

# Model 800H API Service Manual

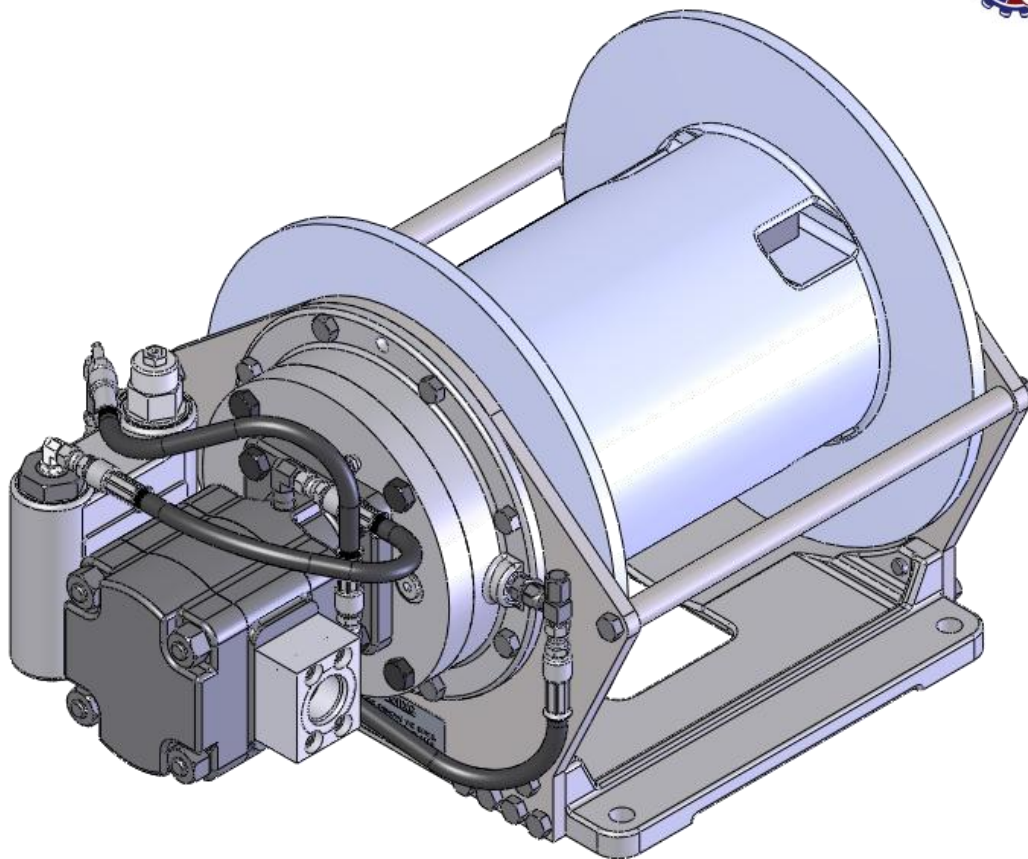
**DESIGN SERIES 001**



Authorized Distributor:  
Pacific Marine & Industrial  
www.pacificmarine.net  
info@pacificmarine.net

## TABLE OF CONTENTS

<b>INTRODUCTION AND THEORY OF OPERATION.....</b>	<b>3</b>
<b>HYDRAULIC SCHEMATIC.....</b>	<b>4</b>
<b>MAINTENANCE AND SERVICE.....</b>	<b>5</b>
<b>WIRE ROPE.....</b>	<b>7</b>
<b>DISASSEMBLY.....</b>	<b>8</b>
<b>ASSEMBLY.....</b>	<b>9</b>
<b>SERVICING THE MOTOR.....</b>	<b>10</b>
<b>SERVICING THE BRAKE.....</b>	<b>11</b>
<b>TROUBLESHOOTING.....</b>	<b>13</b>
<b>TORQUE SPECIFICATIONS CHART.....</b>	<b>14</b>
<b>BILL OF MATERIAL.....</b>	<b>15</b>
<b>EXPLODED ISOMETRIC ASSEMBLY DRAWING.....</b>	<b>17</b>



## WARNING

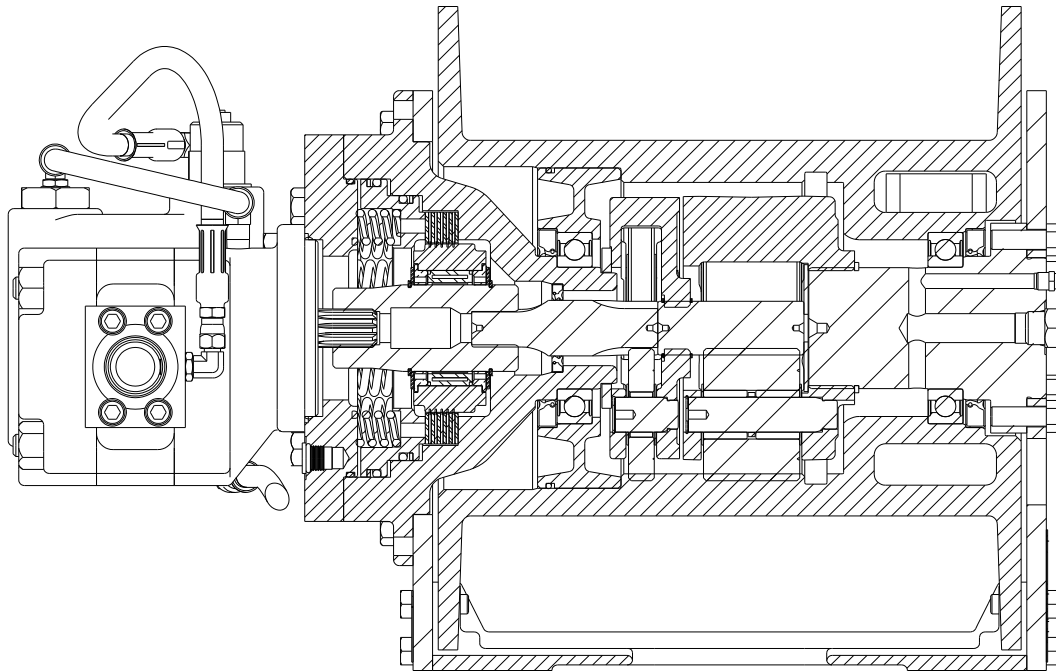
**FAILURE TO HEED THE FOLLOWING WARNINGS MAY RESULT IN SERIOUS INJURY OR DEATH!**

- Operators must be trained in the proper, safe operation of the hoist.
- For all personnel handling applications the guidelines and specification set forth in the API Specification 2C and Recommended Practice 2D as well as any other guidelines published in Tulsa Winch API Instructions For Personnel Handling (FSL-0019) must be followed.
- Cable anchors on hoists are not designed to hold the rated load of the hoist. You must keep at least five (5) wraps of cable on the drum to ensure that the cable doesn't come loose.
- Avoid shock loads. This type of load imposes a strain on the hoist many times the actual weight of the load and can cause failure of the cable or the hoist.
- Make sure that all equipment, including the hoist and cable, are maintained properly.

# INTRODUCTION AND THEORY OF OPERATION



Authorized Distributor:  
Pacific Marine & Industrial  
www.pacificmarine.net  
info@pacificmarine.net



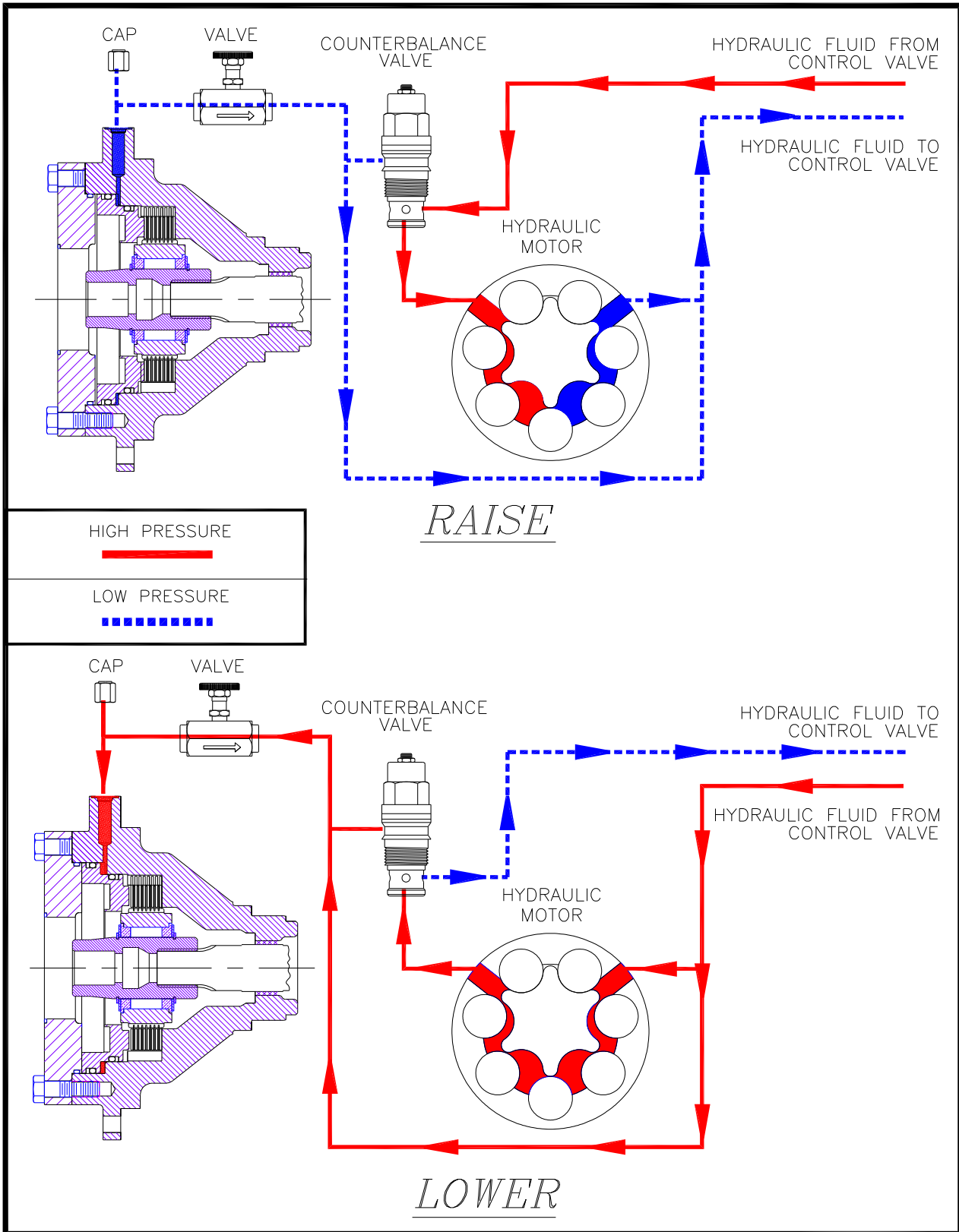
The planetary hoist is designed to utilize a hydraulic motor, driving through a multiple-disc oil brake, through a pair of planetary gearsets to the cable drum.

The multiple-disc oil brake is spring applied and hydraulically released through a port in the brake housing. During inhaul, the brake is not released, since the load is driven through a one-way cam clutch, bypassing the brake. When the load comes to a stop, the cam clutch locks up and the brake prevents the load from moving.

During payout, a counterbalance/cartridge valve is used to prevent the load from moving faster than desired. This valve partially blocks the main line from the motor back to the directional control valve, allowing a metered amount of hydraulic fluid through the motor. The valve is modulated by pilot pressure on the line from the directional control valve to the motor. Additionally, any time there is sufficient pilot pressure (375 PSI  $\pm$ 10%). During pay-out the spring applied static brake is released.



# HYDRAULIC SCHEMATIC





# MAINTENANCE AND SERVICE

For safe and consistent operation of TULSA WINCH hoists, swing drives, and winches, a regular program of preventive maintenance is strongly recommended. Regular oil changes with the correct oil for the ambient temperature conditions and an annual inspection of the wear components will help ensure a long life for your planetary geared products. *For Personnel Handling applications See Tulsa Winch API Instructions For Personnel Handling (FSL-0019).*

## Maintenance Scheduling

The owner is to ensure proper inspection intervals, in compliance with the API RP 2D Section 4 requirements or the ANSI B30.5, 5-2.3, and will review hoist usage categories on a periodic basis. A Qualified Inspector should perform all maintenance and inspections.

For hoists in occasional use, less than 10 hours per month, API RP 2D recommends a pre-use inspection and an annual 12-month inspection based on average use over a quarter.

- For hoists in moderate use, more than 10 but less than 50 hours per month, API RP 2D recommends a pre-use inspection, quarterly inspection, and an annual 12-month inspection based on average use over a quarter.
- For hoists in heavy use, more than 50 hours per month, API RP 2D recommends a pre-use inspection, monthly inspection, quarterly inspection, and an annual 12-month inspection.

## Oil Level Maintenance

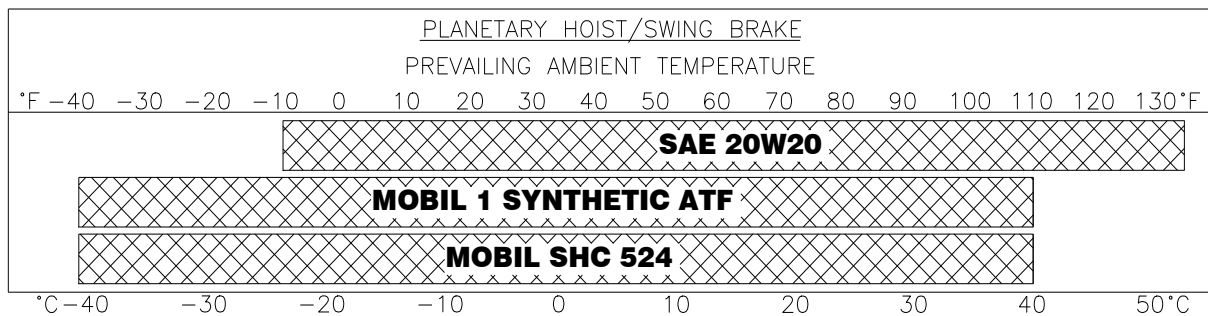
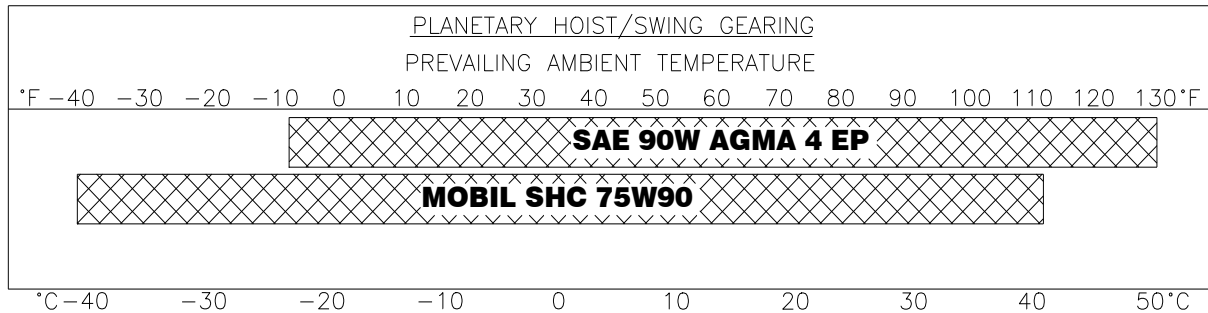
Tulsa Winch recommends that the oil level in the gearbox and brake be checked and adjusted as part of the pre-use inspection. If the oil level drops frequently or oil leakage is detected during an inspection, maintenance should be performed to correct any problems.

## Oil Change Interval

The oil in the gearbox and brake sections should be changed every **1000 hrs** or **6 months** of usage.



# RECOMMENDED OIL



*All oils must meet MIL-PRF2105E. Substitution from a reputable manufacturer is allowed as long as type and grade are maintained.*

OIL CAPACITY	
GEARBOX	1.00 QTS
BRAKE	.25 QTS

## WARNING

**Do not use EP type gear lubes in the brake section of this winch. EP lubes may prevent the clutch from locking up, which, in turn causes the load to fall, resulting in property damage, personal injury, or death.**

The hydraulic system should use only high quality hydraulic fluid from reputable suppliers. These oils should contain additives to prevent foaming and oxidation in the system. All hoist hydraulic systems should be equipped with a return line filter capable of filtering 10 micron particles from the system.

Hoists are shipped from the factory with SAE 90 Extreme Pressure (EP) gear lube in the gearbox and lightweight non-EP oil in the brake section. This oil and gear lube should be satisfactory for operation in ambient temperatures from -10° F (-23° C) to +130° F (+55° C).

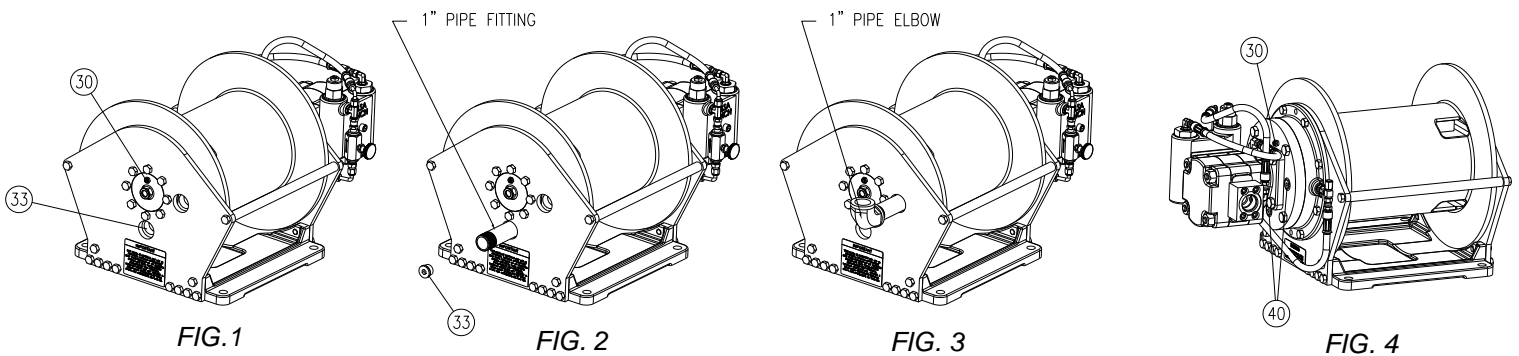


## OIL CHANGE

Drain the gearbox oil by rotating the drum so that the plug (*Item 33*) is visible and aligned with the lower hole in the side plate (*Item 1*) (*See Fig 1*). Screw in a piece of 1" pipe to funnel the oil and then with a hex wrench remove the drain plug located inside of the 1" pipe (*See Fig. 2*). Examine the used oil for signs of significant metal deposits and then dispose of it in a proper manner. Remove the 1" pipe.

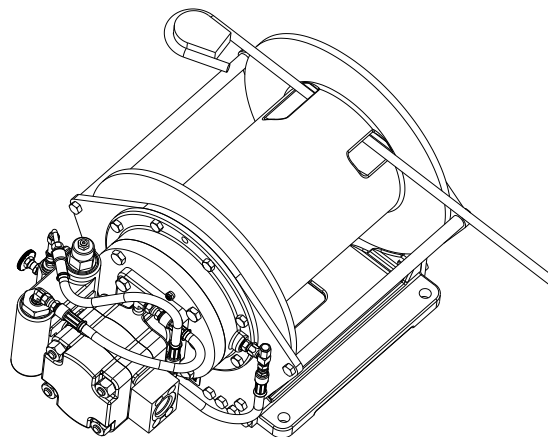
Rotate the drum so that the port is visible through the upper hole in the side plate. Install a 1" pipe with elbow into the upper hole in the side plate (*See Fig. 3*). Fill the gearbox with approx. 1 quart of EP-90 oil until visible in the sight gage (*Item 31*). Remove the pipe and elbow then replace the plug (*Item 33*). *See the Oil Chart on page 6 of this manual for the recommended oil type and grade for your application.*

Drain the brake oil by removing the drain and level plugs (*Item 40*) along with the vent (*Item 30*) above the motor (*See Fig. 4*). Inspect the oil for signs of metallic particles and/or burning and reinstall plugs. Install drain plug (*Item 33*) and fill with approx .25 qts. of non-EP oil and reinstall the vent (*Item 30*). *See Oil Chart Pg. 6 of this manual for recommended oil type and grade for your application.*



## WIRE ROPE

The wedge is designed for 7/16" - 1/2" wire rope installed as shown in illustration below. For other wire rope sizes or poly rope consult factory for recommendations.





# DISASSEMBLY

1. Drain the oil from the gearbox and brake sections using the instructions on page 7.
2. Stand the hoist on its end with the motor pointing up.
3. Disconnect the hose (*Item 57*) connected to the brake housing (*Item 21*). Remove the motor and counterbalance valve assembly from the hoist by removing four capscrews (*Item 51*). See *Servicing The Motor* section on page 10 for motor and counterbalance valve disassembly.
4. Remove the brake subassembly from the hoist by removing eight capscrews (*Item 9*) holding the brake housing to the side plate (*Item 50*). Reinstall two of these capscrews into the two extra tapped holes and tighten them evenly until the brake housing disengages the side plate. See *Servicing The Brake* section on page 11 for brake repair.
5. Remove the side plate (*Item 50*) by removing twelve capscrews (*Item 2*).
6. Lift the bearing carrier (*Item 26*) out of the drum (*Item 5*). Inspect the bearing (*Item 28*) for signs of pitting or spalling and if necessary, replace the bearing and seal (*Item 7-5*).
7. Remove the thrust washer (*Item 6*) and input sun gear (*Item 8*) from the input planet gearset (*Item 36*). Inspect for damage or wear and replace if needed.
8. Remove the input planet gearset (*Item 36*) from the drum. Inspect the gearset for wear or damage and replace if needed. For replacement of individual gearset components contact factory.
9. Remove the output planet gearset (*Item 4*) from the drum (*Item 5*). Inspect the gearset for wear or damage and replace if needed. For replacement of individual gearset components contact factory.
10. Remove the retaining ring (*Item 3*) inside the drum on the output shaft (*Item 32*). Inspect for damage and or deformation and replace if necessary.
11. Remove the drum (*Item 5*) by lifting straight up and off of the output shaft (*Item 32*). Inspect the gear teeth for excessive wear and replace if necessary. Inspect the bearing (*Item 28*) for signs of spalling or pitting and, if necessary, replace the bearing (*Item 28*) and seal (*Item 7-5*).
12. Inspect the output shaft (*Item 32*) for wear or damage and, if necessary, remove it from the side plate (*Item 1*) by removing eight capscrews (*Item 20*).





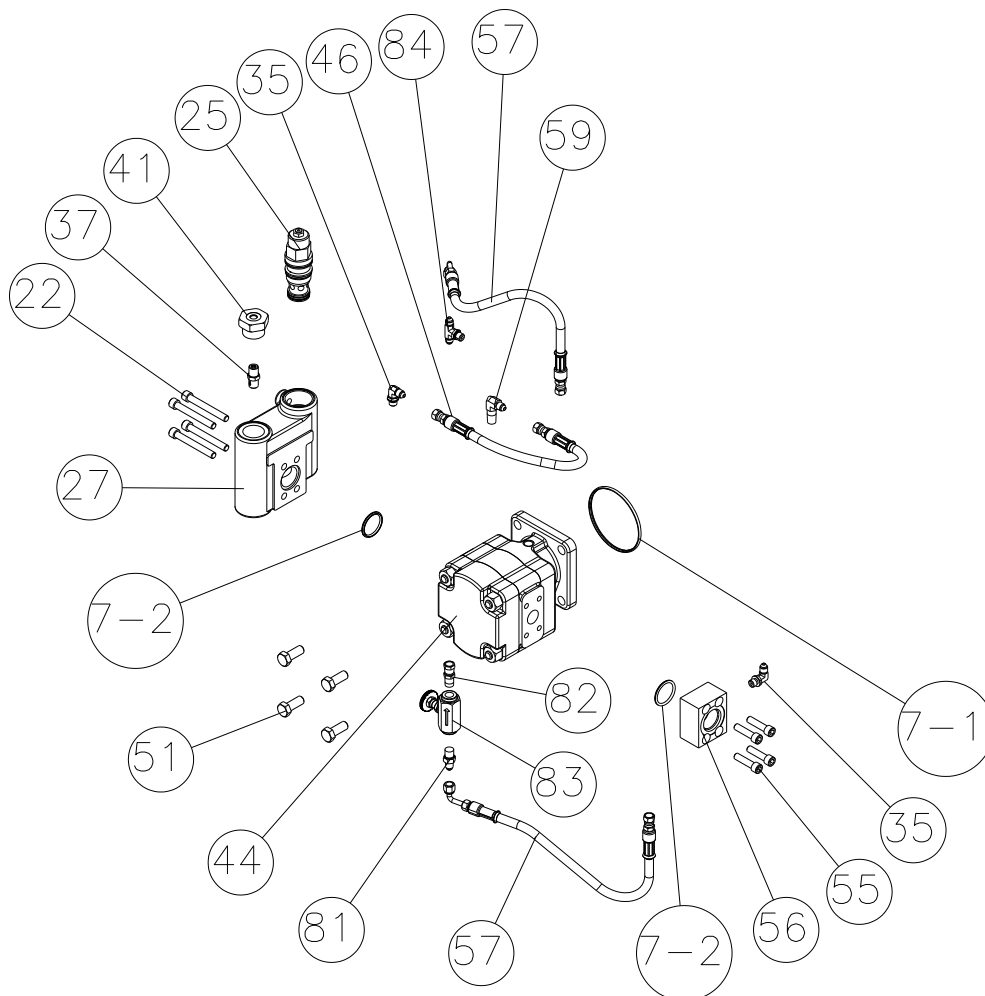
# ASSEMBLY

1. Thoroughly clean and inspect all parts. Replace those that show wear, damage or distortion.
2. Inspect the drum (*Item 5*) for structural integrity and the internal gear teeth for excessive wear, then replace if necessary.
3. Attach the output shaft (*Item 32*) to the side plate (*Item 1*) with eight capscrews (*Item 2*), making sure the vent (*Item 30*) is oriented properly, then torque them to specification (*see Torque Specifications Chart on page 15 of this manual*).
4. Attach the support rods (*Item 43*) to the side plate (*Item 1*) with two capscrews (*Item 2*). Torque to specification (*see Torque Specifications Chart on page 15 of this manual*).
5. If necessary, install a new bearing (*Item 28*) and oil seal (*Item 7-5*) into the drum.
6. Lay the unit down so that the rods (*Item 43*) are pointing up. Set the drum (*Item 5*) onto the output shaft (*Item 32*) being careful not to damage the seal (*Item 7-5*), seating the drum on the output shaft (*Item 32*).
7. Install the retaining ring (*Item 3*) onto the output shaft (*Item 32*).
8. Install the output planet gearset (*Item 4*) into the drum (*Item 5*), making sure it's engages the output shaft (*Item 32*) correctly.
9. Install the input planet gearset (*Item 36*) into the drum (*Item 5*), making sure it's installed correctly into the output planet gear set (*Item 4*).
10. Put a light coating of grease on the thrust washer (*Item 6*) to keep it in place. Install the thrust washer into the input gearset (*Item 36*), and then insert the input sun gear (*Item 8*).
11. Install a new o-ring (*Item 7-10*) and, if necessary, a new bearing (*Item 28*) and seal (*Item 7-5*) into the bearing carrier (*Item 26*). Grease the o-ring and seal and install the bearing carrier into the drum.
12. Position the side plate (*Item 50*) on top of the rods (*Item 43*) and base (*Item 12*). Attach the side plate with twelve capscrews (*Item 2*). Torque to specification (*see Torque Specifications Chart on page 15 of this manual*).
13. Install the brake subassembly into the side plate (*Item 1*), making sure the holes for the motor are in the correct orientation. Also, make sure that the oil drain, level and vent plugs in the cover are properly oriented. Install eight capscrews (*Item 9*) and torque them to specification (*see Torque Specifications Chart on page 15 of this manual*).
14. Install a new o-ring (*Item 7-1*) on the face of the motor and re-install the motor/counterbalance valve assembly. Install four capscrews (*Item 51*) and torque them to specification (*see Torque Specifications Chart on page 15 of this manual*).
15. Reconnect the hose (*Item 57*) to the brake housing (*Item 21*).
16. Fill both the gearbox and the brake section with the proper amount and type of lubricants as instructed in the *Recommended Oil* section on page 6 of this manual.



# SERVICING THE MOTOR

1. Remove all hoses and fittings from motor assembly.
2. Remove the counterbalance valve (*Item 25*) from the block (*Item 27*) and inspect the small metering hole located on the side of the valve to make sure it is not obstructed. Also, inspect the o-rings for damage and replace if necessary.
3. Remove the plug (*Item 41*) and check valve (*Item 37*). Inspect the check valve (*Item 37*) to insure it is operating properly.
4. If necessary remove the counterbalance block (*Item 27*) by removing the 4 capscrews (*Item 22*). Check the o-ring (*Item 7-2*) for damage and replace if necessary.
5. If needed remove the flange (*Item 56*) by removing the 4 capscrews (*Item 55*). Check the o-ring (*Item 7-2*) for damage and replace if necessary.
6. Motors (*item 44*) and counterbalance valves (*Item 25*) are not serviceable in the field. Return them to an authorized dealer for service.
7. Re-install all components in reverse order of the instructions above...



# SERVICING THE BRAKE

1. Evenly remove the four capscrews (*Item 11*) holding the brake cover (*Item 20*) in place. Spring pressure will raise the cover as the capscrews are loosened. Remove the cover from the brake housing.
2. Remove the springs (*Item 24*) from the piston and check the free height. Each spring should measure at least 1.094 inches with no force on them.
3. Remove the brake piston (*Item 10*) by installing two pieces of 3/8"-16NC all-thread in the bottom of two spring pockets. Using jam nuts, screw the all-thread pieces in evenly until the piston is clear of the housing. An alternate way of removing the piston is to use a portable power unit or shop air to slowly pressurize the brake cavity until the piston is out of the bore.
4. Remove the brake driver/clutch assembly (*Items 13, 14, 15, 17, 34, and 38*) from the brake housing (*Item 21*).
5. Remove the stator plates (*Item 19*) and friction discs (*Item 18*) from the brake housing and check them for excessive wear and replace if necessary. Additionally, check the top stator plate for scoring caused by the piston removal tools and polish if necessary. Friction discs should measure no less than 0.055 inches thick and stator plates should measure no less than 0.064 inches thick.
6. If necessary, remove the seal (*Item 7-6*) from the brake housing.
7. If the brake housing (*Item 21*) is removed from the hoist, examine the journal on the brake housing where the seal (*Item 7-5*) runs for wear. If severely worn, replace the brake housing.
8. Carefully disassemble the brake driver/clutch and note the side in which the markings on the clutch (*Item 34*) are facing. The clutch assembly must be re-assembled with the markings facing the proper direction in order for the hoist to function properly. Inspect the surface on the input and brake drivers (*Items 13 & 38*) where the clutch (*Item 34*) runs. If there is any pitting or spalling on the drivers then both it and the clutch must be replaced.
9. Re-assemble the driver/clutch assembly, making sure that the clutch is installed in correct direction to lock-up during pay-out.
10. If removed install a new seal (*Item 7-6*) into the brake housing. If the brake housing is removed from the hoist, temporarily install the input sun gear (*Item 8*) into the brake housing and slide the driver/clutch assembly onto the sun gear spline.
11. Install the stator plates (*Item 19*) and friction discs (*Item 18*) into the brake housing starting with a stator and alternating friction discs and stator plates. There is one more stator plate than friction disc so you will finish with a stator plate.
12. Coat the new o-rings and backup rings (*Items 7-3, 7-9, 7-7, & 7-8*) with light oil and install onto the piston (*Item 10*). See Fig. 5 for proper o-ring/backup ring installation.
13. Carefully install the piston (*Item 10*) into the brake housing (*Item 21*) and gently tap it down until it is seated against the friction disc/stator pack.

14. Install the springs (*Item 24*) into the spring pockets of the piston. If working in a horizontal position, coat the bottom of each spring with chassis lube to keep it in position.
15. Coat the new o-ring (*Item 7-4*) with light oil and install it into the groove on the brake cover (*Item 20*).
16. Install the cover (*Item 20*) onto the brake housing (*Item 21*) and draw it down evenly, alternating between opposite capscrews (*Item 11*). Make sure that the cover is aligned properly with the brake housing in order to correctly orient the motor and vent/drain plugs.
17. Check the brake release with a portable hydraulic pump. Full release should be obtained at 375 PSI  $\pm$ 10%.

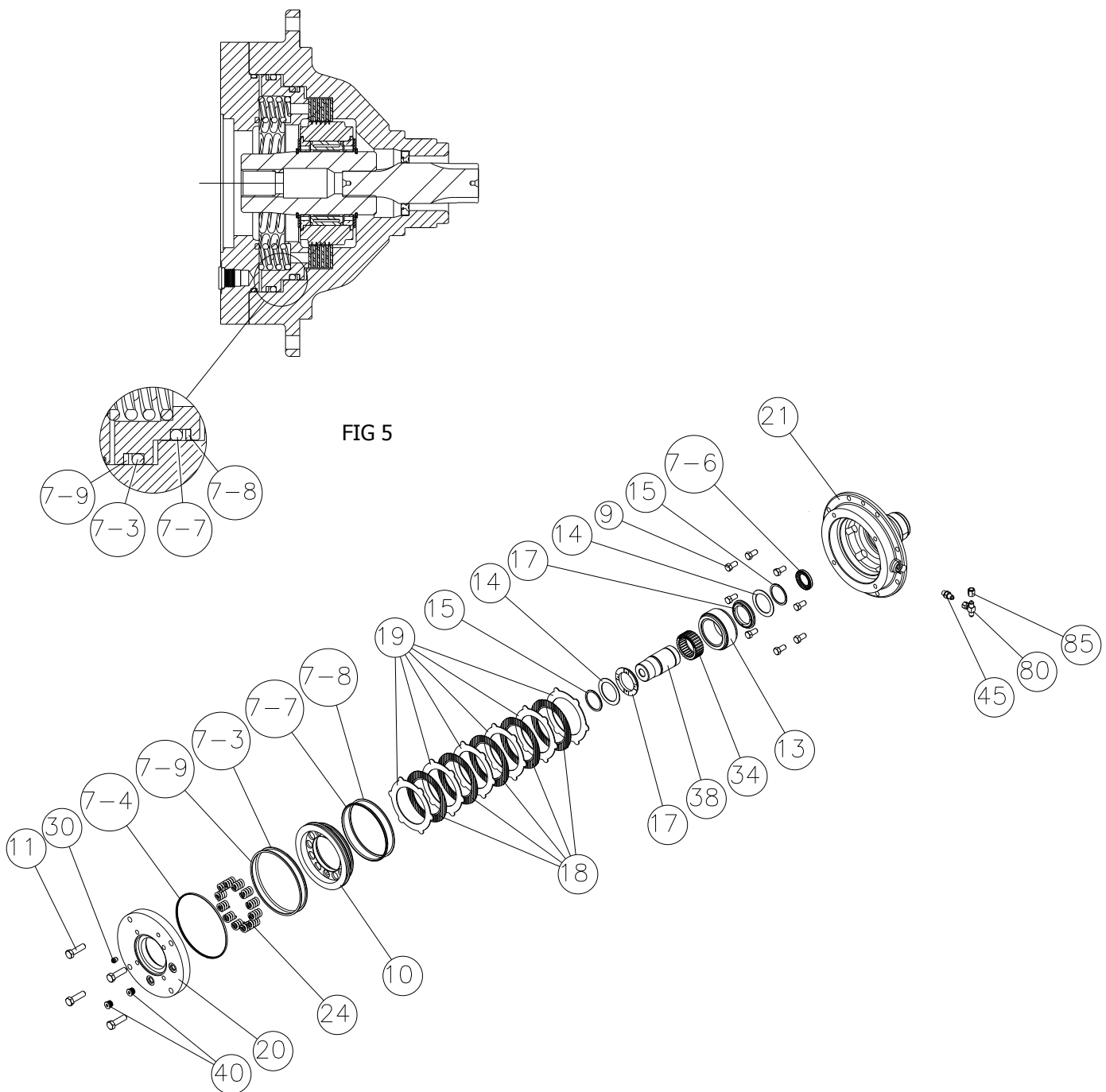


FIG 5

# TROUBLESHOOTING

## Hoist won't hold load

### Possible Solutions:

1. There is excessive back pressure in the hydraulic system. Check the system for line restrictions and reduce the back pressure.
2. The brake discs are worn. Replace the brake discs. Friction discs should measure no less than 0.055 inches thick and the stator plates should measure at least 0.068 inches thick.
3. The brake clutch is slipping due to wear of either driver and/or clutch. Inspect the driver components for wear and replace if necessary.

## Hoist unable to lift load

### Possible Solutions:

1. The relief valve setting may be too low to allow proper lifting. Increase the relief pressure setting.
2. The load being lifted may be more than the winches rating. Verify weight and reduce the load or re-rig it to increase mechanical advantage.

## Hoist unable to lower load

### Possible Solutions:

1. The counterbalance valve cartridge may have a plugged metering hole (*see page 10 for location of metering hole*). Remove the cartridge and clean it.

## Oil leaks from motor-side vent

### Possible Solutions:

1. The motor shaft seal may have failed. Replace the motor and reduce the back pressure if that was a cause of the seal failure.
2. The brake pistons o-ring seals may have failed. Service the brake section and replace any worn parts found.

# TORQUE SPECIFICATIONS CHART

Nominal	Size	Dry	Plated	Lubricated	Dry	Plated	Lubricated
		SAE Grade 5 Torque *(Ft-Lbs)	SAE Grade 5 Torque *(Ft-Lbs)	SAE Grade 5 Torque *(Ft-Lbs)	SAE Grade 8 Torque *(Ft-Lbs)	SAE Grade 8 Torque *(Ft-Lbs)	SAE Grade 8 Torque *(Ft-Lbs)
<b>1/4</b>	<b>20</b>	<b>8</b>	<b>6</b>	<b>5</b>	<b>12</b>	<b>9</b>	<b>7</b>
<b>1/4</b>	<b>28</b>	<b>10</b>	<b>7</b>	<b>6</b>	<b>14</b>	<b>10</b>	<b>8</b>
<b>5/16</b>	<b>18</b>	<b>17</b>	<b>13</b>	<b>10</b>	<b>25</b>	<b>18</b>	<b>15</b>
<b>5/16</b>	<b>24</b>	<b>19</b>	<b>14</b>	<b>11</b>	<b>27</b>	<b>20</b>	<b>16</b>
<b>3/8</b>	<b>16</b>	<b>31</b>	<b>23</b>	<b>19</b>	<b>44</b>	<b>33</b>	<b>26</b>
<b>3/8</b>	<b>24</b>	<b>35</b>	<b>26</b>	<b>21</b>	<b>49</b>	<b>37</b>	<b>30</b>
<b>7/16</b>	<b>14</b>	<b>49</b>	<b>37</b>	<b>30</b>	<b>70</b>	<b>53</b>	<b>42</b>
<b>7/16</b>	<b>20</b>	<b>55</b>	<b>41</b>	<b>33</b>	<b>78</b>	<b>58</b>	<b>47</b>
<b>1/2</b>	<b>13</b>	<b>76</b>	<b>57</b>	<b>45</b>	<b>106</b>	<b>80</b>	<b>64</b>
<b>1/2</b>	<b>20</b>	<b>85</b>	<b>64</b>	<b>51</b>	<b>120</b>	<b>90</b>	<b>72</b>
<b>9/16</b>	<b>12</b>	<b>109</b>	<b>82</b>	<b>65</b>	<b>153</b>	<b>115</b>	<b>92</b>
<b>9/16</b>	<b>18</b>	<b>122</b>	<b>91</b>	<b>73</b>	<b>172</b>	<b>129</b>	<b>103</b>
<b>5/8</b>	<b>11</b>	<b>150</b>	<b>113</b>	<b>90</b>	<b>212</b>	<b>159</b>	<b>127</b>
<b>5/8</b>	<b>18</b>	<b>170</b>	<b>128</b>	<b>102</b>	<b>240</b>	<b>180</b>	<b>144</b>
<b>3/4</b>	<b>10</b>	<b>266</b>	<b>200</b>	<b>160</b>	<b>376</b>	<b>282</b>	<b>226</b>
<b>3/4</b>	<b>16</b>	<b>297</b>	<b>223</b>	<b>178</b>	<b>420</b>	<b>315</b>	<b>252</b>
<b>7/8</b>	<b>9</b>	<b>430</b>	<b>322</b>	<b>258</b>	<b>606</b>	<b>454</b>	<b>364</b>
<b>7/8</b>	<b>14</b>	<b>474</b>	<b>355</b>	<b>284</b>	<b>668</b>	<b>501</b>	<b>401</b>
<b>1</b>	<b>8</b>	<b>644</b>	<b>483</b>	<b>386</b>	<b>909</b>	<b>682</b>	<b>545</b>
<b>1</b>	<b>14</b>	<b>721</b>	<b>541</b>	<b>433</b>	<b>1019</b>	<b>764</b>	<b>611</b>
<b>1-1/8</b>	<b>7</b>	<b>794</b>	<b>596</b>	<b>475</b>	<b>1288</b>	<b>966</b>	<b>772</b>
<b>1-1/8</b>	<b>12</b>	<b>890</b>	<b>668</b>	<b>534</b>	<b>1444</b>	<b>1083</b>	<b>866</b>
<b>1-1/4</b>	<b>7</b>	<b>1120</b>	<b>840</b>	<b>672</b>	<b>1817</b>	<b>1363</b>	<b>1090</b>
<b>1-1/4</b>	<b>12</b>	<b>1241</b>	<b>930</b>	<b>745</b>	<b>2012</b>	<b>1509</b>	<b>1207</b>

T = BOLT TORQUE (LB. FT.)

K = TORQUE COEFFICIENT (K = 0.20 DRY

W = PRELOAD TENSION

D = NOMINAL BOLT SIZE (IN.)

$T = (KWD) / 12$

K = 0.15 PLATED      K = 0.12 LUBRICATED)

\* ALL TORQUE VALUE TOLERANCES ARE ± 5%

# BILL OF MATERIAL

SEQ	QTY	P/N	DESCRIPTION
1	1	45410	SIDE PLATE
2	32	45451	CAPSCREW
3	1	29973	RETAINING RING
4	1	4583	OUTPUT GEARSET (59:1 RATIO)
4	1	4588	OUTPUT GEARSET (23:1 & 34:1 RATIO)
5	1	45446	DRUM
6	1	45200	WASHER, THRUST
7	1	4587	SEAL KIT
7-1	1	31455	O-RING
7-2	2	42468	O-RING
7-3	1	32186	O-RING
7-4	1	33094	O-RING
7-5	2	45452	OIL SEAL
7-6	1	43508	OIL SEAL
7-7	1	42335	O-RING
7-8	1	42336	BACKUP RING
7-9	1	42337	BACKUP RING
7-10	1	45043	O-RING
8	1	45436	INPUT SUN GEAR (59:1 RATIO)
8	1	45464	INPUT SUN GEAR (23:1 RATIO)
8	1	45465	INPUT SUN GEAR (34:1 RATIO)
9	8	45439	CAPSCREW
10	1	42942	BRAKE PISTON
11	4	10381-TW	CAPSCREW
12	1	45412	BASE
13	1	45453	BRAKE DRIVER
14	2	41723	RACE
15	2	26980	RETAINING RING
17	2	41743	BUSHING, THRUST
18	5	32765	FRICTION DISC
19	6	42148	STATOR PLATE
20	1	43429	BRAKE COVER
21	1	45434	BRAKE HOUSING
22	4	31558	CAPSCREW
24	12	43938	BRAKE SPRING
25	1	41867	COUNTERBALANCE VALVE
26	1	45447	BEARING CARRIER
27	1	45438	COUNTERBALANCE BLOCK
28	2	45419	BEARING
29	1	45459	CABLE WEDGE
30	2	13050-TW	BREATHER
31	1	45445	SIGHT PLUG
32	1	45418	OUTPUT SHAFT
33	1	41719	O-RING PLUG
34	1	41759	SPRAG/CAM CLUTCH
35	2	42089	90 DEG. ADAPTER

<b>SEQ</b>	<b>QTY</b>	<b>P/N</b>	<b>DESCRIPTION</b>
<b>36</b>	1	4586	INPUT GEARSET (59:1 RATIO)
<b>36</b>	1	4590	INPUT GEARSET (23:1 RATIO)
<b>36</b>	1	4589	INPUT GEARSET (34:1 RATIO)
<b>37</b>	1	42223	CHECK VALVE
<b>38</b>	1	45435	INPUT DRIVER
<b>40</b>	2	42392	O-RING PLUG
<b>41</b>	1	42225	ADAPTER PLUG
<b>43</b>	2	45417	SUPPORT ROD
<b>44</b>	1	45437	HYDRUALIC MOTOR (1.97 CU.-IN.)
<b>44</b>	1	45449	HYDRAULIC MOTOR (2.95 CU.-IN.)
<b>44</b>	1	45450	HYDRAULIC MOTOR (3.94 CU.-IN.)
<b>45</b>	1	41838	STRAIGHT ADAPTER
<b>46</b>	1	42030	HOSE ASSEMBLY
<b>50</b>	1	45409	SIDE PLATE
<b>51</b>	4	20524	CAPSCREW
<b>55</b>	4	24475	CAPSCREW
<b>56</b>	1	45453	FLANGE
<b>57</b>	2	42031	HOSE ASSEMBLY
<b>59</b>	1	42259	90 DEG. ADAPTER
<b>80</b>	1	42033	TEE FITTING
<b>81</b>	1	40280	STRAIGHT ADAPTER
<b>82</b>	1	42848	STRAIGHT SWIVEL ADAPTER
<b>83</b>	1	42847	NEEDLE VALVE
<b>84</b>	1	42438	TEE FITTING
<b>85</b>	1	42851	CAP
<b>87</b>	1	42846	IMPORTANT LABEL
<b>88</b>	1	43462	WARNING LABEL



# EXPLODED ISOMETRIC ASSEMBLY DRAWING

