



**TYPE 2
HYDRAULIC PTO**

**INSTALLATION AND
MAINTENANCE MANUAL**



**WPT Power Corporation
1600 Fisher Road - Wichita Falls, TX 76305
P.O. Box 8148 - Wichita Falls, TX 76307
Ph. 940-761-1971
www.WPTpower.com**

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1.0 INTRODUCTION


- 1.1 The WPT Power PTO is the most rugged PTO available on the market today. Follow the procedures detailed in this Installation Maintenance Manual for years of service.
- 1.2 When ordering parts, use the part number from the Bill of Materials supplied with this unit. Also, please include the part number and the serial number from the unit itself. These will be found on a metal tag riveted to the bell housing. Your WPT Distributor can provide a copy of the Bill of Materials if the one provided should become lost.
- 1.3 When performing installation and maintenance functions, refer to the drawing at the back of this manual. The references on the drawing in this manual DO NOT correspond to the references on the assembly drawing and Bill of Materials. Do not use the item numbers from the drawing in this manual for ordering parts.

 **DANGER:**

To avoid damage or personal injury, ensure that adequate lifting devices and hand tools are available.

 **DANGER:**

Read these instructions thoroughly and review until you fully understand all warning and hazards before proceeding with the work described in this manual. Failure to follow these instructions in this manual can result in unreasonable exposure to hazardous conditions and/or personal injury and/or death.

Throughout there are a number of HAZARD WARNINGS that must be read and adhered to in order to prevent possible loss of equipment and/or personal injury and /or loss of life. The three warning words are “DANGER”, “WARNING” and “CAUTION”. They are used to indicate the severity of the hazard and are preceded by a safety alert symbol. 

“**DANGER**” – Denotes the most serious injury hazard and is used when serious injury or death **WILL** result from misuse or failure to follow the specific instructions set forth in this manual.

“**WARNING**” – Denotes when serious injury or death **MAY** result from misuse or failure to follow the specific instructions set forth in this manual.

“**CAUTION**” – Denotes when injury, product or equipment damage may result from the misuse or failure to follow the specific instructions set forth in this manual.

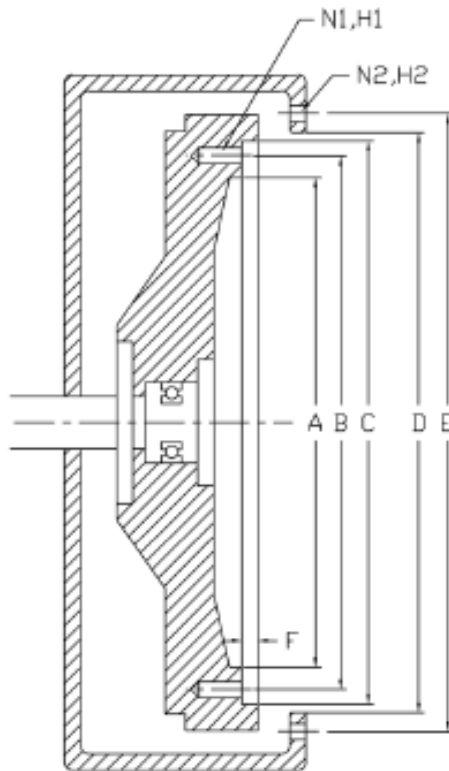
It is the responsibility of the personnel involved in the installation, operation and maintenance of this equipment, on which this PTO is mounted, that they must fully understand the warnings and dangers that are listed in this manual and are aware of what the correct procedures must be to safely install, operate and maintain this equipment.

2.0 SPECIFICATIONS

2.1 Flywheel and Flywheel Housing Dimensions

TABLE 1 in (mm)											
CLUTCH SIZE	"A"	"B"	"C"	N1	H1	SAE HSG SIZE	"D"	"E"	N2	H2	F
18"/14"	19.62 (498.3)	21.375 (542.93)	22.500 (571.50)	6	5/8-11 NC	"O"	25.500 (647.70)	26.750 (679.45)	16	1/2-13 NC	0.25 (6.4)
14"	16.12 (409.4)	17.250 (438.15)	18.375 (466.73)	8	1/2-13 NC	"1"	20.125 (511.17)	20.875 (530.22)	12	7/16-14 NC	0.25 (6.4)
11"	12.38 (314.5)	13.125 (333.38)	13.875 (352.43)	8	3/8-16 NC	"2"	17.625 (447.68)	18.375 (466.72)	12	3/8-16 NC	0.25 (6.4)
11"	12.38 (314.5)	13.125 (333.38)	13.875 (352.43)	8	3/8-16 NC	"3"	16.125 (409.58)	16.875 (428.62)	12	3/8-16 NC	0.25 (6.4)

Dimensions listed here-in-above are standard. However, the assembly specific drawing overrides this table.



2.2 Maximum RPM

TABLE 2			
CLUTCH SIZE	11"	14"	18"
RPM	2500	2300	2100

Do not exceed maximum ratings without consulting WPT Engineering.

2.3 Suggested Hydraulic Schematic

NOTE: Recommended operating hydraulic pressure is 500 P.S.I. ± 50.

TABLE 3

HYDRAULIC ACTUATION

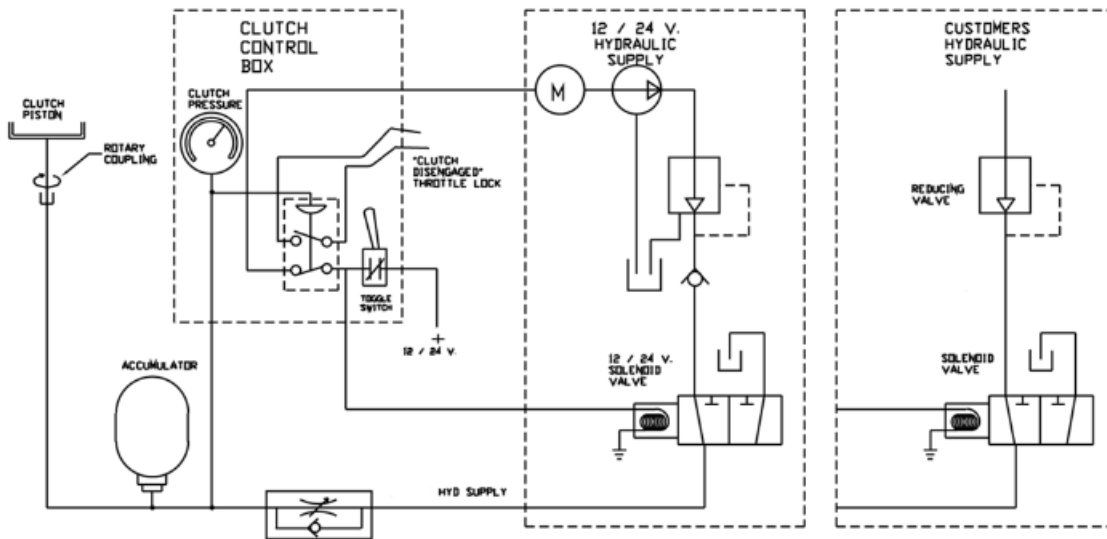


TABLE 4

TORQUE VALUES FOR SOCKET HEAD AND HEX HEAD CAPSCREWS						
SOCKET HEAD CAP SCREWS						
BOLT SIZE IN INCHES	As Received			Lubricated**		
	LB - FT	LB - IN	Nm	LB - FT	LB - IN	Nm
1/4	13	150	17	10	120	13
5/16	23	305	34	18	244	27
3/8	45	545	62	36	436	49
7/16	70	840	95	56	672	76
1/2	108	1300	147	86	1040	117
9/16	155	1860	210	124	1488	168
5/8	211	2530	286	168	2024	228
3/4	367	4400	497	293	3520	397
7/8	583	7000	791	466	5600	632
1	867	10400	1175	693	8320	940
1 1/8	1242	14900	1684	993	11920	1347
1 1/4	1750	21000	2374	1400	16800	1899
1 3/8	2317	27800	3142	1853	22240	2513
1 1/2	3042	36500	4125	2433	29200	3300
1 3/4	4950	59400	6714	3960	47520	5371
2	7492	89900	10161	5993	71920	8128
HEX HEAD CAP SCREWS - Grade 8						
BOLT SIZE IN INCHES	As Received			Lubricated**		
	LB - FT	LB - IN	Nm	LB - FT	LB - IN	Nm
1/4	8	100	11	6	80	9
5/16	17	200	23	13	160	18
3/8	30	360	41	24	288	32
7/16	48	570	64	38	456	51
1/2	83	990	112	66	792	89
9/16	107	1285	145	85	1028	116
5/8	143	1714	194	114	1371	155
3/4	256	3070	347	204	2456	277
7/8	417	5000	565	333	4000	452
1	625	7500	848	500	6000	678
HEX HEAD CAP SCREWS - Grade 5						
BOLT SIZE IN INCHES	As Received			Lubricated**		
	LB - FT	LB - IN	Nm	LB - FT	LB - IN	Nm
1/4	6	71	8	5	56	6
5/16	12	142	16	9	113	12
3/8	22	260	29	17	208	23
7/16	34	410	46	27	328	36
1/2	53	636	72	42	508	57
9/16	74	890	101	59	712	80
5/8	104	1250	141	83	1000	112
3/4	183	2200	249	146	1760	199
7/8	298	3570	403	238	2856	322
1	440	5280	597	352	4224	477
1 1/8	553	6640	750	442	5312	600
1 1/4	775	9300	1051	620	7440	840
1 3/8	1012	12140	1372	809	9712	1097
1 1/2	1350	16200	1831	1080	12960	1464

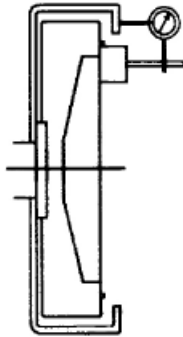
NOTE: Torque specifications listed above are recommended unless the assembly specific drawing lists otherwise.

3.0 INSTALLATION

3.1 Flywheel and flywheel housing alignment inspection.

It is strongly recommended that dial indicator checks be made (as shown) prior to installation of the PTO, especially on new engines or when a previous PTO failure might indicate an alignment problem.

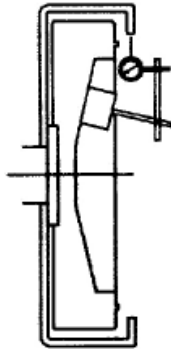
3.1.1 Check flywheel to housing face run out.



Mount the indicator base on the face of the flywheel and position the dial indicator tip perpendicular to the flywheel housing mounting face. Rotate the flywheel 360 degrees while holding pressure against the crankshaft thrust bearing. The total indicator reading should not exceed:

SAE #3 Housing:	0.008 inches (0.20 mm)
SAE #2 Housing:	0.009 inches (0.23 mm)
SAE #1 Housing:	0.012 inches (0.30 mm)
SAE #0 Housing:	0.016 inches (0.41 mm)

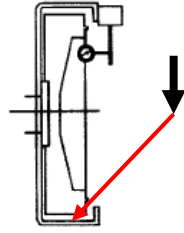
3.1.2 Check flywheel housing bore run out.



Mount the indicator base on the face of the flywheel and position the dial indicator tip so its movement is perpendicular to the pilot bore of the flywheel housing. Rotate the flywheel 360 degrees. The total indicator reading should not exceed:

SAE #3 Housing:	0.008 inches (0.20 mm)
SAE #2 Housing:	0.009 inches (0.23 mm)
SAE #1 Housing:	0.012 inches (0.30 mm)
SAE #0 Housing:	0.016 inches (0.41 mm)

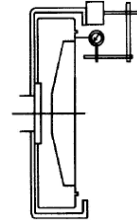
3.1.3 Check Flywheel Radial Play



Apply upward radial force by using a prybar to check the radial play in flywheel. The total indicator reading should not exceed:

All Flywheel Sizes: 0.008 (0.20 mm).

3.1.4 Check flywheel face run out.



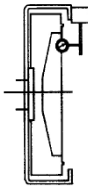
Mount the indicator base on the flywheel housing and position the dial indicator tip so its movement is perpendicular to the face of the flywheel. Position the indicator tip near the drive ring mounting bolt circle diameter. Rotate the flywheel 360 degrees while holding pressure against the crankshaft thrust bearing. The total indicator reading should not exceed:

11" Clutch: 0.007 inches (0.18 mm)

14" Clutch: 0.009 inches (0.23 mm)

18" Clutch: 0.011 inches (0.28 mm)

3.1.5 Check flywheel pilot bore run out.



Mount the indicator base on the flywheel housing and position the dial indicator tip so its movement is perpendicular to the face of the pilot ring inner diameter on the flywheel. Rotate the flywheel 360 degrees. The total indicator reading should not exceed:

All Flywheel Sizes: 0.005 inches (0.13 mm)

3.2 Lubrication Prior To Installation

3.2.1 PTO's with Grease Lubrication: The WPT PTO is lubricated at the factory with Lubriplate® 1200-2 lithium based grease. Lubrication should be topped off prior to being placed in service. See **Section 6** for specific lubrication instructions.

3.2.2 PTO's with Oil Lubrication: Use only Mobil – Exxon SHC 85w-140 synthetic oil or equivalent.

NOTE: If utilizing Python Hydraulic Clutch Control refer to HCC manual.



WARNING:

PTO is shipped without oil and must be filled with oil prior to being placed in service.

3.2.3 See **Section 6** for specific lubricating instructions.

3.3 Mounting PTO on Engine



DANGER:

The PTO is heavy; use approved lifting equipment and procedures to prevent accident or injury.

3.3.1 Use a long-handled screwdriver or other tool to align the friction disc teeth with the teeth of the drive ring.



WARNING:

Use caution when installing the PTO to avoid damaging the teeth of the friction discs.

3.3.2 Install the **drive ring** on the engine flywheel making sure that the ring is seated in the locating bore. Use SAE Grade 5 bolts (or equivalent) with lock washers and torque to the specifications in **Table 4** or to the engine manufacturer's torque recommendation. Use the engine manufacturer's torque if different from that in **Table 4**.

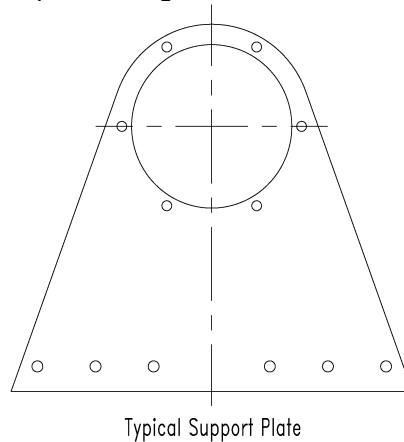
3.3.3 Slowly draw the PTO toward the engine, this can be done by installing 3 or 4 equally spaced lengths of all-thread with nuts into the flywheel housing and tightening these while supporting the weight of the PTO with a hoist or cribbing.

3.3.4 When the PTO is fully in place, remove the studs, if used, and replace with SAE Grade 5 bolts (or equivalent) with lock washers and torque to the value in **Table 4**. Use the engine manufacturer's torque recommendation if different from that in **Table 4**.

3.3.5 Install customer supplied support plate per Table 5 below.

TABLE 5 - SUPPORT PLATES			
CLUTCH SIZE	SIDE LOAD APPLICATION	IN - LINE APPLICATION	SUPPORT PLATE THICKNESS
211 and smaller	Recommended	Recommended	.250" - .375" Thick
311 thru 314	Required	Recommended	.375" - .500" Thick
318	Required	Required	.500" - .750" Thick

3.3.6 Typical support plate configuration.



3.3.7 MOUNTING THE SHEAVE, see **section 4.0** below.

3.4 Hydraulic Connection

3.4.1 Mount **rotary union** to shaft only after the PTO is mounted to the engine and sheave and belts have been installed.

3.4.2 A flexible hose must be used for the hydraulic connection to the rotary coupling. Assemble rotary coupling to fittings and hose, before mounting to the shaft



WARNING:

Ensure that there is no side load placed on the rotary coupling. The rotary coupling is delicate and extremely sensitive to damage by side load.

4.0 MOUNTING THE SHEAVE

If the key is not in the shaft, install it now. Be sure it seats in the bottom of the slot. Measure the distance from the top of the key to the opposite side of the shaft. Compare this measurement to the mating dimension in the sheave or bushing and adjust key height if necessary.

Install sheave, belts and adjust belt tension.



WARNING:

Do not exceed belt tension shown on WPT assembly drawing. Re-check and adjust belt tension after several hours of operation.

5.0 OPERATION

5.1 Recommended operating hydraulic pressure is 500 P.S.I. ± 50.

5.2 Ensure that hose or pipe sizes are adequate to supply the fluid to the clutch. Hose or pipe size of 1/4 inch should be a minimum for short runs. Use 3/8-inch size if runs are longer than 15 feet.

5.3 Where high inertia loads must be started, engaging the clutch at idle speed may stall the engine. High inertia loads may be brought up to speed by engaging the clutch for short periods (1 second) at intervals long enough to prevent excessive heat buildup in the friction

discs. With extremely high loads, the engine may have to be operated at higher speeds while engaging the clutch.

- 5.4 Once the load is turning with the clutch fully engaged, the engine RPM may be increased.

Special hydraulic circuitry may be used to regulate clutch engagement. Consult WPT for recommended equipment.

 **WARNING:**

UNDER NO CIRCUMSTANCES should the clutch be slipped for more than 1-3 seconds depending on the application, without either fully engaging the clutch or completely disengaging the clutch to allow it to cool.

 **WARNING:**

Any excessive vibration in the PTO should be cause for investigation. All rotating parts of the WPT PTO are balanced at the factory.

6.0 LUBRICATION

6.1 Grease Specification

The WPT PTO is lubricated at the factory. The lubricant type is specified on a tag affixed to the PTO. Grease specified on tag will serve under normal ambient conditions up to 2300 RPM at a maximum bearing temperature of 225° F (93.3° C).

6.2 Grease Specification for Cold Conditions

For any PTO with a lube label naming 1200-2, use Lubriplate® MAG-1 below -25° F (-32° C),. If 1200-2 Lubriplate® is not called out on label contact WPT for substitute.

 **WARNING:**

Do not mix sodium or calcium-based greases with lithium-based grease.

6.3 Grease Lubrication Intervals

There are only two places on the WPT PTO that require lubrication. Each is connected to the bearing cavity with the excess grease being forced out of a relief valve on the bottom of the unit. The small amount of grease expelled is an indication that enough grease is being provided.

When the PTO runs, additional grease will be expelled out of the relief valve due to pressure caused from the bearings heating up. This is normal and the amount of grease expelled will vary, depending on the amount of grease in the cavity.

Every 75 hours of operation add enough grease to expel a small amount from the relief valves.

Every 300 hours of operation flush the bearing with approximately 7.5 oz. (1/2 tube).

These lubrication intervals are suggested. The operator is responsible for establishing lubrication intervals according to the duty cycle and operating conditions in which the equipment is used.

6.4 Oil Specification

Use only Mobil – Exxon SHC 85w-140 synthetic oil or equivalent.

NOTE: If utilizing Python Hydraulic Clutch Control refer to HCC manual.



WARNING:

WPT PTO is shipped without oil and must be filled with oil prior to being placed in service.

6.5 Oil lubrication intervals

These lubrication intervals are suggested. The operator is responsible for establishing lubrication intervals according to the duty cycle and operating conditions in which the equipment is used.

Check oil levels periodically. Add oil to bottom edge of sight plug, Do Not overfill.

Drain and refill every 1,000 hours of operation.

6.6 Clutch

No lubrication is required.

6.7 Rotary Union

Normally no lubrication is required. If equipped with grease fittings or oil cups, any good bearing oil or grease can be used, but care should be taken not to over lubricate.

6.8 Bearing Operating Temperature

Operating temperature range is normally between 170° F and 225° F (76.7° C and 93.3° C). Higher ambient temperatures will cause the bearings to run at higher temperatures. More frequent lubrication intervals and/or lubricant designed for higher operating temperatures will be required if the unit is to be used in this environment. Consult the factory for lubricant recommendations where ambient temperatures are consistently above 100° F (38° C).



CAUTION:

Do not rely on checking bearing temperature with the hand. Acceptable bearing temperatures are normally higher than the hand can stand for more than a second. An infrared or contact type thermometer should be used to take accurate temperature measurements.

7.0 MAINTENANCE

This WPT PTO uses a clutch which does not need adjustment and does not require periodic inspection of friction material and wear plates between clutch rebuilds. When the clutch begins to slip while engaged it is necessary to rebuild the clutch replacing the **floating plate, center plates, friction discs, seals, O-rings** and **rotary union**. A clutch that is suspected of slipping should be removed from service for examination or repair.

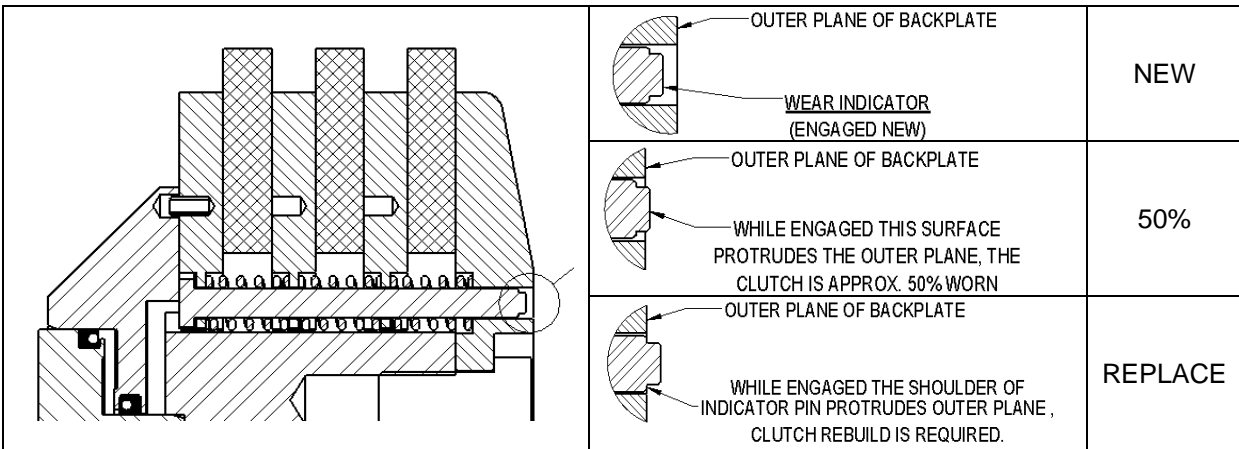


WARNING:

Slippage generates heat and when excessive, will shorten the life of **friction discs** and **seals**.

NOTE: Most damage to WPT clutches is a result of misalignment or low operation pressure. Misalignment will cause premature wear of teeth (**friction disc, center plates, floating plate, hub** and **drive ring**), and if extreme, may cause breakage of these parts. Low operating pressure may cause the clutch to slip. Low operating pressure or insufficient delivery may cause the clutch to engage slowly.

7.1 Wear Indicator (only used on some 14" & 15" units)



- 7.1.1 On new units the wear indicator pin is not seen breaking the outer plane of the backplate while the unit is in the engaged state.
- 7.1.2 As the friction disc wears the indicator face will become visible in engaged state.
- 7.1.3 When indicator pin surface has broken the outer plane of backplate in engaged state, the friction discs are 50% worn.
- 7.1.4 When indicator pin shoulder has broken the outer plane of the backplate in engaged state. It is time to replace the friction disc, springs, and seals.

7.2 Disassembly

(Refer to PTO illustrations at the back of this manual)

WARNING:

Use care when removing the PTO from the engine to avoid damage to grease fittings, friction disc teeth and other components.

- 7.2.1 Disengage clutch, remove power from the engine and make sure the appropriate engine operation controls are locked and tagged before beginning.
- 7.2.2 Use a hoist or other suitable lifting equipment to support the weight of the PTO. Attach lifting devices at several places or use cribbing to support the PTO in a horizontal position during removal.

DANGER:

The PTO can weigh in excess of 500 lbs. (227 Kg). Use approved lifting equipment and procedures to prevent accident or injury.

- 7.2.3 Remove hoses, rotary union and other connections connected to the PTO.
- 7.2.4 Remove the mounting bolts between the PTO and flywheel housing, removing those located near the top last. The PTO should separate from the flywheel housing. If the PTO doesn't separate, insert two of the bolts into the two threaded holes in the bellhousing until the housing is removed from the engine flywheel housing pilot diameter.
- 7.2.5 Remove the PTO from the engine.
Use care when removing the PTO from the engine to avoid damage to **grease fitting, friction disc teeth** and other components.

7.2.6 Before removing six-cylinder **bolts (SHCS piston)**, see **CAUTION** below.



CAUTION:

Use caution when removing **bolts (SHCS piston)**. **Springs** within the clutch store energy and could cause the clutch to fly apart. The best removal practice will be to remove 3 of the 6 **bolts**, replace them with 12" long all-thread segments. Place a large outer diameter washer on each of the all-thread bolts, followed by a nut. Run the nut down the all-thread segment until it holds the **piston** in place. Remove the remaining 3 **bolts**. Loosen the three nuts on the all-thread bolt, evenly, until all stored energy is removed.

7.2.7 Remove the **piston** and **cylinder** assembly from the shaft.

7.2.8 Separate the **piston** and **cylinder** assembly and discard the Polypak **seals** and **O-Rings**.

7.2.9 Remove the **floating plate** from the **Hub**. Remove the 4 **roll pins** from the **floating plate** and retain for reassembly.

7.2.10 Remove the **friction discs** and **center plates** from the **hub**.

7.2.11 Check **hub** and **drive ring** teeth for wear. Lay a straight edge along the side of the teeth. Any groove worn .015" (.38mm) indicates part replacement.

7.2.12 Position the shaft with the clutch at the top and resting on the **bellhousing/bearing carrier**.

7.2.13 Bend the tab out of the slot on the bearing lock nut (6) and remove the **locknut** and **lock washer** or remove **snap ring** on compact version.

7.2.14 Use a puller in the threaded holes in the **hub** to pull the **hub** and **backplate**.

7.2.15 Remove the **set screw** in the **clutch spacer** if equipped.

7.2.16 Remove the **clutch spacer** if required.

7.2.17 Turn unit over, clutch end down.

7.2.18 Remove the sheave if still on the shaft.

7.2.19 Remove the bolts from the **outer endcap** and remove it.

7.2.20 The **shaft assembly** may now be drawn out of the **bearing carrier**.

7.2.21 Remove the bolts from the **inner endcap** and remove it.

7.2.22 Remove the **oil seal spacers**, **bearings** and **bearing spacer** from the **shaft**.

7.3 Preparing the shaft for assembly

7.3.1 Clean the **shaft**. Remove all dirt or corrosion.

7.3.2 Check the **shaft** to see that it is free of burrs.

7.3.3 Inspect **threads** to see that there is no damage.

7.3.4 **Keyways** should not be worn. **Key** should be a snug fit in the **keyway**.

7.4 Assembly

- 7.4.1 Assemble **shaft assembly** and place into **bearing carrier/bellhousing** by reversing items 7.2.1 through 7.2.22.
- 7.4.2 Place new **friction discs** and **center plates** on the **hub** as shown in the illustration in the back of this manual.
- 7.4.3 Place new **friction discs** and **center plates** on the **hub** as shown in the illustration in the back of this manual.
- 7.4.4 Fit the **roll pins** into the new **floating plate** and place on the **hub**.

NOTE: **Roll pin** side of **floating plate** should face away from **friction discs**.

IMPORTANT:

Floating plate to **hub** alignment is critical. Align two of the **roll pins** 180° apart with two bolt holes in **hub**. The other two **roll pins** will be halfway between two bolt holes. Mark location of one **roll pin** that is in line with **hub** bolt hole, using a permanent marker. Place mark between the **roll pin** and the O.D. of the **floating plate**. Mark will be used to align the **piston/cylinder** assembly with the **floating plate**.

- 7.4.5 Inspect the actuator parts (**piston & cylinder**) for burrs and sharp edges. Use a fine file or emery cloth to smooth any sharp edges.

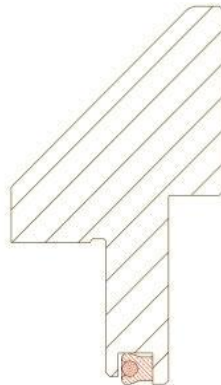


WARNING:

Surfaces on which the seals ride are 16 (0.4) Ra inch (micron) finish. Do not damage these surfaces when removing burrs and sharp edges. Any damage to the seal surfaces could result in a hydraulic leak.

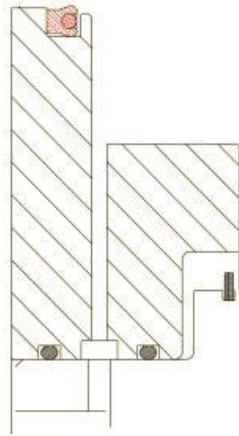
- 7.4.6 Lubricate the new **seal** with clean hydraulic fluid and insert into the **cylinder**.

NOTE: Ensure that the open face of the **seal** is facing the flywheel side of the clutch as shown below.



- 7.4.7 Lubricate new **seal** and new **O-rings** with clean hydraulic oil. Insert the new **seal** and the new **O-rings** into the **piston**.

NOTE: Ensure that the open face of the **seal** is facing the sheave side of the clutch as shown below.



- 7.4.8 Liberally lubricate all seals and seal surfaces with clean hydraulic oil prior to assembly. Insert the **piston** into the **cylinder** while taking care not to damage the seals.

IMPORTANT:

Piston to cylinder alignment is critical. Align two of the roll pin holes 180 deg. apart in the **cylinder** with two bolt holes in **piston**. The other two roll pin holes will be halfway between two bolt holes. Mark location of one roll pin hole, that is in line with **hub** bolt hole, using a permanent marker. Place mark on the O.D. of the large angle surface of **cylinder**. Mark will be used to align the piston/cylinder assembly with the **floating plate**.



WARNING:

Use of sharp objects to force seal into grooves will result in seal damage. Take care to not roll the edge of either seal back when assembling the piston into the cylinder.

NOTE: A ring style compressor may be required to install the piston **seal** into the **cylinder**.

- 7.4.9 Fit the **piston** and **cylinder** assembly onto the 4 **roll pins** located in the **floating plate** making sure to align the permanent marker marks and bolt holes.
- 7.4.10 Install three 12" long all-thread segments equally spaced thru the **piston** and into the **hub**. Place a large outer diameter washer on each of the all-thread bolts, followed by a nut. Tighten the nuts evenly on the all-threads, squeezing the springs, until the floating plate contacts the hub.



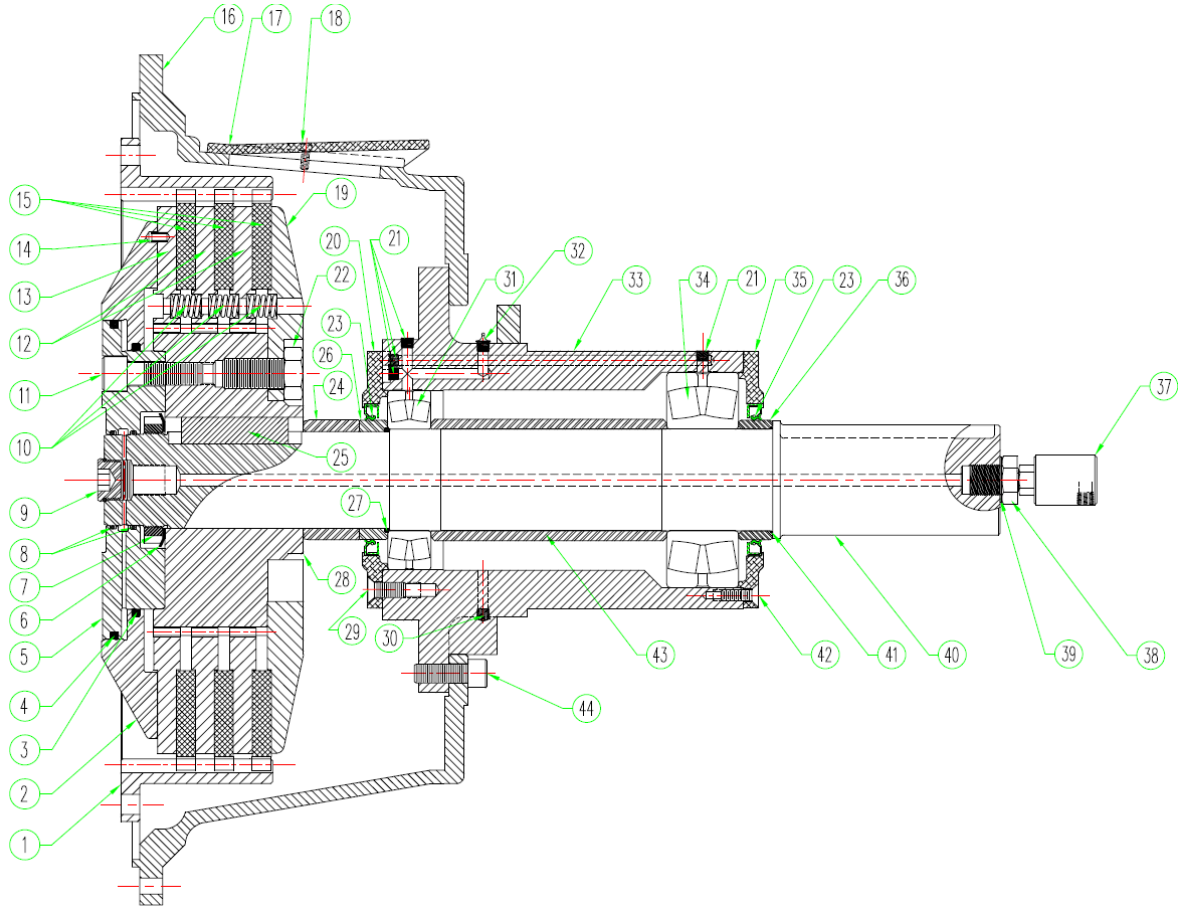
WARNING:

Ensure that the **floating plate** teeth are aligned with the **hub** teeth to prevent damage during installation.

- 7.4.11 Continue tightening the nuts until the **floating plate** is against the **friction disc** and **piston** is in place against **hub**.
- 7.4.12 Install and hand tighten three **socket head bolts (piston)**, using thread locking compound, in holes between the all-threads.
- 7.4.13 Remove the three nuts, washers and all-threads and install the remaining three **socket head bolts (piston)** using thread locking compound.
- 7.4.14 Torque the 6 **bolts** evenly to the torque specified in **Table 4**.

- 7.4.15 Pressure test the unit. Connect the PTO to a hydraulic oil supply connected through the **Rotary Union** at the sheave end of shaft. Apply a maximum of 35 bar (500 psi) to the unit. Hold pressure for approximately one hour.
- 7.4.16 Check for any visible leaks around the **Piston** and **Cylinder** assembly.
- 7.4.17 If it passes pressure test, mount PTO unit onto engine. See section **3.0 Installation**, for specific instructions.

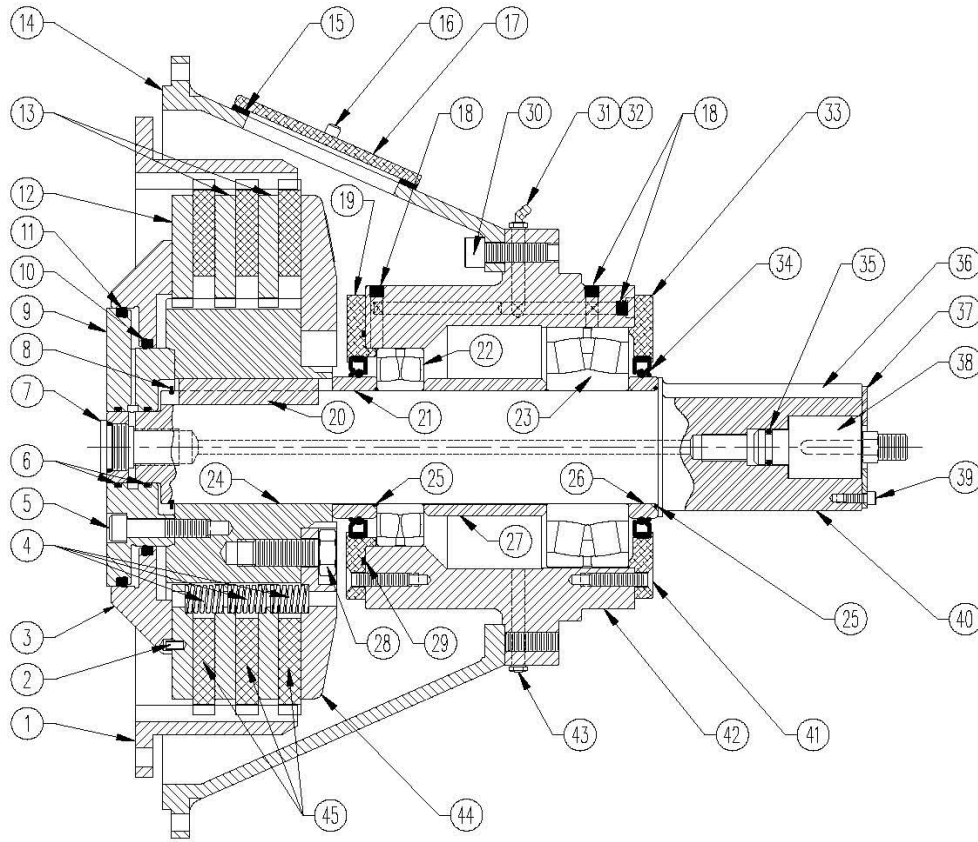
8.0 TYPICAL DRAWING AND PARTS LIST



Item	Description	Qty	Item	Description	Qty
1	Driving Ring	1	23	Oil Seal	2
2	Cylinder	1	24	Spacer, Clutch	1
3	Seal, Polypak, Inner	1	25	Key, Clutch	1
4	Seal, Polypak, Outer	1	26	Spacer, Oil Seal, Inner	1
5	Piston	1	27	O-Ring, Spacer	1
6	Washer, Lock	1	28	Hub	1
7	Locknut	1	29	FHSCS	6
8	O-Ring	2	30	Relief Valve	1
9	Plug	1	31	Bearing, Small	1
10	Spring	varies	32	Zerk, Grease	2
11	SHCS, Piston	6	33	Bearing Carrier	1
12	Center Plate	2	34	Bearing, Large	1
13	Floating Plate	1	35	Endcap, Outer	1
14	Pin, Roll	4	36	Spacer, Oil Seal, Outer	1
15	Friction Disc	3	37	Rotary Union	1
16	Bellhousing	1	38	Adapter, Rotary Union	1
17	Cover, Hand Hole	2	39	Gasket	1
18	SHCS, Cover	1	40	Shaft	1
19	Backplate	1	41	O-Ring, Spacer	1
20	Endcap, Inner	2	42	FHSCS	6
21	Pipe Plug	5	43	Spacer, Bearing	1
22	HHCS	4	44	SHCS, Bellhousing	12

NOTE: For actual drawing and parts list, contact WPT. Use assembly no./serial no. to identify your unit.

9.0 TYPICAL DRAWING AND PARTS LIST – COMPACT



Item	Description	Qty	Item	Description	Qty
1	Driving Ring	1	24	Hub	1
2	Pin, Roll	4	25	O-Ring, Spacer	2
3	Cylinder	1	26	Spacer, Oil Seal, Outer	1
4	Spring	24	27	Spacer, Bearing	1
5	SHCS, Piston	6	28	HHCS	4
6	O-Ring	2	29	O-Ring	1
7	Plug	1	30	SHCS, Bellhousing	12
8	Snap Ring	1	31	Zerk, Grease	2
9	Piston	1	32	Cap, Grease	2
10	Seal, Polypak, Inner	1	33	Endcap, Outer	1
11	Seal, Polypak, Outer	1	34	Oil Seal	2
12	Floating Plate	1	35	O-Ring	1
13	Center Plate	2	36	Key	1
14	Bellhousing	1	37	Endcap, Shaft	1
15	Gasket	1	38	Rotary Union	1
16	SHCS, Cover	2	39	SHCS, Endcap	4
17	Cover, Hand Hole	1	40	Shaft	1
18	Pipe Plug	4	41	FHSCS	12
19	Endcap, Inner	1	42	Bearing Carrier	1
20	Key, Clutch	1	43	Relief Valve	1
21	Spacer, Oil Seal, Inner	1	44	Backplate	1
22	Bearing, Small	1	45	Friction Disc	3
23	Bearing, Large	1			

NOTE: For actual drawing and parts list, contact WPT. Use assembly no./serial no. to identify your unit.

10.0 TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy
PTO Will Not Engage/Disengage	Improper engagement pressure	Check engagement pressure and adjust as necessary
	Worn or damaged friction discs	Inspect friction discs and replace as needed
	Debris in clutch pack	Inspect clutch pack and remove debris
Ringing or Knocking Sound While Disengaged	Normal operational sound	Engage PTO
Grinding/Scraping Sounds While Engaged or Disengaged	Worn PTO main bearings	Inspect main bearings and replace as needed
Clutch Slips, Burnt Smell, and/or Smoke from PTO	Improper engagement pressure	Check engagement pressure and adjust as necessary
	Worn or damaged friction discs	Inspect friction discs and replace as needed
	Sliding sleeve assembly contacting clutch shaft	Check for axial loading on operating shaft
Excessive Vibrations	Worn engine bearings	Inspect endplay and runout on engine flywheel, replace as needed
	Worn PTO main bearings	Inspect main bearings and replace as needed
	Improper alignment	Check alignment, adjust as needed
Split Friction Disc or Broken Teeth	Worn drive ring	Inspect drive ring teeth and replace as needed
	Engagement speed is too high	Reduce to 1100 r/min or below
	Improper alignment	Check alignment, adjust as needed
	No support outboard support plate	Check if unit requires outboard support, install if needed
	High inertia or shock load starts	Contact WPT Power Applications Engineering for support
PTO Self Engages	Improper engagement torque	Check engagement torque and adjust as necessary
	Worn or damaged friction discs	Inspect friction discs and replace as needed
Frequent Adjustments Needed to Engagement Pressure	Engagement speed is too high	Reduce engagement speed to below 1100 r/min
Bearing Carrier Hot	Too much or too little grease	Remove/Add Grease
	Improper belt tension	Adjust belt tension according to belt manufactures recommendations
	Worn PTO main bearings	Inspect main bearings and replace as needed
Excessive Grease Leaking	Over greased	Run at idle speed until grease outflow stops

11.0 GENERAL STORAGE GUIDELINES

Upon receipt of parts or assemblies, they should be inspected for corrosion or other related damage. If any problem is detected, contact vendor.

It is the owner's primary responsibility to store and protect the PPD product.

Products should be stored in a manner that it is protected from the environment and outside sources, which may include but are not limited to the following:

- **Environmental storage requirements should be maintained as follows:**
 - No exposure to rainwater
 - Temperatures 32F° (0C°) to 110F° (43C°)
 - Below 50% average humidity
 - Average sunlight

- **Hazards that require addition protection:**
 - Dust and debris
 - Oil, water, saltwater, acids, or other chemicals
 - Any other foreign items which may damage the product.
 - Other measures include covering the product to prevent ingress of foreign matter.

- **Additional Protection Measures for Long-Term Storage
(For storage exceeding one month):**
 - Coat exposed metal with Cosmoline RP-342 "HEAVY" Military-Grade Rust Preventive Aerosol Spray, or equal
 - Coating of painted surfaces is not required or recommended.
 - Visually inspect the product for degradation once every three-months

- **Rubber Storage Environment (spare parts):**
 - Temperatures 50F° (10C°) to 85F° (29C°)
 - Below 50% average humidity
 - Limited exposure to light and UV
 - Clean, dust-free environment