AUTOMOTIVE STYLE CLUTCH

MECHANICAL PTO

Installation & Maintenance Manual

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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 and 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 bellhousing. Your WPT Power 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 11 thru 13. 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 Flywheel housings compliant with SAE No. 3, No. 4, GM® style or JEEP® style.

2.2 Flywheels compliant with SAE J618 single plate spring loaded clutches.

2.3 Refer to the assembly drawing supplied with this unit for maximum RPM and side load. Your WPT Distributor can provide a copy of the drawing if the one provided should become lost.

2.4 Flywheel and flywheel housing alignment tolerances see Section 3.0.

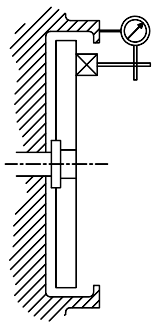
2.5 Refer to Chart 1 on page 10 for recommended bolt torque values.

3.0 INSPECTION

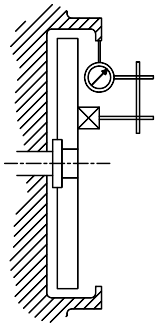
3.1 **Preparation.** Upon receipt of your WPT Power product, inspect for and report any evidence of damage. To avoid damage or personal injury, insure that adequate lifting devices and hand tools are available. Compare the flywheel and flywheel housing to the bell housing, clutch disc and pressure plate, respectively to ensure that you have the correct size unit.

3.2 **Check 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.

3.3 **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 the values listed in the table shown below in section **3.4 Check flywheel housing bore run out**.



3.4 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 through 360 degrees.



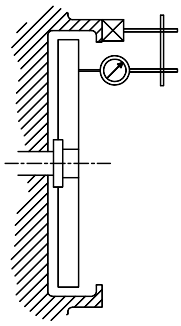
The total indicator reading should not exceed:

SAE ”3” Housing: 0.010 inches (0.254 mm)
SAE ”4” Housing: 0.009 inches (0.229 mm)
(Reference: SAE J617 table 1A)

Note: Not applicable for GM® style or JEEP® style housing

3.5 Check flywheel face run out.
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 pressure plate 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.



3.6 Check engine crankshaft endplay.
Measure and document the engine’s crankshaft endplay before installing PTO. Using dial indicator as shown in 3.5 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.

4.0 INSTALLATION

NOTE: For units with model number WTD-13-130 or WTD-13-133, the factory flywheel offset is set to standard SAE #3. For alternate offset settings see Section 9.1.

4.1 Clean the friction surface of the flywheel and **pressure plate** with an appropriate cleaning solvent to remove any oil and grease.

4.2 Use an alignment tool to center the **clutch plate** on the flywheel, if necessary. The pressure plate side of the clutch plate should face out.

NOTE: For the PTO's with model number WTD-11-143 or WTD-11-144, see Section 14 for complete alignment tool details.

4.3 Place the **pressure plate** and **clutch plate** in position on the flywheel and assemble using grade 8 bolts. Make sure alignment tool is in place, and then tighten the bolts evenly in an alternating pattern. Torque bolts to the specifications in Chart 1 on page 10 or to the engine manufacturer's torque. Use the engine manufacturer's torque recommendation if different from that in Chart 1. The alignment tool can now be removed.

⚠ CAUTION:

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

4.4 Insert guide pins into the engine flange face 180° apart in order to properly align the PTO **bellhousing** and **shaft** with the engine.

4.5 Remove inspection **hand hole cover** from the PTO **bellhousing**. Align the PTO **bellhousing** and **shaft** parallel with the engine crankshaft.

4.6 Advance the PTO **bellhousing** onto the guide pins carefully. Continue until it is against the engine flywheel housing. Remove the guide pins and install grade 5 or better hex head cap screws to attach the bellhousing to the engine. Torque bolts to the specifications in Chart 1 on page 10 or to the engine manufacturer's torque. Use the engine manufacturer's torque recommendation if different from that in Chart 1.

4.7 Place the **hand lever** on the desired side of the operating **shaft.** Secure with the appropriate **hex head cap screw.** The **hand lever** should be at a 5° to 10° angle from vertical toward the engine when the clutch is completely disengaged, see appropriate drawing at the back of this manual, page 11.

4.8 For initial adjustment of clutch: See adjustment instruction in Section 7.0.

4.9 Replace **hand hole cover** and attach with screws prior to use.

⚠ 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, ensure 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.

5.0 LUBRICATION

5.1 The **throw-out bearing** and **main bearings** are sealed for life and require no lubrication except WTD-11-143 & WTD-11-144 units pack using EP-2 Lithium based grease or equal every 300 hours. However, they should be inspected every two years for wear or damage.

5.2 Apply one shot of grease every 100 hours of use to all **fittings** on the operating shaft. Use a good quality lithium-based grease (300°F minimum drop point, No. 2 NGLI).

5.3 During adjustment, apply a small amount of grease to the **ball stud** to prevent wear and corrosion.

5.4 Please refer to pages in the back of this manual for a drawing and parts list for this PTO.

6.0 OPERATION

⚠ **WARNING:** If the **hand lever** has no free play present before the clutch is engaged, adjust, as necessary. See clutch adjustment, Section 7.0.

6.1 Start the engine and idle at low speed (1000 rpm or less).

6.2 Machinery to be driven should be under no load.

6.3 Use one single swift movement of the hand lever to engage the clutch. Do not allow the clutch to slip for longer than 2 seconds without either completely engaging it or completely disengaging it.

6.4 If the load to be driven has a large inertia to overcome, the clutch may need to be slipped several times (a.k.a. “bumping-in”) to bring the driven load up to speed. After 3 to 4 slips, engage the hand lever fully.

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

⚠ **WARNING:** Engagement at engine speeds above 1000 rpm will reduce clutch life and may cause damage to driven machinery.

7.0 MAINTENANCE

⚠ **WARNING:** In order for the clutch **release bearing** to not contact the release fingers when the clutch is fully engaged, the clutch should be adjusted periodically.

⚠ **CAUTION:** Turn off engine and prevent from being restarted while adjustments are being performed.

7.1 Fully engage the clutch.

7.2 Remove **hand hole cover.**

7.3 Check the clearance between the clutch release fingers and the **throw-out bearing** surface, as specified on drawing supplied with this unit. Your WPT distributor can provide a copy of the drawing if the one provided should become lost.

7.4 Loosen the **jam nut** and rotate the **ball end adjust** as needed to obtain the proper clearance.

7.5 Recheck clearance after **jam nut** has been tightened.

7.6 Replace **hand hole cover.**

8.0 DISASSEMBLY

(Refer to PTO Illustration on pages 11-19 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.

⚠ CAUTION:
The PTO is heavy. Use approved lifting equipment 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, shaft** splines, and other components.

8.2 Remove the clutch from the flywheel.

8.2.1 Remove bolts holding the **pressure plate** and **clutch plate** to the flywheel.

8.2.2 Remove **pressure plate** and **clutch plate.**

8.3 Remove the shaft from the PTO housing.

8.3.1 Place the assembly in a position to have access inside **bellhousing.**

8.3.2 Remove **spring, fork** and **throw-out bearing sleeve** from housing assembly.

8.3.3 Remove **engagement cam assembly** from **bellhousing.** Remove **bolts** and slide **engagement shaft** out of **bellhousing.**

8.3.4 Remove **bolts** from **bearing carrier.**

8.3.5 Strike output end of **shaft** with soft faced hammer or use a suitable bearing press to loosen **shaft, bearings** and **bearing carrier** from PTO **bellhousing**.

8.3.6 Remove **bearing carrier** and **shaft** with **bearings** from PTO **bellhousing.**

8.3.7 Remove **bearing carrier** from **shaft** and **bearings** using a suitable bearing press.

8.3.8 Using a suitable bearing press, remove **bearings** from shaft.

9.0 ASSEMBLY

9.1 Alternate flywheel offset setting for WTD-13-130 & WTD-13-133 only.

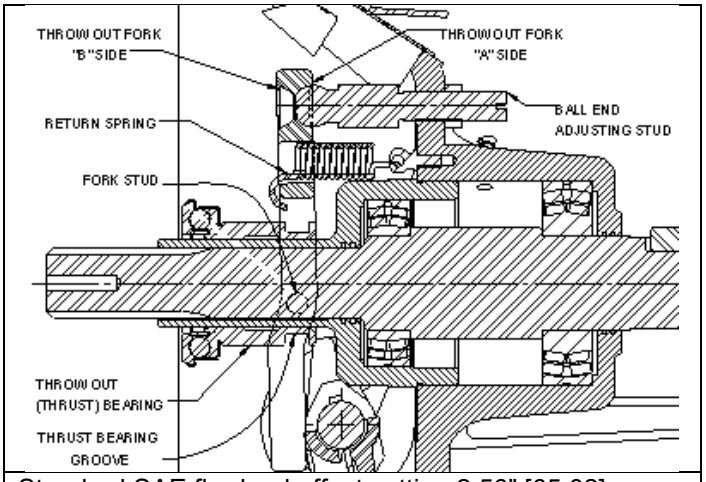
9.1.1 Remove return spring from throw-out fork.

9.1.2 Remove throw-out fork from ball end adjusting stud.

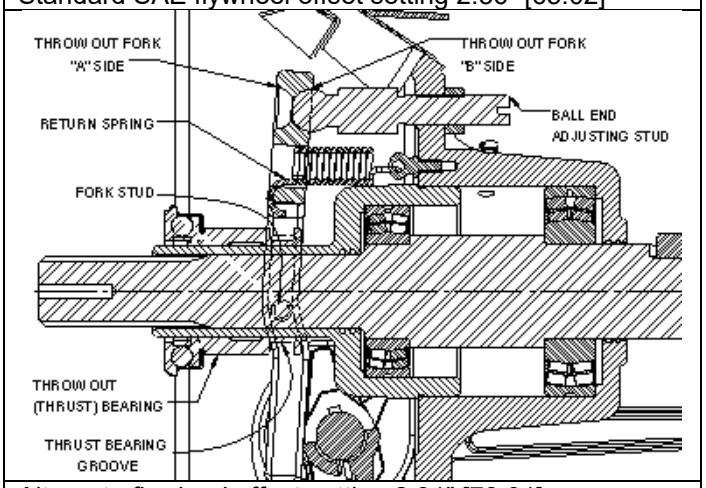
9.1.3 Ensure fork stud is out of thrust bearing groove.

NOTE: Ball end socket is engaged on “A” side from factory.

9.1.4 Reverse throw-out fork to engage alternate ball end socket. Ball engaged on “B” side.



Standard SAE flywheel offset setting 2.56” [65.02]



Alternate flywheel offset setting 2.91” [73.91]

9.1.5 Ensure fork stud is inside throw-out bearing groove.

9.1.6 Insert ball end stud into ball socket of throw-out fork on “B” side.

9.1.7 Secure return spring to throw-out fork.

9.1.8 Check clearance and adjust as needed see Section 7.0.

9.2 Assembly of the unit

9.2.1 Install **shaft** into PTO **bellhousing** by reversing steps found in Section 8.3.

9.2.2 Install **clutch plate** and **pressure plate** to flywheel following instructions 4.1 thru 4.3.

9.2.3 Install shaft and housing assembly following instructions 4.4thru 4.7.

9.2.4 Adjust clutch as indicated in instructions 7.0 **MAINTENANCE**.

10.0 CHART 1

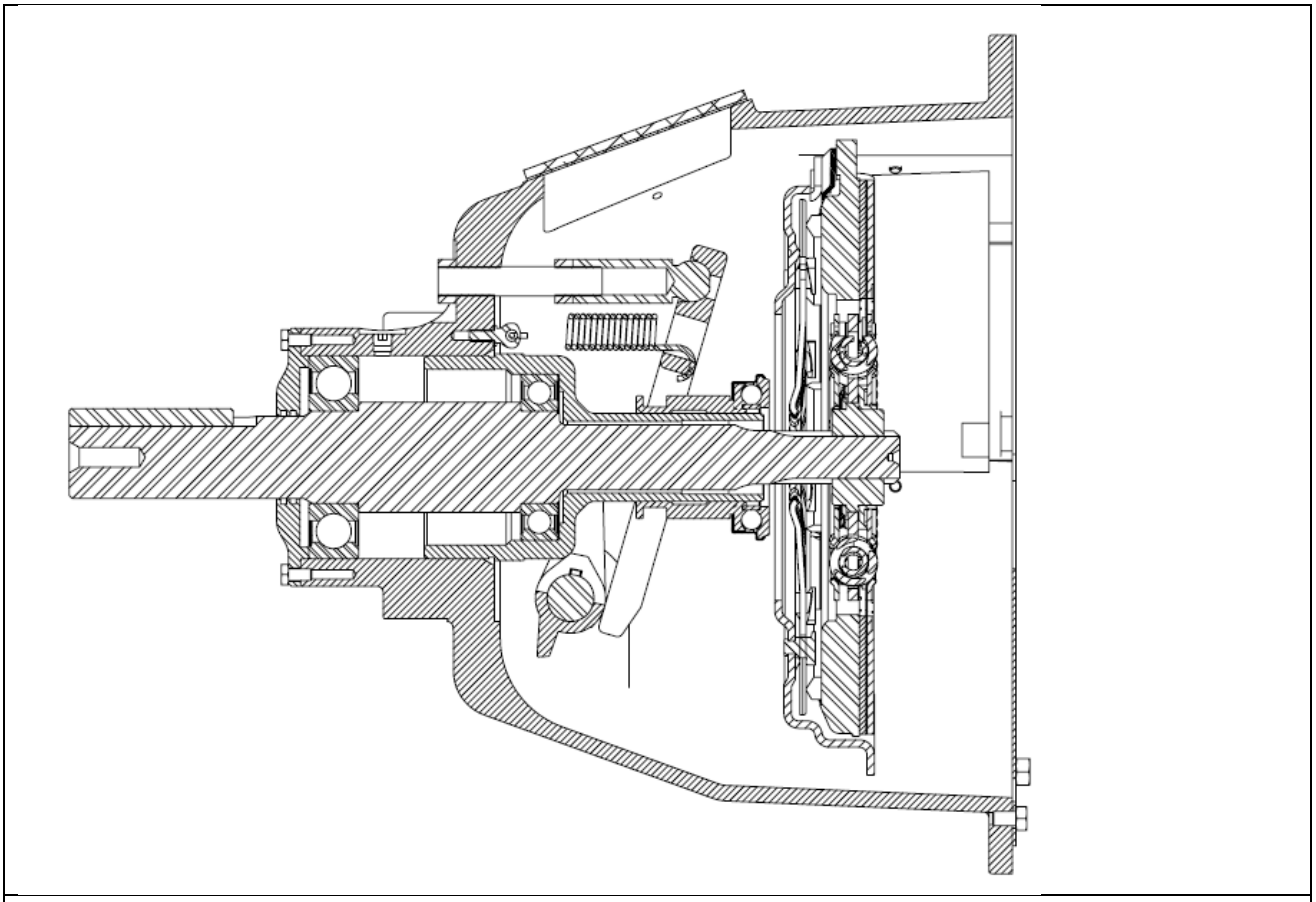
TORQUE VALUES FOR HEX HEAD CAP SCREWS (HHCS)						
HEX HEAD CAP SCREWS - Grade 8						
BOLT SIZE	**As Received**			**Lubricated****		
IN INCHES	**LB - FT**	**LB - IN**	**Nm**	**LB - FT**	**LB - IN**	**Nm**
1/4 -20	8	100	11	6	80	9
5/16-18	17	200	23	13	160	18
3/8 -16	30	360	41	24	288	32
7/16-14	48	570	64	38	456	51
1/2 -13	83	990	112	66	792	89
9/16-12	107	1285	145	85	1028	116
5/8 -11	143	1714	194	114	1371	155
3/4 -10	256	3070	347	204	2456	277
7/8 -9	417	5000	565	333	4000	452
1 -8	625	7500	847	500	6000	678
1 1/8-7	770	9240	1040	616	7390	835
1 1/4-7	1090	13100	1480	869	10400	1180
1 3/8-6	1430	17200	1940	1140	13700	1550
1 1/2-6	1890	22700	2560	1510	18100	2050
HEX HEAD CAP SCREWS - Grade 5						
BOLT SIZE	**As Received**			**Lubricated****		
IN INCHES	**LB - FT**	**LB - IN**	**Nm**	**LB - FT**	**LB - IN**	**Nm**
1/4 -20	6	71	8	5	56	6
5/16-18	12	142	16	9	113	12
3/8 -16	22	260	29	17	208	23
7/16-14	34	410	46	27	328	36
1/2 -13	53	636	72	42	508	57
9/16-12	74	890	101	59	712	80
5/8 -11	104	1250	141	83	1000	112
3/4 -10	183	2200	249	146	1760	199
7/8 -9	298	3570	403	238	2856	322
1 -8	440	5280	597	352	4224	477
1 1/8-7	553	6640	750	442	5312	600
1 1/4-7	775	9300	1051	620	7440	840
1 3/8-6	1012	12140	1372	809	9712	1097
1 1/2-6	1350	16200	1831	1080	12960	1464
**** NOTE: For Loctite use lubricated values**						

TORQUE VALUES FOR SOCKET HEAD CAP SCREWS (SHCS)

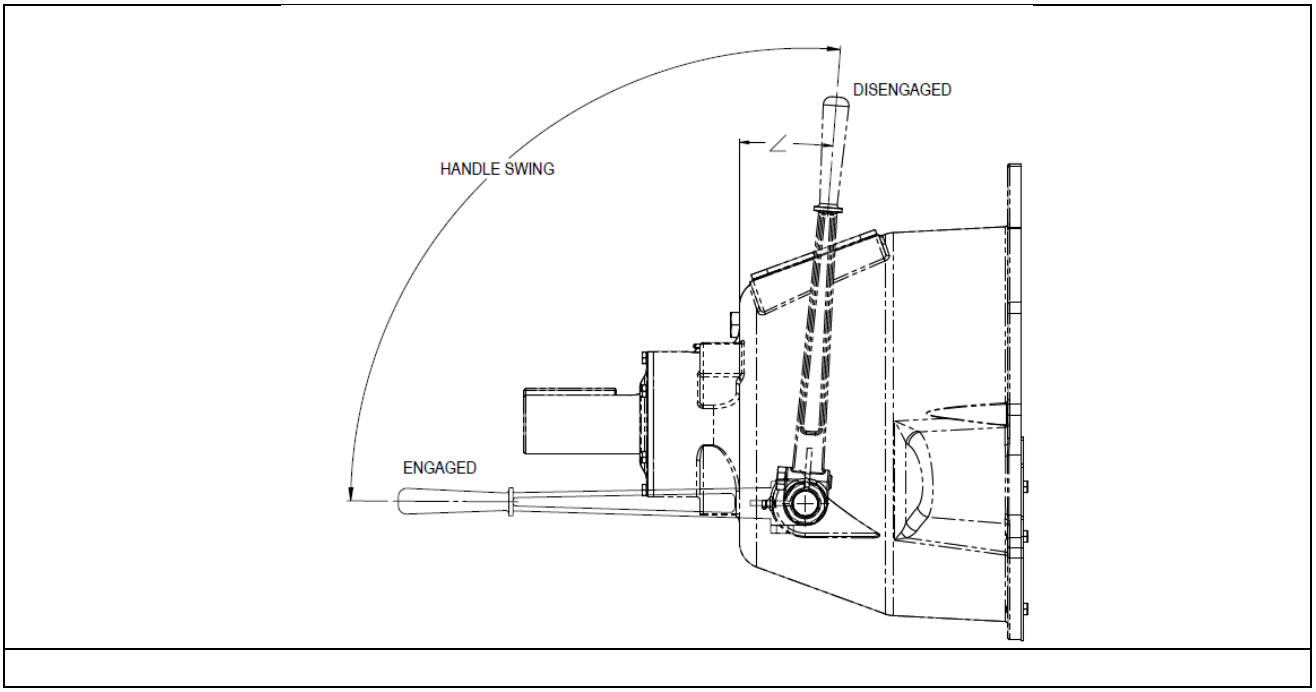
BOLT SIZE	As Received			Lubricated**		
IN INCHES	LB - FT	LB - IN	Nm	LB - FT	LB - IN	Nm
1/4 -20	13	150	17	10	120	13
5/16-18	23	305	34	18	244	27
3/8 -16	45	545	62	36	436	49
7/16-14	70	840	95	56	672	76
1/2 -13	108	1300	147	86	1040	117
9/16-12	155	1860	210	124	1488	168
5/8 -11	211	2530	286	168	2024	228
3/4 -10	367	4400	497	293	3520	397
7/8 -9	583	7000	791	466	5600	632
1 -8	867	10400	1175	693	8320	940
1 1/8-7	1242	14900	1684	993	11920	1347
1 1/4-7	1750	21000	2374	1400	16800	1899
1 3/8-6	2317	27800	3142	1853	22240	2513
1 1/2-6	3042	36500	4125	2433	29200	3300
1 3/4-5	4950	59400	6714	3960	47520	5371
2-4.5	7492	89900	10161	5993	71920	8128

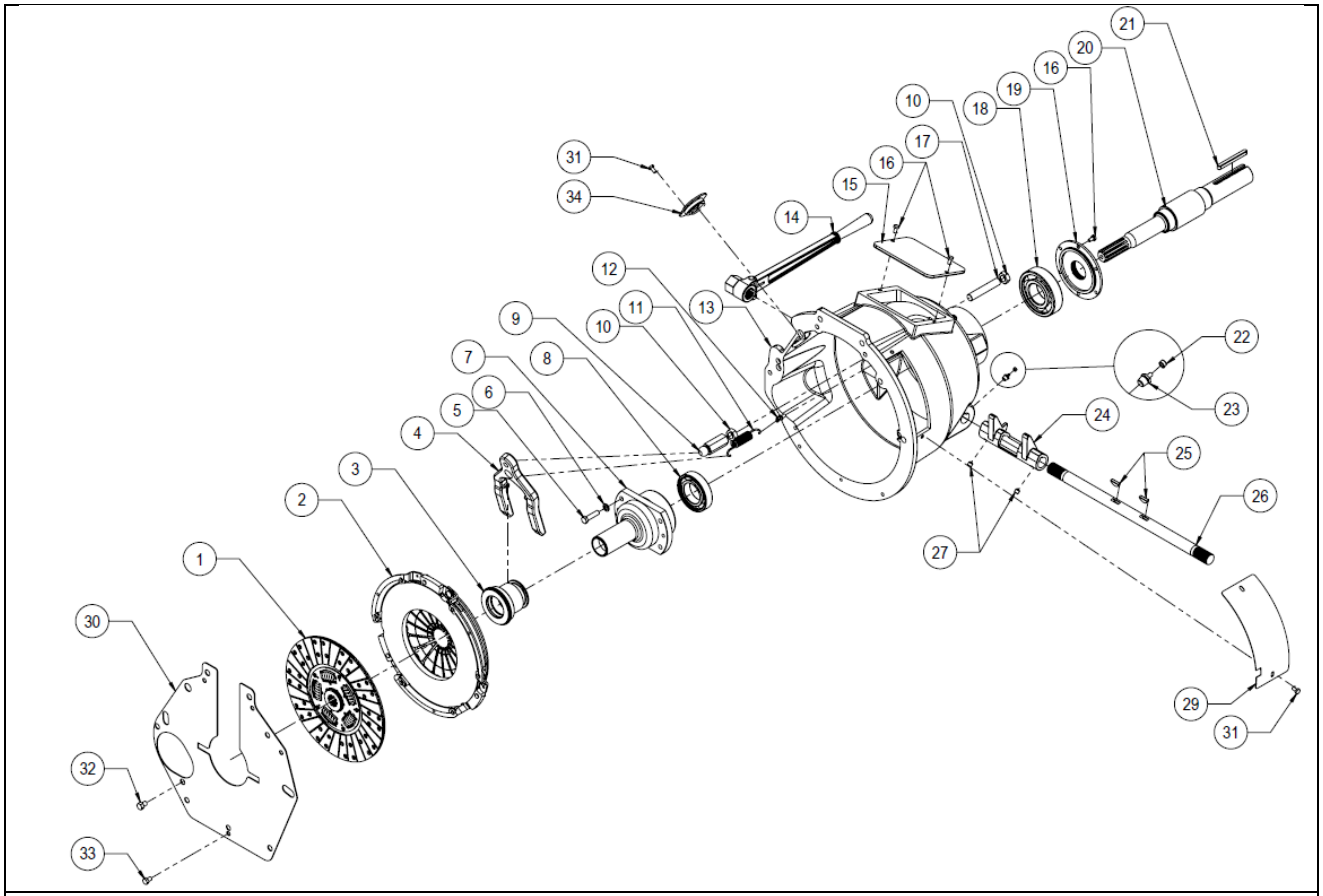
**** NOTE: For Loctite use lubricated values**

11.0 11” PTO Drawing and Parts List



Jeep Style (WTD-11-148 Shown)

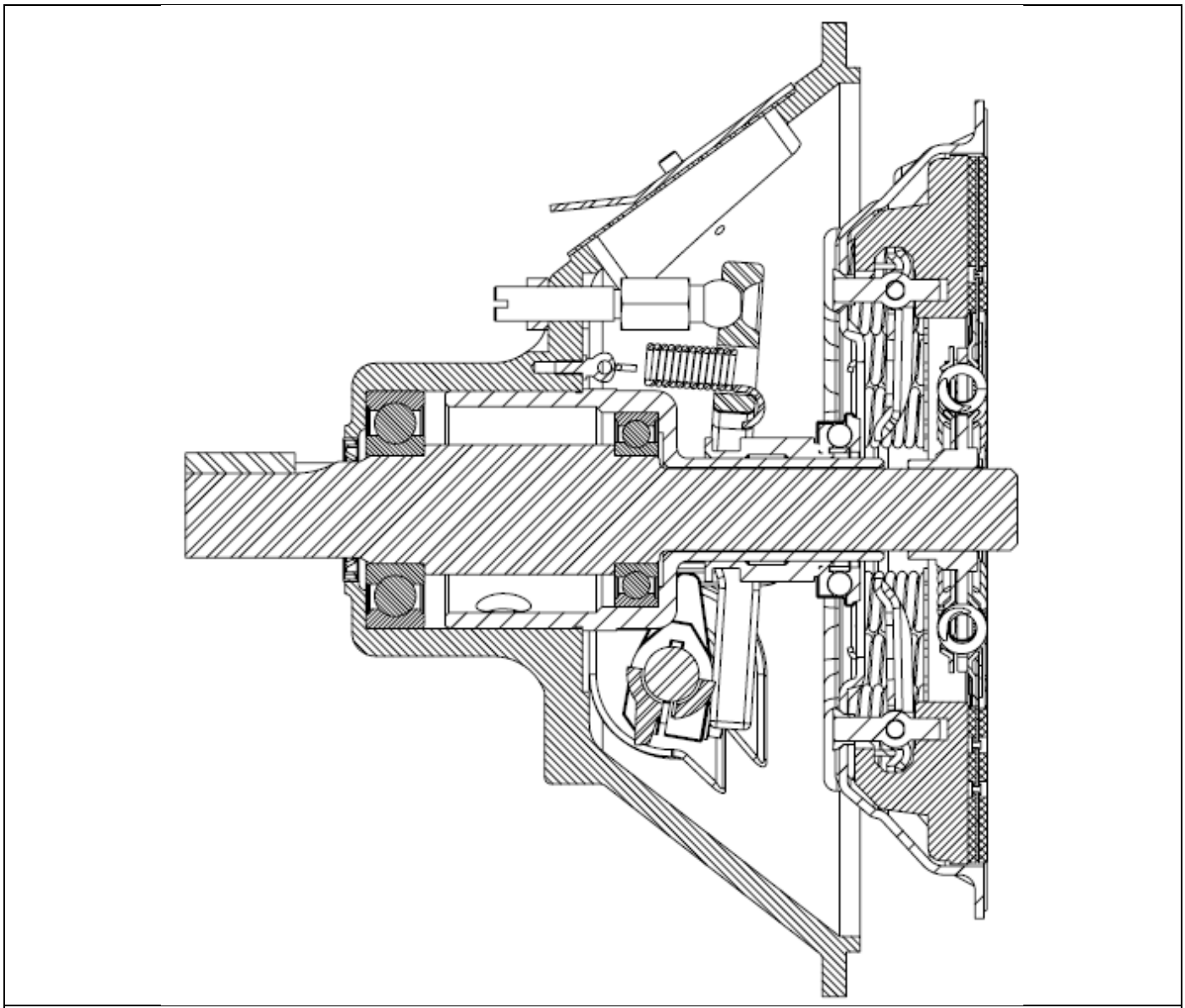




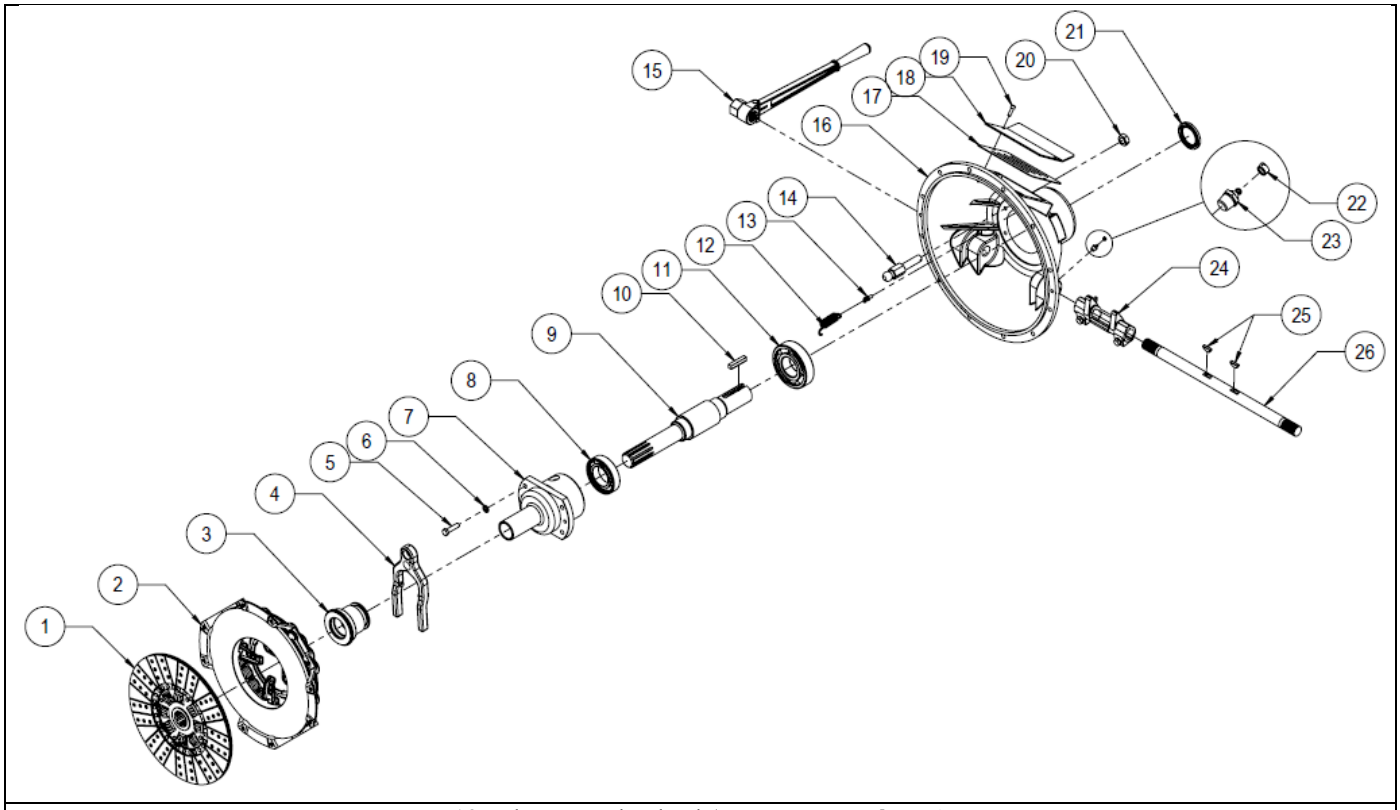
Jeep Style (WTD-11-148 Shown)

#	Description		#	Description
1	ASSEMBLY,CLUTCH PLATE		18	BRG,OUTBOARD
2	ASSEMBLY,PRESSURE PLATE		19	BRG ENDCAP
3	BRG,THRUST		20	SHAFT
4	FORK,THROW-OUT		21	KEY
5	HHCS		22	CAP,GREASE FITTING
6	WASHER,LOCK		23	ZERK
7	BRG CARRIER		24	ENGAGEMENT CAM
8	BRG,INBOARD		25	KEY,WOODRUFF
9	BALL END ADJUST		26	SHAFT,OPERATING
10	HEX NUT		27	SET SCREW
11	SPRING,EXTENSION		28	PLUG,PIPE (not Shown)
12	SCREW,SPRING ANCHOR		29	ACCESS COVER
13	BELLHOUSING		30	DUST COVER
14	ASSEMBLY,LEVER,HAND		31	HHCS
15	NAMEPLATE		32	HHCS
16	HHCS		33	HHCS
17	STUD,THREADED ADJUST		34	ADAPTER, SPEED SENSOR

12.0 13” PTO Drawing and Parts List



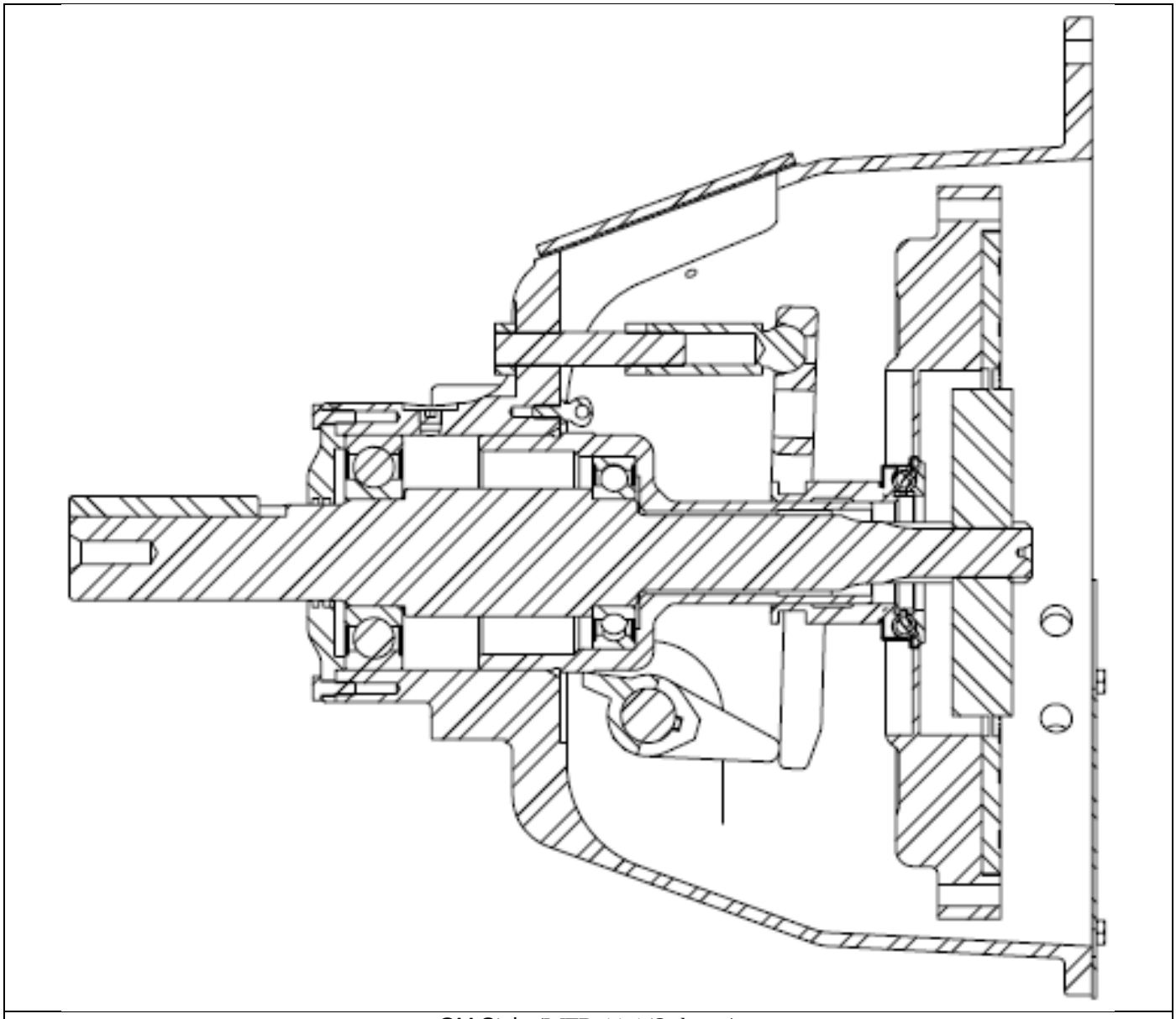
13” Flat Face Flywheel (WTD-13-130 shown)



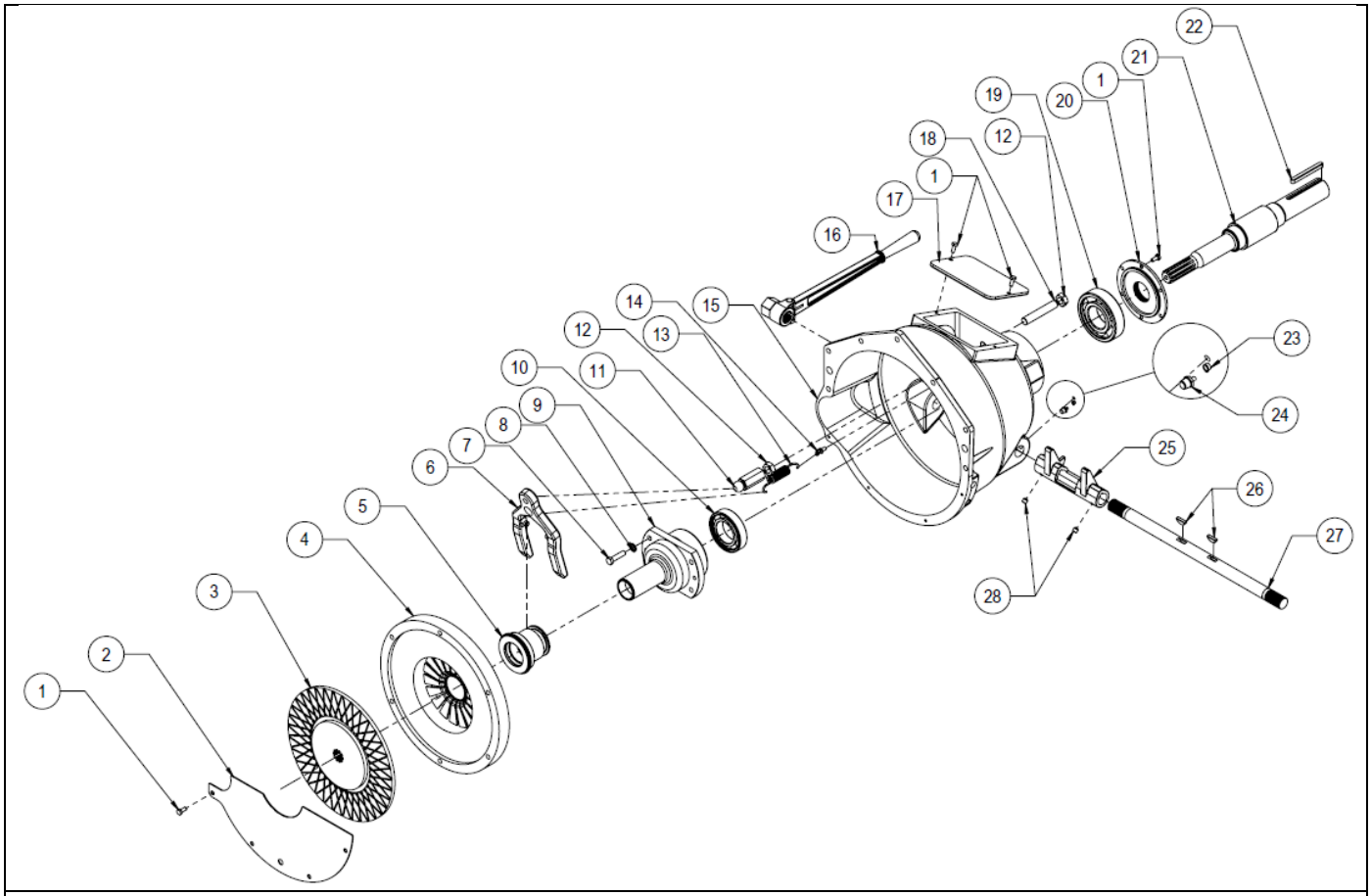
13” Flat Face Flywheel (WTD-13-130 shown)

#	Description		#	Description
1	CLUTCH PLATE		14	STUD,BALL END ADJUST
2	PRESSURE PLATE		15	ASSEMBLY,LEVER,HAND
3	BRG,THRUST		16	BELLHOUSING
4	FORK,THROW-OUT		17	RODENT COVER
5	HHCS		18	HAND HOLE COVER
6	WASHER,LOCK		19	SHCS
7	BRG CARRIER		20	HEX NUT
8	BRG,INBOARD		21	SEAL,OUPUT SHAFT
9	SHAFT		22	CAP,GREASE FITTING
10	KEY,OUTPUT		23	ZERK
11	BRG,OUTBOARD		24	ENGAGEMENT CAM ASSY
12	SPRING,EXTENSION		25	KEY,WOODRUFF
13	SCREW,SPRING ANCHOR		26	SHAFT,OPERATING

13.0 11” GM® Style PTO Drawing and Parts List



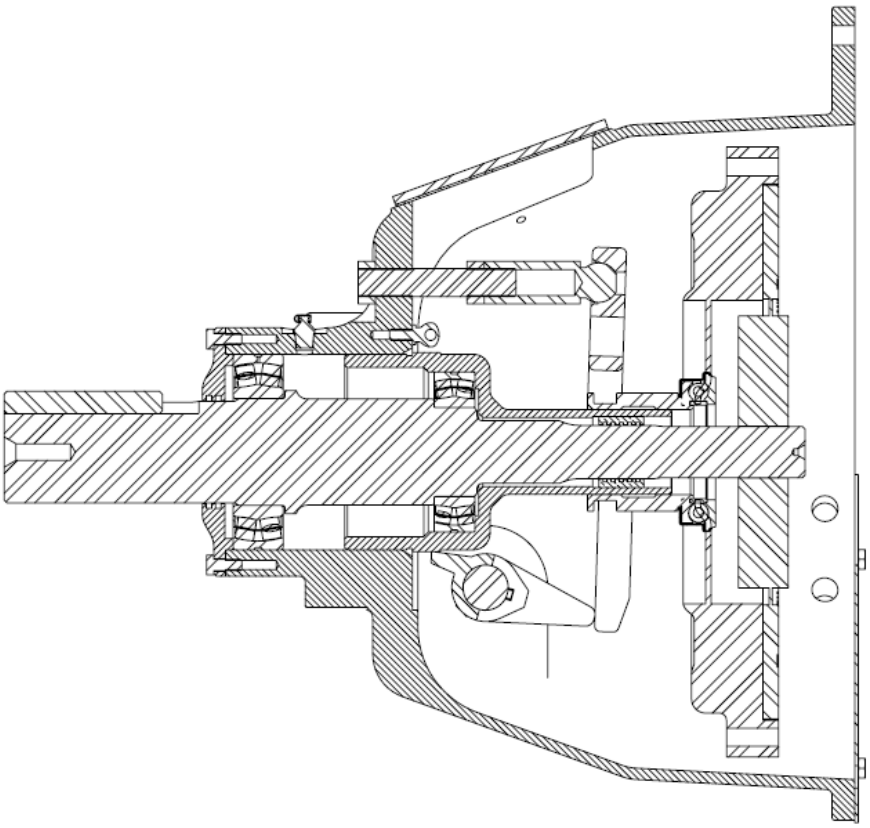
GM Style (WTD-11-143 shown)



GM Style (WTD-11-143 shown)

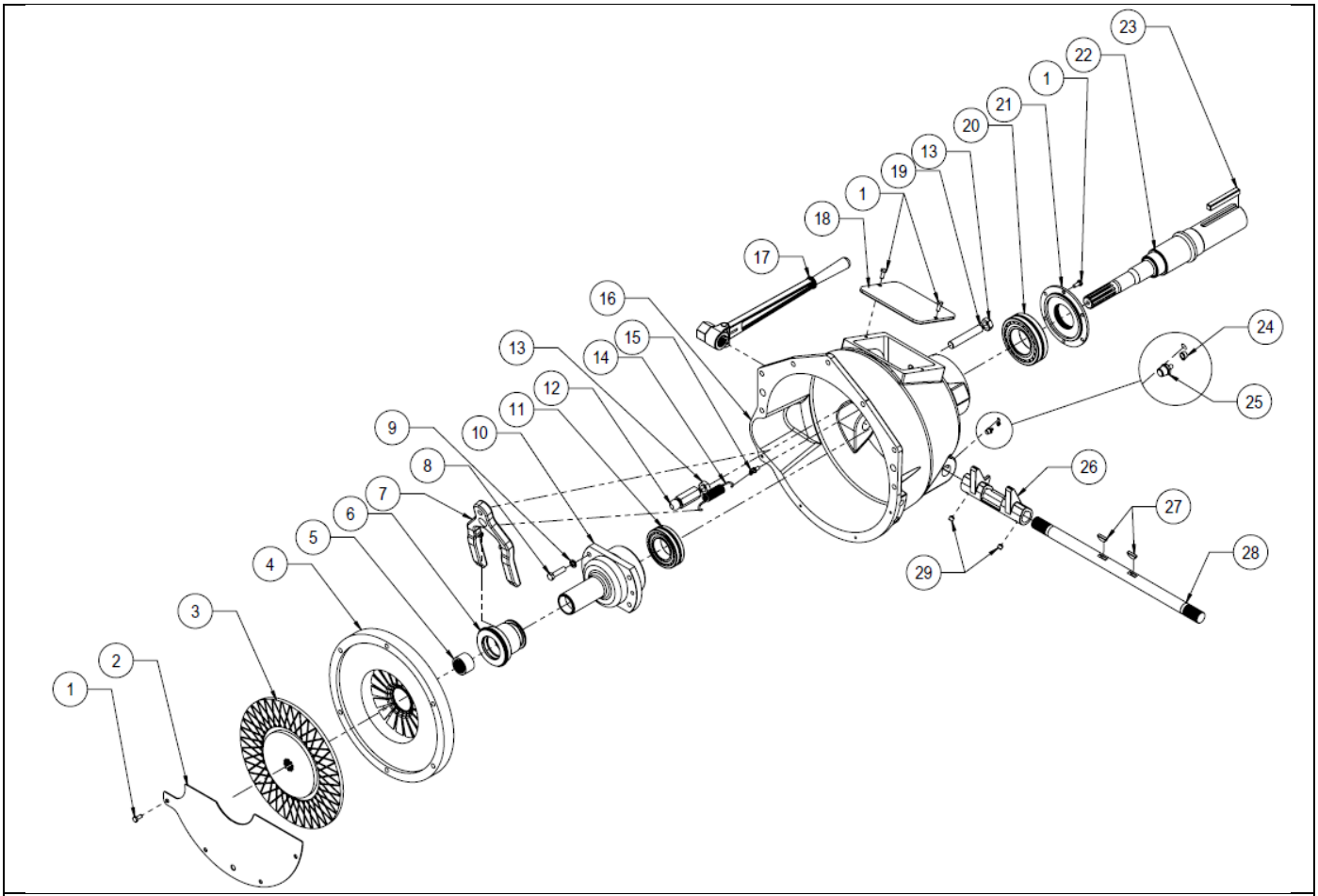
#	Description		#	Description
1	HHCS		15	BELLHOUSING
2	DUST COVER		16	ASSEMBLY,LEVER,HAND
3	ASSEMBLY,CLUTCH PLATE		17	NAMEPLATE
4	ASSEMBLY,PRESSURE PLATE		18	STUD,THREADED ADJUST
5	BRG,THRUST		19	BRG,OUTBOARD
6	FORK,THROW-OUT		20	BRG ENDCAP
7	HHCS		21	SHAFT,AUTOMOTIVE STYLE
8	WASHER,LOCK		22	KEY
9	BRG CARRIER		23	CAP,GREASE FITTING
10	BRG,INBOARD		24	ZERK
11	BALL END ADJUST		25	ENGAGEMENT CAM
12	HEX NUT		26	KEY,WOODRUFF
13	SPRING,EXTENSION		27	SHAFT,OPERATING
14	SCREW,SPRING ANCHOR		28	SET SCREW

14.0 11” GM® Style High Sideload PTO Drawing and Parts List



GM Style (WTD-11-144 shown with Labyrinth Seal)

Note: Add grease during installation to Labyrinth Seal when replacing.

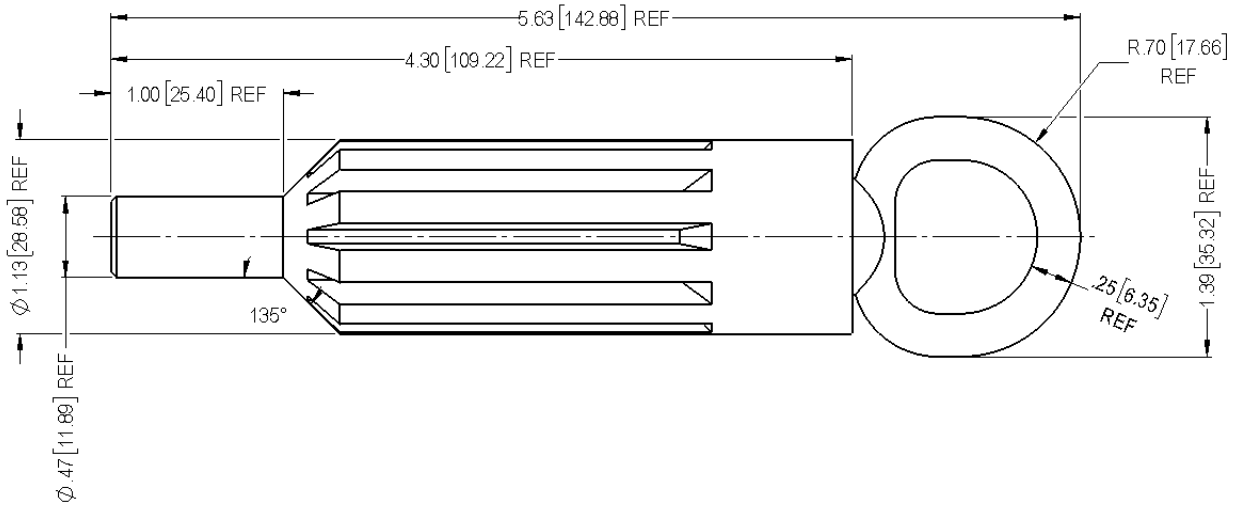


GM Style (WTD-11-144 shown with Labyrinth Seal)

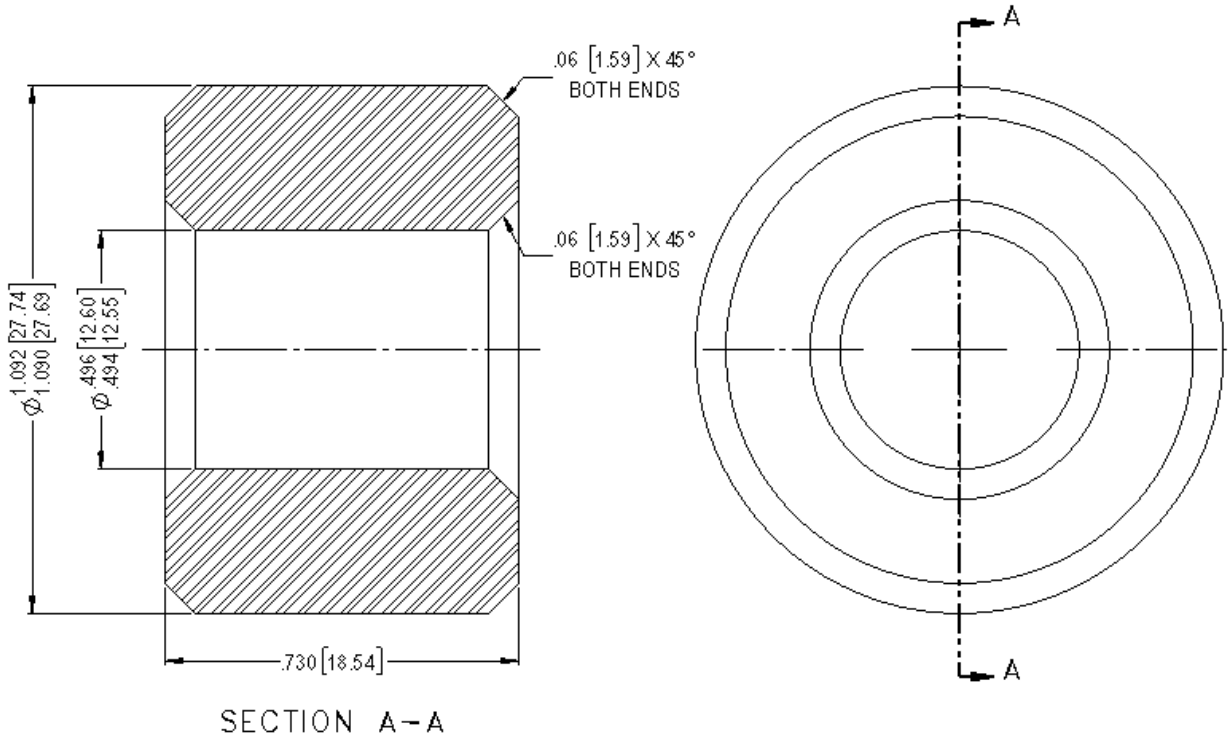
#	Description		#	Description
1	HHCS		16	BELLHOUSING
2	DUST COVER		17	ASSEMBLY,LEVER,HAND
3	ASSEMBLY,CLUTCH PLATE		18	NAMEPLATE
4	ASSEMBLY,PRESSURE PLATE		19	STUD,THREADED ADJUST
5	SEAL,GREASE,LABYRINTH		20	BRG,SPHERICAL ROLLER
6	BRG,THRUST		21	BRG ENDCAP
7	FORK,THROW-OUT		22	SHAFT
8	HHCS		23	KEY
9	WASHER,LOCK		24	CAP,GREASE FITTING
10	BRG CARRIER		25	ZERK
11	BRG,SPHERICAL ROLLER		26	ENGAGEMENT CAM
12	BALL END ADJUST		27	KEY,WOODRUFF
13	HEX NUT		28	SHAFT,OPERATING
14	SPRING,EXTENSION		29	SET SCREW
15	SCREW,SPRING ANCHOR			

15.0 11” GM® Style (WTD-11-143 & WTD-11-144) Alignment Tool and Spacer Details

Alignment Tool – Can be purchase at most automotive part stores with the Doorman part number 14522 or with the Centerforce part number 50028. If unavailable at a local automotive part store, WPT can be contacted with part number WTD-11-A49.



Flywheel Spacer – Can be made at a local machine shop from mild steel using the drawing below or call WPT to purchase part number WTD-11-A66.



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