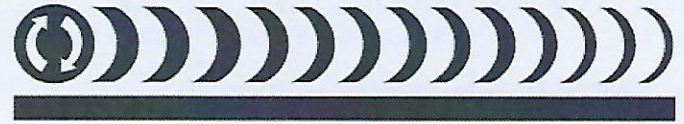


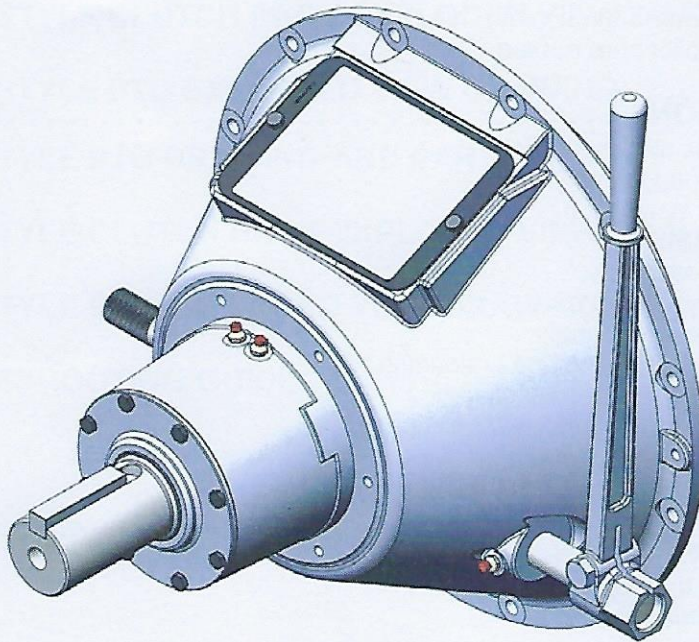
WPT POWER

CORPORATION



MECHANICAL POWER TAKE OFF PILOTLESS

INSTALLATION AND MAINTENANCE MANUAL



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1.0 INTRODUCTION


- 1.1 The WPT Power Corporation 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 the metal hand hole cover on 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 drawings at the back of this manual, pages 17 thru 21. 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, insure 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 See Chart 5 for flywheel dimensions, page 15 and drawing page 16.
- 2.2 See Chart 5 for flywheel housing dimensions, page 15 and drawing page 16.
- 2.3 The maximum RPM is listed in Chart 4 for your PTO size, page 15.

3.0 MAINTENANCE

- 3.1 The WPT mechanical PTO requires lubrication with NLGI #2 lithium based grease. Prior to installation, grease the main shaft bearings and operating shaft. Apply grease to each fitting until grease just appears at the respective seal surfaces. Although the PTO is normally lubricated at the factory, this step will insure that all moving parts are properly lubricated for initial use.
- 3.2 During normal operation, apply grease to the lever (operating) shaft, one shot per 100 hours of operation. Grease the main bearings (located on the clutch shaft) as shown in **Chart 1** below.

Recommended Lubrication Intervals

Clutch Size	Grease Shots per Zerk	Hours of Operation
C106	3	100
C107	3	100
C108	3	100
C110	6	100
SP111	6	100
SP211	6	100
SP311	8	50
SP114	6	100
SP214	8	50
SP314	8	50

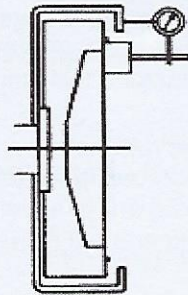
Chart 1

- 3.3 Amount and frequency of lubrication are only a recommendation. Actual requirements will vary, due to load and operating conditions. New units should be monitored for heat and wear for a period of time, to determine actual needs.
- 3.4 When washing the PTO be careful not to spray directly into where the solution will get inside the bellhousing and contaminate the clutch, grease fittings, bearings or shafts.

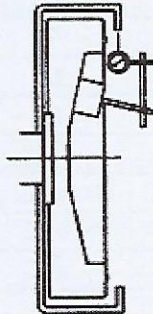
4.0 INSPECTION

- 4.1 **Preparation.** Upon receipt of your WPT product, inspect for and report any evidence of damage. To avoid damage or personal injury, insure that adequate lifting devices and hand tools are available. Compare the flywheel and flywheel housing to the bell housing and drive ring, respectively to insure that you have the correct size unit.
- 4.2 **Check engine flywheel and flywheel housing alignment.** It is strongly recommended that 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.
- 4.3 **Engine flywheel to housing face run out inspection.** 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 the values listed in the table shown below in Section 4.4.



- 4.4 Check engine flywheel housing bore runout.** 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.



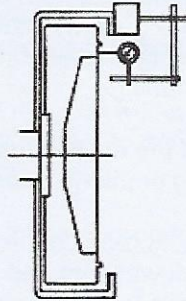
The total indicator reading should not exceed:

SAE "00" Housing:	0.019 inches (0.483 mm)
SAE "0" Housing:	0.016 inches (0.406 mm)
SAE "1" Housing:	0.012 inches (0.305 mm)
SAE "2" Housing:	0.011 inches (0.279 mm)
SAE "3" Housing:	0.010 inches (0.254 mm)
SAE "4" Housing:	0.009 inches (0.229 mm)
SAE "5" Housing:	0.008 inches (0.203 mm)
SAE "6" Housing:	0.007 inches (0.178 mm)

(Reference: SAE J617 table 1A)

- 4.5 Check engine flywheel face runout.** 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 0.0005 inches (0.013 mm) per inch of measured diameter.



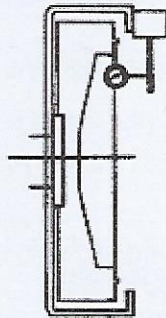
4.6 Check engine crankshaft endplay.

Measure and document the engine's crankshaft endplay before installing PTO. Using dial indicator as shown in 4.5 move the crankshaft back against the rear main bearing and then move the crankshaft to the front of the engine. Record the total movement as shown by the dial indicator.

4.7 Check engine flywheel pilot bore runout.

Mount the indicator base on the flywheel housing and position the dial indicator tip so its movement is perpendicular to the pilot bore diameter, to measure pilot bore runout. Rotate the flywheel through 360 degrees.

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



5.0 INSTALLATION

- 5.1 Use the drive ring 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.
- 5.2 Engage the clutch by operating the hand lever. Remove the drive ring. Do not disengage clutch until installation is complete.
- 5.3 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 **Chart 3** on page 13 or to the engine manufacturers torque recommendation. Use the engine manufacturer's torque recommendation if different from that in **Chart 3**.

- 5.4 Remove inspection cover nameplate from the PTO bellhousing and slowly draw the PTO toward the engine; this can be done by installing 3 or 4 equally spaced lengths of all-thread into the flywheel housing. Install nuts and tighten these while supporting the weight of the PTO with a hoist or cribbing.
- 5.5 As the PTO is drawn toward the engine, insure that the friction discs engage the teeth on the drive ring without binding or interference.
- 5.6 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 **Chart 3** on page 14. Use the engine manufacturer's torque recommendation if different from that in **Chart 3**.
- 5.7 The operating handle (hand lever) may be installed on either side of the PTO engagement shaft, depending upon space requirements and convenience to the operator. Install lever with the cast hex facing away from the PTO. Engage clutch, remove handle and reinstall using the first spline that positions handle over center, see pages 17 & 20.

 **CAUTION:**

Operating handle must be mounted in the vertical position, just over center, to eliminate excessive wear in the collar, see drawings on pages 17 and 20.

- 5.8 To check relief from bearing preloading, engage the clutch, then move the hand lever back and forth to feel the bearing endplay. Shaft and clutch should move .003" to .010" (.08mm to .25mm).
- 5.9 Re-check crankshaft endplay. If not the same as recorded in 4.6, STOP and determine the cause. Crankshaft and clutch shaft must have the proper amount of endplay or bearings may fail.
- 5.10 When installing PTO with operating shaft vertical, a stop collar should be added to the shaft on the topside for support.
- 5.11 Support plate is required for SP311/214/314 side load applications and recommended for in-line applications.
- 5.12 Automatic or Remote Engagement of the PTO.
 - 5.12.1 This PTO design may be actuated by applying a force with a remote actuator to the handle of the PTO. There are many acceptable methods, such as; Hydraulic Cylinder, Pneumatic Cylinder, or Linear actuator. The principles of remote operation are simple, and we will do our best to identify problem areas, and best practices in this section.
 - 5.12.2 The actuator must be oriented such that the normal direction of its force remains tangent to the Arc of Engagement.
 - 5.12.3 Size of actuator is critical. The actuator must be of sufficient size to apply the required amount of force on the handle. Too much force can cause permanent deformation of the Sliding Sleeve Assembly. Too little force will cause excess slippage, damage to the clutch and will eventually damage the Sliding Sleeve Assembly.
 - 5.12.4 The actuators end position must be adjustable to allow the connection with the PTO handle to be appropriately positioned. When adjustments are made to the Clutch, it is required to test, check, and correct actuators rod length to assure proper stroke length. The connection between the PTO Handle and

Actuator must float freely after engagement, and after disengagement of the PTO. Short life of the Sliding Sleeve Assembly will result if slack between the handle and actuator is not maintained.

5.12.5 The actuators travel must be within appropriate limits to engage and disengage the PTO. Failure to adhere to this rule will cause failure and likely breakage of the PTO's Clutch.

5.12.6 See **Chart 2** to determine appropriate force and stroke requirements.

 **WARNING:**

The WPT mechanical PTO is capable of side load and inline power transmission applications. Special care should be exercised when installing the PTO in an inline application. Due to engine movement and other factors that may cause misalignment, WPT recommends that a flexible coupling or drive shaft be used to join the PTO and driven shaft. If a coupling is used, insure that it has sufficient horsepower capacity and that shafts are in line within the limits specified by the coupling manufacturer. If you are unsure about the procedure to align these shafts, consult the coupling manufacturer or WPT Power Corp.

6.0 CLUTCH OPERATION

6.1 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.

6.2 Do not engage clutch above 1100 RPM.

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

 **CAUTION:**

UNDER NO CIRCUMSTANCES should the clutch be slipped for more than four seconds maximum 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.

7.0 PTO ADJUSTMENT

7.1 Clutch Adjustment

The WPT mechanical PTO uses an adjusting collar to adjust for clutch wear. If the engagement force reaches 2/3 of maximum specified torque, clutch slips, heats excessively, or operating lever fails to stay engaged, clutch adjustment is required.

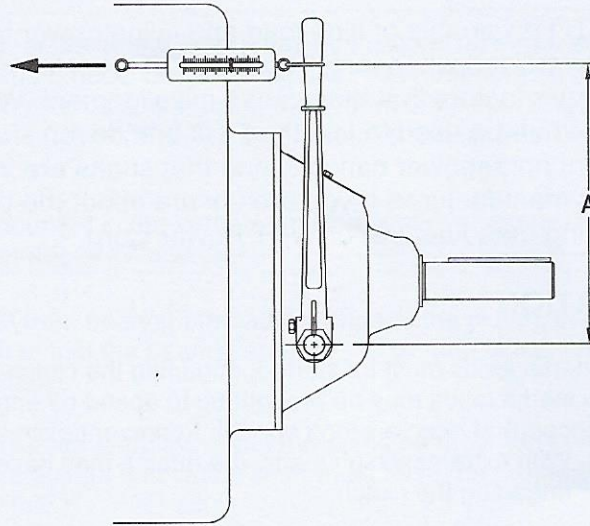
7.1.1 Remove inspection cover nameplate.

7.1.2 Disengage locking pin for "SP" style clutches by pushing pin in with a screwdriver. For "C" style clutches pull locking pin out.

7.1.3 Turn adjusting ring clockwise to increase clutch engagement force.

7.1.4 Adjust clutch engagement force until the hand lever force required to engage the clutch is within the range specified on the inspection cover nameplate or **Chart 2** below.

Check engagement force with a torque wrench using the cast hex on the lever. Or check hand lever engagement force using spring scale at hand lever length "A" shown in sketch and **Chart 2** below.



Minimum and Maximum values for checking clutch engagement

Model/ Size	Operating Shaft Torque lbf-ft (N-m)	Hand Lever Force lb (kg)	Hand Lever Length "A"
C106	66/86 (89/117)	60/78 (27/35)	13.3" (337.8)
C107	66/86 (89/117)	60/78 (27/35)	13.3" (337.8)
C108	71/94 (96/127)	64/85 (29/39)	13.3" (337.8)
C110	88/117 (119/159)	79/106 (36/48)	13.3" (337.8)
SP111	107/141 (144/191)	97/127 (44/58)	13.3" (337.8)
SP211	134/177 (181/240)	121/160 (55/73)	13.3" (337.8)
SP311	171/227 (232/308)	98/130 (44/59)	21" (533)
SP114	218/289 (295/391)	125/165 (57/75)	21" (533)
SP214	218/289 (295/391)	125/165 (57/75)	21" (533)
SP314	218/289 (295/391)	125/165 (57/75)	21" (533)

CHART 2

7.1.5 Release lock pin after completing adjustment.

7.1.6 Replace inspection cover nameplate.

NOTE: New friction discs require frequent adjustments during an initial break-in period. Recheck clutch adjustment after the first 10 hours of operation.

Clutch Adjustment Frequency

- 7.1.7 As clutch wears, the hand lever force required to engage clutch will decrease.
- 7.1.8 The need to readjust the clutch is indicated when the handle force has decreased to 2/3 of the maximum force specified on the inspection cover plate **OR** anytime clutch slippage is detected.
- 7.1.9 Do not adjust clutch so tight that hand lever force exceeds the maximum as indicated on the inspection cover nameplate or **chart 2**.

 **CAUTION:**

Do not use any automated clutch engagement device which continues to apply pressure to the hand lever, after clutch is engaged. To prevent excessive wear to clutch sliding sleeve and other clutch parts, the hand lever should be allowed to rest in a vertical position with no external force applied to it once clutch is engaged.

8.0 DISASSEMBLY

(Refer to PTO Illustration on pages 17 through 22 of this manual)
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.

 **DANGER:**

The PTO is heavy. Use approved lifting eyes and procedures to prevent accident or injury.

8.1 Remove the PTO from the engine.

- 8.1.1 Remove hand lever and other connections to the PTO.
- 8.1.2 Remove drive shaft or drive belts from PTO output shaft.
- 8.1.3 Remove the mounting bolts attaching PTO to 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.

 **WARNING:**

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

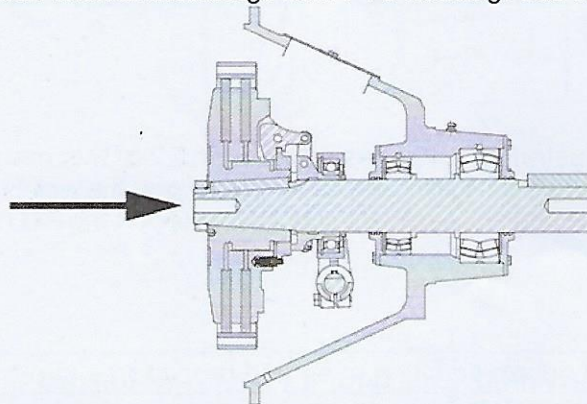
8.2 Remove the clutch from the PTO

- 8.2.1 Bend hub lock washer tab away from hub locknut.
- 8.2.2 Remove hub locknut.
- 8.2.3 Remove hub lock washer.

- 8.2.4 Remove the clutch assembly using a gear puller and the tapped holes that are provided in the hub & backplate.
- 8.2.5 Remove cotter pins, straight pins, and any washers from the clutch assembly, allowing the sliding sleeve and collar to separate from the clutch.
- 8.2.6 Push or pull clutch adjusting lock and remove adjusting collar from clutch.
- 8.2.7 Remove plates and friction disc from hub and backplate.

8.3 Remove the shaft from the PTO housing

- 8.3.1 Remove the bolts #17 from end cap #16, (see page 17).
- 8.3.2 Remove key from clutch end of shaft.
- 8.3.3 Strike clutch end of shaft with soft faced hammer or use a suitable bearing press to loosen shaft and bearings from PTO housing. See sketch below for direction.



- 8.3.4 Remove shaft and bearings from PTO housing.
- 8.3.5 Using a suitable bearing press, remove bearings from shaft.

9.0 ASSEMBLE THE PTO

9.1 Install shaft in PTO housing

Reverse steps 8.3.1 through 8.3.5 on page 12.

9.2 Install Clutch

Install clutch by reversing steps 8.2.1 through 8.2.7 on page 11.

9.3 Check runout between clutch and bellhousing

- 9.3.1 Hang PTO from hoist with clutch end down.
- 9.3.2 Place magnetic base on clutch with dial indicator on bellhousing pilot, zero dial indicator.

9.3.3 Rotate bellhousing 360 deg. watching the dial indicator needle movement. T.I.R. tolerance is .0005" per inch of diameter.

9.3.4 Move indicator to the bellhousing face and zero the needle.

9.3.5 Rotate bellhousing 360 deg. watching the dial indicator needle movement. T.I.R. tolerance is .0005" per inch of diameter.

9.4 Adjust Clutch

Adjust clutch as indicated in steps 7.1.1 through 7.1.9 on pages 9 through 11.

10.0 BOLT TORQUE VALUES

TORQUE VALUES FOR SOCKET HEAD AND HEX HEAD CAPSCREWS

SOCKET HEAD CAP SCREWS

BOLT SIZE INCHES	As Received			Lubricated**		
	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
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 INCHES	As Received			Lubricated**		
	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
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 INCHES	As Received			Lubricated**		
	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
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: For Loctite use lubricated values

Chart 3

11.0 SPECIFICATIONS

Model/ Size	Available SAE Housing Sizes	Maximum Input Torque lbf-ft (N·m)	Maximum Speed rpm	Approx. Net Weight lb (kg)
C106	6,5,4	171 (232)	3500	60 (27)
C107	6,5,4	191 (259)	3200	72 (32)
C108	5,4,3	248 (336)	3100	83 (37)
C110	4,3,2	354 (481)	2800	117 (53)
SP111	3,2,1	487 (660)	2500	143 (64)
SP211	3,2,1	974 (1321)	2500	157 (71)
SP311	3,2	1746 (2367)	2300	223 (101)
SP114	1,0	862 (1169)	2300	263 (119)
SP214	1,0	1724 (2337)	2300	332 (150)
SP314	1,0	2586 (3506)	2300	413 (187)

Contact WPT for applications requiring higher speeds.

CHART 4

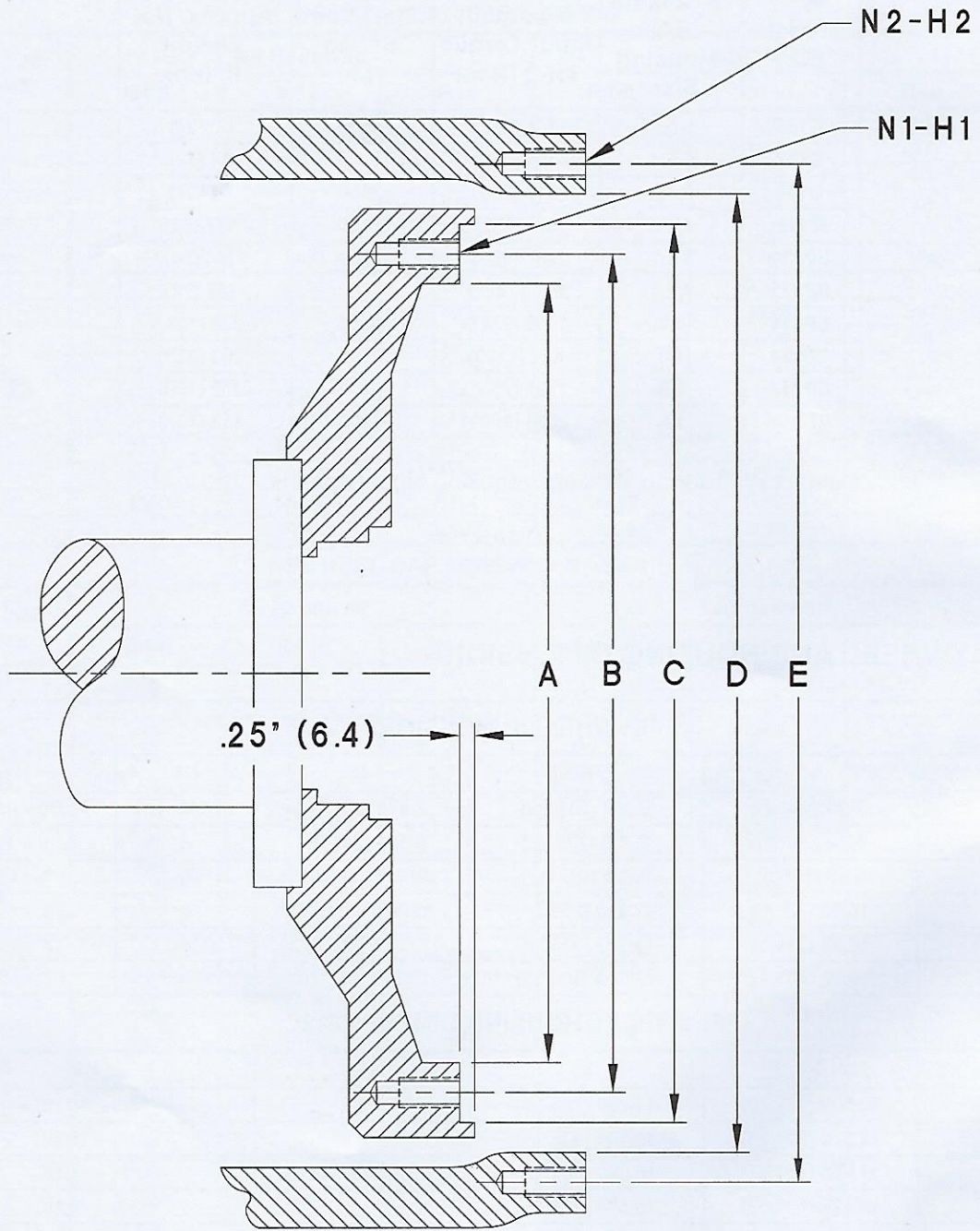
12.0 FLYWHEEL AND HOUSING DIMENSIONS

FLYWHEEL DIMENSIONS					
Clutch size	A	B	C	N1	H1
6"	7.25 (184.2)	8.500 (215.90)	7.875 (200.02)	6	5/16 – 18 NC
7"	8.12 (206.2)	8.750 (222.25)	9.500 (241.30)	8	5/16 – 18 NC
8"	8.88 (225.6)	9.625 (244.48)	10.375 (263.52)	6	3/8 – 16 NC
10"	10.88 (276.4)	11.625 (295.28)	12.375 (314.32)	8	3/8 – 16 NC
11"	12.38 (314.5)	13.125 (333.38)	13.875 (352.42)	8	3/8 – 16 NC
14"	16.12 (409.4)	17.250 (438.15)	18.375 (466.72)	8	1/2 - 13 NC
FLYWHEEL HOUSING DIMENSIONS					
Housing size	D	E	N2	H2	
6	10.500 (266.70)	11.250 (285.75)	8	3/8 – 16 NC	
5	12.375 (314.33)	13.125 (333.38)	8	3/8 – 16 NC	
4	14.250 (361.95)	15.000 (381.00)	12	3/8 – 16 NC	
3	16.125 (409.58)	16.875 (428.63)	12	3/8 – 16 NC	
2	17.625 (447.68)	18.375 (466.73)	12	3/8 – 16 NC	
1	20.125 (511.18)	20.875 (530.22)	12	7/16 - 14 NC	
1/2	23.000 (584.20)	24.375 (619.12)	12	1/2 - 13 NC	
0	25.500 (647.70)	26.750 (679.45)	16	1/2 - 13 NC	
00	31.000 (787.40)	33.500 (850.90)	16	1/2 – 13 NC	

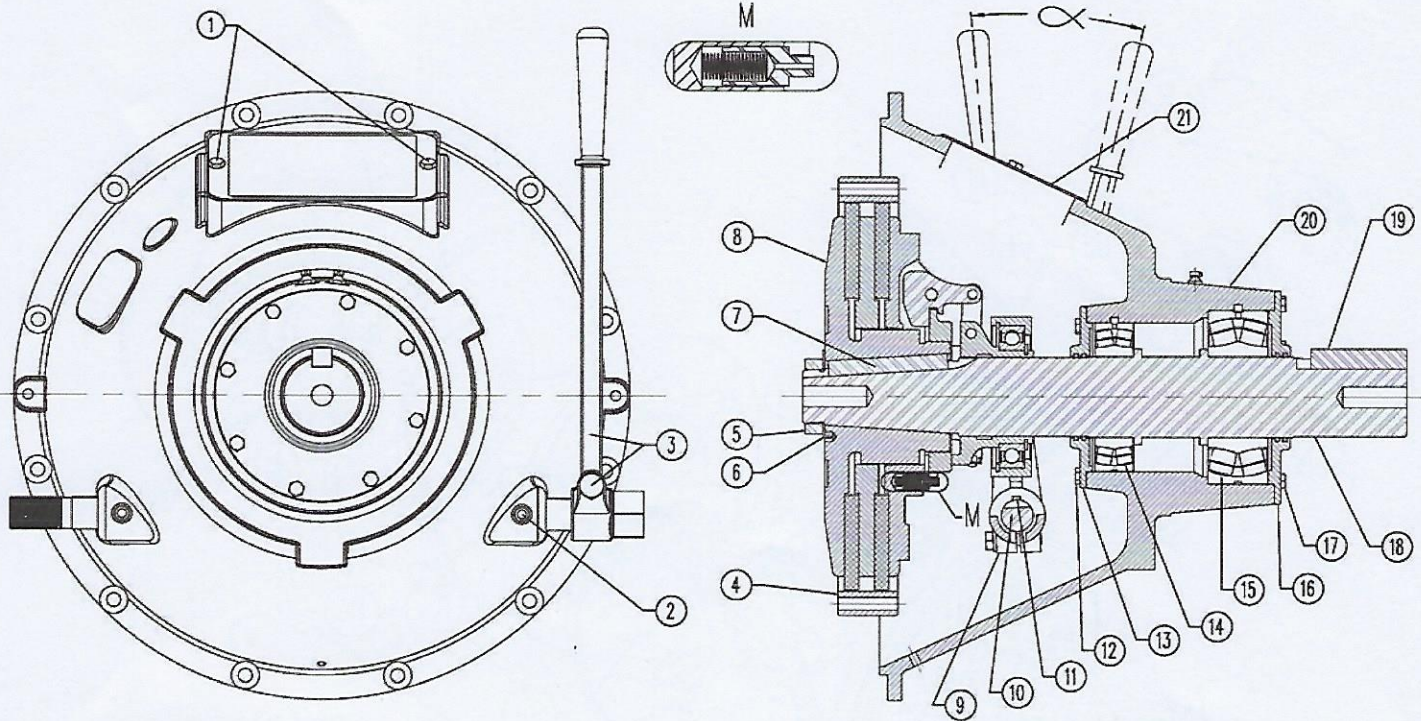
See page 16 for flywheel and housing drawing.

CHART 5

13.0 FLYWHEEL AND HOUSING DRAWING

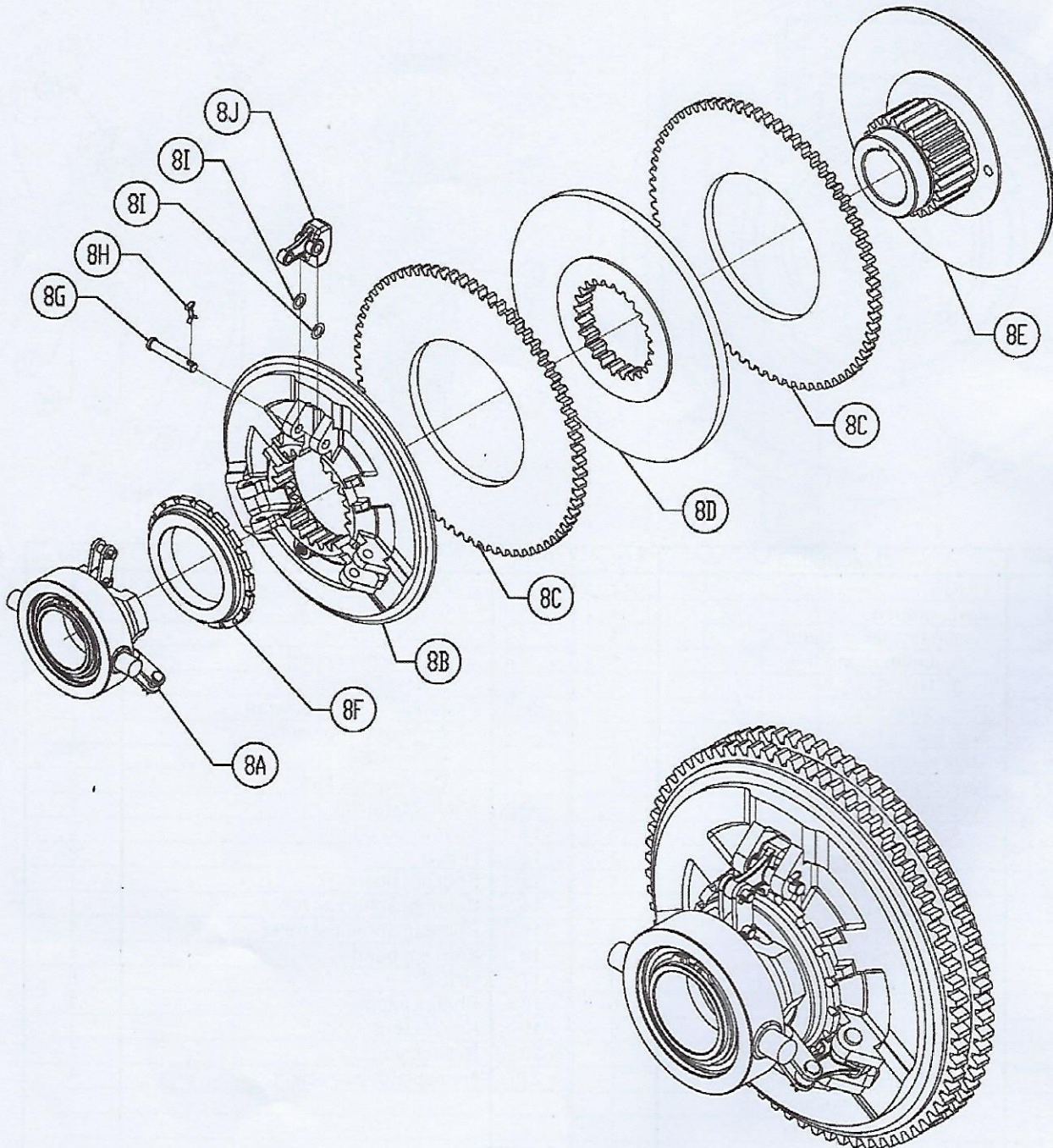


14.0 WTD-SP STYLE 2 PLATE PTO DRAWING AND PARTS LIST

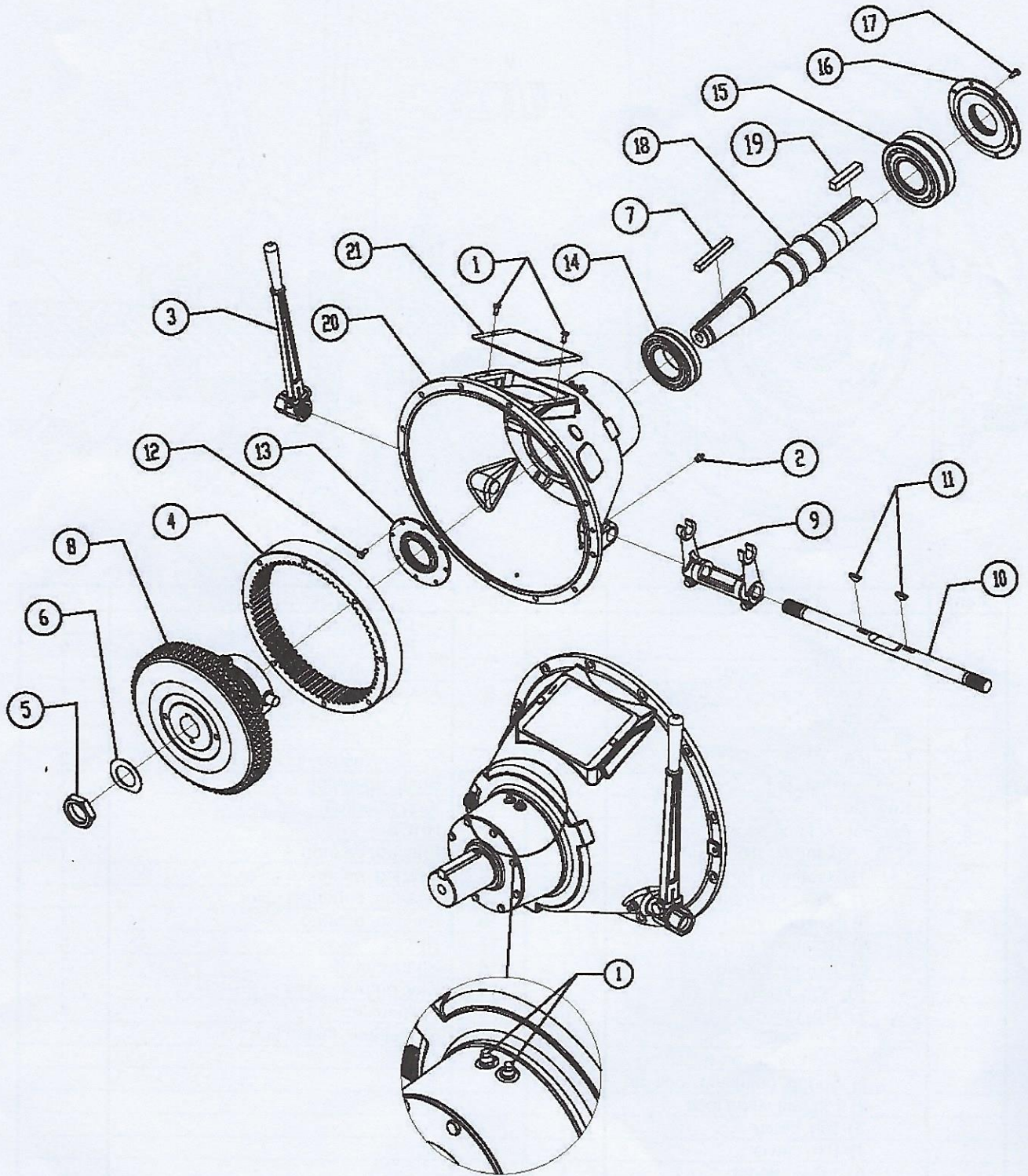


Item	Description	Qty	Item	Description	Qty
1	HHCS	2		F. Ring, adjusting	1
2	Zerk, grease	4		G. Pin, clevis	3
3	Assembly, lever, hand	1		H. Pin, cotter	3
	A. Lever, hand	1		I. Washer spring	6
	B. HHCS	1		J. lever, finger	3
4	Ring, drive	1	9	Assembly, yoke, throwout	1
5	Nut, hub	1		A. Yoke, throwout	1
6	Lock washer, hub	1		B. HHCS	2
7	Key, clutch	1		C. Washer, lock	2
8	Assembly clutch pack	1	10	Shaft, operating	1
	A. Assembly, sliding sleeve,	1	11	Key, woodruff	2
	1) Retaining Ring	1	12	HHCS	8
	2) Collar, bearing	1	13	Endcap, bearing	1
	3) Ball bearing	1	14	Bearing, spherical roller	1
	4) Retaining ring	1	15	Bearing, spherical roller	1
	5) Sleeve, sliding	1	16	Endcap, bearing	1
	6) Link, lever	6	17	HHCS	8
	7) Pin, clevis	6	18	Shaft, clutch	1
	8) Pin, cotter	6	19	Key, output	1
	B. Assembly, plate, floating	1	20	Bellhousing	1
	1) Spring, adjusting, lock pin	1	21	Nameplate, instruction	1
	2) Pin, adjusting lock	1			
	3) Plate, floating	1			
	C. Disc, friction	2			
	D. Plate, center	1			
	E. Hub & backplate	1			

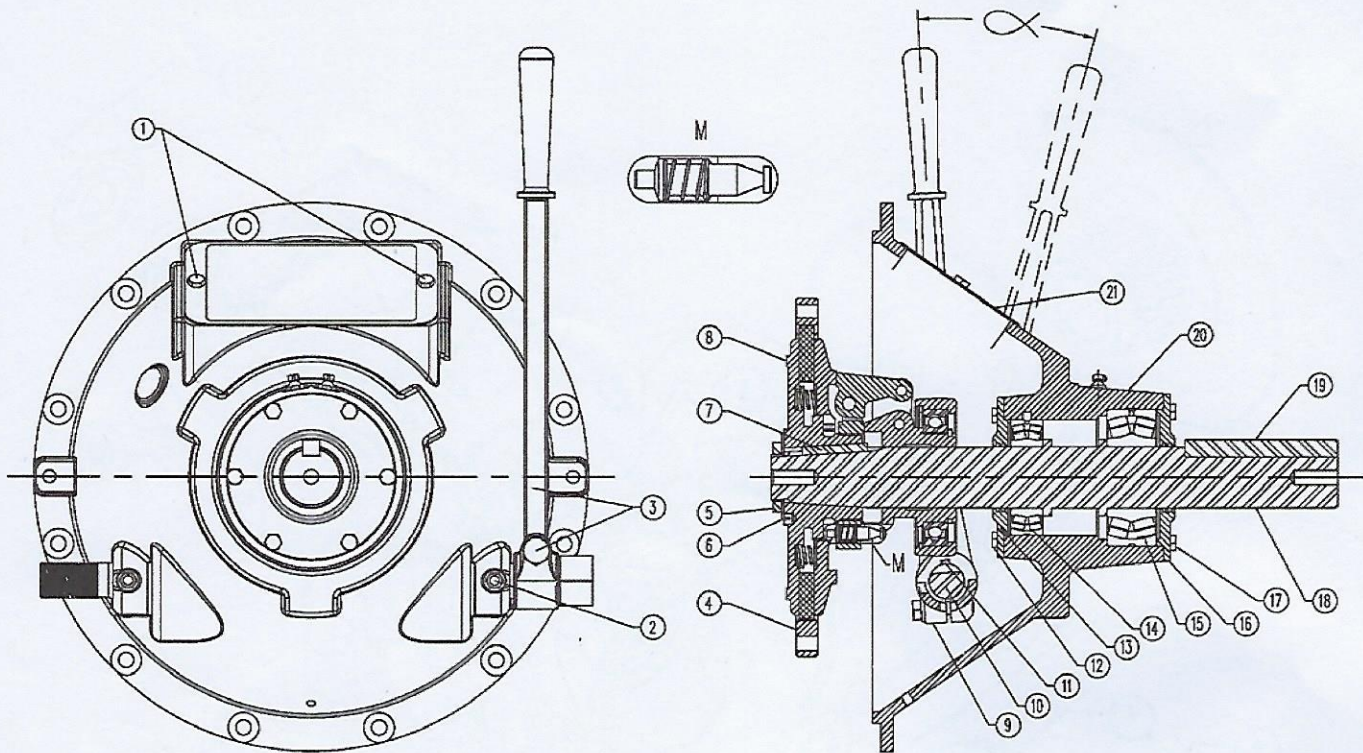
15.0 WTD-SP STYLE TWO PLATE CLUTCH PACK EXPLODED VIEW DRAWING



16.0 WTD-SP STYLE TWO PLATE PTO EXPLODED VIEW DRAWING

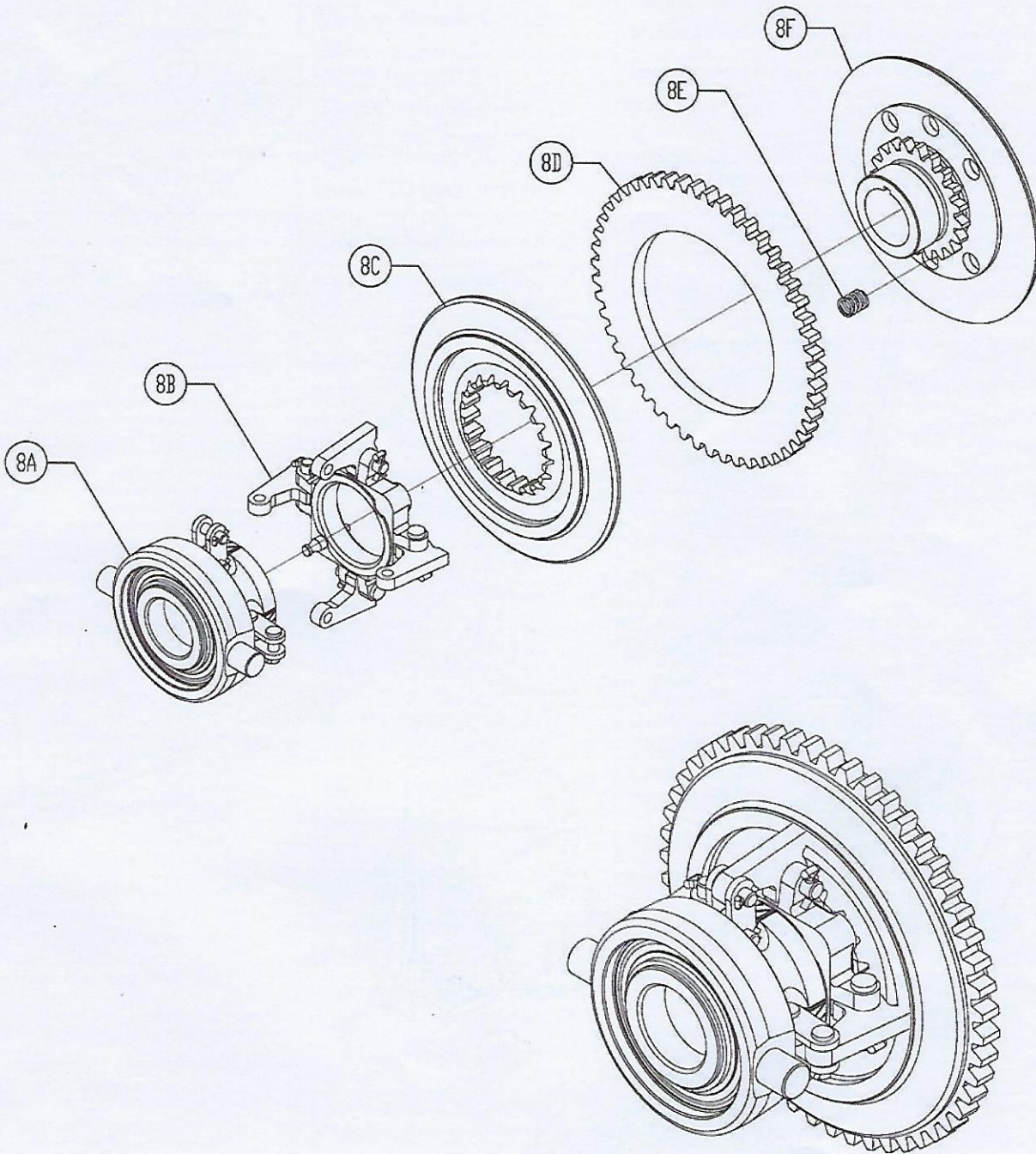


17.0 WTD-C STYLE SINGLE PLATE PTO DRAWING AND PARTS LIST

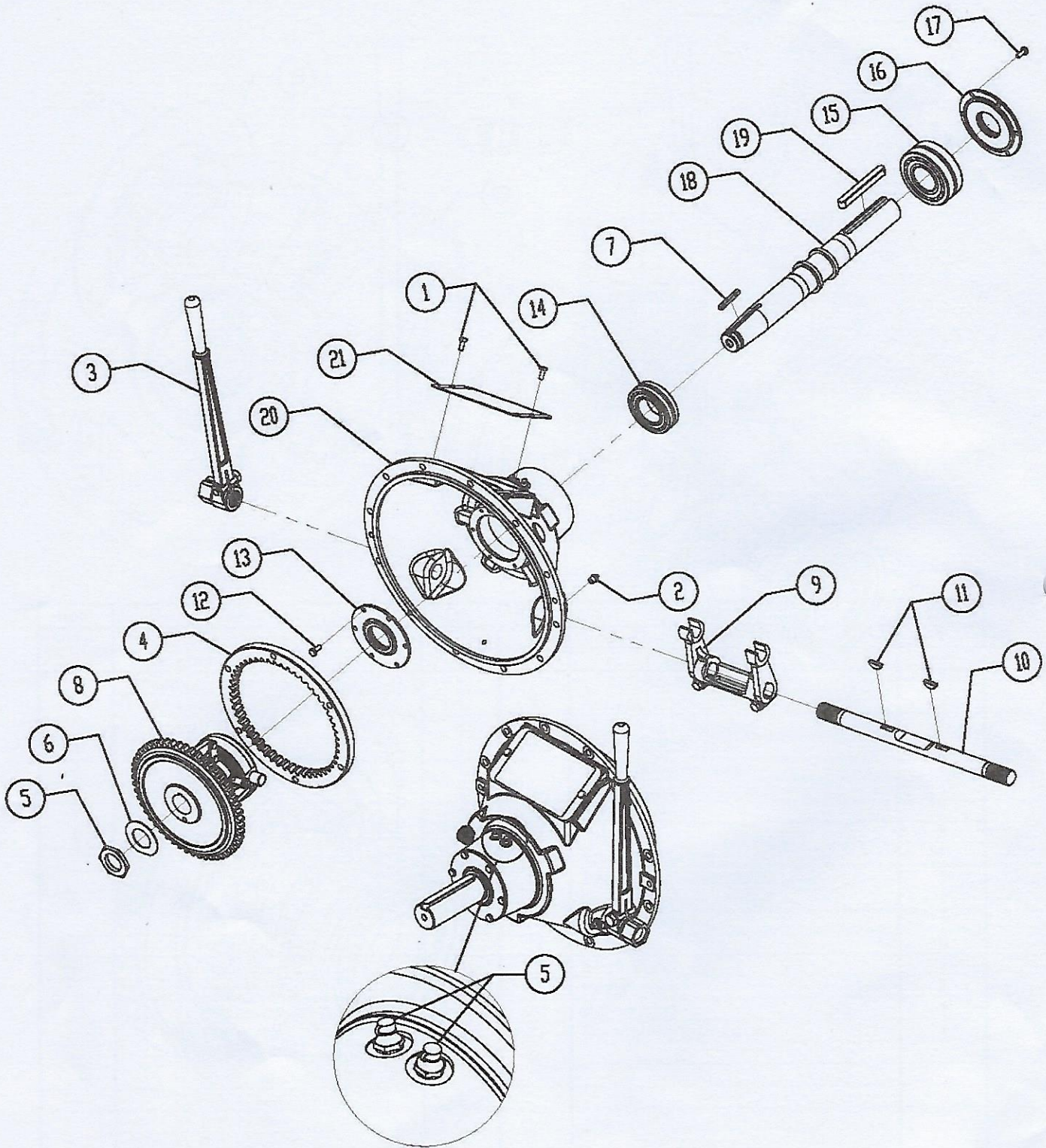


Item	Description	Qty	Item	Description	Qty
1	HHCS	2		D. Disc, friction	1
2	Zerk, grease	4		E. Spring, release	6
3	Assembly, lever, hand	1		F. Hub & backplate	1
	A. Lever, hand	1	9	Assembly, yoke, throwout	1
	B. HHCS	1		A. Yoke, throwout	1
4	Ring, drive	1		B. HHCS	2
5	Nut, hub	1		C. Washer, lock	2
6	Lock washer, hub	1	10	Shaft, operating	1
7	Key, clutch	1	11	Key, woodruff	2
8	Assembly clutch pack	1	12	HHCS	6
	A. Assembly, sliding sleeve,	1	13	Endcap, bearing	1
	1) Retaining Ring	1	14	Bearing, spherical roller	1
	2) Collar, bearing	1	15	Bearing, spherical roller	1
	3) Ball bearing	1	16	Endcap, bearing	1
	4) Retaining ring	1	17	HHCS	6
	5) Sleeve, sliding	1	18	Shaft, clutch	1
	6) Link, lever	8	19	Key, output	1
	7) Pin, clevis	8	20	Bellhousing	1
	8) Pin, cotter	8	21	Nameplate, instruction	1
	B. Assembly, lever, adjusting	1			
	1) Spring, adjusting, lock pin	1			
	2) Pin, adjusting lock	1			
	3) Pin, cotter	4			
	4) Pin, clevis	4			
	5) Lever, finger	4			
	6) Ring, adjusting	1			
	C. Plate, floating	1			

18.0 WTD-C STYLE SINGLE PLATE CLUTCH PACK EXPLODED VIEW DRAWING



19.0 WTD-C STYLE SINGLE PLATE PTO EXPLODED VIEW DRAWING



20.0 TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy
PTO Will Not Engage/Disengage	Improper engagement torque	Check engagement torque 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 pilot bearing	Inspect pilot bearing and replace as needed
	Worn PTO main bearings	Inspect main bearings and replace as needed
Clutch Slips, Burnt Smell, and/or Smoke from PTO	Improper engagement torque	Check engagement torque 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
	Worn PTO pilot bearing	Inspect pilot bearing 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
	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 Torque	Engagement speed is too high	Reduce engagement speed to below 1000 r/min
	Excessive force on operating handle	Reduce operating force to spec
Pilot Bearing Will Not Fit in Bore	Incorrect pilot bearing size	Measure pilot bearing bore and depth, replace as needed
Clutch Will Not Fully Seat on Bell Housing	Pilot bearing wrong size	Measure pilot bearing bore and depth, contact WPT Power Applications Engineering
	Flywheel bore depth too shallow	Measure bore depth, contact WPT Power Applications Engineering
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