



## TYPE 1 PTO

# INSTALLATION AND MAINTENANCE MANUAL

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## 1.0 INTRODUCTION

- 1.1** The WPT Power Transmission 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 assembly 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.

## 2.0 SPECIFICATIONS

- 2.1** See Chart 3 for flywheel dimensions.
- 2.2** See Chart 3 for flywheel housing dimensions.
- 2.3** See Chart 4 and 5 for the allowable side pull of your PTO.
- 2.4** The maximum RPM is listed in Chart 4 and 5 for your PTO size.

## 3.0 MOUNTING THE SHEAVE

### 3.1 Removing the sheave housing

- 3.1.1 If a sheave has not been mounted, mark the shaft in the center of the distance between the bearing end caps(33)
- 3.1.2 Remove the 6 socket head bolts (47) and 12 socket head bolts (40) holding the sheave housing to the bearing housing and bell housing.
- 3.1.3 Attach approved lifting eyes in the 3/4-10 NC holes in the ribs on the side of the housing if the PTO is in a horizontal position.
- 3.1.4 Attach a pattern of lifting eyes in the 1/2-13 holes in the sheave housing if the PTO is in a vertical position.
- 3.1.5 If the housing does not separate easily, insert (2) 1/2-13 jack bolts in the end of the bell housing and tighten these evenly to move the bell housing off the bearing housing boss. The sheave housing weighs approximately 500 lbs. for the 14" and 18" clutch and approximately 600 lbs. for the 21".

### 3.2 Removing the outboard bearing

- 3.2.1 Remove the 6 socket head cap screws(52) joining the bearing end caps(32) & (33) to the bearing carrier(41).
- 3.2.2 Slide the bearing carrier off the bearing.
- 3.2.3 Bend the locking tab of the lockwasher(48) out of the locknut(51). Remove the locknut and washer.
- 3.2.4 Remove the outboard seal spacer(43).
- 3.2.5 Take precautions to keep the bearing clean. If the bearing does not slide easily off the shaft, install a bearing puller with splitter plates behind the bearing and remove it from the shaft. Do not pull on the bearing end cap(33). The shaft has a 3/4-10 thread at the bottom of the rotary coupling pocket.
- 3.2.6 Remove the seal spacer(43).

### 3.3 Installing the sheave

- 3.3.1 If the key(57) is not in the shaft, install it now. Be sure it seats in the bottom of the slot.
- 3.3.2 Measure the distance from the top of the key to the opposite side of the shaft.
- 3.3.3 Compare this measurement to the mating dimension in the sheave or bushing and adjust the key height if necessary.
- 3.3.4 Slide the sheave onto the shaft and lock in the approximate center determined in 3.1.1 above.

### 3.4 Replacing the outboard bearing

If the outboard bearing(45) is not assembled as a unit with the bearing carrier(41), seal housings (32 & 33), and seals(36), go to section 9.3.24

- 3.4.1 Slide the seal spacer(43) onto the shaft until it seats against the shoulder.
- 3.4.2 Install the outboard bearing(45) with its carrier(41), seal housings(32 & 33), and seals(36) onto the shaft. Use a light coating of grease on the seal ring and be careful to not damage the seal.
- 3.4.3 Slide the remaining seal spacer(43) onto the shaft. Use a light coating of grease on the seal ring and be careful to not damage the seal.
- 3.4.4 Install the bearing lockwasher(48) and locknut(51) tightening the nut 1/4 turn past makeup or hand tight. Lock the nut with one of the tabs of the lockwasher.
- 3.4.5 If the rotary coupling(50) was removed, install it in its counterbore and lock in place with ring(49) and 4 socket head bolts(26).

### 3.5 Replacing the sheave housing

- 3.5.1 Refer to 9.4.1

## 4.0 INSTALLATION

### 4.1 Flywheel and flywheel housing alignment checks

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

#### 4.1.1 Flywheel to housing face runout check. (see Figure 3)

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.

SAE #1 Housing: 0.012 inches (0.305 mm)

SAE #1/2 Housing: 0.014 inches (0.356 mm)

SAE #0 Housing: 0.016 inches (0.406 mm)

SAE #00 Housing: 0.019 inches (0.483 mm)

#### 4.1.2 Check flywheel housing bore runout. (see Figure 4)

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 through 360 degrees. The total indicator reading should not exceed:

SAE #1 Housing: 0.012 inches (0.305 mm)

SAE #1/2 Housing: 0.014 inches (0.356 mm)

SAE #0 Housing: 0.016 inches (0.406 mm)

SAE #00 Housing: 0.019 inches (0.438 mm)

#### 4.1.3 Check flywheel face runout. (see Figure 5)

Mount the indicator base on the flywheel housing and position the dial indicator tip so that 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 0.011 inches (0.279 mm)

#### 4.1.4 Check flywheel pilot bore runout. (see Figure 6)

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. Rotate the flywheel through 360 degrees.

The total indicator reading should not exceed 0.005 inches (0.127 mm)

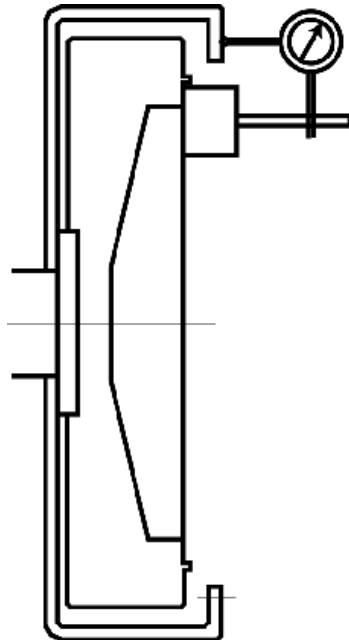


FIGURE 3

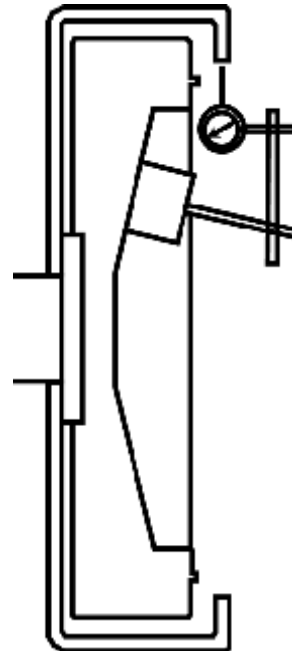


FIGURE 4

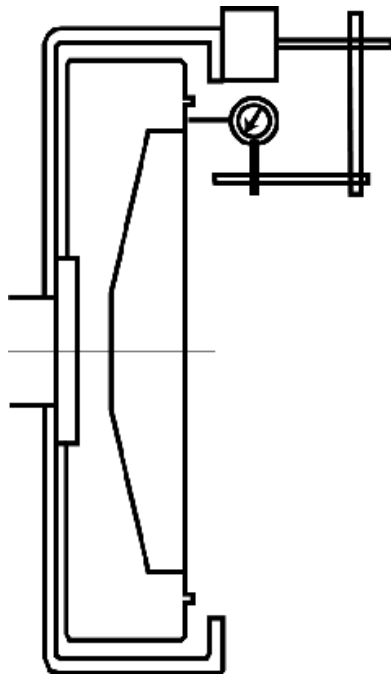


FIGURE 5

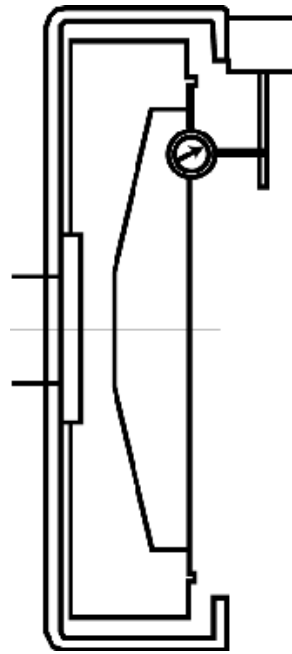


FIGURE 6

#### 4.2 Lubrication prior to installation

- 4.2.1 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 lubrication instructions

#### 4.3 Mounting the PTO on the engine

Alternate methods are described to align the friction discs.

- 4.3.2 (Requires air supply) Use the drive ring (2) provided with the PTO or remove the drive ring from the engine flywheel to use as an alignment gauge. Place the drive ring over the friction discs. Center the drive ring relative to the O.D. of the clutch body. Engage the clutch with 100 psi compressed air. Be sure there is adequate hose length to reach the back of the engine.
- 4.3.2 Remove the drive ring.
- 4.3.3 (No Air Required) Use a long handled screwdriver or other tool to align the friction disc teeth with the teeth of the drive ring. Use caution when installing the PTO to avoid damaging the teeth of the friction discs
- 4.3.4 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 lockwashers and torque to the specifications in Chart 1 or to the engine manufacturer's torque recommendation. Use the engine manufacturer's torque recommendation if different from that in Chart 1.
- 4.3.5 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.
- 4.3.6 When the PTO is fully in place, remove the studs if used and replace with SAE Grade 5 bolts (or equivalent) with lockwashers and torque to the value in Chart 1. Use the engine manufacturer's torque recommendation if different from that in Chart 1.

#### 4.4 Installing or replacing belts

To install/replace belts, the customer's support bracket and sheave housing must be removed.

- 4.4.1 Remove outboard support bracket
- 4.4.2 Remove the 6 socket head bolts (47) and 12 socket head bolts (40) holding the sheave housing to the bearing housing and bell housing.
- 4.4.3 Attach approved lifting eyes in the ¾-10 NC holes in the ribs of the sheave housing.
- 4.4.4 If the housing does not separate easily, insert (2) 1/2-13 jack bolts in the end of the bell housing and tighten these evenly to move the bell housing off the bearing housing boss. The sheave housing weighs approximately 500 lbs. for the 14" and 18" clutch and approximately 600 lbs. for the 21".
- 4.4.5 Install/replace belts.
- 4.4.6 Reposition the sheave housing on the bell housing (30) and outboard bearing carrier (41).
- 4.4.7 Align bolt holes and start socket head bolts (47). Supporting the sheave housing with cribbing or threaded rods screwed into the bell housing will aid assembly.
- 4.4.8 Evenly tighten socket head bolts (47) to the values from Chart 1.
- 4.4.9 Remove threaded rods, if used, and install socket head bolts (40). Tighten to the values from Chart 1.
- 4.4.10 Replace outboard support bracket and adjust belt tension.

Check and adjust belt tension after the first several hours of operation.

## 5.0 OPERATION

### 5.1 Clutch engagement procedure

- 5.1.1 Insure that hose or pipe sizes are adequate to supply the air to the clutch. Hoses or pipe size of 1/2 inch should be a minimum for short runs. Use 3/4 inch size if runs are longer than 15 feet.
- 5.1.2 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 build up in the friction discs. With extremely high loads, the engine may have to be operated at higher speeds while engaging the clutch.
- 5.1.3 Once the load is turning with the clutch fully engaged, the engine RPM may be increased.

Special air circuitry may be used to regulate clutch engagement. Consult WPT Power Transmission for recommended equipment.

#### NOTE:

UNDER NO CIRCUMSTANCES should the clutch be slipped for more than several seconds without either fully engaging the clutch or completely disengaging the clutch to allow it to cool.

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

### Re-lube before placing in service

#### 6.1 Grease specification

The WPT PTO is lubricated at the factory with Lubriplate®1200-2, lithium base grease with an EP (extreme pressure) additive. This will serve under normal ambient conditions up to 2100 RPM at a maximum bearing temperature of 200 deg. F. (93.3 deg. C.)

#### 6.2 Grease specification for cold conditions

For ambient temperatures below -25 deg. F. (-32 deg. C.), Lubriplate® MAG-1 may be substituted.

#### Grease Caution:

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

#### 6.3 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.

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

6.3.2 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.

6.3.3 **CLUTCH:** No lubrication is required.

6.3.4 **ROTO-COUPLING (50):** 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.

#### 6.4 Bearing operating temperature.

Operating temperature range is normally between 170 deg. F. and 200 deg. F. (76.7 to 93.3deg. C.). Higher ambient temperatures will cause the bearings to run hotter. 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 deg. F.(38 deg. C.)

#### Note:

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



## 7.0 MAINTENANCE

The WPT PTO uses an air operated clutch which does not need frequent adjustment. It does however, require periodic inspection to determine if friction discs and/or drive plates have worn, increasing clutch clearance. The clutch should be adjusted if the movement of the pressure plate is more than the value for that clutch found in Chart 2.

### 7.1 Inspecting and adjusting the clutch

- 7.1.1 Remove power (stop the engine) and tag any remote start devices.
- 7.1.2 Remove hand hole covers.
- 7.1.3 With a flashlight and short scale, measure the movement of the pressure plate as the clutch is engaged and disengaged. Compare this measurement to that shown in Chart 2.
- 7.1.4 To adjust the clutch without removing the PTO from the engine, proceed to step 7.2. To remove the PTO and rebuild the clutch, proceed to step 8.1

It is good to periodically remove dirt and accumulated dust from the clutch. Wear a mask and eye protection while doing this. WPT friction material is asbestos free.

### 7.2 Adjusting the clutch on the engine

- 7.2.1 Remove the air hoses(23) connecting the shaft to the airtube.
- 7.2.2 Remove the hose adapters(22)
- 7.2.3 Remove the 4 socket head cap screws(19) in the airtube holding plate(17).
- 7.2.4 Slide the airtube holding plate(17) and airtube(16) back to expose the shims(18).
- 7.2.5 With snips or saw, cut the necessary number of shims and remove them.
- 7.2.6 Replace the airtube and airtube holding plate. Torque the 4 socket head cap screws to the value from Chart 1.
- 7.2.7 Replace fittings and hoses.
- 7.2.8 Check clutch clearance per 7.1.3 above.
- 7.2.9 Replace hand hole covers and remove tags from remote starting devices.

### 7.3 Adjusting the clutch with PTO removed from engine

- 7.3.1 See section (9.2.8)

Whenever the PTO is removed from the engine, it is recommended that the hub and drive ring teeth be checked for wear. To do this, lay a straight edge along the side of the teeth. Any groove worn .015" (.38mm) should indicate replacement of that part.

Examine the friction surfaces of the center plates(12) and floating plate(13) for heat checking and surface flatness. Flatness should be within .005" (.13mm) and the two sides of the centerplates should be parallel within the same amount.

Most damage to WPT clutches is a result of misalignment or low operating pressure. Misalignment will cause premature wear of teeth (friction disc, center plates, hub and drive ring), and if extreme, may cause breakage of these parts. Low air pressure may cause the clutch to slip. Low air pressure or low air volume may cause the clutch to engage slowly. Slippage generates heat, which if excessive, will shorten the life of friction discs, insulator plate and airtube. A clutch that is suspected of slipping should be removed from service for examination or repair.

## 8.0 DISASSEMBLY

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

### 8.1 Removing the PTO from the engine.

- 8.1.1 Use a hoist or other suitable lifting equipment to support the weight of the power take-off. Attach lifting devices at several places or use cribbing to support the PTO in a horizontal position during removal.

#### Caution:

The PTO weighs in excess of 1000 lbs. (454 Kg.) Use approved lifting eyes and procedures to prevent accident or injury.

- 8.1.2 Remove air hoses and other connections to the PTO

- 8.1.3 Remove the mounting bolts between 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, gently pry the flanges apart until the housing is removed from the engine flywheel housing pilot diameter.

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

### 8.2 Removing the Sheave Housing and Belts.

- 8.2.1 Place the PTO on the floor, clutch down, supported by wood blocks under the bell housing. Use adequate support to keep the PTO from tipping.

- 8.2.2 Refer to 3.1 of this manual.

- 8.2.3 Slide the belts off the pulley(s).

- 8.2.4 The sheave housing, if replaced at this time, will help balance the PTO.

### 8.3 Remove the outboard bearing

- 8.3.1 Bend the tab out of the slot on the bearing lock nut(51) and remove the nut and washer(48).

- 8.3.2 Remove 6 flat head socket cap screws(52) and slide the bearing end cap(32) off of the shaft.

- 8.3.3 Slide the seal spacer(43) off of the shaft.

- 8.3.4 Slide the bearing carrier(41) off the bearing and off of the shaft.

- 8.3.5 Slide the bearing off the shaft. If a puller is necessary, use splitter plates behind the bearing. Do not pull on the bearing end cap(33). The shaft is tapped  $\frac{3}{4}$ -10 at the bottom of the rotary coupling pocket.

- 8.3.6 Remove the seal spacer(43).

### 8.4 Removing the bell housing

- 8.4.1 Remove 6 socket head cap screws(38) and lift the bell housing off the inboard bearing carrier(39). If the bell housing does not lift off easily, insert jack bolts in the threaded holes provided and tighten these evenly to separate the two.

### 8.5 Removing the clutch from the PTO

- 8.5.1 Position the shaft with the clutch at the top.

- 8.5.2 Bend the tab out of the slot on the bearing lock nut(7) and remove the nut and washer.

- 8.5.3 Remove the hoses(23) and hose adapters(22).

- 8.5.4 Remove the set screw(21) in the clutch spacer(20) if equipped.
- 8.5.5 Remove the 4 hex head cap screws(10) holding the backplate(3) and remove the backplate.
- 8.5.6 Remove the friction discs(4), pressure plates(12), springs(11), floating plate(13), insulator plate(15) and airtube(16).
- 8.5.7 Use a puller in the threaded holes in the hub(5) to pull the hub. The shaft has a 1-14 UNS tapped hole in the end.
- 8.5.8 Remove the clutch spacer(20).

## 8.6 Removing the inboard bearing

- 8.6.1 Remove the grease hoses(55) from the bearing carrier(39).
- 8.6.2 Remove 6 flat head socket cap screws(37) and slide the bearing end cap(32) off of the shaft.
- 8.6.3 Slide the bearing carrier(39) off of the shaft.
- 8.6.4 Slide the seal spacer(35) off the shaft.
- 8.6.5 Slide the bearing off the shaft. If a puller is necessary, use splitter plates behind the bearing. Do not pull on the bearing end cap(33).
- 8.6.6 Slide the seal spacer(35) off the shaft.

## 9.0 ASSEMBLY

### 9.1 Preparing the shaft

- 9.1.1 Clean the shaft. Remove all dirt or corrosion.
- 9.1.2 Check the shaft to see that it is free of burrs.
- 9.1.3 Inspect threads to see that there is no damage.
- 9.1.4 Keyways should not be worn. Keys should be a snug fit in the slot.

### 9.2 Assembling the clutch

It is easier to assemble and test the clutch outside the PTO. These instructions detail assembly in that manner.

- 9.2.1 Place the hub on a workbench with the back plate end up. Attach the backplate with hex head cap screws (10).
- 9.2.2 Invert the hub and backplate so the backplate is on the workbench.
- 9.2.3 Attach the insulator plate(15) to the floating plate(13) with roll pins(14) if it is not already done.
- 9.2.4 Place the centerplates, friction discs and floating plate with insulator plate attached on the hub as shown in the diagram. Be sure the release springs(11) are properly seated in their counterbores.
- 9.2.5 Place the shims (18) on the hub.
- 9.2.6 Insert the airtube(16) in the airtube holding plate(17) and set this assembly on the hub. Be careful not to damage the airtube or brass spuds.

- 9.2.7 Attach the airtube holding plate using 4 socket head cap screws(19)
  - 9.2.8 Plug all but 1 spud and install fittings to connect this spud to a supply of compressed air (60 PSI minimum).
  - 9.2.9 Using compressed air, engage and disengage the clutch while measuring movement of the insulator plate(15). Compare this value with that in Chart 2 and adjust the number of shims(18) accordingly.
  - 9.2.10 Invert the clutch so the airtube holding plate is on the workbench.
  - 9.2.11 Remove the backplate, friction discs, center and floating plates and airtube.
  - 9.2.12 The hub with attached shims and airtube holding plate will be installed on the shaft as an assembly.
- 9.3 Assembling the PTO
- 9.3.1 Install the seals in the bearing end caps(36,32 & 33) and set these aside.
  - 9.3.2 Fix the shaft vertically with the clutch end up.
  - 9.3.3 Slide an inboard end cap(33) with seal over the shaft with the seal facing up.
  - 9.3.4 Slide a seal spacer(35) on the shaft until it stops against the raised diameter.
  - 9.3.5 Heat the inboard bearing(34) using an appropriate heat source and slide it on the shaft until it seats against the seal spacer. Allow the bearing to cool.
  - 9.3.6 Slide the inboard bearing carrier(39) over the bearing.
  - 9.3.7 Slide the other inboard seal spacer(35) onto the shaft and seat it against the bearing.
  - 9.3.8 Slide the outboard bearing end cap(32) over the shaft and using thread locking compound, bolt both end caps to the bearing housing with 6 flat head socket cap screws(37). Torque these per Chart 1.
  - 9.3.9 Slide the clutch spacer/s(21) over the shaft until it seats against the seal spacer. Rotate this to expose the ports in the shaft and install the hose adapters(22).
  - 9.3.10 Install the hub key(9) in its slot and measure the distance from top of key to opposite side of shaft. Compare this measurement to the corresponding measurement in the hub and file or grind the key if necessary.
  - 9.3.11 Heat the hub with attached airtube holding plate using an appropriate heat source and install on the shaft. Use anti-seize compound and have equipment available to push the hub on the shaft if necessary.
  - 9.3.12 Allow the hub to cool and install the clutch components as shown in the diagram being sure the release springs(11) are properly seated in their counterbores.
  - 9.3.13 Use thread locking compound on the 4 hex head cap screws(19) holding the backplate(17) and torque these per Chart 1.
  - 9.3.14 Install air hoses(23) between shaft and airtube.
  - 9.3.15 Air test these connections before continuing.
  - 9.3.16 Install set screw(21) in clutch spacer if required.
  - 9.3.17 Install grease hoses(55) in the bearing housing(39).
  - 9.3.18 Install the bearing lockwasher(6) and bearing nut(7).

- 9.3.19 Lock the bearing nut with one of the tabs of the lockwasher.
  - 9.3.20 Invert the PTO so the sheave end is up. Be sure the shaft and clutch are adequately supported.
  - 9.3.21 Slide the bell housing over the shaft and install 6 socket head cap screws(38). Use thread locking compound and torque to values from Chart 1.
  - 9.3.22 Connect grease hoses(55) to adapters(28).
  - 9.3.23 Fit sheave key into keyslot and mount sheave if necessary. See 3.3
  - 9.3.24 Slide the other inboard bearing end cap(33) over the shaft with seal facing up.
  - 9.3.25 Slide the seal spacer(43) onto the shaft until it seats against the shoulder.
  - 9.3.26 Install the outboard bearing(45) in the outboard bearing housing(41) and slide this onto the shaft.
  - 9.3.27 Slide the remaining seal spacer(43) onto the shaft.
  - 9.3.28 Slide the outboard bearing end cap into place and bolt both end caps to the bearing housing using flat head socket cap screws(52) and thread locking compound. Torque to the value listed in Chart 1 for socket head bolts.
  - 9.3.29 Install the bearing lockwasher(48) and bearing nut(51).
  - 9.3.30 Lock the bearing nut with one of the tabs of the lockwasher.
  - 9.3.31 Install the rotary coupling(50) in its counterbore and lock in place with ring(49) and 4 socket head bolts(26)
  - 9.3.32 Install hand hole covers(25).
- 9.4 Installing the sheave housing
- 9.4.1 Using a hoist and approved lifting eyes, set the sheave housing over the outboard bearing housing. Align the mating holes and install several bolts to aid assembly. Check the desired orientation of the opening of the sheave housing with the bell housing.
  - 9.4.2 Tighten the bolts(47) drawing the sheave housing onto the bearing carrier boss while aligning the sheave housing to bell housing bolt holes. Be sure the sheave housing counterbore is tight against the bell housing boss. This establishes alignment of the components. Install socket head cap screws(40) with thread locking compound and torque to the value shown in Chart 1.

## 10.0 WARRANTY

WPT guarantees all products will leave the factory in good condition. The products are warranted against defects in workmanship and material for a period of 365 days(one year) after shipment. Adjustment under this warranty will be made only after completion of inspection of the part or product in our factory. Liability under the warranty shall extend only to the replacement or correction of any defective part or product as determined by WPT. All materials must be returned freight prepaid. This warranty shall not apply to any product that has been repaired or altered without the specific knowledge and consent of an authorized representative of the manufacturer; or operated or installed in a manner contrary to the manufacturer's instruction; or subjected to misuse or improper maintenance; or has been damaged by accident or negligence. This warranty is made in lieu of all other warranties, expressed or implied, including but not limited to warranties of merchantability or fitness for a particular purpose, and there are no other warranties that extend beyond this expressed warranty. WPT reserves the right to discontinue models or to change specification at any time without notice. No discontinuance or change will create any liability on the part of WPT in respect to its products in the hands of customers or products on order not incorporating such changes even though delivered after any such change. Rotating equipment is potentially dangerous and should be properly guarded. The user should check for all applicable safety codes and provide suitable guarding.

BOLT SIZE IN INCHES	TORQUE VALUES FOR SOCKET HEAD AND HEX HEAD CAPSCREWS								
	SOCKET HEAD CAP SCREWS			HEX HEAD CAP SCREWS - GR 8			HEX HEAD CAP SCREWS - GR 5		
	lb.ft.	lb.in.	Nm	lb.ft.	lb.in.	Nm	lb.ft.	lb.in.	Nm
1/4	13	150	17	8	100	11	6	71	8
5/16	23	305	34	17	200	23	12	142	16
3/8	45	545	62	30	360	41	22	260	29
7/16	70	840	95	48	570	64	34	410	46
1/2	108	1300	147	83	990	112	53	636	72
9/16	155	1860	210	107	1285	145	74	890	101
5/8	211	2530	286	143	1714	194	104	1250	141
3/4	367	4400	497	256	3070	347	183	2200	249
7/8	583	7000	791	417	5000	565	298	3570	403
1	867	10400	1175	625	7500	848	440	5280	597
1 - 1/8	1242	14900	1684				553	6640	750
1-1/4	1750	21000	2374				775	9300	1051
1-3/8	2317	27800	3142				1012	12140	1372
1 - 1/2	3042	36500	4125				1350	16200	1831
1-3/4	4950	59400	6714						
2	7492	89900	10161						

CHART 1

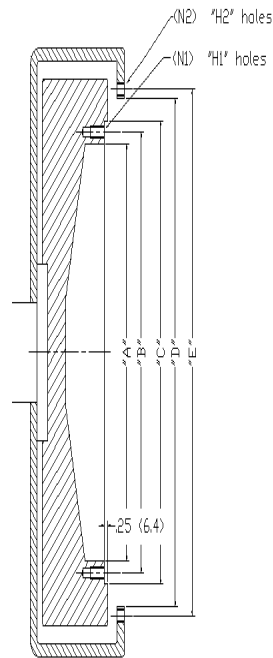
Clutch Size (inches)	MAX. RPM	Minimum Clearances		Minimum Clearances		Total Maximum Clearance Allowed (w/o shims)	
		inches	mm	inches	mm	inches	mm
		2 DISC UNITS		3 DISC UNITS			
14 & 14H	2300	3/32 - 5/32	2.38 - 3.97	1/8 - 5/32	3.18 - 3.97	7/16	11.11
18	2100	1/8 - 5/32	3.18 - 3.97	5/32 - 3/16	3.97 - 4.76	7/16	11.11
21	1800	5/32 - 3/16	3.97 - 4.76	3/16 - 7/32	4.76 - 5.56	1/2	12.70

CHART 2

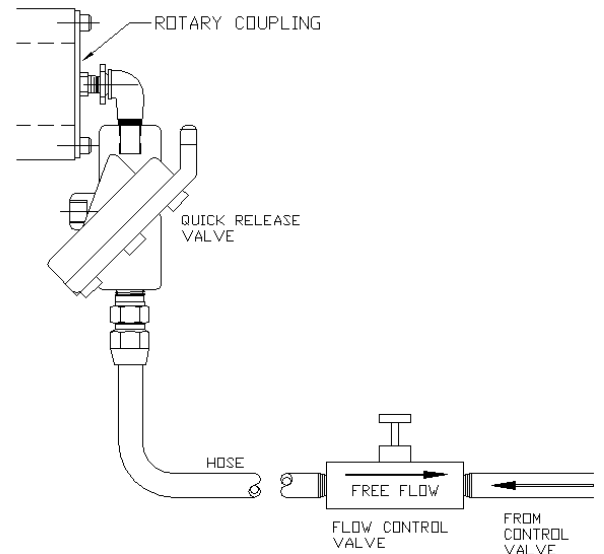
### FLYWHEEL AND FLYWHEEL HOUSING DIMENSIONS

Clutch size						Housing size				
	"A"	"B"	"C"	N1	H1		"D"	"E"	N2	H2
						"1"	20.125 (511.17)	20.875 (530.22)	12	7/16 - 14 NC
14"	16.12 (409.4)	17.250 (438.15)	18.375 (466.72)	8	1/2 - 13 NC	"1/2"	23.000 (584.20)	24.375 (619.12)	12	1/2 - 13 NC
18"	19.62 (498.3)	21.375 (542.92)	22.500 (571.50)	6	5/8 - 11 NC	"0"	25.500 (647.70)	26.750 (679.45)	16	1/2 - 13 NC
21"	23.00 (584.2)	25.250 (641.35)	26.500 (673.10)	12	5/8 - 11 NC	"00"	31.000 (787.40)	33.500 (850.90)	16	1/2 - 13 NC

**CHART 3**



**Figure 1**



**Figure 2**

<b>ALLOWABLE SIDE PULL LOAD (lbs.) FOR 5000 hrs. BEARING LIFE</b>									
<b>"X" DISTANCE</b>									
	<b>4"</b>	<b>5"</b>	<b>6"</b>	<b>7"</b>	<b>8"</b>	<b>9"</b>	<b>10"</b>	<b>11"</b>	<b>12"</b>
<b>MAX. LOAD @ 2100 RPM</b>	<b>15,300</b>	<b>16,550</b>	<b>18,000</b>	<b>19,750</b>	<b>19,050</b>	<b>17,200</b>	<b>15,700</b>	<b>14,400</b>	<b>13,300</b>
<b>MAX. LOAD @ 1800</b>	<b>16,050</b>	<b>17,350</b>	<b>18,900</b>	<b>20,700</b>	<b>20,000</b>	<b>18,050</b>	<b>16,450</b>	<b>15,100</b>	<b>14,000</b>
<b>MAX. LOAD @ 1200</b>	<b>18,300</b>	<b>19,750</b>	<b>21,500</b>	<b>23,600</b>	<b>22,750</b>	<b>20,550</b>	<b>18,750</b>	<b>17,200</b>	<b>15,900</b>

**CHART 4 (14 & 18 IN. PTO)**

<b>ALLOWABLE SIDE PULL LOAD (lbs.) FOR 5000 hrs. BEARING LIFE</b>									
<b>"X" DISTANCE</b>									
	<b>6"</b>	<b>7"</b>	<b>8"</b>	<b>9"</b>	<b>10"</b>	<b>11"</b>	<b>12"</b>	<b>13"</b>	<b>14"</b>
<b>MAX. LOAD @ 1800</b>	<b>27,600</b>	<b>29,250</b>	<b>31,100</b>	<b>33,150</b>	<b>35,575</b>	<b>38,300</b>	<b>41,550</b>	<b>44,300</b>	<b>41,150</b>
<b>MAX. LOAD @ 1200</b>	<b>24,300</b>	<b>25,750</b>	<b>27,350</b>	<b>29,175</b>	<b>31,275</b>	<b>33,700</b>	<b>36,525</b>	<b>39,300</b>	<b>36,750</b>

**CHART 5 (21 IN. PTO)**



NOTE: THIS DIAGRAM IS ONLY A DEPICTION OF A STANDARD PTO.  
 FOR ACTUAL ASSEMBLY DRAWING OF YOUR UNIT CONTACT MPT.  
 USE ASSY. NO./SER. NO. TO IDENTIFY YOUR UNIT.

