20691	Washer - Flat, 1/4	8
7	20710	Washer - Lock, 1/4	4
8	20642	Nut - Hex, 1/4-20NC	4
9	*20676	Nut - Lock, 1/4-20NC	2
	56810	Assembly - Red-E-Vider	
10	38954	Weldment - Back Plate	1
11	17078	Collar - Set	1

HILLSIDE FLOW DIVIDER AND RED-E-VIDER

ITEM	PART NO.	DESCRIPTION	QTY
12	56834	Weldment - Adjusting Screw	1
13	32439	Support - Outer Screw	1
14	56808	Weldment - Deflector Plate	1
15	32440	Extension - Vee Divider	2
16	32447	Screw - Flat Head, 5/16-18NC x 1-1/4	2
17	36419	Washer - Lock, 5/16	2
18	36413	Nut - Hex, 5/16-18NC	2
19	32446	Screw - Truss Head, 1/4-20NC x 3/4	4
20	36418	Washer - Lock, 1/4	4
21	32445	Nut - Wing, 1/4-20NC	4
22	20673	Nut - Wing, 3/8-16NC	1
23	36425	Washer - Flat, 3/8	1
24	20697	Washer - Flat, 5/8	1
25	56806	Weldment - Side Plate, R.H.	1
26	56807	Weldment - Side Plate, L.H.	1
27	56858	Capscrew, 5/16-18NC x 3/4	4
28	36419	Washer - Lock, 5/16	4
29	36413	Nut - Hex, 5/16-18NC	4

37496 - Assembly Includes Items 2 - 8.
* - Not Shown

GROUP - HYDRAULICS WITH SYNCO



GROUP - HYDRAULICS WITH SYNCO

ITEM	PART NO.	DESCRIPTION	QTY
1	22426	Hose End	1
2	16521-32	Hose - Return, 1" x 32"	1
3	36802	Hose End	4
4	29840	Adapter - 90°	3
5	39175	Valve - Relief	1
6	34726	Adapter - 45°	1
7	29803	Adapter	5
8		Assembly - Tube for:	
	43538	10' Unit	1
	43539	11' Unit	1
	43540	12' Unit	1
	43541	13' Unit	1
	43542	14' Unit	1
	46532	15' Unit	1
	46533	16' Unit	1
9	38576	Valve - Control	1
10	22017	Adapter	1
11	16363	Nipple - Close	2
12	16357	Tee - Pipe	1
13	29751	Adapter	2
14	38269	Valve - Flow Limiter 71798 - Seal Kit	1
15	34730	Adapter - Tee	1
16	16521-13	Hose - Return, 1" x 13"	2
17	39369	Hose End	1
18	34761	Hose End	2
19	29807	Adapter - 90°	2
20	16521-30	Hose - Return, 1" x 30"	1
21	29850	Adapter - Tee	2
22	29775	Adapter	1
23	56121	Hose Assembly	1
24	29778	Adapter	1
25	29753	Adapter	1
26	56107	Hose Assembly	1
27	29791	Adapter - Tee	1
28	34712	Adapter	1
29	56127	Hose Assembly	1

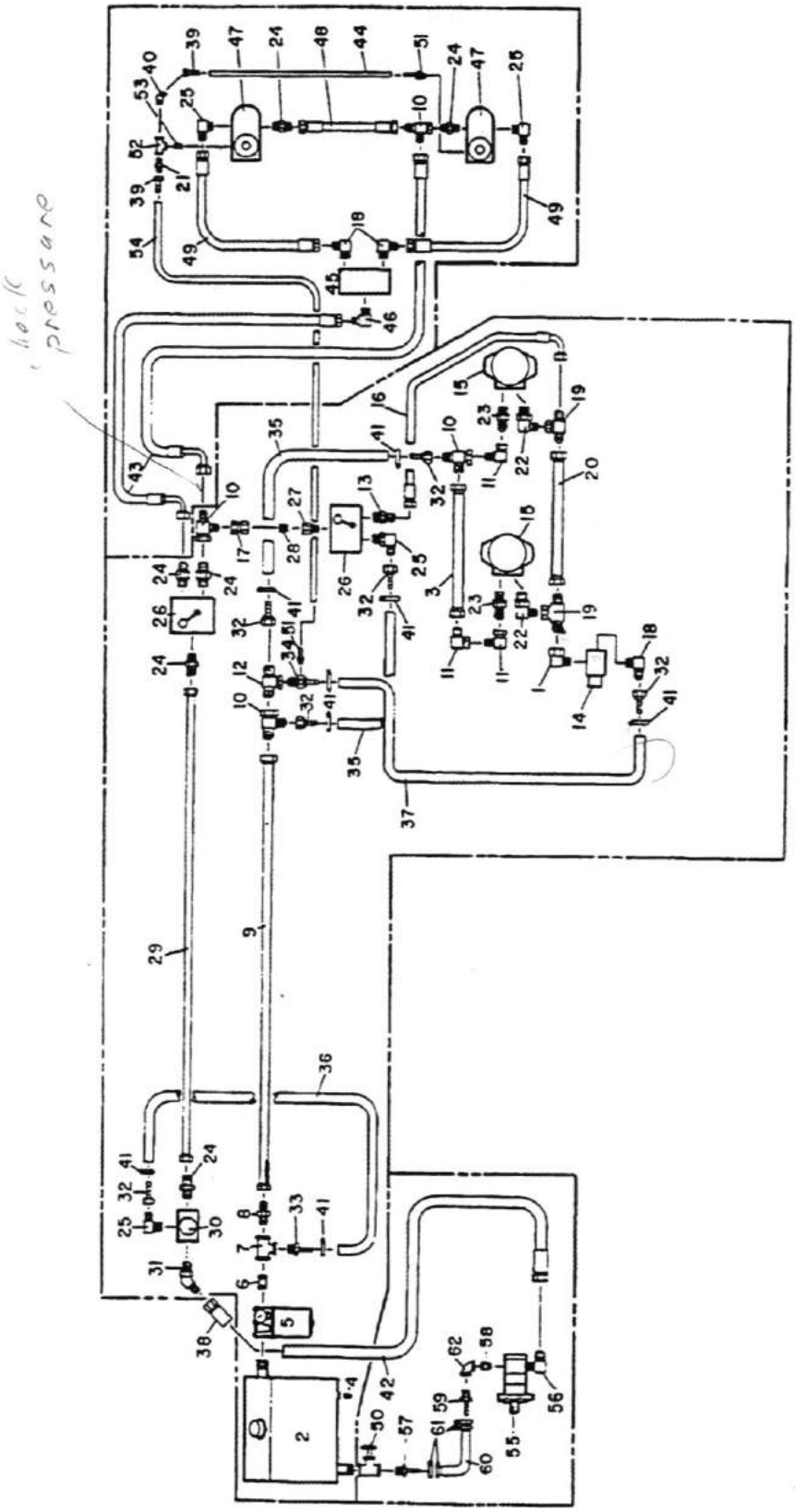
GROUP - HYDRAULICS WITH SYNCO CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
30		Assembly - Tube for:	
	43525	10' Unit	1
	43526	11' Unit	1
	43527	12' Unit	1
	43528	13' Unit	1
	43529	14' Unit	1
	46530	15' Unit	1
	46531	16' Unit	1
31	6318	Tee - Pipe	1
32	6028	Nipple - Close	1
33	39845	Filter - Oil	1
34	31140	Assembly - Hydraulic Tank	1
35	6033	Plug - Pipe	1
36	6335	Clamp - Hose	6
37	29840	Adapter - 90°	2
38	71781	Valve - Flow Divider	1
39	29840	Adapter	1
40	36580	Motor - Hydraulic	2
41	29731	Assembly - Hose	1
42	56128	Assembly - Hose	2
43	34195-24	Hose - Drain, 3/8 dia. X 24"	1
44	34764	Adapter - 45°	1
45	34760	Hose End	2
46	2793	Tee - Pipe	1
47	4343	Nipple - Close	1
48	34195-96	Hose - Drain, 3/8 dia. X 96"	1
49	56109	Assembly - Hose	2
50	29751	Adapter - Connector (10' & 12'-16' Units)	1
	29763	Adapter - 90° Elbow (11' Unit)	1
51	22393	Assembly - Pump, 1-1/4"	1
	22394	Assembly - Pump, 1-1/2"	1
	22395	Assembly - Pump, 1-3/4"	1
	22396	Assembly - Pump, 2"	1
	22397	Assembly - Pump, 2-1/4"	1
	22398	Assembly - Pump, 2-1/2"	1
52	16582	Hose End (Use with 1-1/4" & 1-1/2" Pumps)	1
	24502	Hose End (Use with 1-3/4" - 2-1/2" Pumps)	1
53	22155	Valve - Gate	1
54	16572	Hose End (Use with 1-1/4" & 1-1/2" Pumps)	1
	24502	Hose End (Use with 1-3/4" - 2-1/2" Pumps)	1
55	23184-72	Hose - Suction (Use with 1-1/4" & 1-1/2" Pumps)	1
	21878-72	Hose - Suction (Use with 1-3/4 - 2-1/2" Pumps)	1

GROUP - HYDRAULICS WITH SYNCO CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
56	6335	Clamp - Hose (Use with 1-1/4" & 1-1/2" Pumps)	4
	6288	Clamp - Hose (Use with 1-3/4" - 2-1/2" Pumps)	4
57	6010	Elbow - Pipe (Use with 1-1/4" & 1-1/2" Pumps)	1
	6011	Elbow - Pipe (Use with 1-3/4" - 2-1/2" Pumps)	1
58	6027	Nipple - Close (Use with 1-1/4" & 1-1/2" Pumps)	1
	6028	Nipple - Close (Use with 1-3/4" - 2-1/2" Pumps)	1
59	29763	Adapter - 90° (Use with 1-1/4" & 1-1/2" Pumps)	1
	29794	Adapter - 90° (Use with 1-3/4 - 2-1/2" Pumps)	1
60	-------	---------	
61	29610	Assembly - Hose	1
62	56509	Hose End	1
63	55970	Motor - Hydraulic	1
64	55972	Motor - Hydraulic	1
65	34763	Adapter	1

GROUP - HYDRAULICS WITHOUT SYNCO



GROUP - HYDRAULICS WITHOUT SYNCO CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
1	29827	Adapter - 90°	1
2	31140	Assembly - Hydraulic Tank	1
3	22267-4¼	Tube - Hydraulic, 1" dia. x 4-1/4"	1
	34740	Fitting - Tube, 1"	2
	34745	Sleeve - Tube, 1"	2
4	6033	Plug - Pipe	1
5	39845	Filter - Oil	1
6	6028	Nipple - Close	1
7	6318	Tee - Pipe	1
8	29751	Adapter - Connector (10' & 12' - 16')	1
	29763	Adapter - 90° Elbow (11' Unit)	1
9		Assembly - Tube for:	
	43525	10' Unit	1
	43526	11' Unit	1
	43527	12' Unit	1
	43528	13' Unit	1
	43529	14' Unit	1
	46530	15' Unit	1
	46531	16' Unit	1
10	29850	Adapter - Tee	4
11	29807	Adapter - 90°	3
12	29836	Adapter - Tee	1
13	29835	Adapter	1
14	78948	Valve - Dump	1
15	38897	Motor - Hydraulic	2
16	56107	Assembly -	1
17	34716	Adapter - Swivel	1
18	29840	Adapter - 90°	3
19	29809	Adapter - Tee	2
20	22266-4½	Tube - Hydraulic, 3/4" dia. x 4-1/2"	1
21	34739	Fitting - Tube, 3/4"	2
	34744	Sleeve - Tube, 3/4"	2
21	34763	Adapter	1
22	29773	Adapter - 90°	2
23	29778	Adapter	2
24	29803	Adapter	6
25	29840	Adapter - 90°	4
26	38576	Valve - Control	2
27	22017	Adapter - Bushing	1
28	16363	Nipple - Close	1

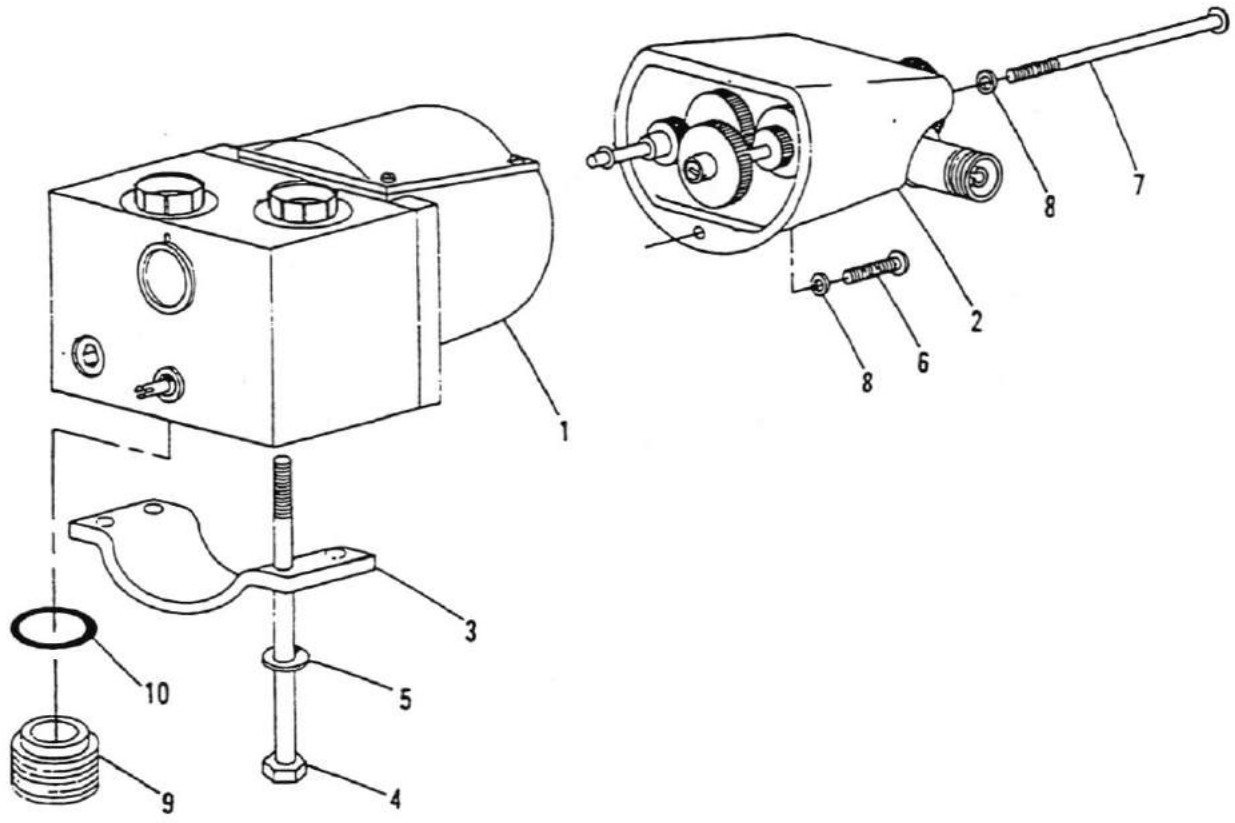
GROUP - HYDRAULICS WITHOUT SYNCO CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
29		Assembly - Tube for:	
	43538	10' Unit	1
	43539	11' Unit	1
	43540	12' Unit	1
	43541	13' Unit	1
	43542	14' Unit	1
	46532	15' Unit	1
	46533	16' Unit	1
30	39175	Valve - Relief	1
31	34726	Adapter - 45°	1
32	36802	End - Hose	6
33	22426	End - Hose	1
34	39369	End - Hose, Modified	1
35	16521-20	Hose - Return, 1" dia. x 20"	2
36	16521-36	Hose - Return, 1" dia. x 36"	1
37	16521-30	Hose - Return, 1" dia. x 30"	1
38	56509	End - Hose, Reusable	1
39	34761	End - Hose	2
40	34764	Adapter - 45°	1
41	6335	Clamp - Hose	8
42	29610	Assembly - Hose	1
43	56109	Assembly - Hose	2
44	34195-24	Hose, 3/8 dia. x 24"	1
45	71781	Valve - Flow Divider	1
46	29840	Adapter	1
47	36580	Motor - Hydraulic	2
48	29731	Assembly - Hose	1
49	56128	Assembly - Hose	2
50	22155	Valve - Gate	1
51	34760	End - Hose	2
52	2793	Tee	1
53	4343	Nipple - Close	1
54	34195-96	Hose - Drain, 3/8" dia. x 96"	1
55	22393	Assembly - Pump, 1-1/4"	1
	22394	Assembly - Pump, 1-1/2"	1
	22395	Assembly - Pump, 1-3/4"	1
	22396	Assembly - Pump, 2"	1
	22397	Assembly - Pump, 2-1/4"	1
	22398	Assembly - Pump, 2-1/2"	1
56	29763	Adapter - 90° (Use with 1-1/4" & 1-1/2" Pumps)	1
	29794	Adapter - 90° (Use with 1-3/4" - 2-1/2" Pumps)	
57	16582	Nipple - Hose End (Use with 1-1/4" & 1-1/2" Pumps)	1

GROUP - HYDRAULICS WITHOUT SYNCO CONT'D

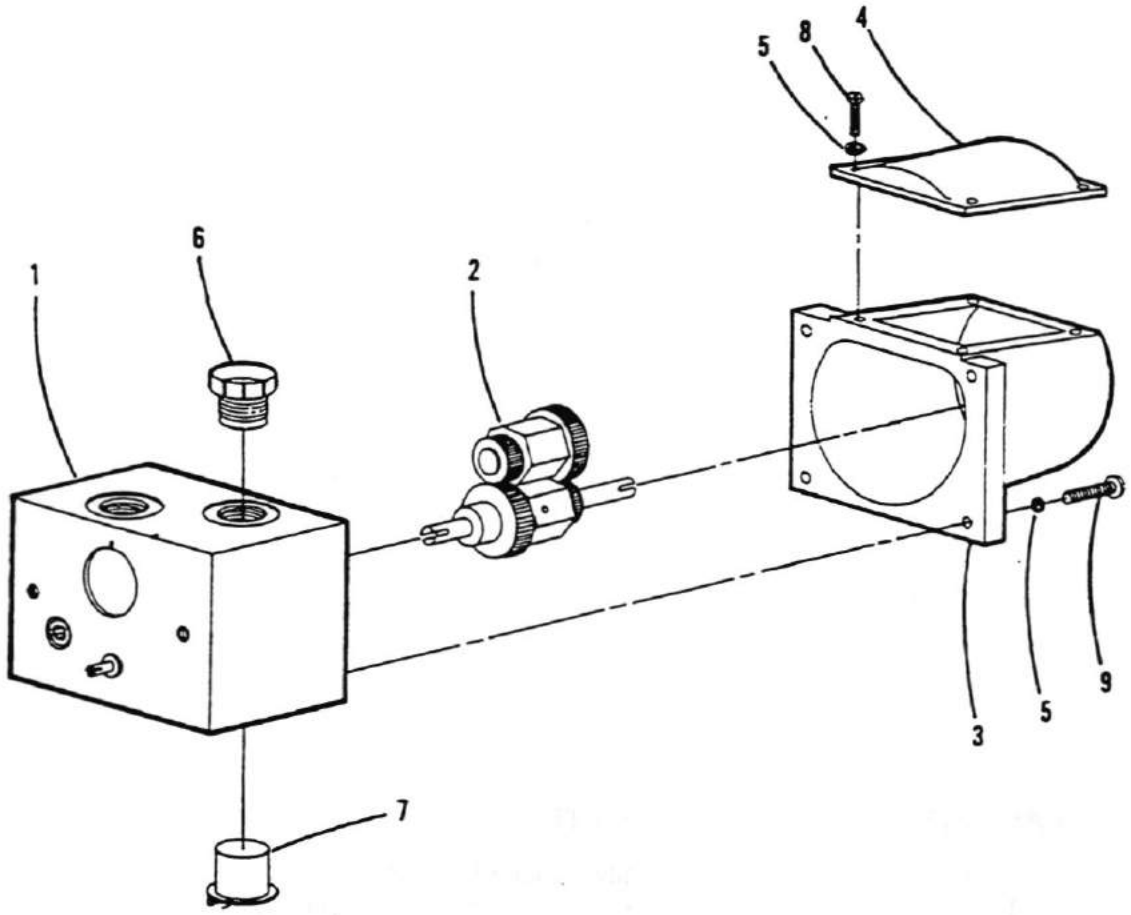
ITEM	PART NO.	DESCRIPTION	QTY
58	6027	Nipple - Close (Use with 1-1/4" & 1-1/2" Pumps)	1
	6028	Nipple - Close (Use with 1-3/4" - 2-1/2" Pumps)	1
59	16572	Nipple - Hose End (Use with 1-1/4" & 1-1/2" Pumps)	1
	24502	Nipple - Hose End (Use with 1-3/4" - 2-1/2" Pumps)	1
60	23184-72	Hose - Suction (Use with 1-1/4" & 1-1/2" Pumps)	1
	21878-72	Hose - Suction (Use with 1-3/4" - 2-1/2" Pumps)	1
61	6335	Clamp - Hose (Use with 1-1/4" & 1-1/2" Pumps)	4
	6288	Clamp - Hose (Use with 1-3/4" - 2-1/2" Pumps)	4
62	6010	Elbow - Pipe (Use with 1-1/4" & 1-3/4" Pumps)	1
	6011	Elbow - Pipe (Use with 1-3/4" - 2-1/2" Pumps)	1

SUB-ASSEMBLY - SYNCO-MATIC MARK II



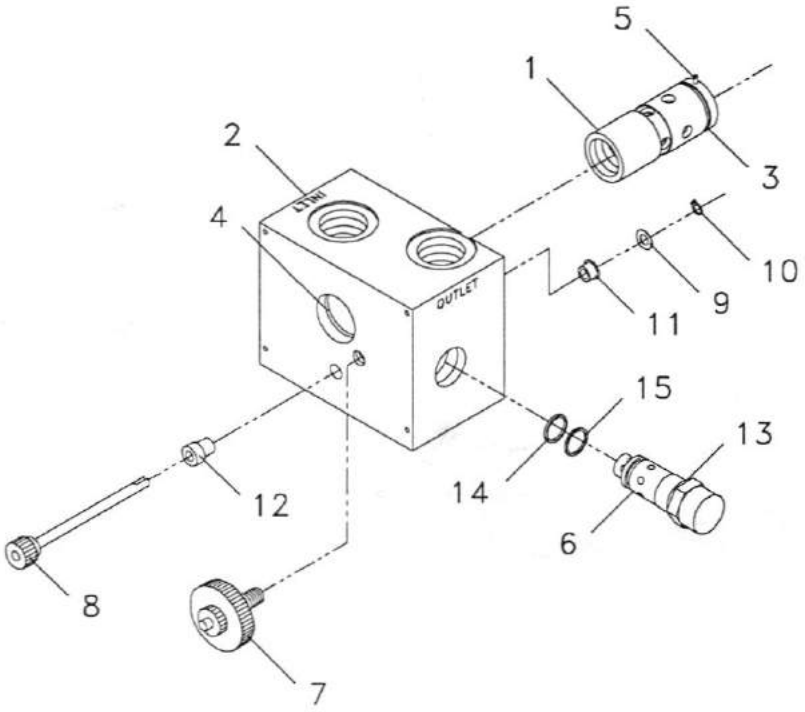
ITEM	PART NO.	DESCRIPTION	QTY
	53713	Assembly Group - Valve, 3:1 (2000 PSI)	
	55365	Assembly Group - Valve, 3:1 (1500 PSI)	
1	44405	Assembly Group - Valve Body (1500 PSI)	1
	53714	Assembly Group - Valve Body (2000 PSI)	1
2	55366	Assembly Group - Two Speed, 3:1	1
3	47276	Saddle - Motor (55365 Assembly)	1
	44407	Saddle - Motor (53713 Assembly)	1
4	47277	Screw - Cap	4
5	36419	Washer - Lock	4
6	44453	Screw - Machine	1
7	44455	Screw - Machine	2
8	44451	Washer - Lock	3
9	44409	Adapter - Port (installed w/motor)	2
10	44486	Kit - Seal, For Mark II Valve	

SUB-ASSEMBLY - SYNCO-MATIC MARK II
GROUP-VALVE BODY



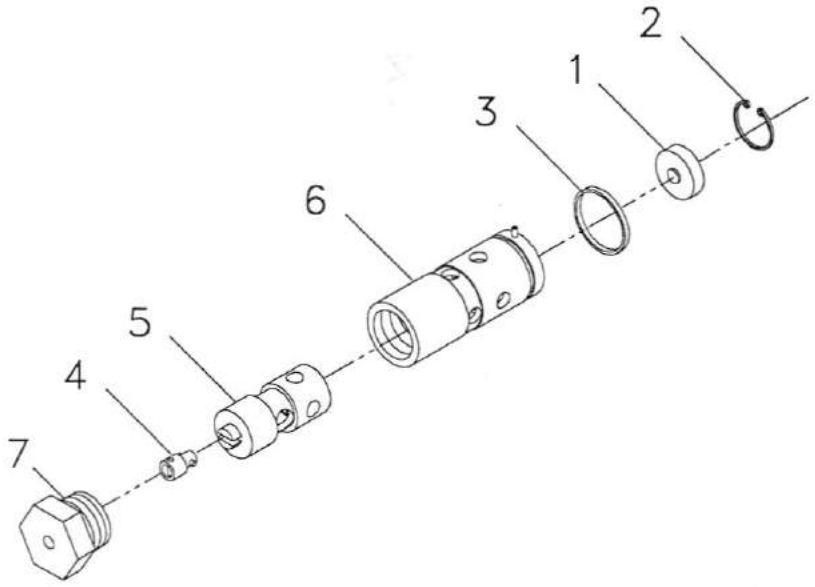
ITEM	PART NO.	DESCRIPTION	QTY
	53714	Assembly Group - Valve Body (2000 PSI)	
	44405	Assembly Group - Valve Body (1500 PSI)	
1	44410	Assembly - Valve Body (1500 PSI)	1
	53715	Assembly - Valve Body (2000 PSI)	1
2	44411	Assembly Group - Idler Arm	1
3	44412	Assembly - Bell Housing	1
4	44413	Assembly - Cap	1
5	44451	Washer - Lock	8
6	8396	Cap - Plastic	2
7	29341	Cap - Plastic	2
8	44452	Screw - Machine	4
9	44453	Screw - Machine	4

SUB-ASSEMBLY - SYNCO-MATIC MARK II
VALVE BODY



ITEM	PART NO.	DESCRIPTION	QTY
	53715	Assembly - Valve Body (2000 PSI)	
	44110	Assembly - Valve Body (1500 PSI)	
1	44423	Assembly - Spool & Liner	1
2	44424	Valve Body	1
3	29874	"O" Ring	1
4	24544	"O" Ring	3
5	44457	Pin-Roll	1
6	39287	Cartridge - Relief, 1500 PSI (Incl. Items 13, 14 & 15)	1
	44402	Cartridge - Relief, 2000 PSI (Incl. Items 13, 14 & 15)	1
7	44447	Assembly - Idler Gear w/Shoulder Bolt	1
8	44448	Assembly - Motor Input Shaft	1
9	44449	Shim	1
10	44464	Ring - Snap	1
11	44433	Bushing	1
12	44450	Bushing	1
13	29854	"O" Ring	2
14	29876	"O" Ring	1
15	29871	Ring - Back-up	1

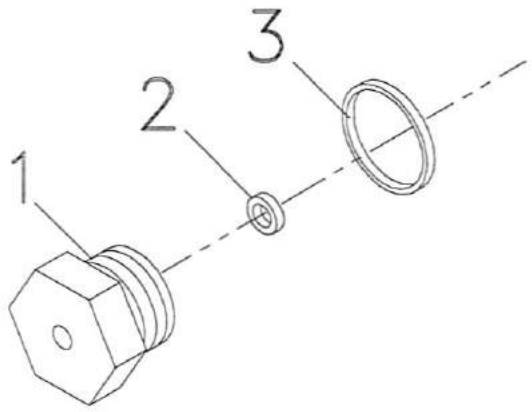
SUB-ASSEMBLY - SYNCO-MATIC MARK II
SPOOL & LINER



ITEM	PART NO.	DESCRIPTION	QTY
	44423	Assembly - Spool & Liner	
1	44425	Snap - Ring	1
2	29862	"O" Ring	1
3	N.S.	Disc - Spool End	1
4	44426	Assembly - Shaft - Coupling	1
5	N.S.	Assembly - Spool	1
6	N.S.	Liner - Spool	1
7	44427	Assembly - Plug	1

N.S. - Not Serviced

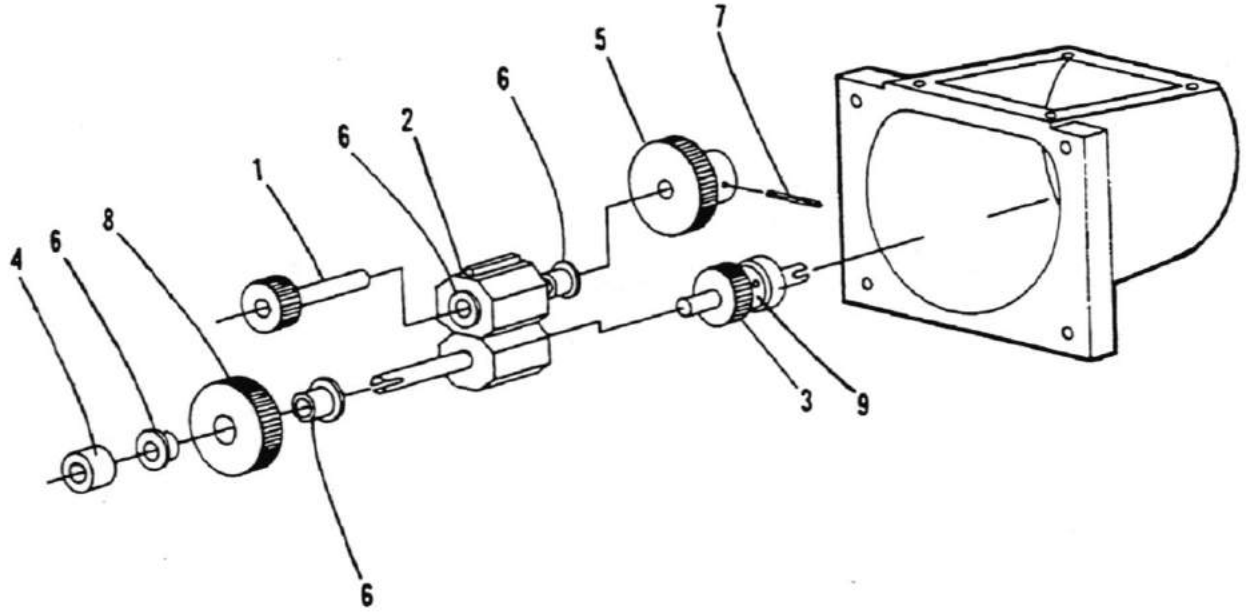
SUB-ASSEMBLY - SYNCO-MATIC MARK II
PLUG



ITEM	PART NO.	DESCRIPTION	QTY
	44427	Assembly - Plug	
1	N.S.	Plug - Spool	1
2	29872	Ring - Quad	1
3	29855	"O" Ring	1

N.S. - Not Serviced

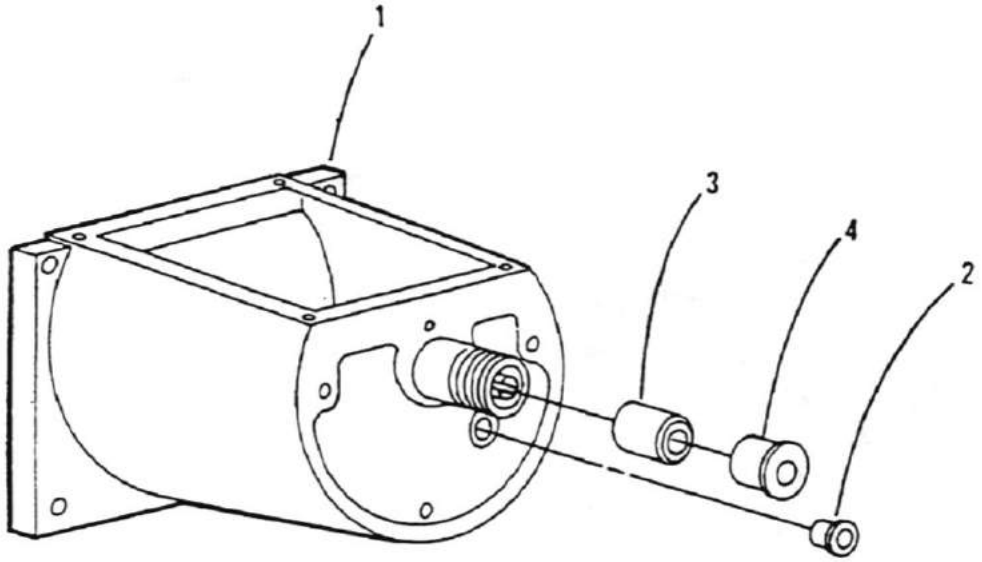
SUB-ASSEMBLY - SYNCO-MATIC MARK II
GROUP - IDLER ARM



ITEM	PART NO.	DESCRIPTION	QTY
	44411	Assembly - Group, Idler Arm	
1	44428	Assembly - Gear	1
2	44429	Assembly - Idler Arm	1
3	44430	Assembly - Two Speed Input Shaft	1
4	44431	Spacer	1
5	44432	Gear - 52 Tooth	1
6	44433	Bushing	4
7	44461	Pin - Ross	1
8	51244	Gear - Resolve	1
9	*44435	Bearing	2

* - 1 Each Included in Assemblies 44429 and 44430

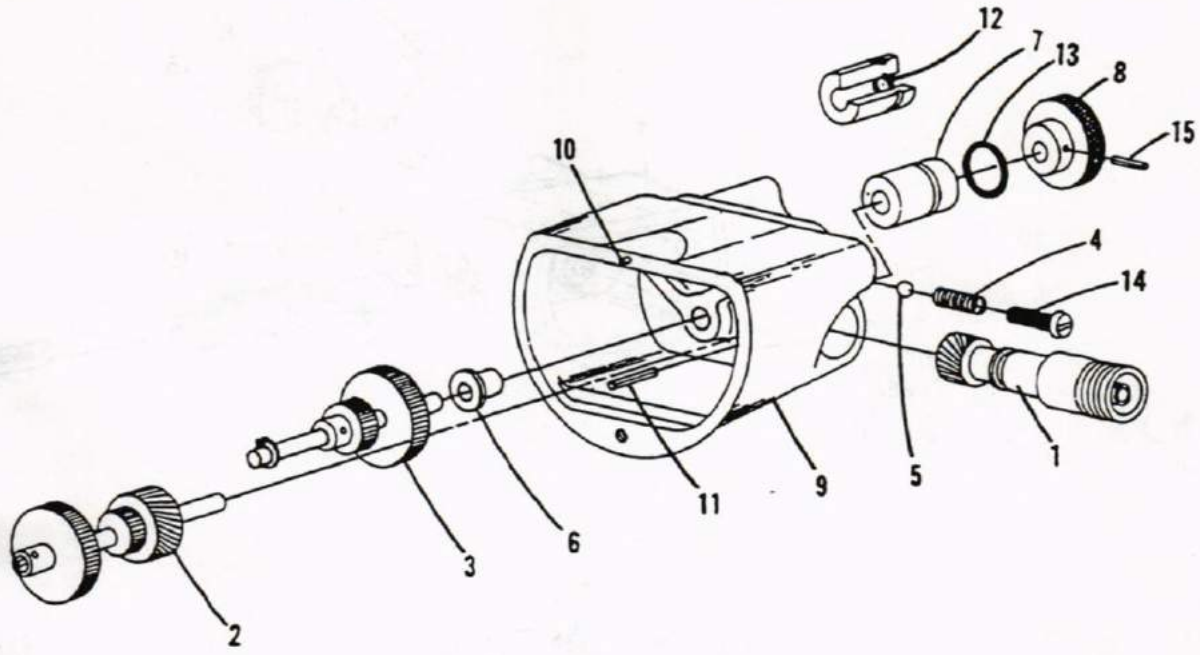
SUB-ASSEMBLY - SYNCO-MATIC MARK II
BELL HOUSING



ITEM	PART NO.	DESCRIPTION	QTY
	44412	Assembly - Bell Housing	
1	N.S.	Bell Housing	1
2	44419	Bushing	1
3	44436	Bushing	1
4	44437	Bushing	1

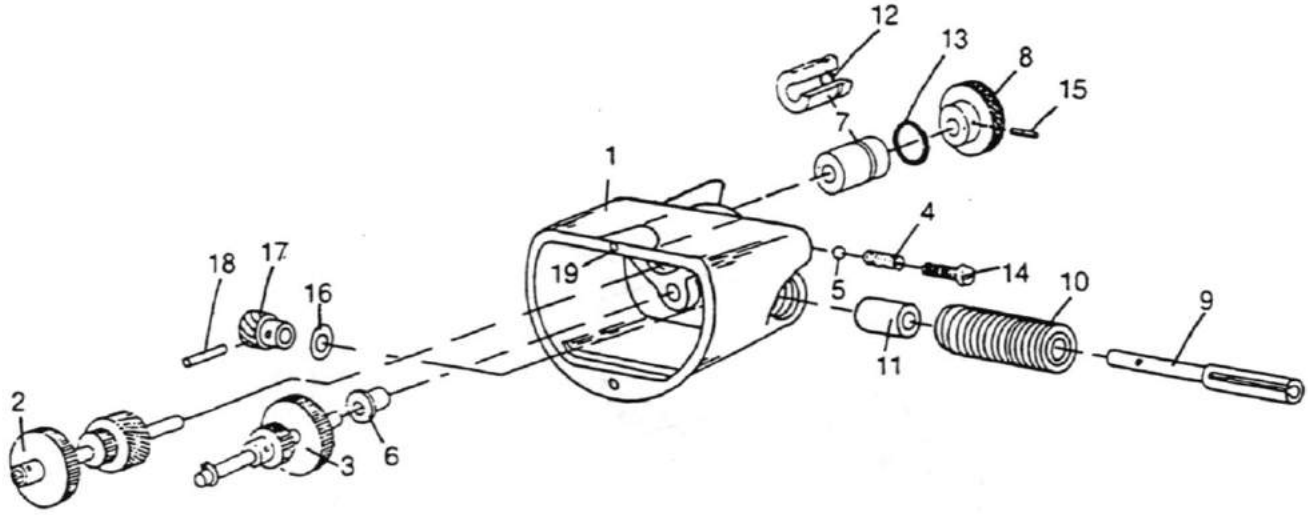
N.S. - Not Serviced

SUB-ASSEMBLY - SYNCO-MATIC MARK II
SHIFTABLE TWO SPEED



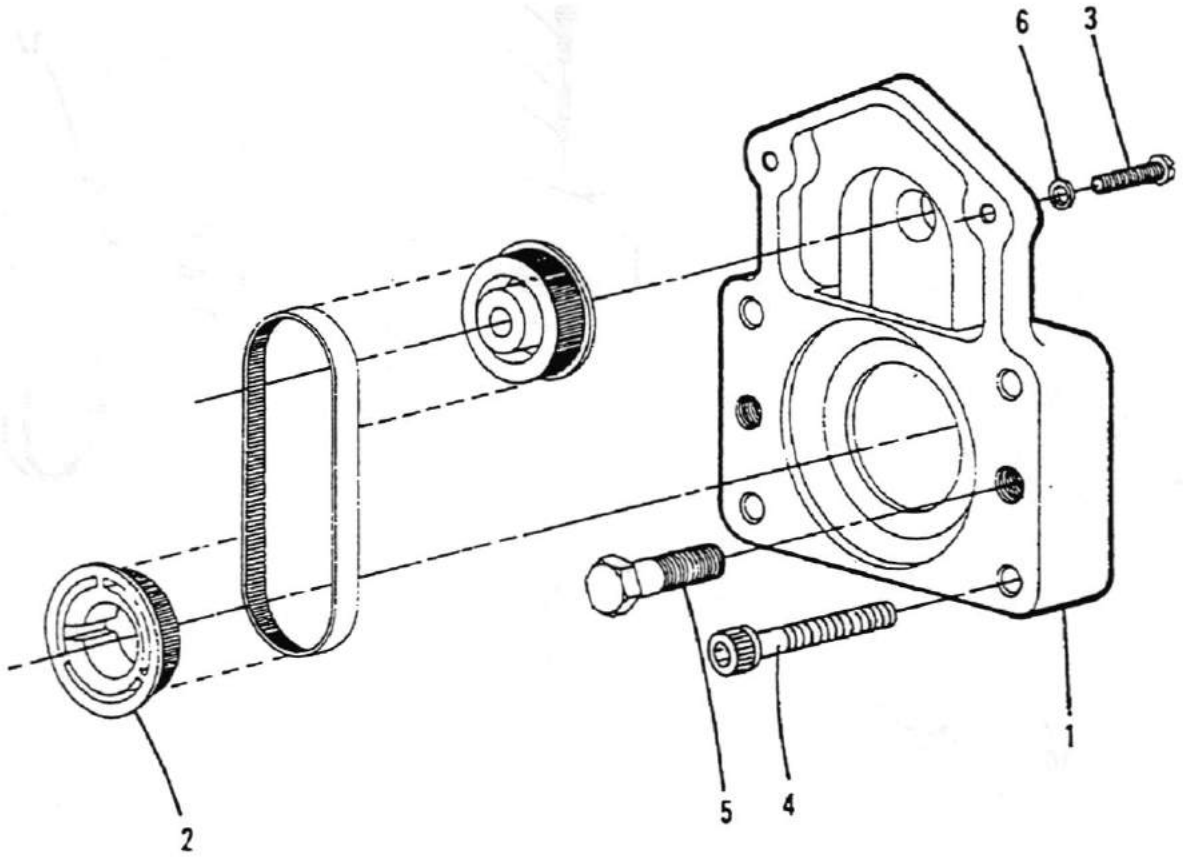
ITEM	PART NO.	DESCRIPTION	QTY
	~~55366~~ 72963	Assembly - Shiftable Two Speed, 3:1	
1	44414	Assembly - Drive Shaft	1
2	55367	Assembly - Driven Shaft, 3:1	1
3	55368	Assembly - Idler Shaft, 3:1	1
4	44417	Spring	1
5	44418	Ball	1
6	44419	Bushing	1
7	44420	Bushing - Knob	1
8	44421	Knob	1
9	44422	Housing - Shiftable Two Speed	1
10	44460	Pin - Roll	1
11	44461	Pin - Roll	1
12	29872	Ring - Quad	1
13	29873	"O" Ring	1
14	44453	Machine Screw	1
15	44463	Pin - Roll	1

SUB-ASSEMBLY - SYNCO-MATIC MARK II
SHIFTABLE TWO SPEED, NEW STYLE



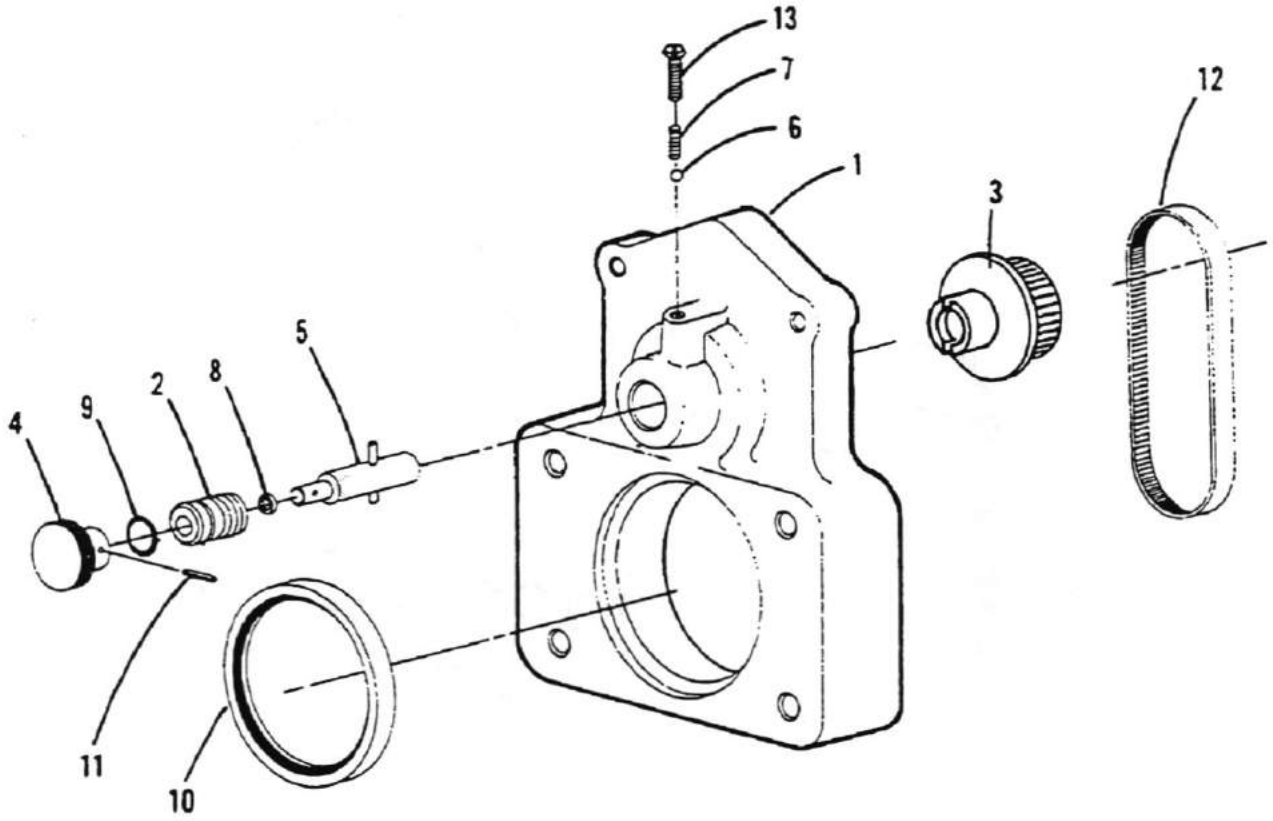
ITEM	PART NO.	DESCRIPTION	QTY
	72963	Assembly - Shiftable Two Speed, 3:1	
1	72967	Housing - Shiftable Two Speed	1
2	55367	Assembly - Driven Shaft, 3:1	1
3	55368	Assembly - Idler Shaft, 3:1	1
4	44417	Spring	1
5	44418	Ball	1
6	44419	Bushing	1
7	44420	Bushing - Knob	1
8	44421	Knob	1
9	51210	Shaft - Input	1
10	72965	Bushing - Threaded	1
11	72966	Bushing - Bronze	1
12	29872	Ring - Quad	1
13	29873	"O" Ring	1
14	44453	Screw - Machine	1
15	44463	Pin - Roll	1
16	51218	Washer - Flat	1
17	51209	Gear - Helix, Drive	1
18	44461	Pin - Roll	1
19	44460	Pin - Roll	1

SUB-ASSEMBLY - SYNCO-MATIC MARK II
GROUP - DRIVE, COG-BELT



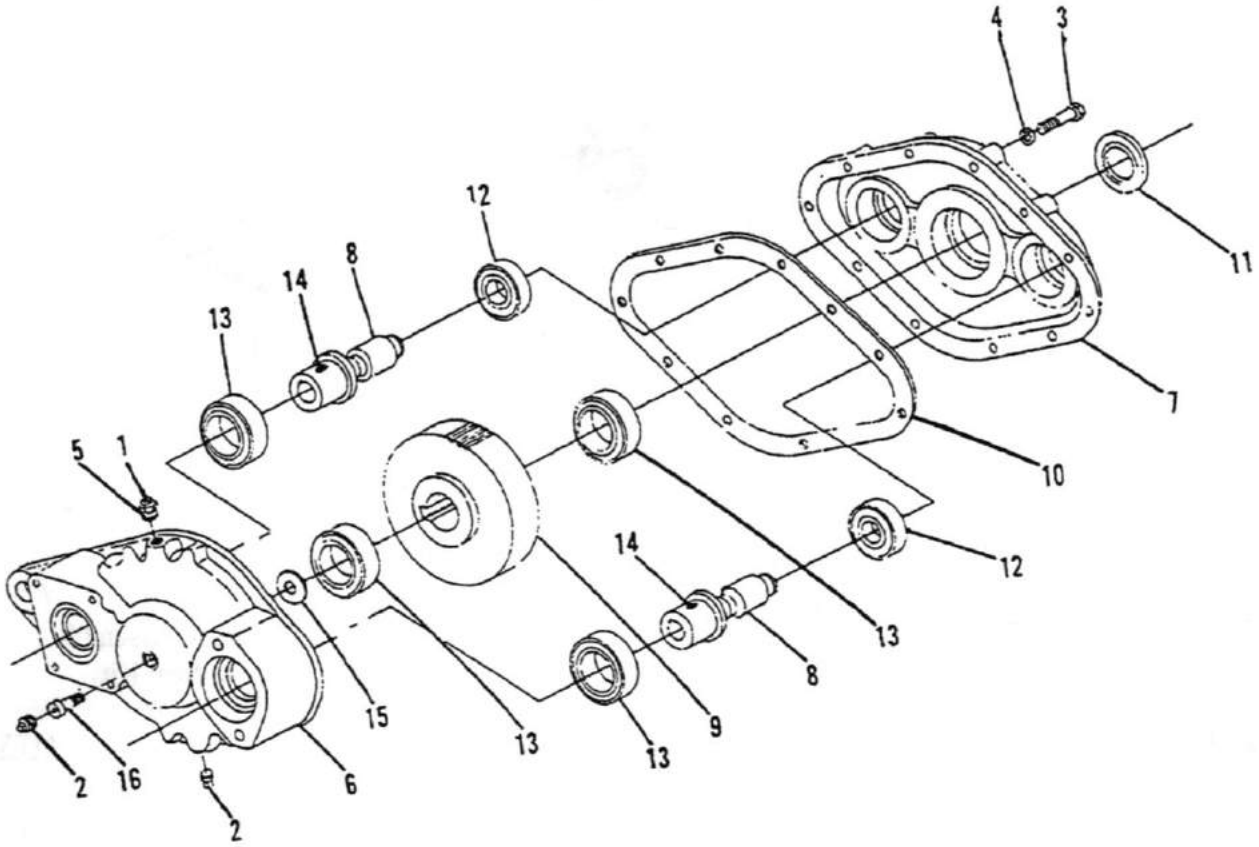
ITEM	PART NO.	DESCRIPTION	QTY
	43503	Group - Drive, Cog-belt	
1	44438	Assembly - Adapter	1
2	44440	Pulley - Timing, Drive	1
3	44454	Screw - Machine	2
4	44456	Screw - Cap, Socket Head	4
5	44442	Screw - Cap, Special	2
6	44451	Washer - Lock	2

SUB-ASSEMBLY - SYNCO-MATIC MARK II
ADAPTER



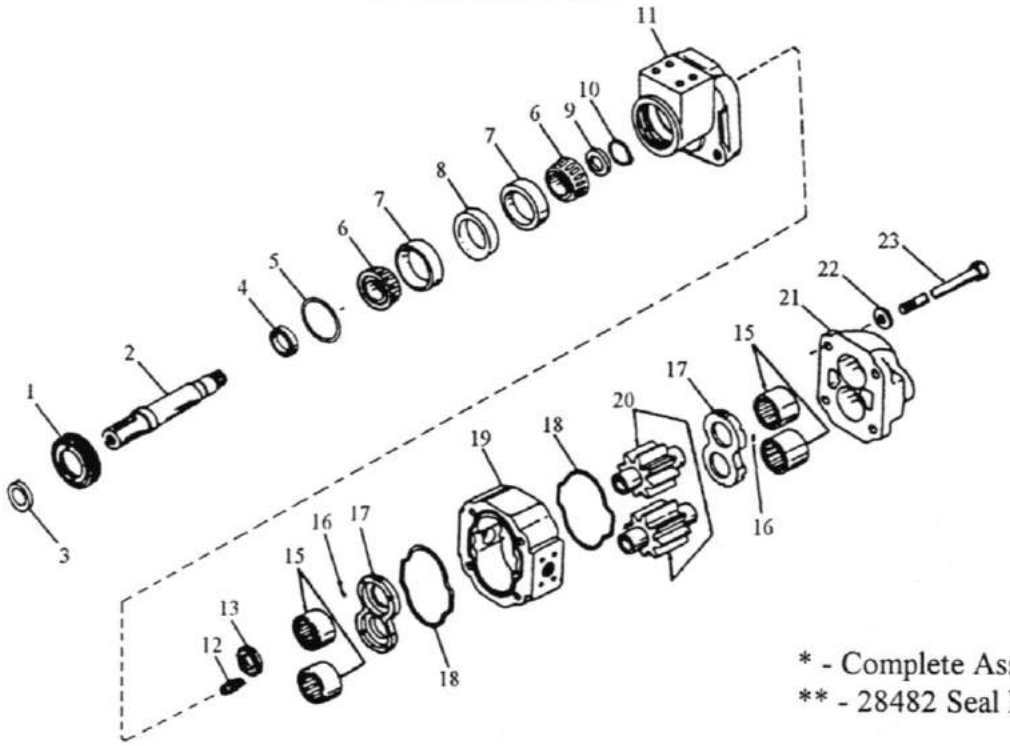
ITEM	PART NO.	DESCRIPTION	QTY
	44438	Assembly - Adapter	
1	44443	Adapter	1
2	44444	Bushing - Clutch Detent	1
3	44441	Pulley - Timing, Driven	1
4	44421	Knob	1
5	44446	Assembly - Clutch Shaft	1
6	44418	Ball	1
7	44417	Spring	1
8	29872	Ring - Quad	1
9	29875	"O" Ring	1
10	44445	Seal	1
11	44463	Pin - Roll	1
12	44439	Belt - Timing	1
13	44498	Screw - Machine	1

GEAR CASE



ITEM	PART NO.	DESCRIPTION	QTY
	37985	Assembly - Gear Case without Mark II	
	55971	Assembly - Gear Case with Mark II	
1	2564	Cap - Breather	1
2	6031	Pipe - Plug	2
3	20040	Screw - Cap, 5/16 NC x 2	10
4	20711	Washer - Lock, 5/16	10
5	27465	Bushing - Pipe, 1/8 x 7/8	1
6	38983	Housing - Outboard without Mark II	1
	55974	Housing - Outboard with Mark II	1
7	38982	Housing - Inboard	1
8	37003	Gear - Pinion	2
9	38981	Gear	1
10	38978	Gasket	1
11	37006	Seal - Oil	1
12	37007	Bearing	2
13	37008	Bearing	4
14	20431	Screw - Nylock Set	1
15	38979	Washer	2
16	38980	Screw - Allen Head	1

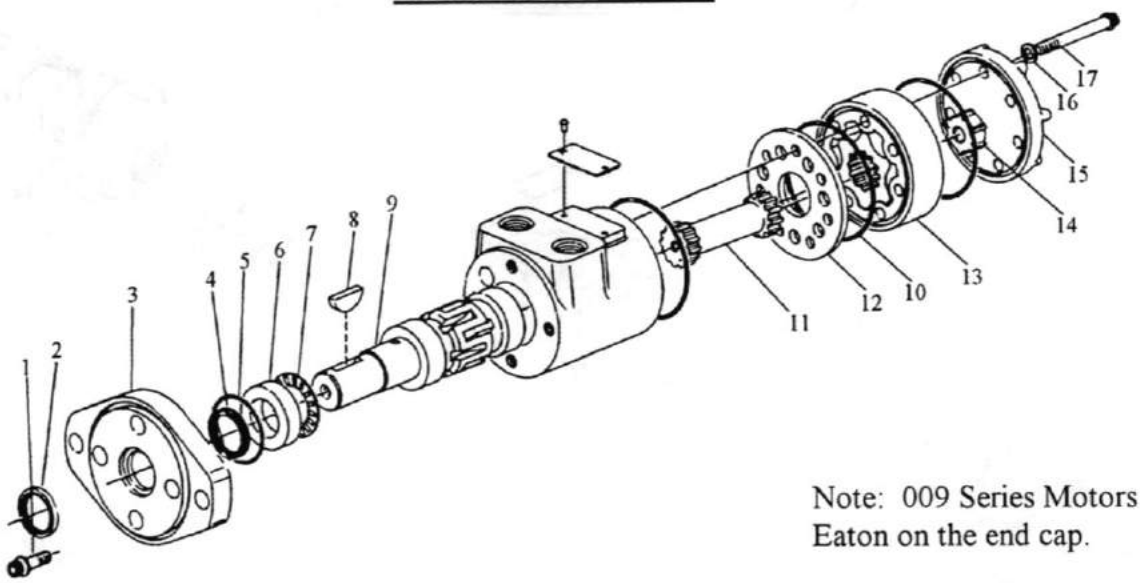
SPINNER MOTOR



* - Complete Assembly
** - 28482 Seal Kit

ITEM	PART NO.	DESCRIPTION	QTY
	*36580	Motor - Hydraulic	
1	**33777	Ring - Retainer	1
2	28485	Shaft	1
3	33809	Seal - Excluder	1
4	**71980	Seal	1
5	**28494	"O" Ring	1
6	**28491	Cone - Bearing	2
7		Cup - Bearing	2
8	28454	Spacer	1
9	**28486	Spacer (Kit)	1
10	28499	Ring - Snap	1
11	28490	Plate - Shaft End	1
12	58797	Plug	2
13	**28495	Bushing	1
15	23806	Bearings	4
16	**23819	Seals - Pocket (Makes 12 Seals)	1
17	23818	Plate	2
18	**23820	Gasket	2
19	41954	Housing	1
20	23824	Gear Set	1
21	23812	Cover - Port End	1
22		Washer	4
23	20190	Screw - Cap	4
	23940	Tool - Seal Installation (Required for Item 4)	1

CONVEYOR MOTOR

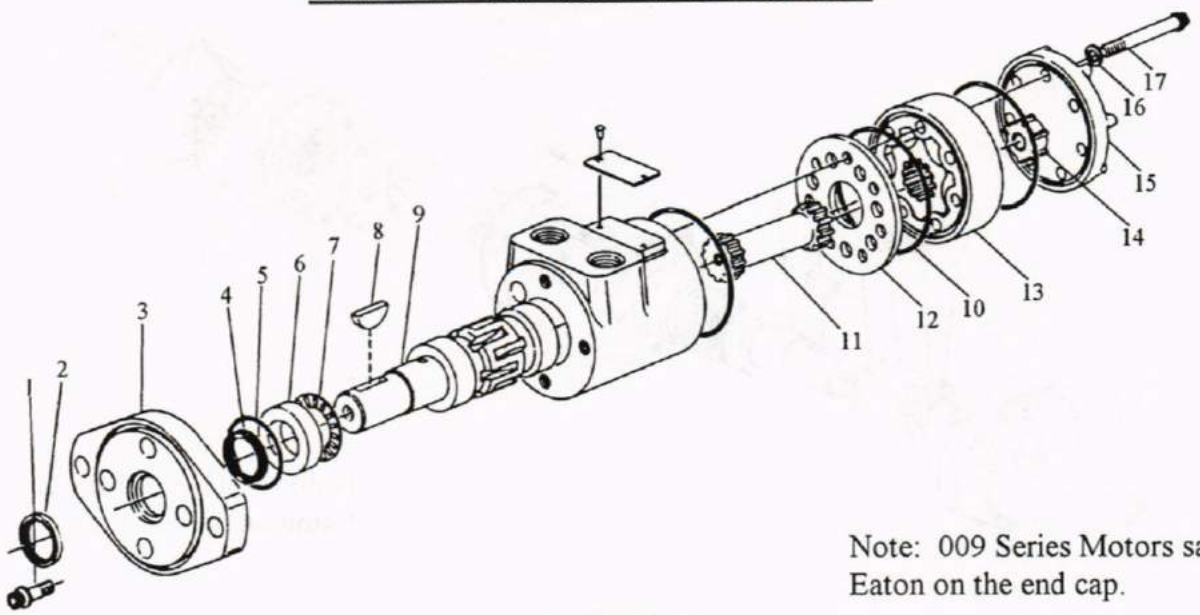


Note: 009 Series Motors say Eaton on the end cap.

ITEM	PART NO. 007 Series	PART NO. 009 Series	DESCRIPTION	QTY
	46396		Motor - Hydraulic, 2"	
	46395		Motor - Hydraulic, 1 1/2"	
1	30665		Screw - Cap	4
2	37382	43471	Seal	1
3	46397	73546	Flange - Mounting	1
4	37378	73473	Seal	1
5	37379	73474	Seal - "O" Ring	1
6	37385		Race - Bearing	1
7	37401		Bearing - Thrust Needle	1
8	3065		Key - Woodruff	1
9	37386		Shaft - Output, Keyed	1
10	37380	73480	Seal - "O" Ring	3
11	16946		Drive	1
12	37388		Plate - Spacer	1
13	37395	73544	Gerotor - 2"	1
	37394	73533	Gerotor - 1 1/2"	1
14	37399		Spacer - 2"	1
	37398		Spacer - 1 1/2"	1
15	37400		Cap - End	1
16	37381		Washer - Seal	7
17	16938		Screw - Cap (Use on 46395)	7
	16937		Screw - Cap (Use on 46396)	7
18	*22068		Seal - "O" Ring	1
	*37352	39137	Kit - Seal (Includes Items 2,4,5,10,16)	
19	*	73472	Washer - Back-up	1

* - Not Shown

CONVEYOR MOTOR WITH MARK II



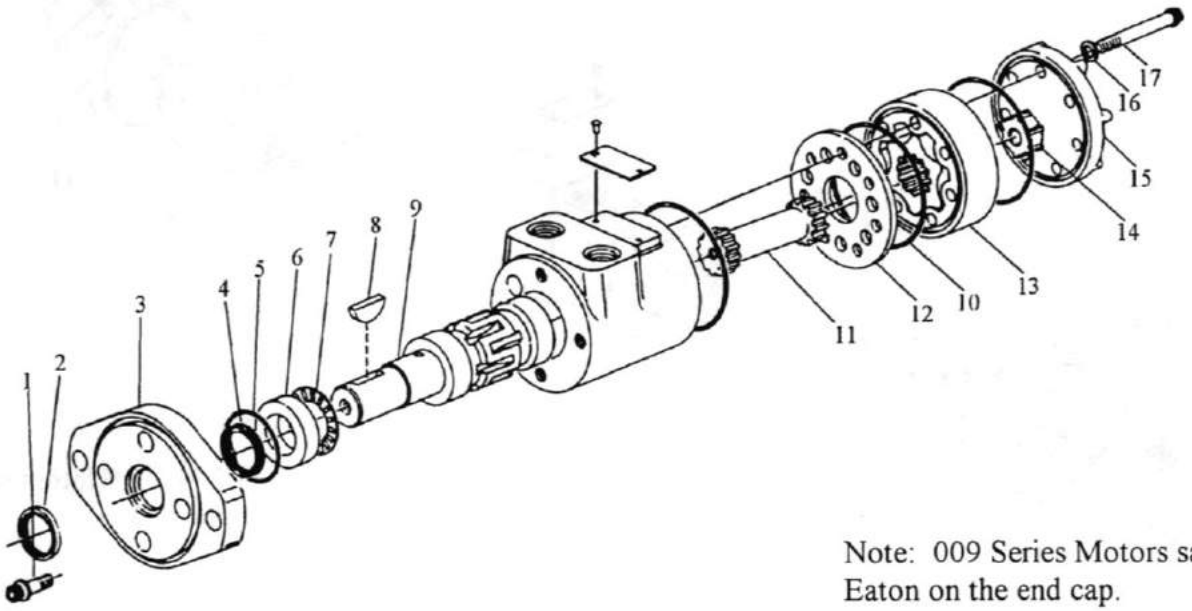
Note: 009 Series Motors say Eaton on the end cap.

ITEM	PART NO. 007 Series	PART NO. 009 Series	DESCRIPTION	QTY
	38897		Motor - Hydraulic, 1 1/2"	
	46395		Motor - Hydraulic, 1 1/2"	
1	30665		Screw - Cap	4
2	37382	73471	Seal	1
3	46397	73556	Flange - Mounting (Used on 46395)	1
	55220	73555	Flange - Mounting (Used on 38897)	1
4	37378	73473	Seal	1
5	37379	73474	Seal - "O" Ring	1
6	37385		Race - Bearing	1
7	37401		Bearing - Thrust Needle	1
8	3065		Key - Woodruff	1
9	37386		Shaft - Output, Keyed	1
10	37380	73480	Seal - "O" Ring	3
11	16946		Drive	1
12	37388		Plate - Spacer	1
13	37394	73553	Gerotor - 1 1/2"	1
14	37398		Spacer	1
15	37400		Cap - End	1
16	37381		Washer - Seal	7
17	16937		Screw - Cap	7
18	*22068		Seal - "O" Ring	1
	*37352	39137	Kit - Seal (Includes Items 2,4,5,10,16)	
19	*	73472	Washer - Back-up	1

* - Not Shown

ALWAYS USE GENUINE PARTS - PLEASE GIVE PART NO., DESCRIPTION AND UNIT SERIAL NO.

CONVEYOR MOTOR WITHOUT MARK II



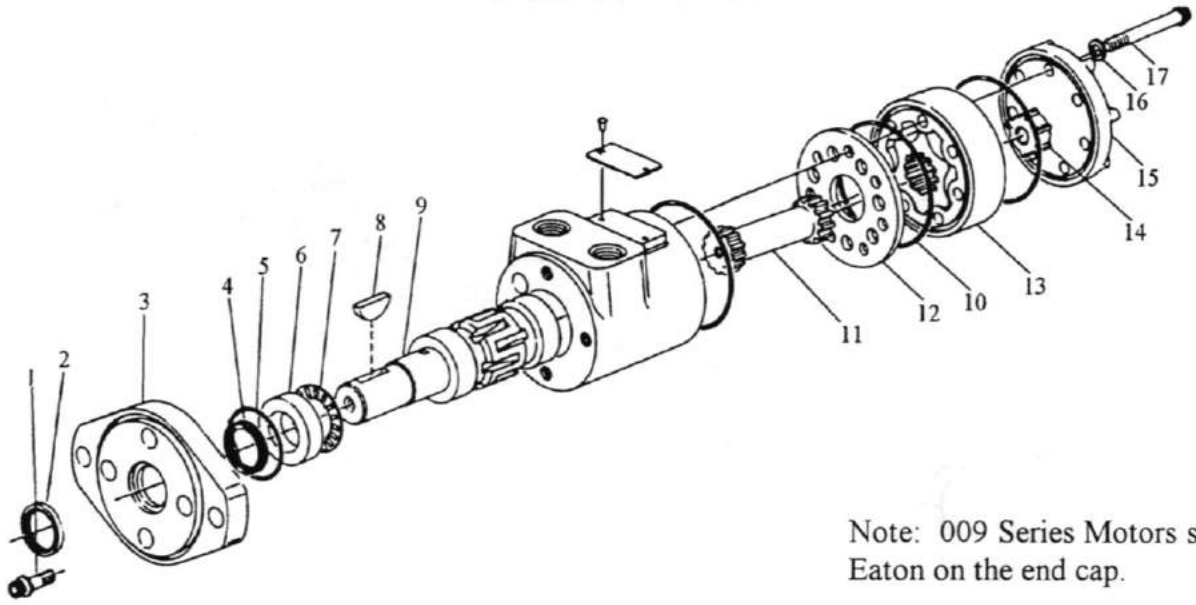
Note: 009 Series Motors say Eaton on the end cap.

ITEM	PART NO. 007 Series	PART NO. 009 Series	DESCRIPTION	QTY
	38898		Motor - Hydraulic, 2"	
1	30665		Screw - Cap	4
2	37382	73471	Seal	1
3	55220	73546	Flange - Mounting	1
4	37378	73473	Seal	1
5	37379	73474	Seal - "O" Ring	1
6	37385		Race - Bearing	1
7	37401		Bearing - Thrust Needle	1
8	3065		Key - Woodruff	1
9	37386		Shaft - Output, Keyed	1
10	37380	73480	Seal - "O" Ring	3
11	16946		Drive	1
12	37388		Plate - Spacer	1
13	37395	73554	Gerotor	1
14	37399		Spacer	1
15	37400		Cap - End	1
16	37381		Washer - Seal	7
17	16938		Screw - Cap	7
18	*22068		Seal - "O" Ring	1
	37352	39137	Kit - Seal (Includes Items 2,4,5,10,16)	
19	*	73472	Washer - Back-up	1

* - Not Shown

ALWAYS USE GENUINE PARTS - PLEASE GIVE PART NO., DESCRIPTION AND UNIT SERIAL NO.

CONVEYOR MOTOR

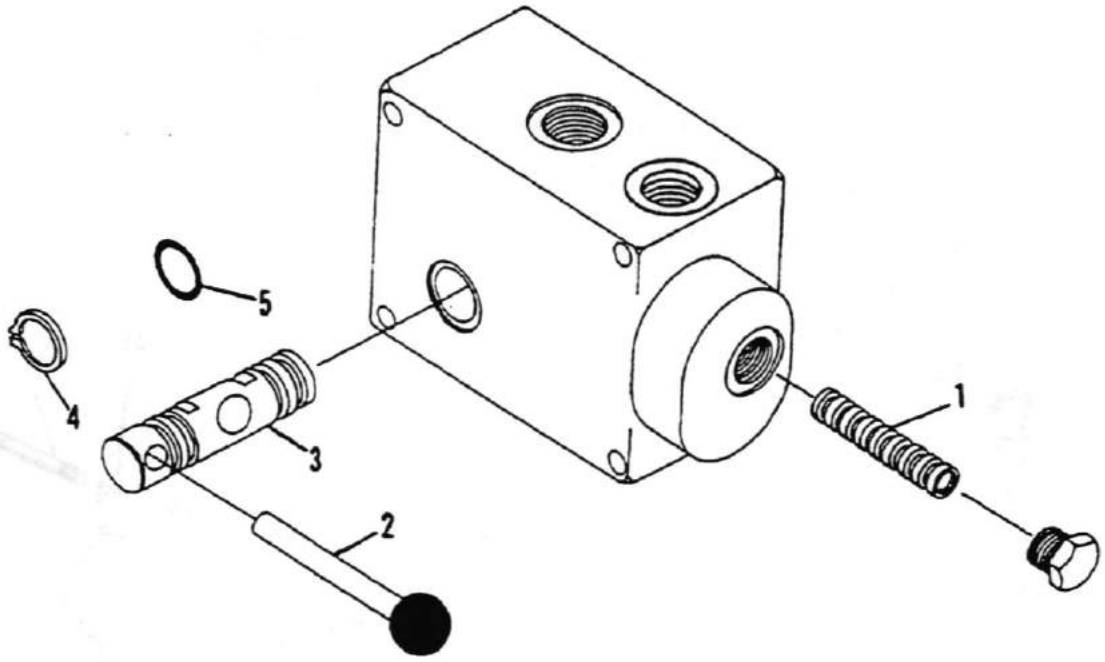


Note: 009 Series Motors say Eaton on the end cap.

ITEM	PART NO. 007 Series	PART NO. 009 Series	DESCRIPTION	QTY
	55970		Motor - Hydraulic, 1"	
	55972		Motor - Hydraulic, Modified 1"	
1	30665		Screw - Cap	4
2	37382	73471	Seal	1
3	46397	73556	Flange - Mounting (Used on 55972)	1
3	55220	73555	Flange - Mounting	1
4	37378	73473	Seal	1
5	37379	73474	Seal - "O" Ring	1
6	37385		Race - Bearing	1
7	37401		Bearing - Thrust Needle	1
8	3065		Key - Woodruff	1
9	37386		Shaft - Output, Keyed	1
10	37380	73480	Seal - "O" Ring	3
11	47062		Drive	1
12	37388		Plate - Spacer	1
13	47063	73551	Gerotor - 1"	1
14	47064		Spacer	1
15	37400		Cap - End	1
16	37381		Washer - Seal	7
17	47065		Screw - Cap	7
18	*22068		Seal - "O" Ring	1
19	*	73472	Washer - Back-up	1
	37352	39137	Kit - Seal (Includes Items 2,4,5,10,16,19)	1

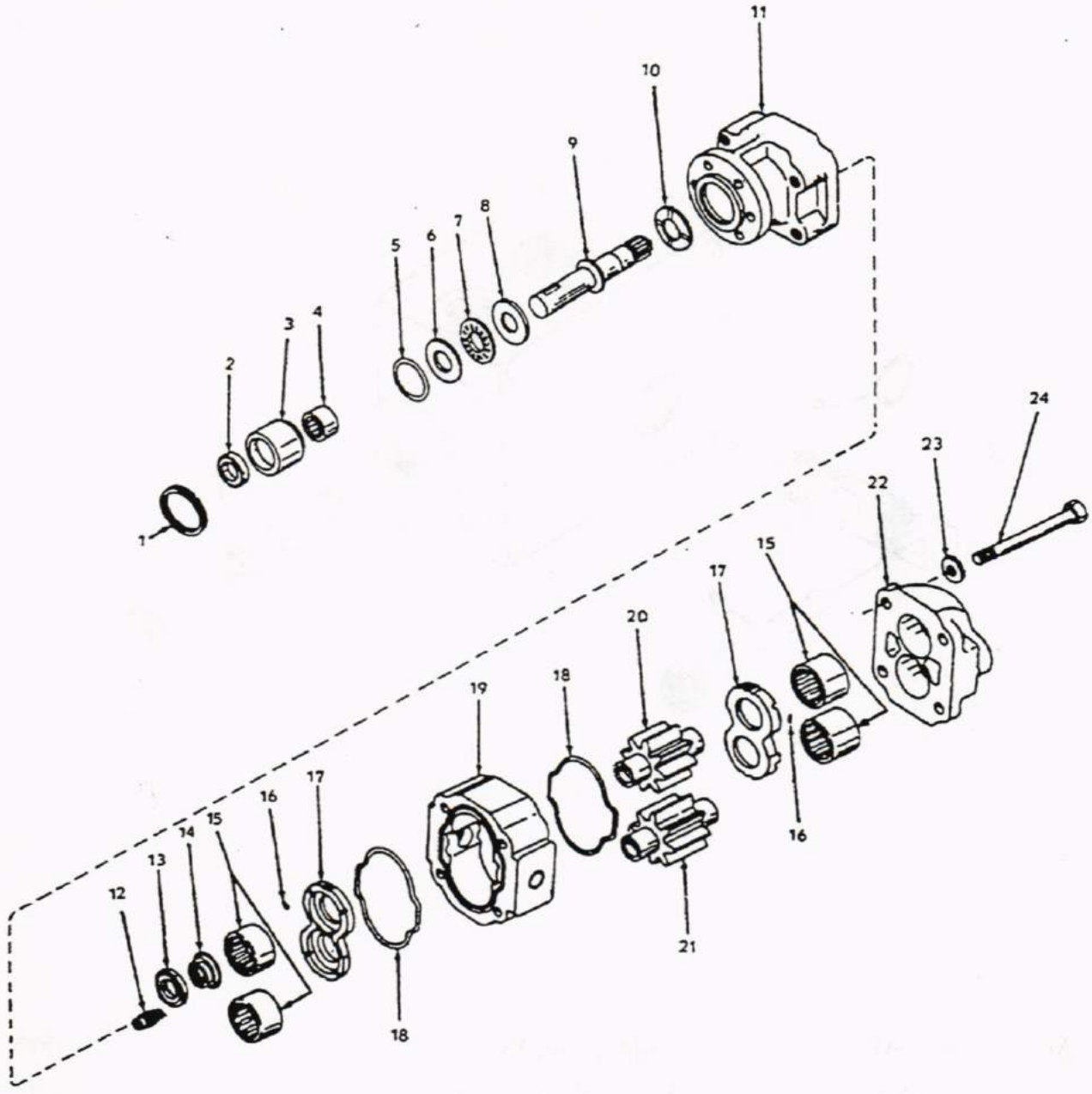
* - Not Shown

CONTROL VALVE



ITEM	PART NO.	DESCRIPTION	QTY
	38576	Valve - Flow Control	1
1	53960	Spring	1
2	53961	Handle - Spool	1
3	53962	Spool - Rotary	1
4	53963	Ring - Snap	2
5	29887	"O" Ring	2

PUMP



ITEM	PART NO.	DESCRIPTION	QTY
	22393	Assembly - Gear Pump, 1 1/4"	
	22394	Assembly - Gear Pump, 1 1/2"	
	22395	Assembly - Gear Pump, 1 3/4"	
	22396	Assembly - Gear Pump, 2"	
	22397	Assembly - Gear Pump, 2 1/4"	
	22398	Assembly - Gear Pump, 2 1/2"	

PUMP CONT'D

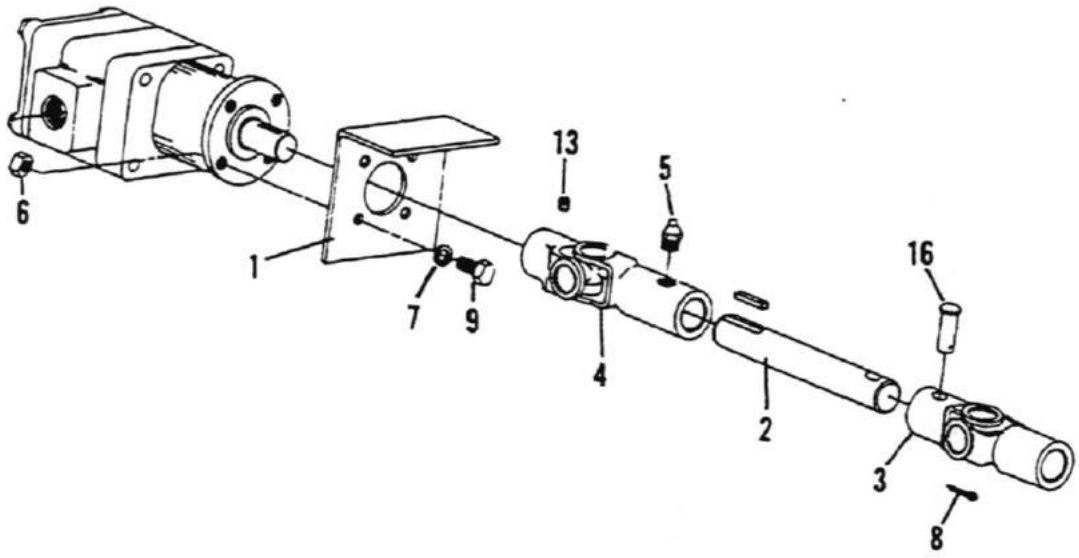
ITEM	PART NO.	DESCRIPTION	QTY
1	**22630	Ring - Snap	1
2	**23804	Seal - Double Lip	1
3	23811	Sleeve - Bearing	1
4	23803	Bearing - Roller	1
5	**23802	"O" Ring	1
6	23809	Thrust Bearing Race	1
7	**23810	Bearing - Thrust	1
8	**23809	Thrust Bearing Race	1
9	23821	Shaft - Drive	1
10	23827	Washer - Thrust	1
11	2381	Cover - Shaft End	1
12	23805	Assembly - Check	2
13	**23808	Bushing - Shaft	1
14	23807	Spring	1
15	23806	Bearing - Roller	4
16	**23819	Seal - Pocket (Makes 12 Seals)	1
17	23818	Plate - Thrust	2
18	**23820	Gasket	2
19	23813	Housing - Gear, 1 1/4"	1
	23814	Housing - Gear, 1 1/2"	1
	30039	Housing - Gear, 1 3/4"	1
	23815	Housing - Gear, 2"	1
	23816	Housing - Gear, 2 1/4"	1
	23817	Housing - Gear, 2 1/2"	1
20	*	Gear - Drive	1
21	*	Gear - Driven	1
22	23812	Cover - Port End	1
23		Washer	4
24	20187	Screw - Cap for 1 1/4" Pump	4
	20188	Screw - Cap for 1 1/2" Pump	4
	20189	Screw - Cap for 1 3/4" Pump	4
	20190	Screw - Cap for 2" Pump	4
	20191	Screw - Cap for 2 1/4" Pump	4
	20192	Screw - Cap for 2 1/2" Pump	4

* - Items 20 and 21 come only as a matched set:

23822	Gear Set 1 1/4"	1
23823	Gear Set 1 1/2"	1
30040	Gear Set 1 3/4"	1
23824	Gear Set 2"	1
23825	Gear Set 2 1/4"	1
23826	Gear Set 2 1/2"	1

** - Seal Kit 27490. Shaft and Seal Kit 27491 (Includes 27490 and Items 4 and 9).

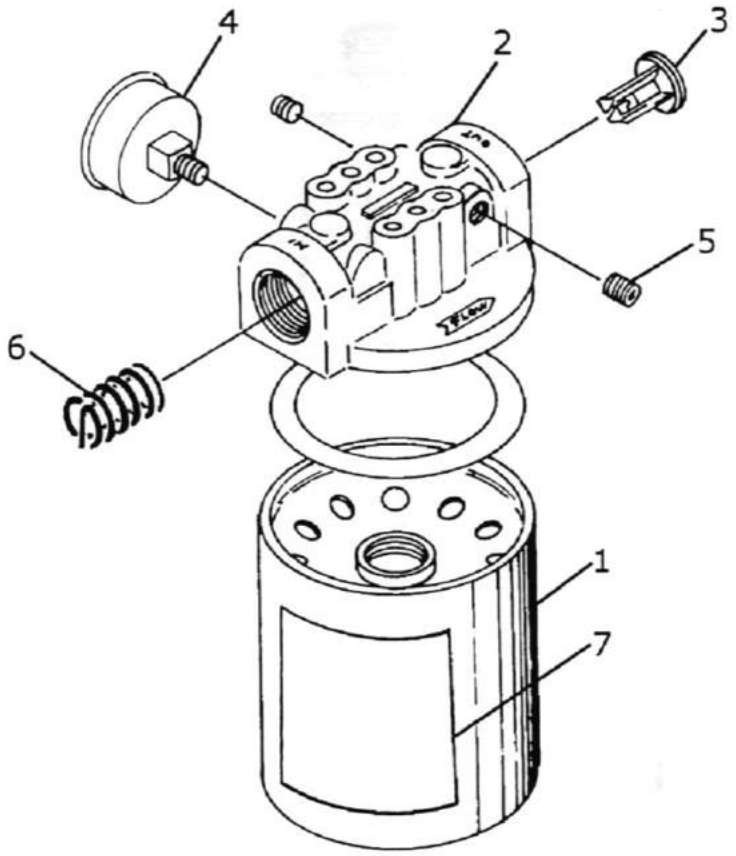
PUMP MOUNTING KIT



ITEM	PART NO.	DESCRIPTION	QTY
1	13850	Weldment - Bracket, Pump	1
2	17932	Shaft - Drive	1
3	7210	U-Joint	1
4	5649	U-Joint	1
	11756	Group - Hardware, Pump (Includes Items 5 - 16)	1
5	6069	Zerk - Grease	1
6	20644	Nut - Hex	4
7	20712	Washer - Lock	4
8	20817	Pin - Cotter	1
9	20069	Screw - Cap	4
10	*20129	Screw - Cap	4
11	*2211	Key - Square	1
12	*2776	Key - Square	1
13	20748	Screw - Set	2
14	*20646	Nut - Hex	4
15	*20714	Washer - Lock	4
16	6122	Pin - Shear	1

* - Not Shown

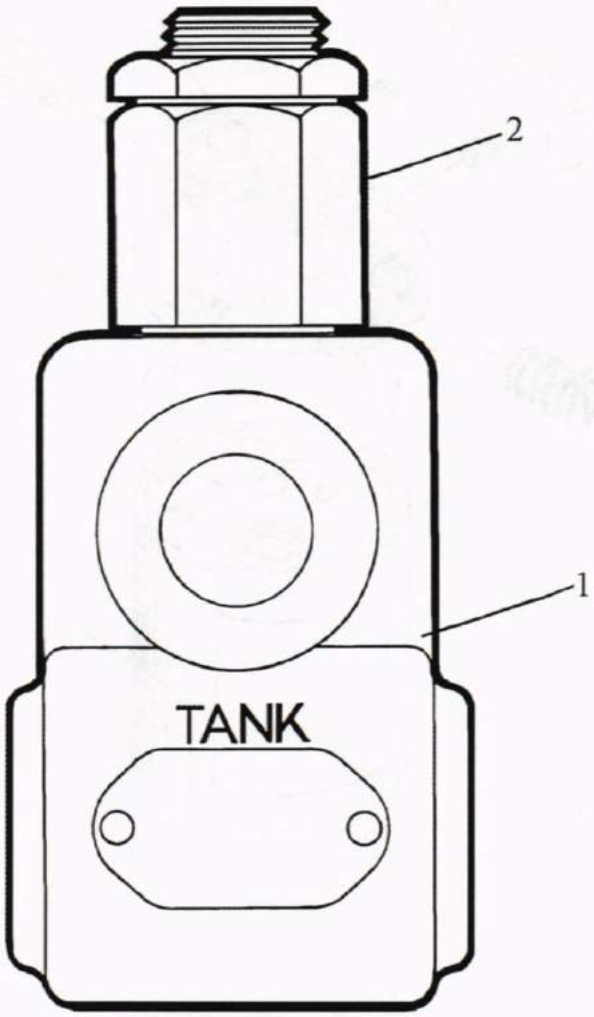
FILTER - HYDRAULIC WITH INDICATOR



ITEM	PART NO.	DESCRIPTION	QTY
	39845	Filter - Hydraulic with Indicator	
1	43530	Filter - Element Kit	1
2	NS	Head Casting	1
3	43533	Relief Valve Poppet	1
4	43534	Indicator with Decal	1
5	6029	Pipe - Plug, 1/8"	1
6	43492	Relief Valve Spring	1
7	39379	Decal	1

NS - Not Serviced

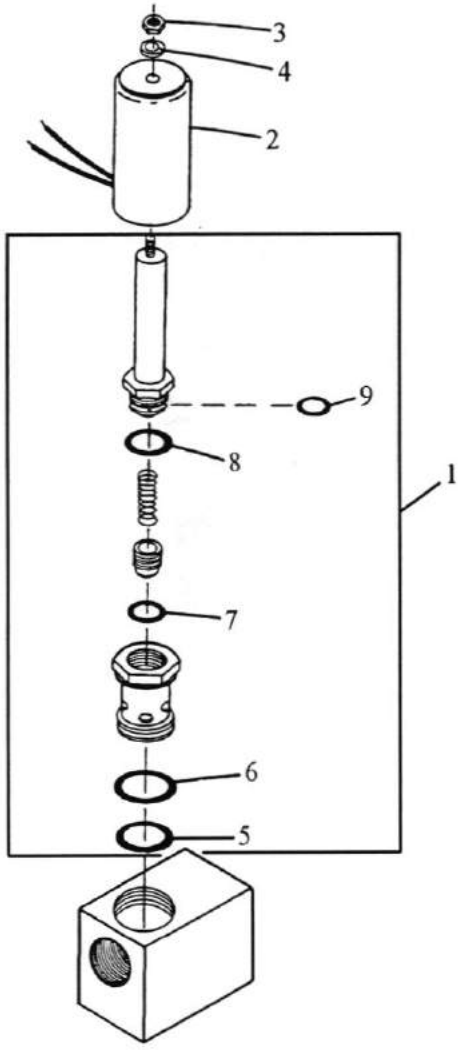
RELIEF VALVE, ADJUSTABLE



ITEM	PART NO.	DESCRIPTION	QTY
	37447	Assembly - Relief Valve, Adjustable	
1	43487	Housing - Relief Valve	NSS
2	43488	Cartridge - Relief Valve	1

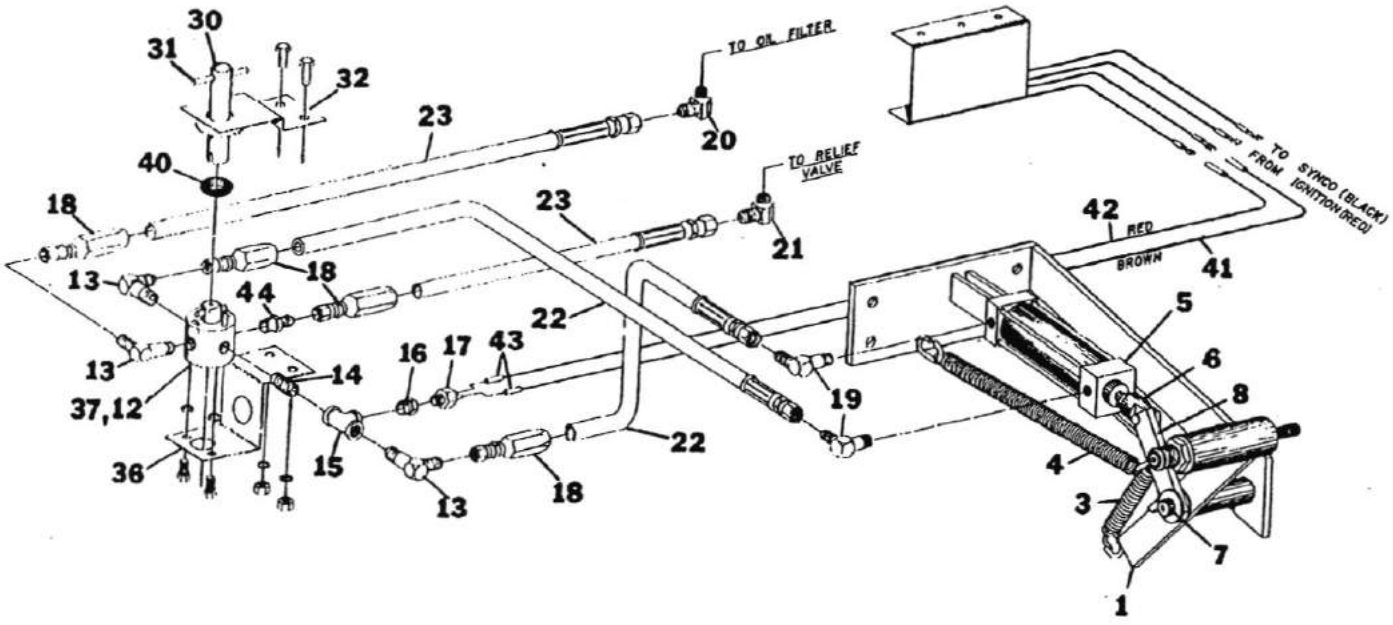
NSS - Not Serviced Separately

DUMP VALVE - SOLENOID



ITEM	PART NO.	DESCRIPTION	QTY
	33712	Dump Valve - Solenoid	
1	33717	Assembly - Cartridge (Includes Items 5 - 9)	1
2	1922	Coil	1
3	20642	Nut - Hex	1
4	20710	Washer - Lock	1
5	29892	"O" Ring	1
6	29893	"O" Ring	1
7	29891	"O" Ring	1
8	30648	"O" Ring	1
9	29891	"O" Ring	1
	33714	Kit - "O" Ring (Includes Items 5 - 9)	1

KIT - SHIPPING, HYDRAULIC FRICTION WHEEL

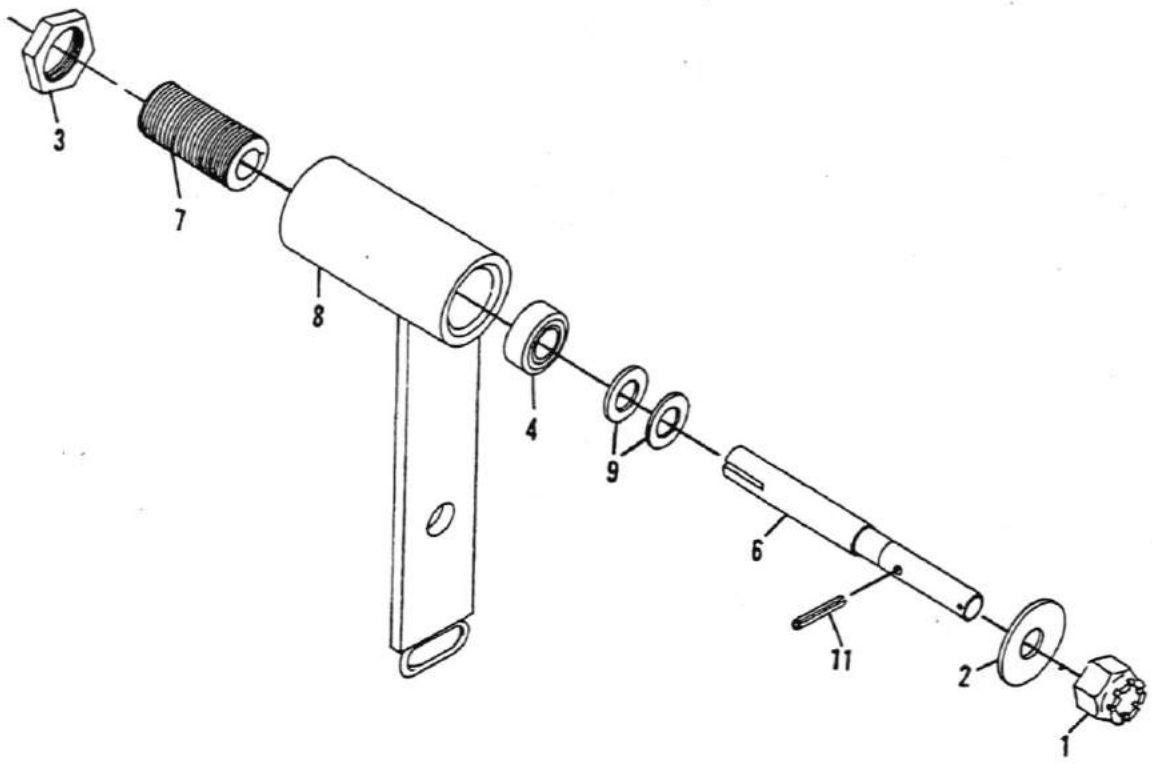


ITEM	PART NO.	DESCRIPTION	QTY
	54907	Kit - Shipping Hydraulic Friction Wheel	1
1	54915	Assembly - Friction Wheel	1
2	20694	Washer	2
3	31575	Spring - Extension	1
4	31576	Spring - Return	1
5	31577	Cylinder - Hydraulic	1
6	31578	Rod Eye	1
7	31579	Screw - Shoulder	1
8	54919	Weldment - Pivot Bar	1
9	6323	Pin - Clevis	1
10	21037	Pin - Clevis	1

KIT - SHIPPING, HYDRAULIC FRICTION WHEEL CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
11	20817	Pin - Cotter	2
12	*54924	Valve - Hydraulic	1
13	34732	Adapter	3
14	16377	Close Nipple	1
15	16515	Tee - Pipe	1
16	6065	Bushing - Reducer	1
17	37037	Switch - Pressure	1
18	56466	Hose End	4
19	34734	Adapter	2
20	34735	Adapter	1
21	34704	Adapter	1
22	56112	Assembly - Hose	2
23	56113	Assembly - Hose	2
24	53968	Assembly - Control Panel	1
25	8735	Panel - Shield	1
26	31906	Spacer - Pipe	4
27	20081	Screw - Cap	4
28	20644	Nut - Hex	4
29	20712	Washer - Lock	4
30	54930	Weldment - Handle	1
31	20941	Pin - Roll	1
32	54932	Retainer - Handle	1
33	20034	Screw - Cap	2
34	20711	Washer - Lock	2
35	20643	Nut - Hex	2
36	54933	Bracket - Valve	1
37	20939	Pin - Roll	1
38	20710	Washer - Lock	2
39	20031	Screw - Cap	2
40	24812	Grommet	1
41	21583-144	Wire - Electric, Brown	1
42	21582-144	Wire - Electric, Red	1
43	39293	Connector - Plug	2
44	29765	Adapter	1
45	*29870	"O" Ring (Repair Item for Item 12)	2
46	*22805	Ring - Snap (Repair Item for Item 12)	2

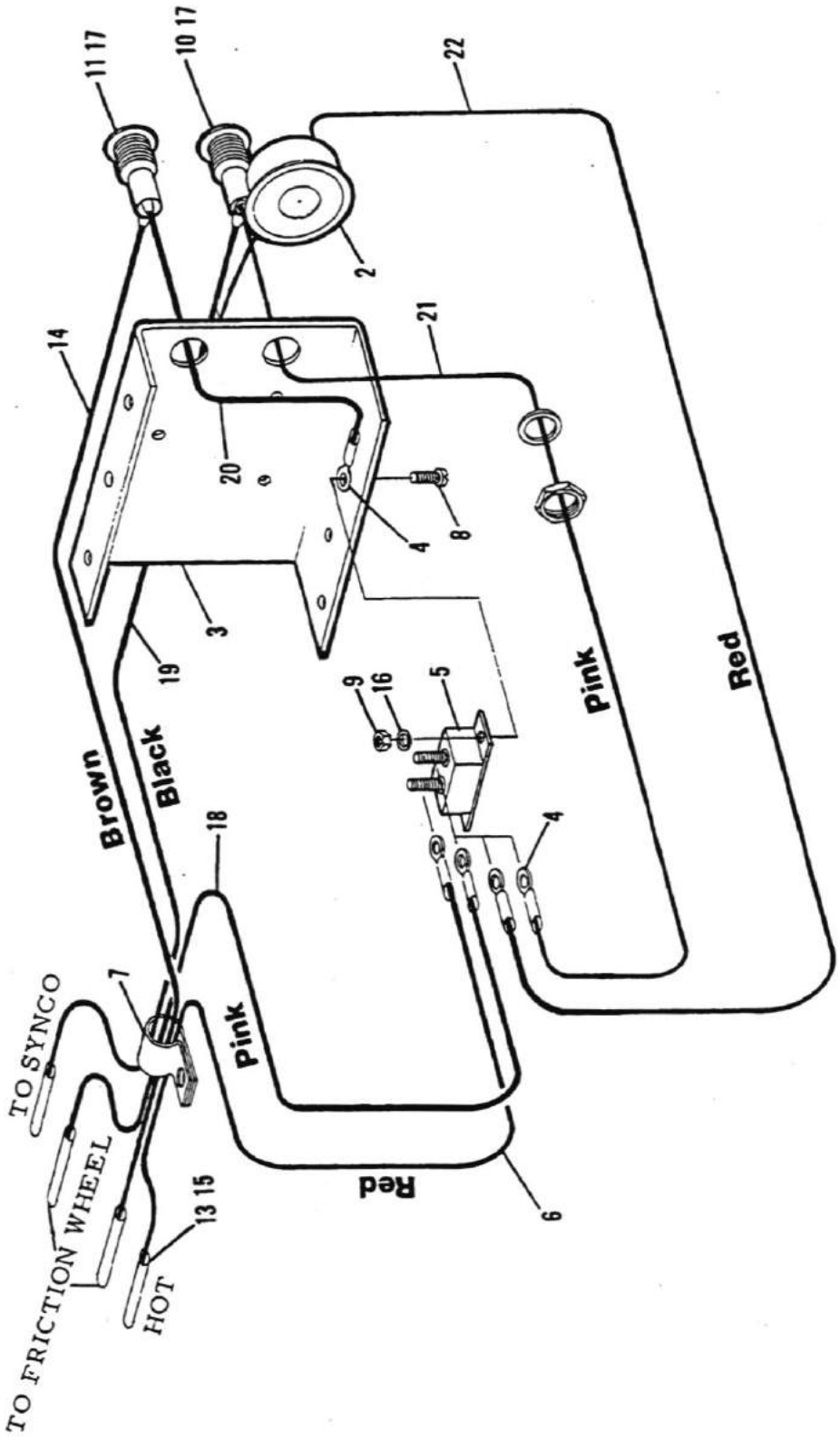
FRICTION WHEEL



ITEM	PART NO.	DESCRIPTION	QTY
	54915	Assembly - Friction Wheel (Does not include Items 1 and 2)	
1	20875	Nut - Castelated	1
2	21394	Washer - Flat	1
3	31167	Nut - Special	1
4	8723	Bearing - Ball	1
5	8724	Ring - Snap	1
6	8725	Shaft	1
7	8726	Bushing - Threaded	1
8	54916	Weldment - Housing	1
9	20261	Washer - Flat	2
10	*6072	Zerk - Grease	1
11	20428	Pin - Roll	1

* - Not Shown

GROUP - INSTRUMENT PANEL



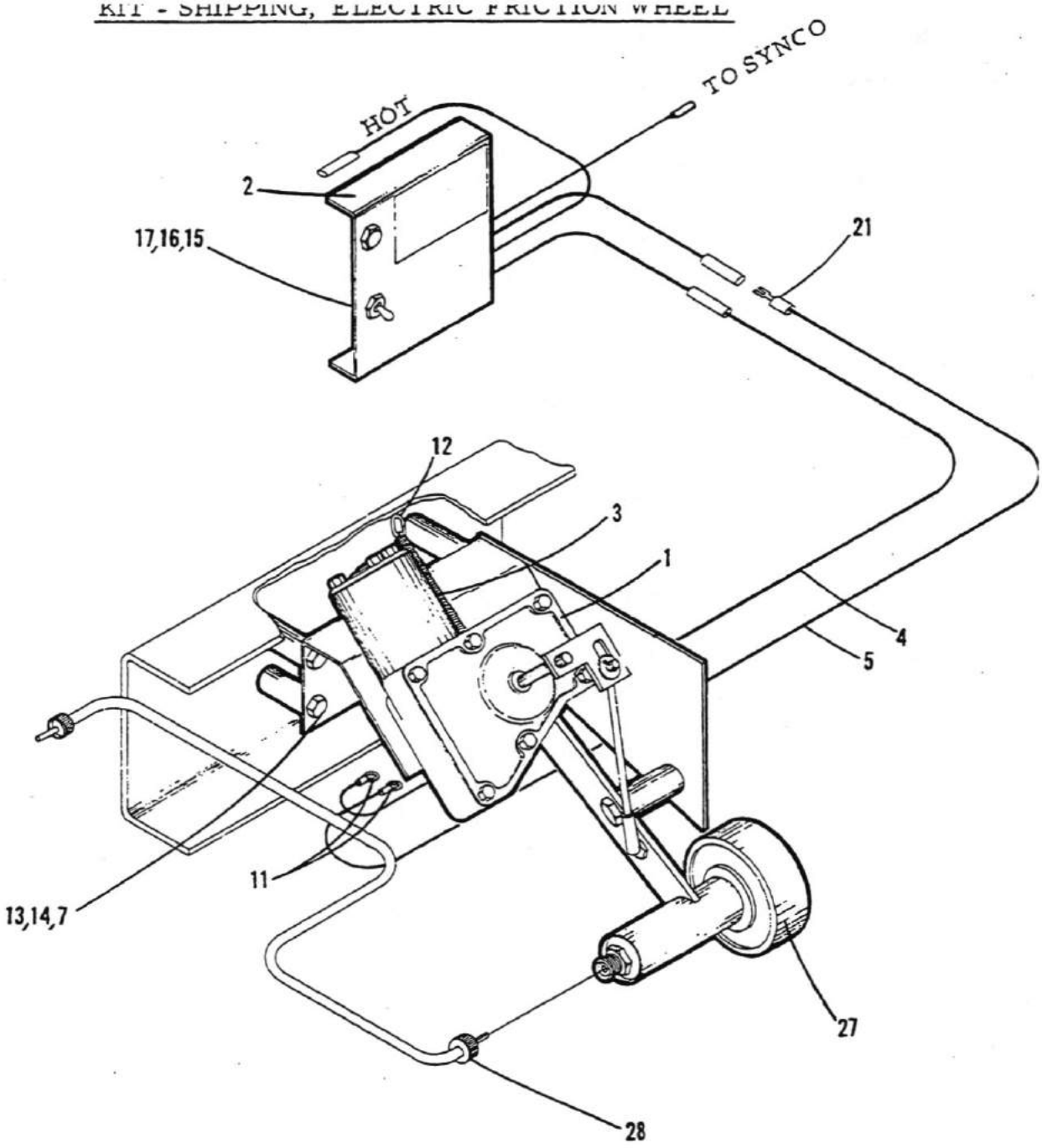
GROUP - INSTRUMENT PANEL CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
	53968	Assembly Group - Instrument Panel	
1	*54927	Decal	1
2	43491	Assembly - Buzzer	1
3	43966	Panel - Instrument	1
4	6536	Terminal - Ring	5
5	21635	Circuit Breaker	1
6	21582-12	Wire - Electric, 14 Ga. Red x 12	1
7	44584	Clamp	1
8	20257	Screw - Machine	3
9	20259	Nut - Hex	3
10	44523	Light - Indicator	1
	44524	Lens - Red	1
	44526	Lamp	1
11	44523	Light - Indicator	1
	44525	Lens - Amber	1
	44526	Lamp	1
12	*44529	Connector - Tap	1
13	6486	Terminal	4
14	21583-12	Wire - Electric, 14 Ga. Brown x 12	1
15	6487	Connector	4
16	31561	Washer - Lock	3
17	44527	Terminal - Fast On	4
18	21589-12	Wire - Electric, 14 Ga. Pink x 12	1
19	21580-12	Wire - Electric, 14 Ga. Black x 12	1
20	21583-5	Wire - Electric, 14 Ga. Brown x 5	1
21	21589-5	Wire - Electric, 14 Ga. Pink x 5	1
22	21961-3	Wire - Electric, 16 Ga. Red x 3	1

* - Not Shown

KIT - SHIPPING, ELECTRIC FRICTION WHEEL

KIT - SHIPPING, ELECTRIC FRICTION WHEEL



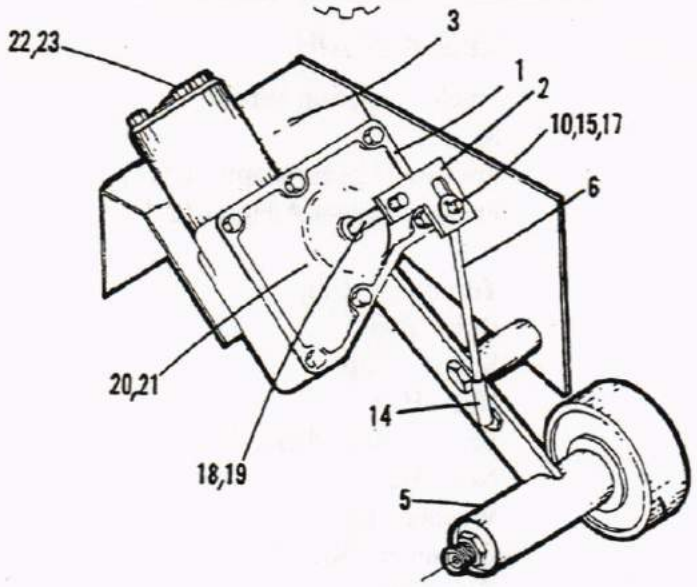
ITEM	PART NO.	DESCRIPTION	QTY
	56186	Kit - Shipping, Electric Friction Wheel	
1	16594	Assembly - Friction Wheel	1
2	56188	Assembly - Friction Wheel Control Panel	1
3	8783	Spring	1
4	21589-144	Wire - Electric, 14 Ga. Pink	1
5	21583-144	Wire - Electric, 14 Ga. Brown	1

KIT - SHIPPING, ELECTRIC FRICTION WHEEL CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
6	*43484	Shield - Friction Wheel	1
7	31906	Spacer	4
8	*31939	Friction Wheel Adapter (.5:1)	1
9	*7919	Friction Wheel Adapter (2:1)	1
10	-----		-
11	6536	Terminal - Ring	2
12	55962	Bolt - Eye	1
13	20081	Screw - Cap	4
14	20644	Nut - Hex	4
15	20569	Screw - Round Head	1
16	20641	Nut - Hex	2
17	20709	Washer - Lock	2
18	*6325	Grommet - Rubber	1
19	*1386	Tie - Plastic	4
20	*21909-10	Chain - Twisted	1
21	6486	Terminal - Fast On	2
22	*20817	Pin - Cotter	1
23	*12374	Connector - Tap	1
24	*20257	Screw - Machine	3
25	*20259	Nut - Hex	3
26	*20643	Nut - Hex	2
27	8719	Friction Wheel, 2 1/2" Diameter	1
	8720	Friction Wheel, 3" Diameter	1
	8721	Friction Wheel, 3 1/2" Diameter	1
	10038	Friction Wheel, 4" Diameter	1
	11416	Friction Wheel, 5" Diameter	1
	32442	Friction Wheel, 6" Diameter	1
28	33947	Speedometer Cable, 120"	1
	33948	Speedometer Cable, 132"	1
	33949	Speedometer Cable, 144"	1
	33950	Speedometer Cable, 156"	1
	33951	Speedometer Cable, 168"	1
	33952	Speedometer Cable, 180"	1
	53974	Speedometer Cable, 192"	1
		Core only of Speedometer Cables listed above for:	
	38329	120" Cable	1
	38330	132" Cable	1
	38331	144" Cable	1
	38332	156" Cable	1
	38333	168" Cable	1
	38334	180" Cable	1
	32811	192" Cable	1

* - Not Shown

ELECTRIC FRICTION WHEEL

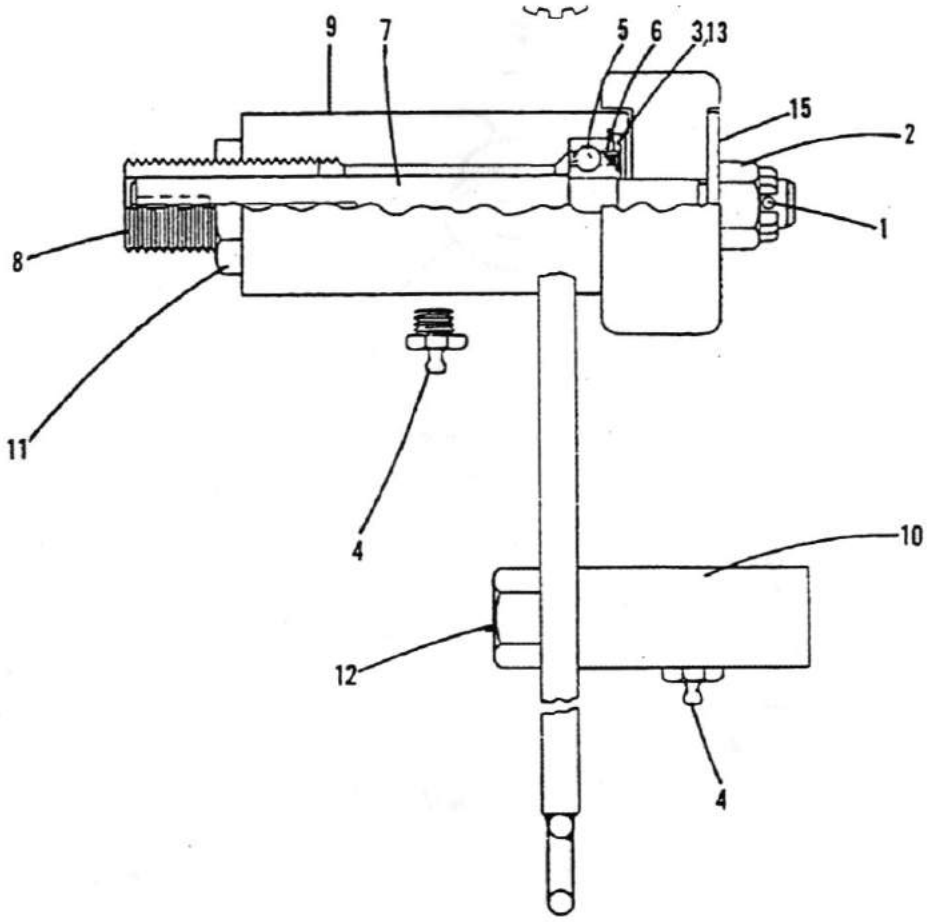


ITEM	PART NO.	DESCRIPTION	QTY
	16594	Assembly - Electric Friction Wheel	
1	2033	Assembly - Electric Actuator	1
2	55964	Link - Bell Crank	1
3	16596	Weldment - Mounting Bracket	1
4	*20875	Nut - Castelated	1
5	14376	Assembly - Friction Wheel	1
6	8776	Rod - Control	1
7	*20128	Screw - Cap	3
8	*20646	Nut - Hex	3
9	*20714	Washer - Lock	3
10	20812	Pin - Cotter	1
11	*20817	Pin - Cotter	1
12	*20694	Washer - Flat	2
13	*21394	Washer - Flat	1
14	40504	Assembly - Ball Joint	1
15	20986	Pin - Roll	1
16	*26974	Gasket	1
17	20691	Washer - Flat	2
18	21422	Collar - Set	1
19	2035	Shaft	1
20	31553	Gasket	1
21	57643	Assembly - Shift Cover	1
22	40635	Motor - Electric	1
23	31237	Gasket	1
24	*34993	Bearing with Snap Ring	1
25	*31559	Assembly - Switch	1
26	*31560	Pin Contact	2

* - Not Shown NOTE: Items 18 - 26 are Service Parts for Item 1.

ALWAYS USE GENUINE PARTS - PLEASE GIVE PART NO., DESCRIPTION AND UNIT SERIAL NO.

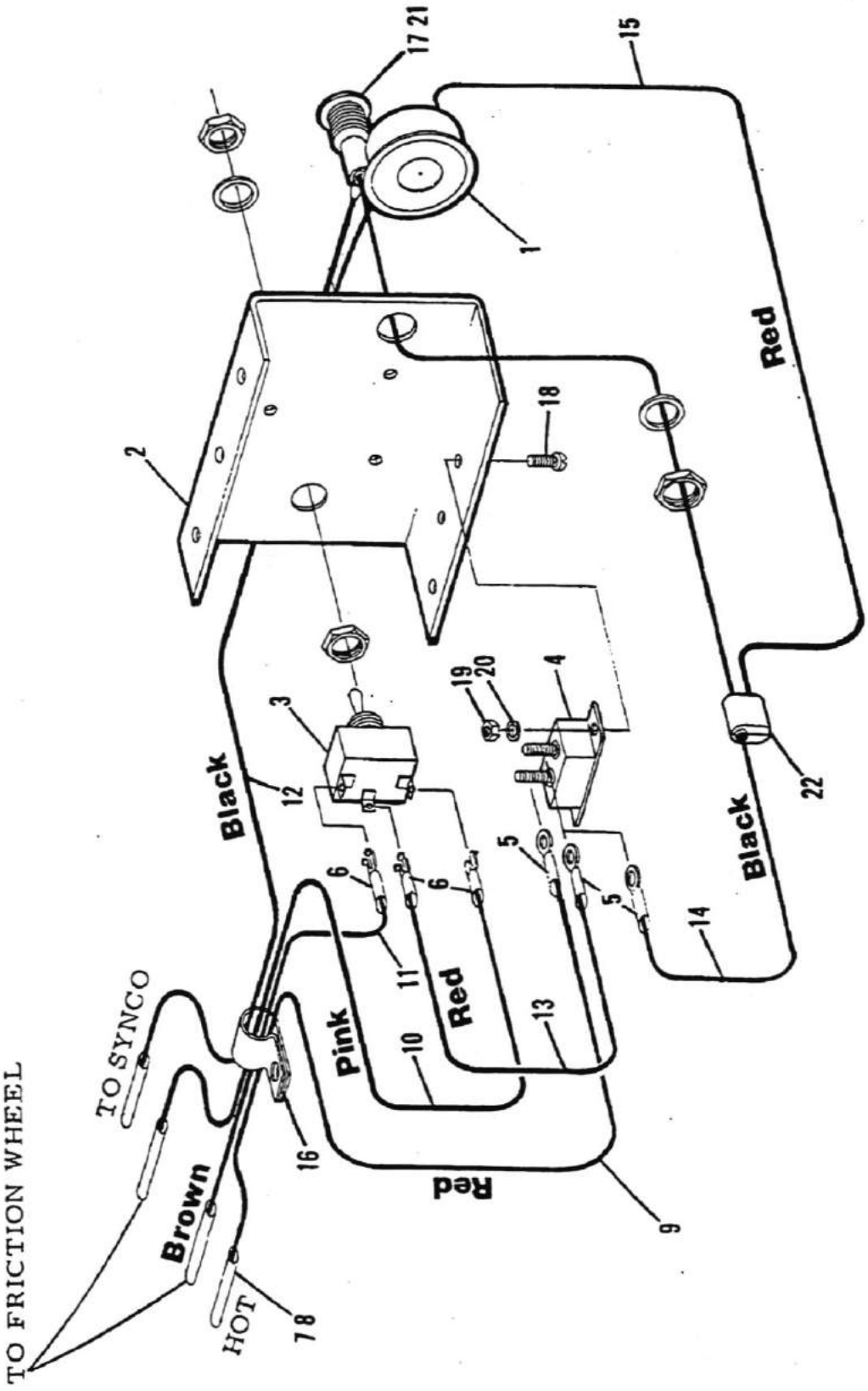
FRICTION WHEEL



ITEM	PART NO.	DESCRIPTION	QTY
	14376	Assembly - Friction Wheel (Does not include Items 1,2,3,15)	
1	20817	Pin - Cotter	1
2	20875	Nut - Castelated	1
3	20694	Washer - Flat	2
4	6072	Zerk - Grease	2
5	8723	Bearing - Ball	1
6	8724	Ring - Snap	1
7	8725	Shaft	1
8	8726	Bushing - Threaded	1
9	8727	Weldment - Housing	1
10	8732	Tube - Spacer	1
11	31167	Nut - Special	1
12	20128	Screw - Cap	1
13	20261	Washer - Flat	2
14	*20428	Pin - Roll	1
15	21394	Washer - Flat	1

* - Not Shown

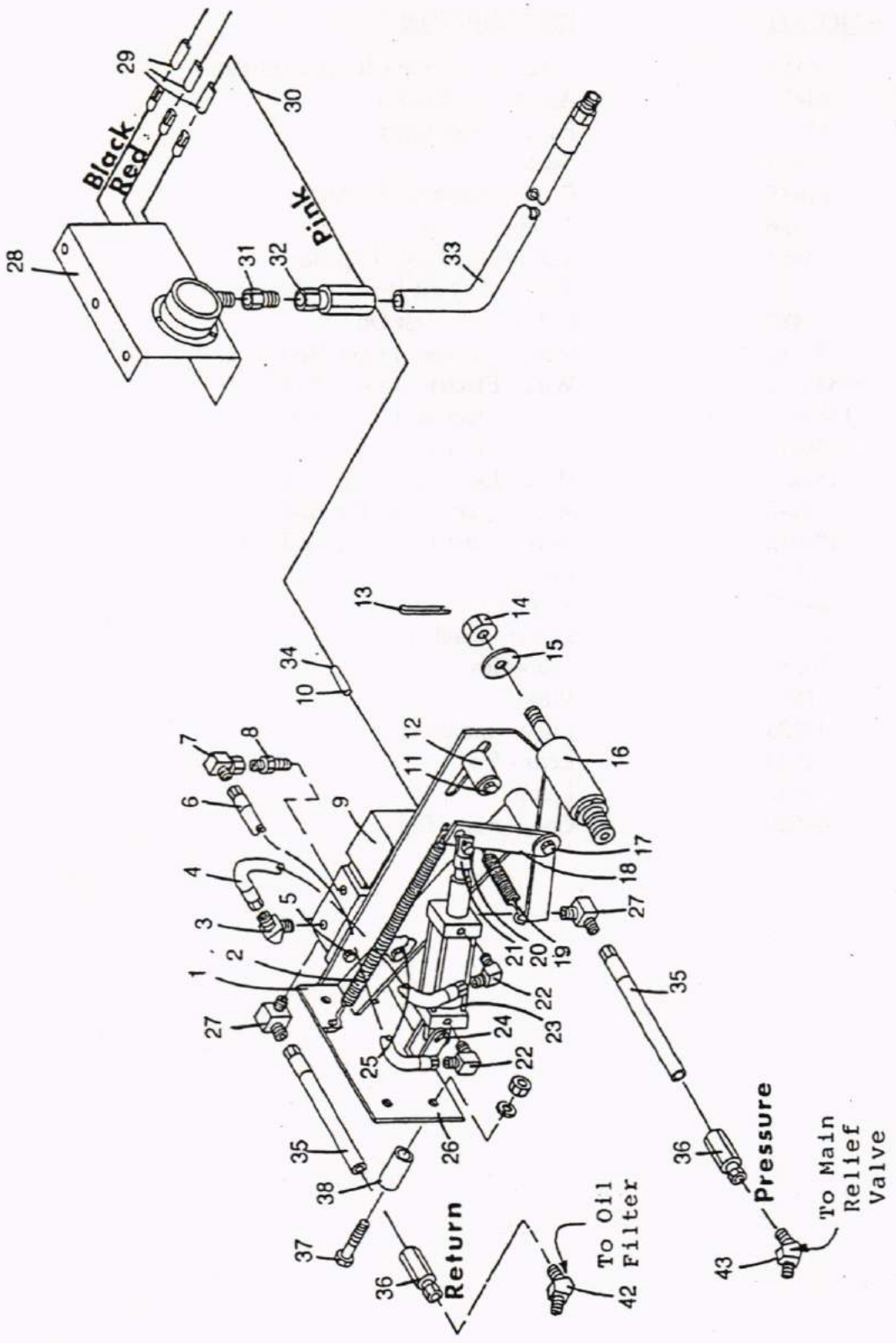
GROUP - INSTRUMENT PANEL



GROUP - INSTRUMENT PANEL CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
	56188	Assembly Group - Instrument Panel	
1	43491	Assembly - Buzzer	1
2	31911	Panel - Instrument	1
3	31681	Switch	1
4	21635	Circuit Breaker - 15 AMP	1
5	6536	Terminal - Ring	3
6	6485	Terminal - Flanged Spade	3
7	6486	Terminal - Fast On	4
8	6487	Connector - Fast On	4
9	21582-12	Wire - Electric, 14 Ga. Red x 12	1
10	21589-12	Wire - Electric, 14 Ga. Pink x 12	1
11	21583-12	Wire - Electric, 14 Ga. Brown x 12	1
12	21580-12	Wire - Electric, 14 Ga. Black x 12	1
13	21582-5	Wire - Electric, 14 Ga. Red x 5	1
14	21580-5	Wire - Electric, 14 Ga. Black x 5	1
15	21961-3	Wire - Electric, 16 Ga. Red x 3	1
16	44584	Clamp	1
17	44527	Terminal - Fast On	2
18	20257	Screw - machine	3
19	20259	Nut - Hex	3
20	31561	Washer - Lock	3
21	44523	Light - Indicator	1
	44524	Lens - Red	1
	44526	Lamp	1
22	44529	Connector - Tap	2

KIT - SHIPPING, ELECTRIC/HYDRAULIC FRICTION WHEEL



KIT - SHIPPING, ELECTRIC/HYDRAULIC FRICTION WHEEL CONT'D

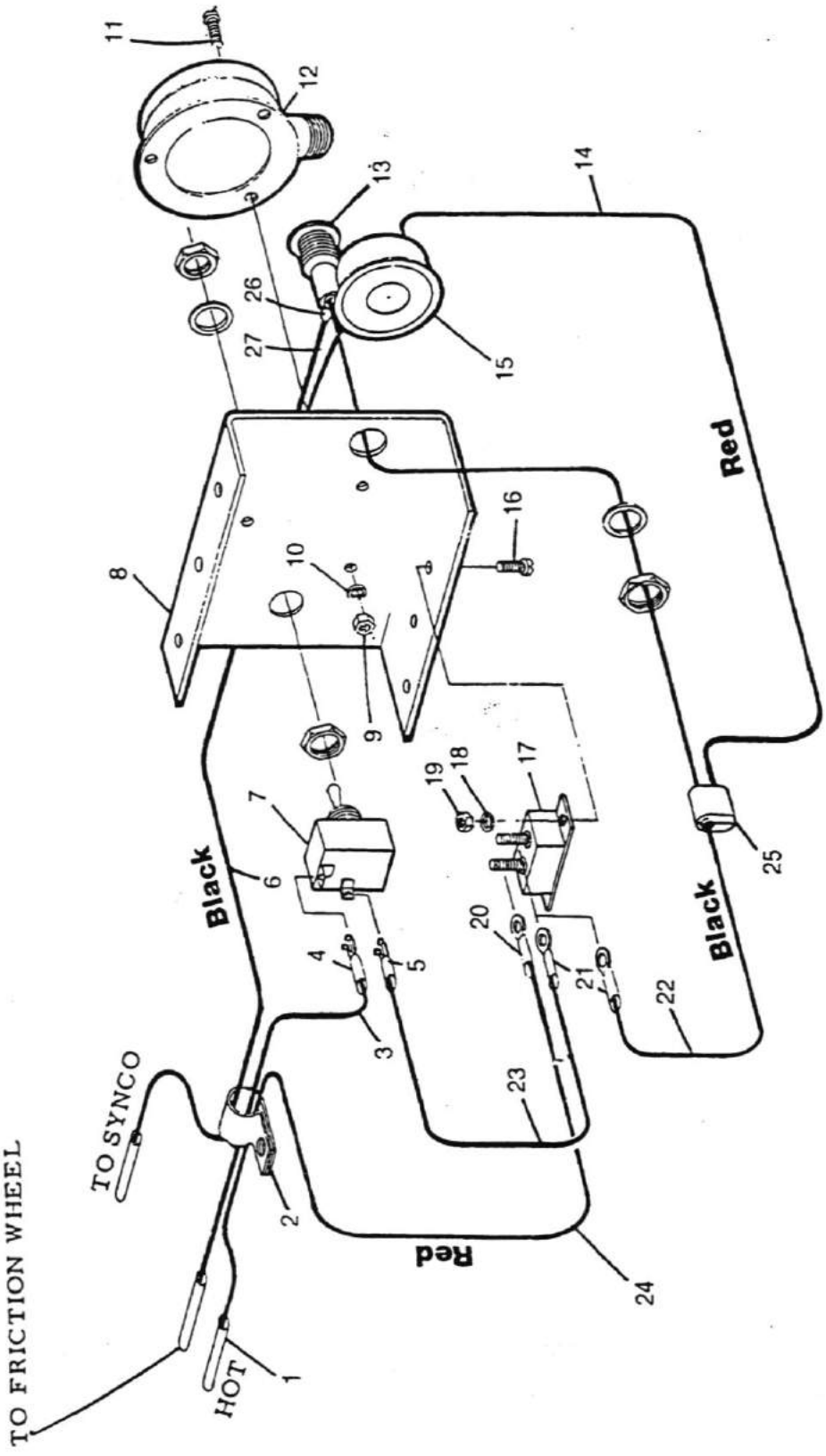
ITEM	PART NO.	DESCRIPTION	QTY
		Kit - Shipping, Electric/Hydraulic Friction Wheel for:	
	72679	10' Unit	
	72680	11' Unit	
	72681	12' Unit	
	72682	13' Unit	
	72683	14' Unit	
	72684	15' Unit	
	72685	16' Unit	
1	72687	Assembly - Friction Wheel	1
2	44304	Spring - Return	1
3	34813	Adapter - Elbow	1
4	58963	Assembly - Hose	1
5	20010	Screw - Cap, 1/4 x 2 1/4	2
	20710	Washer - Lock, 1/4	2
	20642	Nut - Hex, 1/4	2
	72694	Bar - Retainer	1
6	58962	Assembly - Hose	1
7	34816	Adapter - Elbow	1
8	29824	Adapter - Conector	1
9	39370	Valve - Solenoid	1
10	6549	Connector - Butt	1
11	20078	Screw - Cap, 3/8 x 3 3/4	1
	20693	Washer - Flat, 3/8	3
	20712	Washer - Lock, 3/8	1
	20644	Nut - Hex, 3/8	1
12	72695	Spacer - Brake	1
	16529-3	Hose - Brake	1
13	20817	Pin - Cotter	1
14	20875	Nut - Castelated, 1/2	1
15	21394	Washer - Flat	1
16	54915	Assembly - Friction Wheel	1
17	31579	Screw - Shoulder	1
	20695	Washer - Flat	2
18	72696	Weldment - Pivot Bar	1
	6073	Zerk - Drive	1
19	31575	Spring - Extension	1
20	20822	Cotter	1
	20693	Washer - Flat	1
21	31578	Eye - Rod	1
22	34812	Adapter - Elbow	2
23	31577	Cylinder - Hydraulic	1

KIT - SHIPPING, ELECTRIC/HYDRAULIC FRICTION WHEEL CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
24	21037	Pin - Clevis	1
	20822	Pin - Cotter	1
25	12079	Terminal - Ring	1
26	72689	Weldment - Mounting Bracket	1
27	29830	Adapter - Elbow	2
28	72698	Assembly - Control Panel	1
29	6486	Terminal - Fast On	3
30	21589-144	Wire - Pink	1
31	34718	Adapter - Connector	1
32	56466	End - Hose, Reusable	1
33	31582	Assembly - Hose, 10' Unit	1
	31583	Assembly - Hose, 11' Unit	1
	31584	Assembly - Hose, 12' Unit	1
	31585	Assembly - Hose, 13' Unit	1
	31586	Assembly - Hose, 14' Unit	1
	31587	Assembly - Hose, 15' Unit	1
	56614	Assembly - Hose, 16' Unit	1
34	12374	Connector - Splicer	1
35	58961	Assembly - Hose	2
36	56466	End - Hose, Reusable	2
37	20081	Screw - Cap, 3/8 x 4 1/2	4
	20712	Washer - Lock, 3/8	4
	20644	Nut - Hex, 3/8	4
38	31906	Spacer - Pipe	4
39	21582-24	Wire - Red	1
40	*8735	Shield - Friction Wheel	1
41	*43484	Shield - Heat	1
42	34735	Adapter - 45°	1
43	34704	Adapter - 45°	1

* - Not Shown

CONTROL PANEL - ELECTRIC/HYDRAULIC FRICTION WHEEL

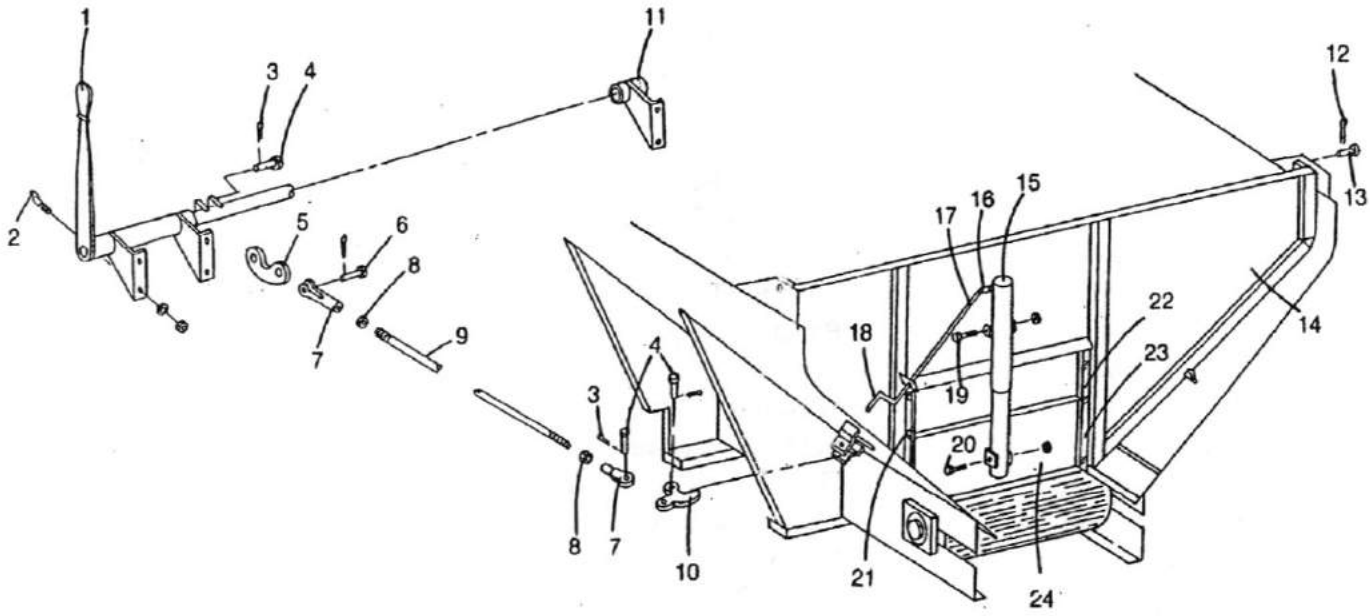


CONTROL PANEL - ELECTRIC/HYDRAULIC FRICTION WHEEL CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
1	72698	Assembly - Control Panel	
	6486	Terminal - Fast On	3
	6487	Terminal - Fast On	3
2	44584	Clamp	1
	20257	Screw - Machine	1
	31561	Washer - Lock	1
	20259	Nut - Hex	1
3	21589-12	Wire - Pink	1
4	6485	Terminal - Flanged Spade	1
5	6485	Terminal - Flanged Spade	1
6	21580-12	Wire - Black	1
7	21681	Switch - Toggle	1
8	31911	Panel - Control	1
9	20259	Nut - Hex	3
10	31561	Washer - Lock	3
11	20257	Screw - Machine	3
12	58571	Gauge	1
13	44523	Light - Indicator	1
	44526	Lamp	1
	44524	Lens - Red	1
14	21582-5	Wire - Red	1
15	43491	Buzzer	1
16	20257	Screw - Machine	2
17	21635	Breaker - Circuit, 15 Amp	1
18	31561	Washer - Lock	2
19	20259	Nut - Hex	2
20	6536	Terminal - Ring	1
21	6536	Terminal - Ring	2
22	21580-5	Wire - Black	1
23	21582-5	Wire - Red	1
24	21582-12	Wire - Red	1
25	44529	Connector - Tap	2
26	44527	Terminal - Fast On	2
27	21960-3	Wire - Black	1
28	*36996	Plate - On/Off	1

* - Not Shown

SWINGING REAR ENDGATE AND CONTROLS



ITEM	PART NO.	DESCRIPTION	QTY
1	36727	Weldment - Lever	1
2	20067	Screw - Cap, 3/8 x 1	6
	20712	Washer - Lock, 3/8	6
	20644	Nut - Hex, 3/8	6
3	20821	Pin - Cotter	8
4	21027	Pin - Clevis	6
5	36819	Link - Over Center	2
6	21028	Pin - Clevis	2
7	9342	Yoke - Female	4
8	21084	Nut - Jam, 1/2 NF	4

SWINGING REAR ENDGATE AND CONTROLS CONT'D

ITEM	PART NO.	DESCRIPTION	QTY
9	56072	Rod - Control, 10'	2
	56073	Rod - Control, 11'	2
	56074	Rod - Control, 12'	2
	56075	Rod - Control, 13'	2
	56076	Rod - Control, 14'	2
	56077	Rod - Control, 15'	2
	56078	Rod - Control, 16'	2
10	36736	Hook - Endgate	2
11	56079	Weldment - Pivot	1
12	20828	Pin - Cotter, 3/16 x 1 1/2	2
13	36719	Pin	2
14	56088	Weldment - Endgate (6" Lower)	1
	56089	Weldment - Endgate (Standard)	1
	56090	Weldment - Endgate (6" Higher)	1
15	40735	Assembly - Jack (See page 54 for parts)	1
16	40705	Joint - "U"	1
17	20986	Pin - Roll	1
18	36725	Handle - Jack	1
19	20136	Screw - Cap, 1/2 x 3 1/4	1
	20680	Nut - Hex, 1/2	1
20	20074	Screw - Cap, 3/8 x 2 3/4	1
	20678	Nut - Hex, 3/8	1
21	2884	Slide - Feedgate, LH	1
22	20005	Screw - Cap, 1/4 x 1	6
	20642	Nut - Hex, 1/4	6
	20710	Washer - Lock, 1/4	6
23	2885	Slide - Feedgate, RH	1
24	14261	Assembly - Feedgate	1
	14262	Weldment - Feedgate	1
	27296	Belt - Retainer	1
	27297	Retainer - Sealer	1
	20621	Screw - Machine	7
	20642	Nut - Hex	7
	20710	Washer - Lock	7
25	*13898	Indicator - Feedgate	1

* - Not Shown