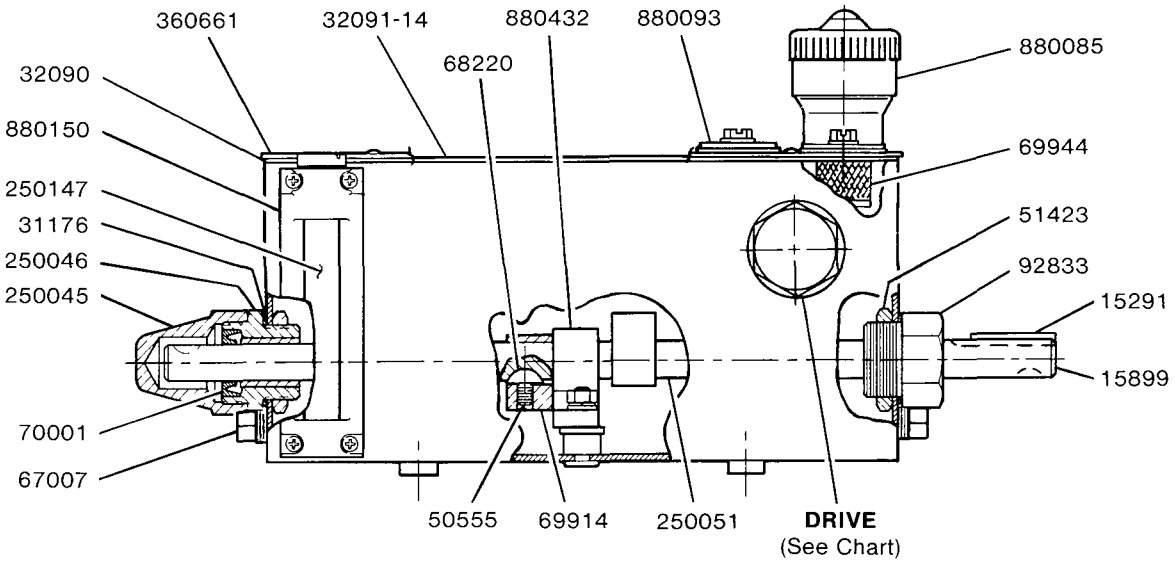
R.H. END DRIVE WITH EXTENDED CAM SHAFT
SEE CHART FOR RATIOS
INCLUDES VITON OIL SEALS



DRIVE CHART

Model	Ratio
835400	100:1
842400	400:1
847400	300:1

DESCRIPTION

The **Tandem Lubricator System** consists of an 8 pint primary lubricator, with provisions for adding a secondary lubricator, to increase capacity The primary lubricator may be driven by an electric motor, machine driven directly, or through chains, belts or a gear reducer. The primary lubricator may be supplied with an internal gear reduction, and will have an extended cam shaft to allow for coupling to the cam shaft of a secondary lubricator.

Models 835400, 842400, and 847400 lubricators are designed to be used as primary lubricators. Each of these models has an internal drive reduction, and extended cam shafts for coupling to an optional secondary lubricator. Shaft covers are provided to cover the extended cam shaft when an optional secondary lubricator is not used.

For more information on coupling and mounting the **Tandem Lubricators** consult service manual Section M3 Page 40 Series. For more information on secondary lubricators, see service manual Section M2 Page 217 Series.

PUMP MOUNTING

When pumps are mounted to the reservoirs, care should be taken to place the pumps with the highest back pressures closest to the driven end of the lubricator assembly. When a secondary lubricator is used, pumps operating over 4000 PSI **MUST** be placed on the primary lubricator.

LIMITATIONS

Each lubricator drive has limitations as to the number of pumps it may operate. The limitation is based on pump size, operating pressure and operation speed. Each lubricator installation should be checked to determine if the application falls within the limitations of the drive. Follow the steps below to determine if the lubricator will handle the application.

1. List the size of the lubricator pump, (ie: 1/4" or 3/8" model) for each pump station on the primary and secondary (if used) lubricators.
2. List the average operating pressure for each individual pump station in lbs./sq. in. The **Operating Pressure** will be the variable **OP** in the equation.
3. From the chart below find the pump factor for each pump station. The **Pump Factor** will be **PF** in the equation.

PUMP SIZE	PUMP FACTOR (PF)
1/4"	1.00
3/8"	1.33

4. With the above information recorded for each pump station, calculate the **Pump Load Factor (LF)** in the equation.

OPERATING PRESSURE (OP) x PUMP FACTOR (PF) = PUMP LOAD FACTOR (LF)
or OP x PF = LF

5. Add together the pump load factors for each pump station from step 4, above. The total equals the **Drive Load Factor.**
6. The maximum **Drive Load Factors** and **Drive Shaft Input Speeds** for each drive may be found in the chart below. The **Drive Load Factor** found in step 5 should not exceed the drive load factors found in the chart below. the maximum **Drive Shaft Speed** should not be exceeded for the drive ratio listed. The optimum cam shaft speed for the lubricators is approximately 4 RPM.

DRIVE RATIO	MAX DRIVE LOAD FACTOR	MAX DRIVE SHAFT SPEED
100:1	12000	1140 RPM
300:1	15000	1725 RPM
400:1	22000	1725 RPM

EXAMPLE APPLICATION:

GIVEN: Drive: 100:1 (Model 835400)
Pump Station #6: 1/4" pump operating @ 1000 PSI
Pump Station #5: 1/4" pump operating @ 1000 PSI
Pump Station #4: 1/4" pump operating @ 500 PSI
Pump Station #3: 1/4" pump operating @ 500 PSI
Pump Station #2: 3/8" pump operating @ 250 PSI
Pump Station #1: 3/8" pump operating @ 250 PSI

1. Find the **Pump Load Factor (LF)** for each pump station, using the **Operating Pressure (OP)** and the **Pump Factor (PF)** for each pump. Use the formula: **OP x PF = LF**

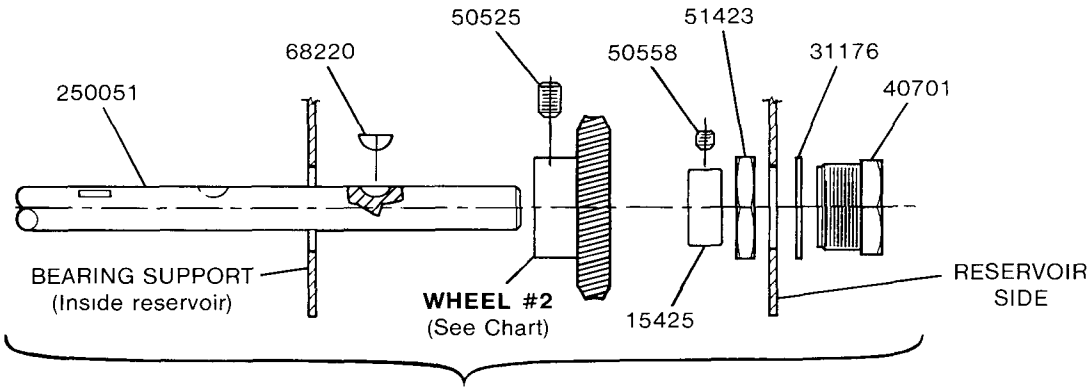
Pump Station #6: 1/4", **OP** = 1000 PSI, **PF** = 1.00; **LF** = 1000 x 1.00; **LF** = 1000
Pump Station #5: 1/4", **OP** = 1000 PSI, **PF** = 1.00; **LF** = 1000 x 1.00; **LF** = 1000
Pump Station #4: 1/4", **OP** = 500 PSI, **PF** = 1.00; **LF** = 500 x 1.00; **LF** = 500
Pump Station #3: 1/4", **OP** = 500 PSI, **PF** = 1.00; **LF** = 500 x 1.00; **LF** = 500
Pump Station #2: 3/8", **OP** = 250 PSI, **PF** = 1.33; **LF** = 250 x 1.33; **LF** = 332.5
Pump Station #1: 3/8", **OP** = 250 PSI, **PF** = 1.33; **LF** = 250 x 1.33; **LF** = 332.5

2. Total all the **Pump Load Factors** from step 1, above, to find the **Drive Load Factor:**

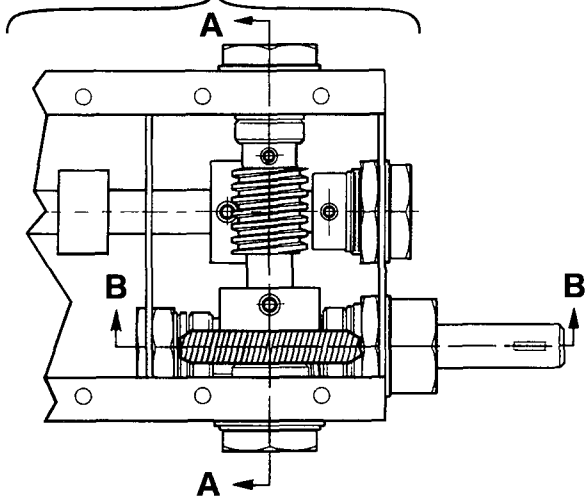
Pump Station #6: 1/4", **OP** = 1000 PSI, **LF** = 1000
Pump Station #5: 1/4", **OP** = 1000 PSI, **LF** = 1000
Pump Station #4: 1/4", **OP** = 500 PSI, **LF** = 500
Pump Station #3. 1/4", **OP** = 500 PSI, **LF** = 500
Pump Station #2: 3/8", **OP** = 250 PSI, **LF** = 332.5
Pump Station #1: 3/8", **OP** = 250 PSI, **LF** = 332.5

Drive Load Factor = 3665.0

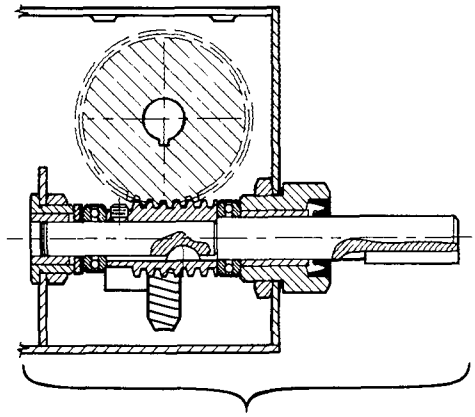
3. Compare the **Drive Load Factor** calculated above with the **Max Drive Load Factor** from the chart for the selected drive. The drive given in the example is a 100:1 drive (Model 835400), which has a **Max Drive Load Factor** of 12000. This figure is well above the drive load factor of 3665 calculated above, and should be satisfactory for the application.



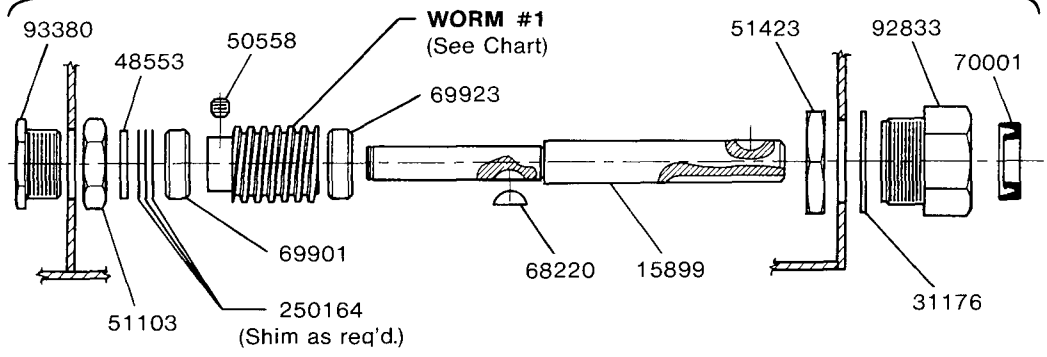
CAM SHAFT ASSEMBLY DETAIL



SECTION B-B

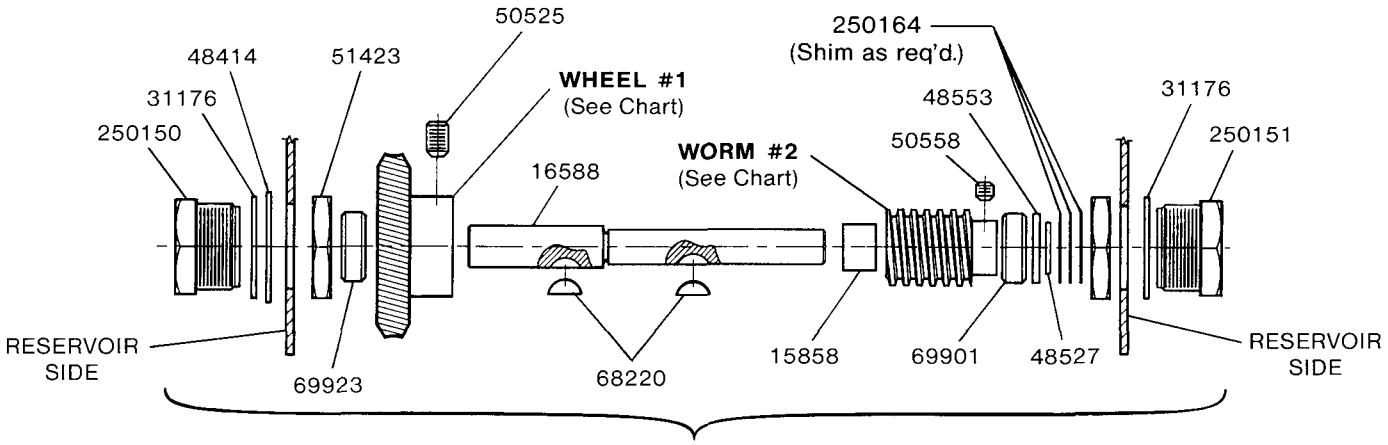


DRIVE SHAFT ASSEMBLY DETAIL

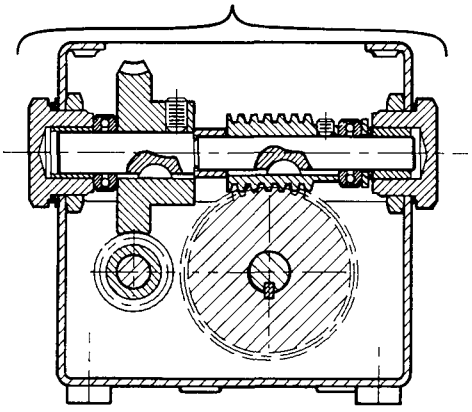


GEAR CHART

MODEL	RATIO	WORM #1	WHEEL #1	WORM #2	WHEEL #2
835400	100:1	15253	69835	15253	69835
847400	300:1	15253	69835	15252	15257
842400	400:1	15270	15297	15270	15297



CROSS SHAFT ASSEMBLY DETAIL



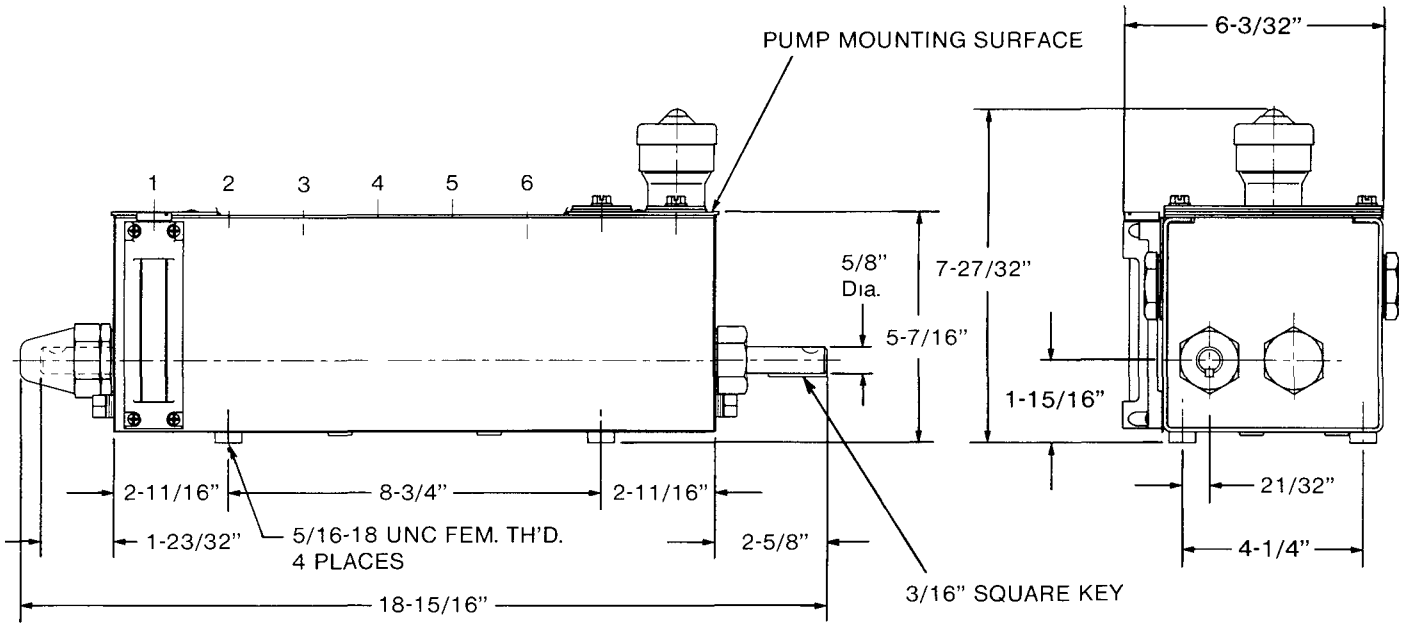
SECTION A-A

DISASSEMBLY INSTRUCTIONS

1. Removal of pumps, filler, and cover plate will allow access to the cams, drive, and cam shaft assembly
2. Remove the cross shaft assembly from the reservoir, (see **Cross Shaft Assembly Detail**). Loosen both end bearings (250150 and 250151) and nut (51423) on the front and rear of the reservoir. Lift out the cross shaft as a complete assembly, with gears, bearings etc. still mounted.
3. Loosen the set screw (50555) in each cam lobe (69914). Slide each cam clear of it's respective woodruff key (69220). Remove the keys from the cam shaft. Loosen the set screw (50525) in wheel #2, (see **Cam Shaft Assembly Detail**), and the set screw in stop collar (15425). Slide wheel #2 aside and remove the key (68220) from the camshaft Remove the stuffing box assembly (250043) from the end of the reservoir. Slide the cam shaft out of the end bearing (40701), stop collar (15425), wheel #2 and the center bearings (880432). As the cam shaft is removed from the reservoir, the cams must be removed as the cam shaft is withdrawn through each center bearing. Remove and discard the shaft oil seals (70001) from the stuffing boxes.
4. Remove the drive shaft assembly (see **Drive Shaft Assembly Detail**), by loosening the stuffing box (92833) and nut (51423). The drive shaft assembly should be removed by sliding it out of the stuffing box hole in the end of the reservoir as a complete assembly.
5. The remaining components may be removed from the reservoir as required. The cross shaft and drive shaft assemblies may be disassembled for cleaning, inspection and repair. **Do Not** remove the center bearings (880432) from the reservoir unless they require replacement
6. Clean and inspect all parts for wear and damage Pay close attention to wear on cams and cam shaft. Inspect the reservoir for cracks and damage Inspect the gearing and bearings for wear and bearings for excessive looseness Worn or damaged parts should be replaced. Always replace shaft seals (70001) when ever the shaft or stuffing box is removed. If the center bearings require replacement, they will have to be aligned with the cam shaft to the end bearings, placing shims as required between the center bearing and the bottom of the reservoir. Cam shaft should rotate with only a slight amount of drag after center bearings are secured to reservoir and end bearing and stuffing box are tight.

ASSEMBLY PROCEDURE

1. Reassembly will be the reverse of the disassembly procedure
2. The drive shaft assembly (see **Drive Shaft Assembly Detail**) should be shimmed as required (250164) for a minimum of end play in the drive shaft assembly once it is assembled into the reservoir. After the stuffing box is firmly tightened the drive shaft should rotate freely, without excessive drag or end play.
3. The cross shaft assembly (see **Cross Shaft Assembly Detail**) should be shimmed as required (250164) for a minimum of end play in the cross shaft assembly after it is assembled into the reservoir. After the end bearings (250150 and 250151) are fully tightened, wheel #1 must mesh with worm #1. The cross shaft should be free to rotate without excessive drag and no end play.
4. Position the cams in their respective pump station locations inside the reservoir, between the bearings Slide the cam shaft into the reservoir through the end bearing hole, and place each cam onto the cam shaft while sliding the cam shaft into the bearings. Install wheel #2 and the stop collar (15425) then slide the cam shaft into the end bearing (40701). Install the stuffing box (250043) and nut (51423), tightening securely Install the woodruff keys (68220) into the cam shaft then slide the cams into position over each key. Align the cams with the pump mounting holes on the top of the reservoir. Slide the end cam and stop collar up against the stufffing box and end bearing to hold the cam shaft into position. Tighten the set screws in both. Adjust the cam positions if necessary to align with the holes in the top of the reservoir, then secure with the set screw (50555).
5. Rotate the drive shaft and check for excessive drag or binding in the drive. The drive shaft should rotate freely. Excessive torque on the cam shaft will cause additional wear on the drive components. Install new shaft oil seal(s) (70001).
6. Reinstall cover plate, gaskets, filler assembly and pumps. Replace gaskets if damaged. Inspect the pumps for wear on the rocker arms, and pivots, replacing as required. Fill reservoir with lubricant and check for leaks.



SERVICE PARTS

Part	Qty.	Description	Part	Qty.	Description
15291	1	Key	69901	2	Thrust bearing
15425	1	Stop collar	69914	5	Cam lobe
15858	1	Spacer	69923	2	Thrust bearing
15899	1	Drive shaft	69944	1	Screen
16588	1	Cross shaft	70001	2	Oil seal
31176	5	Gasket	92833	1	Stuffing box assembly
32090	2	End gasket	93380	1	Bearing
32091-14	1	Gasket strip - 10 ft. section	250045	1	Shaft cover
40701	1	End bearing	250046	1	Stuffing box
48414	1	Washer	250051	1	Cam shaft
48527	1	Washer	250147	1	Gage glass kit
48553	2	Washer	250150	1	End bearing
50525	2	Set screw	250151	1	End bearing
50555	5	Set screw	250164	As req'd.	Shim (Pkg. of 12)
50558	2	Set screw	360661	1	Cover plate
51103	1	Nut	880085	1	Filler cap assembly
51423	5	Nut	880093	As req'd.	Slot cover assembly
67007	2	Plug	880150	1	Gage glass assembly
68220	9	Woodruff key	880432	2	Center bearing assembly

LUBRICATOR ACCESSORIES

Lube Sentries

Model 880447 Monitors camshaft rotation and reservoir oil level.
See Service Manual Section M30, Page 10 Series.

Model 880456 Same as 880447 except with 1" Short Suction Tube
See Service Manual Section M30, Page 10 Series

Oil Level Regulator

Model 880496 Automatically fills lubricator reservoir.
See Service Manual Section M30, Page 9 Series.

Lubricator Flow Switches

Note: To be used with non-conductive fluids only.

Caution: Lubricator must be properly grounded.

Model 880463 Used on individual Type 55 lubricator pumps to monitor lubricant flow.
See Service Manual Section M31, Page 9 Series.

Model 880466 Same as 880463 except includes terminal for series wiring.
See Service Manual Section M31, Page 9 Series.

RETAIN THIS INFORMATION FOR FUTURE REFERENCE

When ordering replacement parts, list: Part Number, Description, Model Number and Series Letter.

LINCOLN provides a Distributor Network that stocks equipment and replacement parts.