



# F20 10-BOLT PTO INSTALLATION

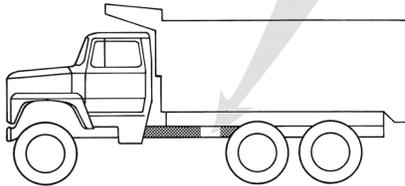
## Ford 10R140 Series Transmissions

### 2020 and later F-250 – F-600

(Requires PTO Option – Ford Order Code 62R)

**1. Label Placement** - The PTO ships with 4 WARNING LABELS. Make sure mounting surfaces are clean before placing labels. Place labels as shown below.

(2) 4" x 8"

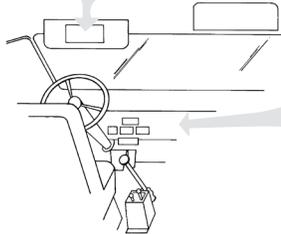


#### Frame Rail Labels

Place on frame rail or truck body on both sides of vehicle. Must be clearly visible by anyone who might go under truck or near PTO. Clean surface thoroughly before installation.

**DO NOT PAINT OVER LABELS!**

(1) 4" x 6.5"

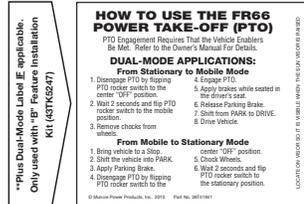


#### Interior Labels

Place 2"x3" PTO Equipped Caution label within cab in clear view of operator and near PTO control. Place 4" x 6.5" Visor Label on visor on operator's side of vehicle.

**DO NOT COVER ANY VEHICLE AIR BAG WARNING LABELS!**

#### DUAL MODE ONLY

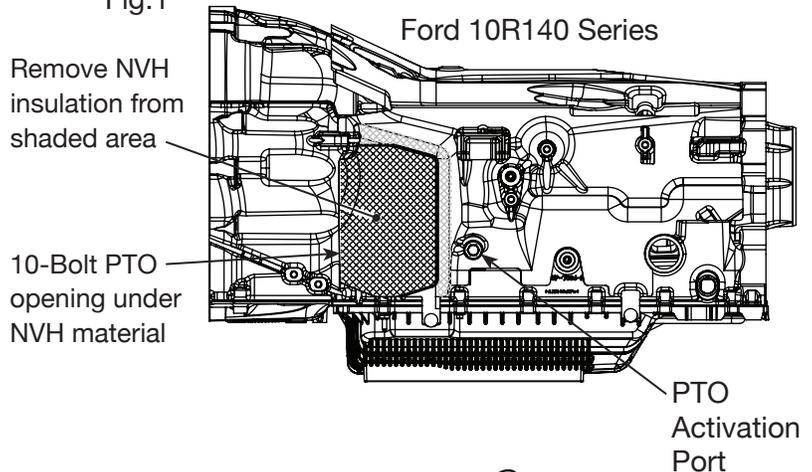


(1) 2" x 3"

**2.** With PARK brake set, place truck in neutral and start engine. Listen to engine and transmission. Any transmission gear noise may be more noticeable after PTO is installed. **STOP ENGINE. NEVER GO UNDER VEHICLE WITH ENGINE RUNNING!**

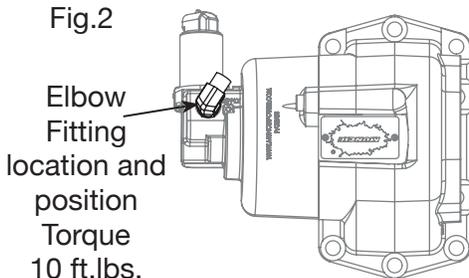
**3.** Find PTO opening on transmission. Remove NVH material from area around PTO aperture. The insulation will need to be cut from area shown in shaded region below. NVH insulation material may not be identical to image shown, and is subject to change, depending on truck type and model year. See Figure 1.

Fig.1



**4.** Install elbow fitting in PTO "SUPPLY" port. Position as shown in Figure 2. Install PTO pressure switch in port adjacent to solenoid valve. See Figure 3.

Fig.2



#### TRANSMISSION FITTING

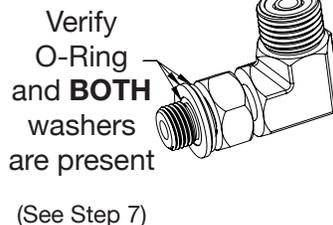
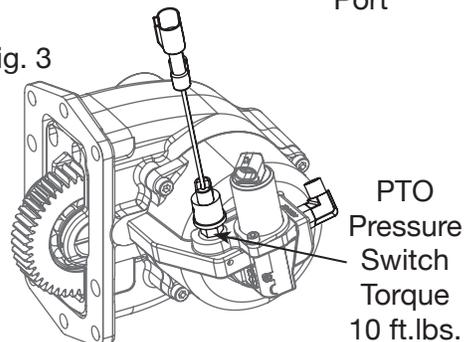


Fig. 3



5. Remove and discard transmission PTO cover plate. See Figure 4. (On 4x4 chassis, the front drive shaft may be removed in order to gain access to PTO opening. Caution: some transmission fluid may escape opening. Take care to keep contaminants out of transmission with cover off. Verify PTO gear is present. See Figure 5. From the PTO mounting kit, find shoulder studs (2 pieces), and install in the correct location. See Figure 6. Install finger tight. Stud will bottom out.

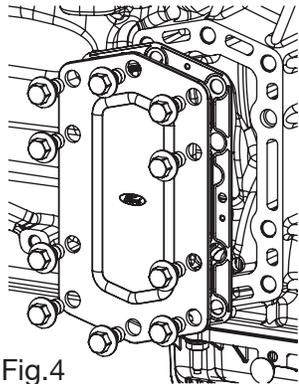


Fig.4



Fig.5

PTO  
Gear Must  
be Present

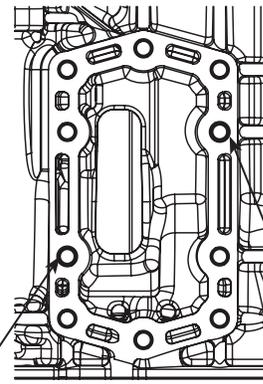


Fig.6

Install Shoulder Studs

**DISCARD FACTORY GASKET**

6. Install supplied gasket over shoulder studs. See Figure 7. A thin coating of Ford transmission fluid on gasket is recommended to help hold gasket to opening. Mount PTO using provided fasteners (7 cap screws/washers and 2 nuts/studs.) – hardened washers are used on cap screws only! check for proper PTO fit on transmission prior to tightening down fasteners. Tighten 12 o'clock and 6 o'clock cap screws first. **TORQUE ALL CAP SCREWS TO 30 FT.LBS. TORQUE STUD NUTS TO 22 FT.LBS.** See Figures 8 and 9.

Fig.7

Torque 30 ft.lbs.

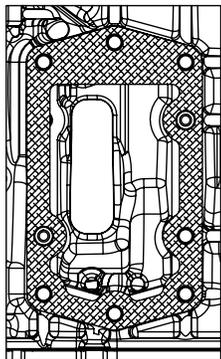


Fig.8

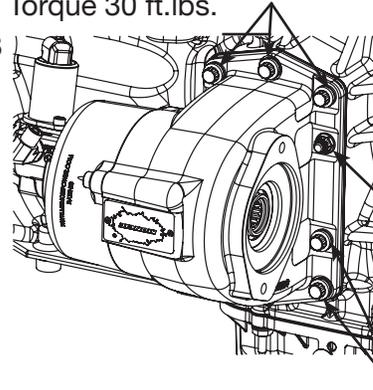
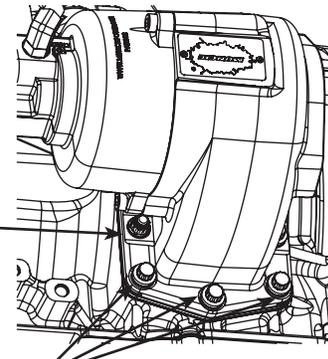


Fig.9

Torque  
22 ft.lbs.



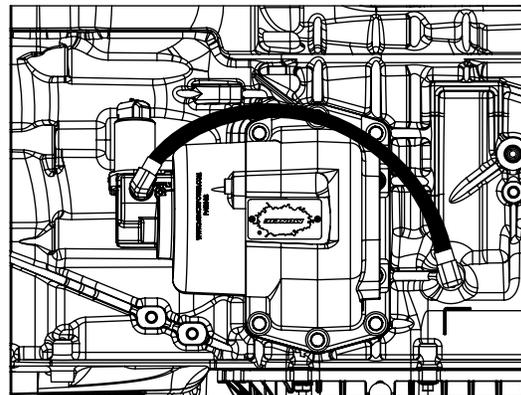
Torque  
30 ft.lbs.

**INSTALL GASKET AS SHOWN**

7. Locate the Metric Straight x ORFS 90 degree adapter fitting (P/N 43T65280) and install in PTO activation port on transmission. The port is located to the right of the PTO opening. Install fitting and position as shown below. Tighten to no more than 5 ft.lbs. **OVER-TIGHTENING WILL STRIP THREADS IN PORT!** Plumb activation hose to port on PTO marked "SUPPLY". Route hose over PTO as shown in Figure 10.

**NOTE:** Fuel lines are present near the rear of the transmission. If running a driveline with the PTO, verify that there is sufficient clearance between the driveline and fuel lines.

Fig.10





## **F20 10-BOLT PTO ACTIVATION**

### **Ford 10R140 Series Transmissions**

### **2020 and later F-250 – F-600**

**FOLLOW INSTALLATION INSTRUCTION IN INSTALLATION MANUAL IN19-04**  
**FOLLOW PRECAUTIONS IN OPERATOR'S MANUAL IN17-04**

- A. IMPORTANT:** Disconnect battery prior to installing electric/hydraulic activation kits.
- B. Locate the wiring harness provided with your PTO. Separate the harness at the 4-wire connector.
- C. The engine compartment section has the connection to the PTO activation solenoid and pressure switch. Make the connection to both components.
- D. Feed the 4-wire connector (white) through to the inside of the cab. Use a pass-through or drill a 5/8" hole and use the grommet provided in your kit. Connection to the Ford wiring is located in the cab. Locate the blunt cut body builder wires provided by Ford as described in this supplement.
- E. Follow the diagrams for your vehicle engine type and operation mode.

Install the Muncie Power switch and indicator light into the Muncie Power switch bracket.

*Note: Ford Auxiliary switches cannot be used for the "Stationary AND Mobile" installations.*

### **Ford SEIC Connector Location – (Passenger Side)**

Locate the FORD wire bundled together at the **PASSENGER SIDE** behind the kick panel at the passenger's feet.

The Muncie Power harness passes through into the cab. Locate the Muncie Power connector and make the connection to the Ford connector. Wire colors and pin locations are as show in the charts on the next page for the harness provided.



# Single Mode (Either Stationary OR Mobile) Installation

For Dual Mode (Stationary AND Mobile), see reverse side of this document.

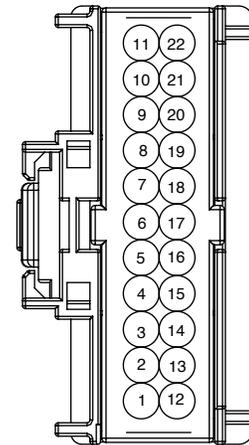
## 2020 & Later F-250 – F-600 DIESEL Engine – Single Mode Wire Harness 34T43730 (F20-F1312-DX5\*\*P\*)

MUNCIE HARNESS COLOR	FORD WIRE COLOR	PIN#
White/Brown	White/Brown	10
Green	Green	9
Yellow/Green	<b>STATIONARY</b> – Yellow/Green	7
	<b>MOBILE</b> – Blue/Orange	11
Gray/Violet	Gray/Violet	6
Blue/White	Blue/White	4
Yellow/Gray	Green/Orange	2

## 2020 & Later F-250 – F-600 GAS Engine – Single Mode Wire Harness 34T43735 (F20-F1312-GX5\*\*P\*)

MUNCIE HARNESS COLOR	FORD WIRE COLOR	PIN#
Yellow/Green	Yellow/Green	18
Green	Green	9
Yellow/Blue	<b>STATIONARY</b> – Yellow/Green	7
	<b>MOBILE</b> – Blue/Orange	11
Yellow/Violet	Yellow/Violet	16
Blue/White	Blue/White	4
Yellow/Gray	Green/Orange	2

**Female Side Connector**



- With the wiring connected, test the vehicle. With the truck in park and the PTO switch in the “OFF” position, start the engine. Listen for a few seconds for any unnatural noises. Always stay clear of rotating components. Should an unnatural noise occur, SHUT OFF the engine and remove the ignition keys. Remove the PTO and examine both the PTO gear and the transmission gear for any defects.
- When satisfied with the PTO installation, check the transmission oil level and fill to proper level per the instructions found in the vehicles operator’s manual. Adding a PTO will require adding transmission fluid. Run the engine for 5 to 10 minutes and check for leaks. Always stand clear of rotating components and never go under the truck with the engine running.
- Shut off the engine and remove the ignition keys. Inspect capscrews to make sure they are properly tightened. Mounting bolts/nuts should be checked on a regular basis.
- For help installing pumps or other equipment, refer to the PTO operator’s manual.

# F20 PTO Activation – Dual Mode (Stationary AND Mobile) Installation

## 2020 and Later F-250 – F-600 For Single Mode (Either Stationary OR Mobile), see reverse side of this document.

RPM module output voltage is factory set for an engine speed of 1,200 RPMs for stationary mode. In mobile mode, the RPM's will be limited to 3,000 in diesel trucks and 6,500 in gas trucks. This is because the 649 OHM resistor is now parallel with the potentiometer inside the RPM control module.

Install the Muncie Power switch and indicator light into the Muncie Power switch bracket.  
*Note: Ford Auxiliary switches cannot be used for the "Stationary AND Mobile" installations.*

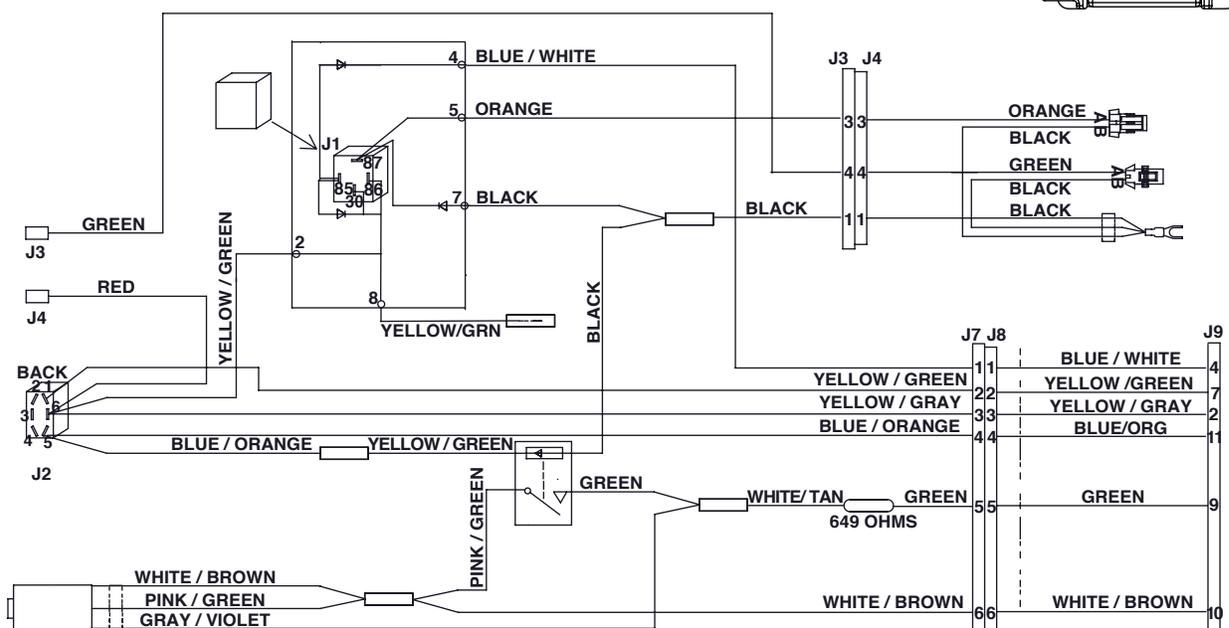
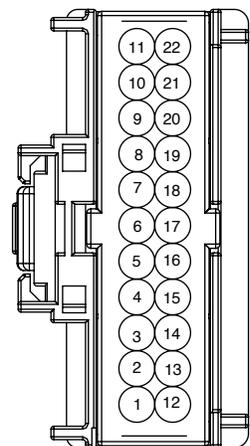
With wiring connected, test the vehicle. With the Truck in park and the PTO switch in the "OFF" position, start the engine. Listen for a few seconds for any unnatural noises. Always stay clear of rotating components. Should an unnatural noise occur, SHUT OFF the engine and remove the ignition keys. Remove the PTO and examine both the PTO gear and transmission gear for any defects.

The potentiometer can now be adjusted to the desired resistance for the engine operation speed.

### 2020 & Later F-250 – F-600 DIESEL Engine – Dual Mode Wire Harness 34T44005 (F20-F1312-DX5\*\*PB)

**Female Side Connector**

MUNCIE HARNESS COLOR	FORD WIRE COLOR	PIN#
White/Brown	White Brown	10
Green	Green	9
Yellow/Blue	<b>STATIONARY</b> – Yellow/Green	7
	<b>MOBILE</b> – Blue/Orange	11
Blue/White	Blue/White	4
Yellow/Gray	Green/Orange	2

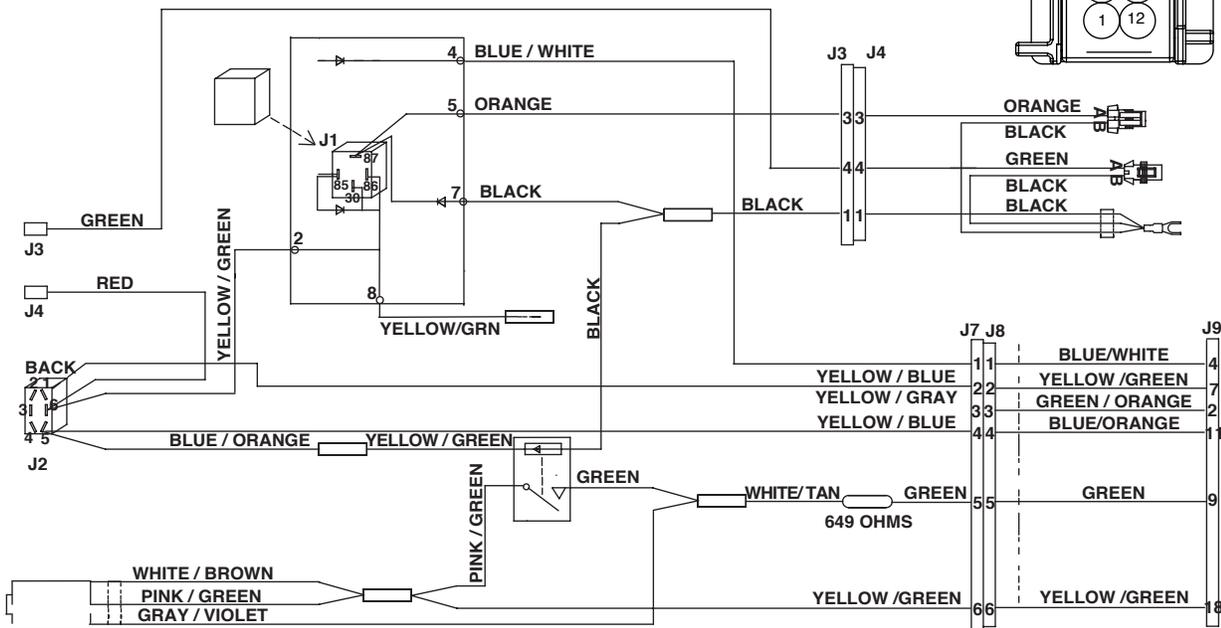
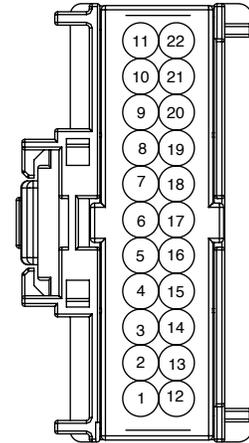


**DIESEL ENGINE – POTENTIOMETER FACTORY SET TO 19.5K OHMS (~1,200 ENGINE RPM)**

# 2020 & Later F-250 – F-600 GAS Engine – Dual Mode Wire Harness 34T44000 (F20-F1312-GX5\*\*PB)

## Female Side Connector

MUNCIE HARNESS COLOR	FORD WIRE COLOR	PIN#
Yellow/Green	Yellow/Green	18
Green	Green	9
Yellow/Blue	<b>STATIONARY</b> – Yellow/Green	7
	<b>MOBILE</b> – Blue/Orange	11
Blue/White	Blue/White	4
Yellow/Gray	Green/Orange	2



### GAS ENGINE – POTENTIOMETER FACTORY SET TO 10.2K OHMS (~1,200 ENGINE RPM)

When satisfied with the PTO installation, check the transmission oil level and fill to the proper level per the instruction found in the vehicles operator's manual. Adding a PTO will require adding transmission fluid. Run engine for 5 to 10 minutes and check for leaks. Always stay clear of rotating components and never go under the truck with the engine running.

SHUT OFF engine and remove the ignition keys. Inspect the capscrews to make sure they are properly tightened. Mounting bolts/nuts should be checked on a regular basis.

#### PTO OPERATION:

1. Vehicle must be wired for mobile operation.
2. With the vehicle engine operation at idle and the parking brake set, engage the PTO by pushing the rocker switch to the "engage" position.
3. Release the parking brake, shift the transmission into a drive or reverse selection.
4. The Torqshift® transmission is designed to allow PTO operation in all gears including over-drive.

Switchable: Stationary/Mobile

1. When switching between modes, a 1-2 second pause in the center "OFF" position is required for the SEIC to recognize the change.



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IN19-05 (Rev. 01-20)

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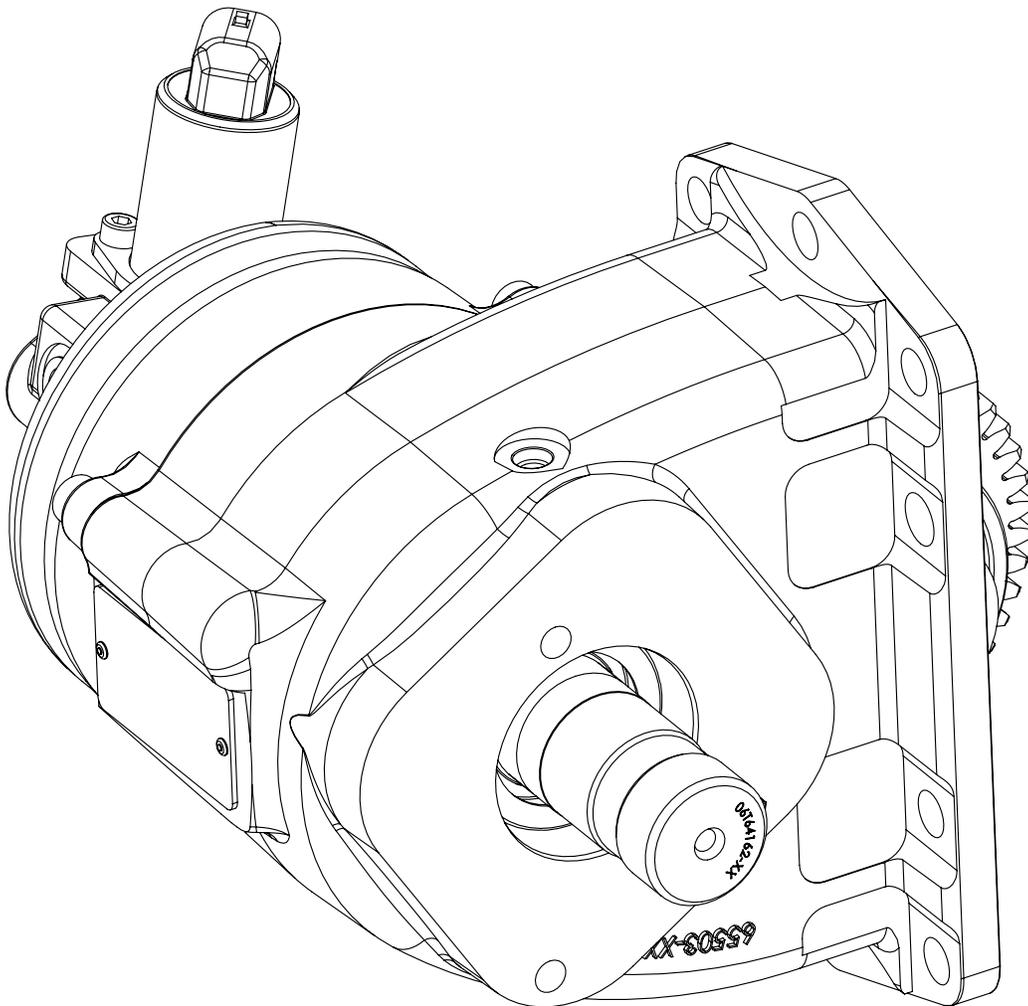
Muncie<sup>®</sup>  
Power  
Products

# F20 PTO

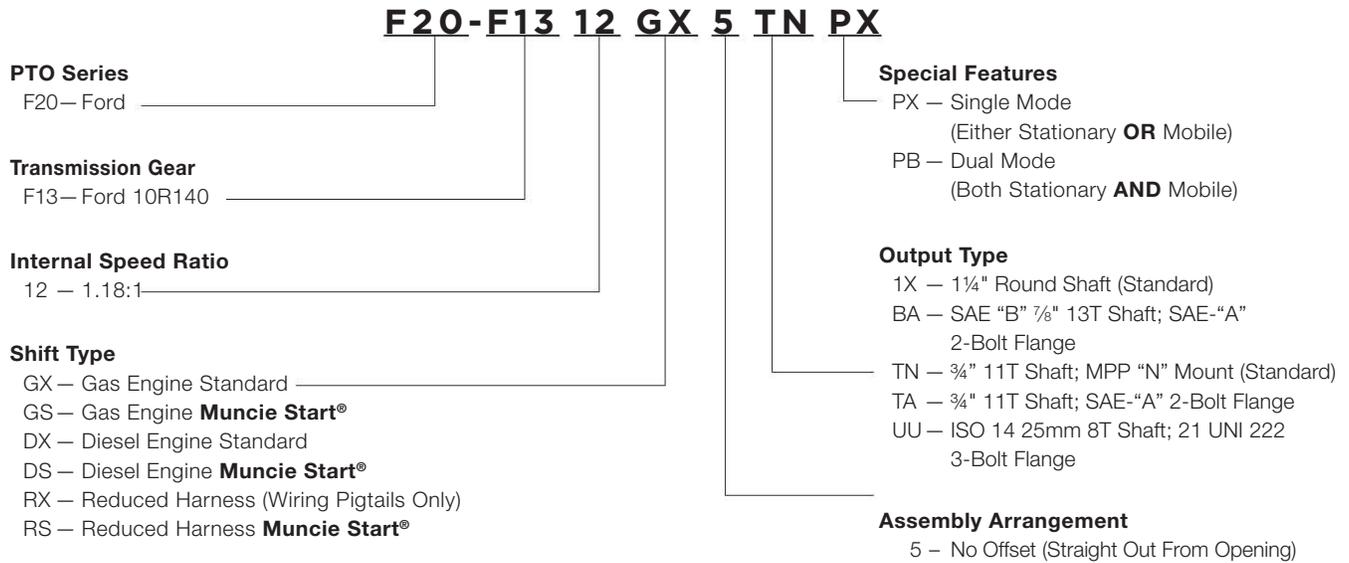
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## PARTS LIST AND SERVICE MANUAL

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# MODEL NUMBER CONSTRUCTION

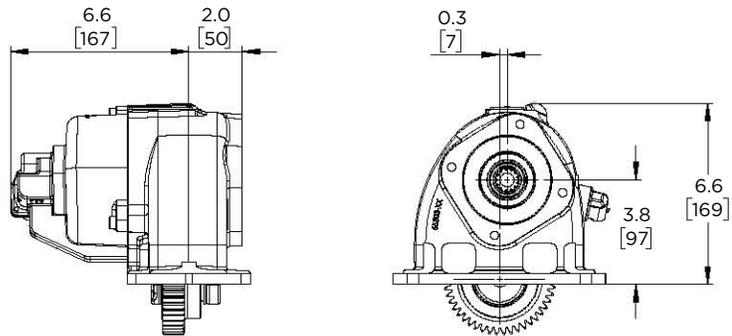


OTHER F20 LITERATURE	
IN17-04	All PTOs Operator's Manual ES
IN17-14	Muncie Start <sup>®</sup> Ford Installation Sheet ES
IN19-04	F20 10-Bolt Installation Instructions ES
IN19-05	F20 10-Bolt Activation Instructions ES
IN19-07	F20 10-Bolt PTO Activation Instructions ("R" Shift)
IN20-04	F20 Rebuild Instructions

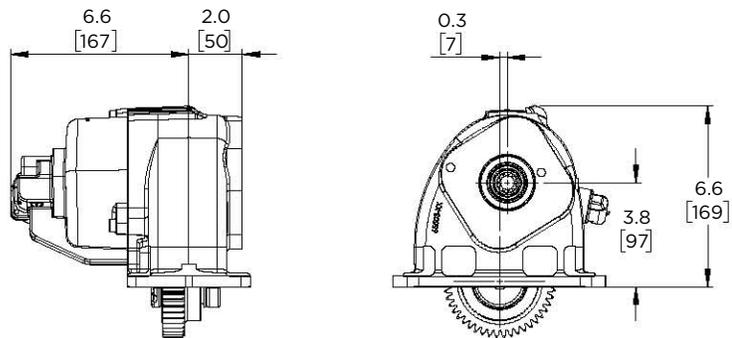
# DIMENSIONS

TA OUTPUT — 3/4" -11T SHAFT, SAE "A" 2-BOLT FLANGE

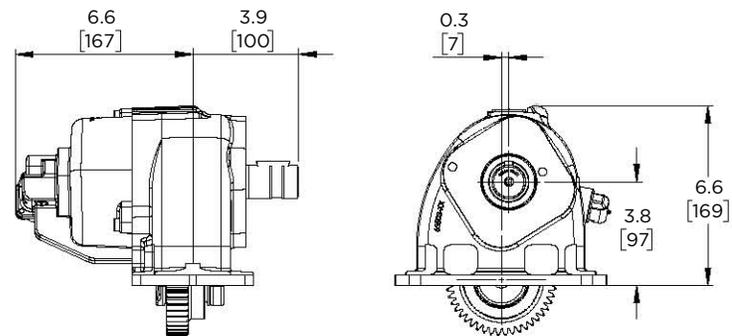
BA OUTPUT — 7/8" -13T SHAFT, SAE "A" 2-BOLT FLANGE



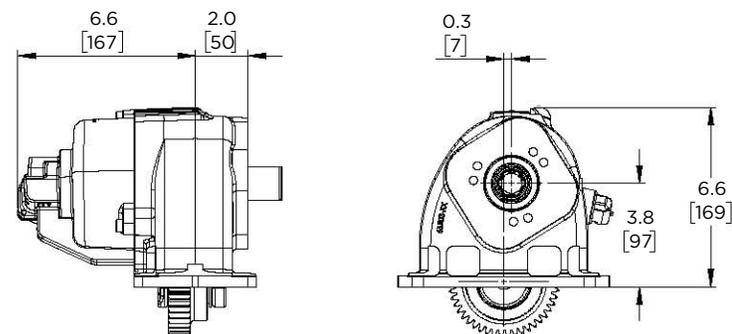
TN OUTPUT — MPP "N" MOUNT 2-BOLT FLANGE



1X OUTPUT — 1 1/4" ROUND KEYS SHAFT

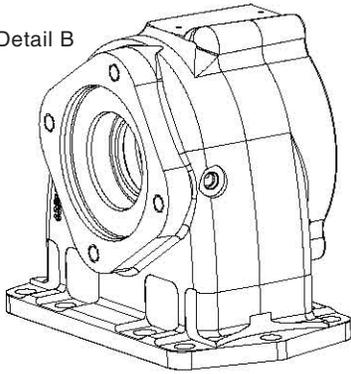


UU OUTPUT — UNI 222 MOUNT 3-BOLT FLANGE

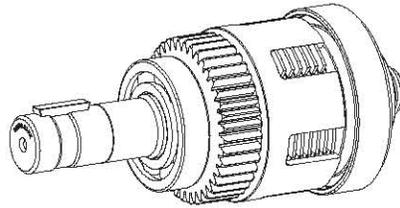


# F20 EXPLODED VIEWS

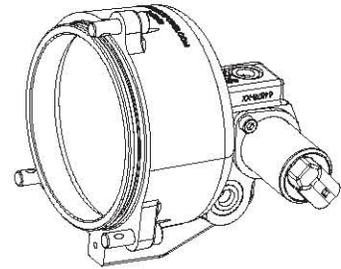
Detail B



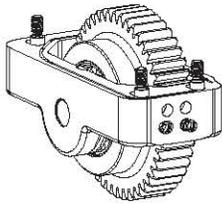
Detail A



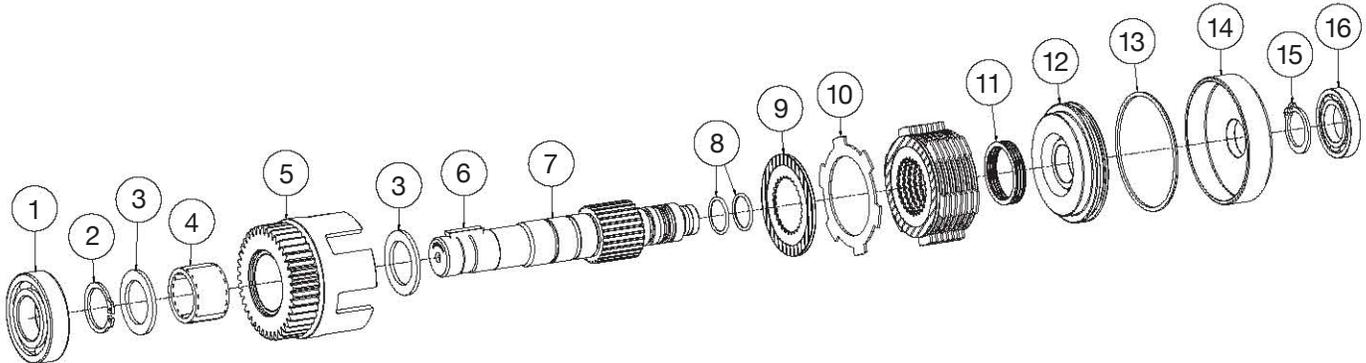
Detail D



Detail C



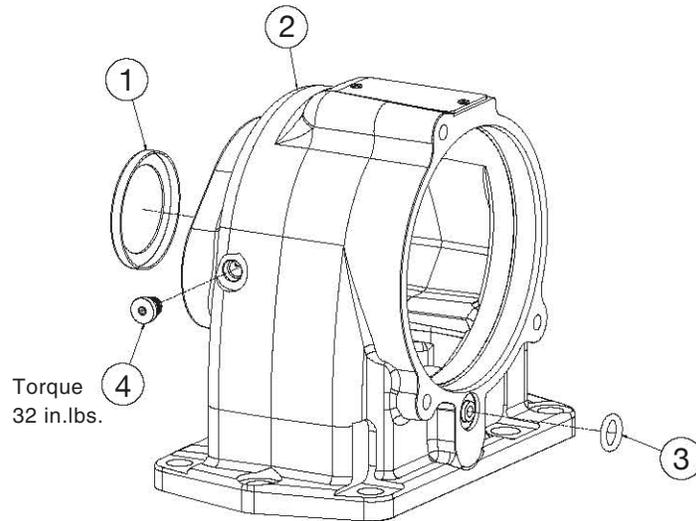
## DETAIL A – OUTPUT SHAFT ASSEMBLY



ITEM	QTY.	PART NO.	DESCRIPTION
1	1	10T21017	Bearing
2	1	24T36470	Snap Ring, Output
3	2	21T62472	Thrust Washer
4	1	10T62471	Needle Bearing
5	1	02T65196	Output Gear
6	1	26T01627	Woodruff Key – $\frac{1}{16}$ "
7	1	06TA6478	Output Shaft: $1\frac{1}{4}$ " rd., $\frac{1}{16}$ " Key
		06TA6472	Output Shaft: $\frac{3}{4}$ " -11T
		06TA6477	Output Shaft: $\frac{1}{2}$ " -13T
		06TA6630	Output Shaft: UNI

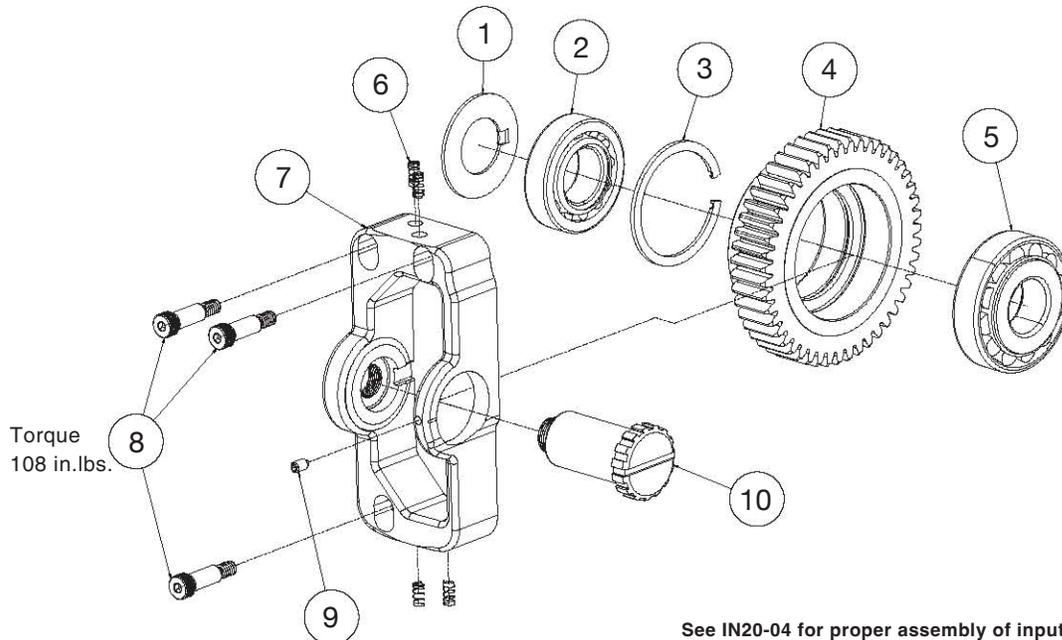
ITEM	QTY.	PART NO.	DESCRIPTION
8	2	12T39023	O-Ring
9	9	49T65367	Friction Disc
10	8	49T36258	Spacer Disc
11	1	27T61827	Piston Return Spring
12	1	49T64056	Piston
13	1	12T64059	Piston O.D. O-Ring
14	1	49T64057	Piston Cup
15	1	24T39182	Snap Ring
16	1	10T39072	Bearing

## DETAIL B – HOUSING ASSEMBLY



ITEM	QTY.	PART NO.	DESCRIPTION
1	1	11T63830	Shaft Seal
2	1	01TA6473	Housing: "1X", "TN"
		01TA6476	Housing: "BA", "TA"
		01TA6613	Housing: "UU"
3	1	12T36878	O-Ring
4	1	25T65492	ORB Plug

## DETAIL C – INPUT ASSEMBLY

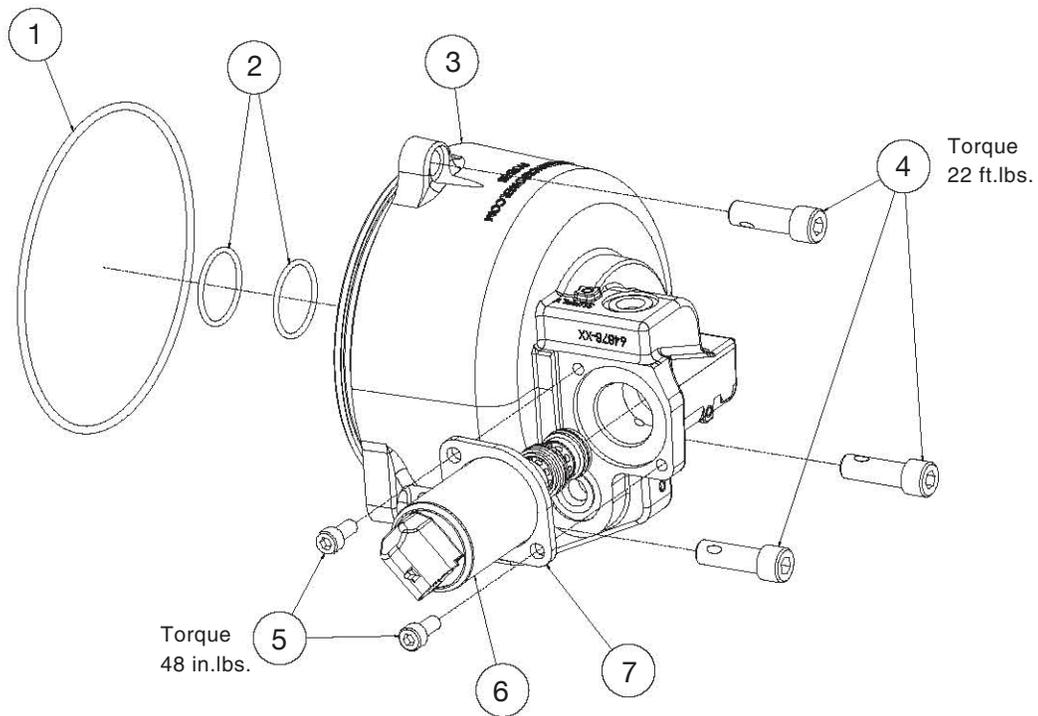


See IN20-04 for proper assembly of input subassembly

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	21T62316	Tabbed Washer
2	1	10T65008	Bearing
3	1	24T65083	Snap Ring
4	1	03T64153	Input Gear (47 Tooth)
5	1	10T65009	Bearing

ITEM	QTY.	PART NO.	DESCRIPTION
6	4	27T63431	Coil Spring
7	1	49T64798	Carrier
8	3	19T65081	Shoulder Bolt
9	1	19T36846	Set Screw
10	1	07T64145	Input Shaft

# DETAIL D – REAR COVER ASSEMBLY



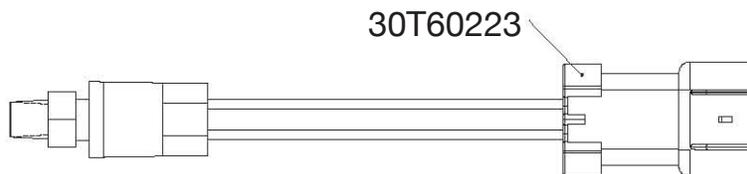
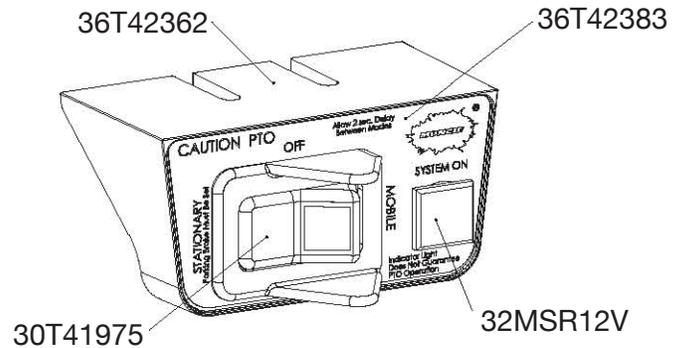
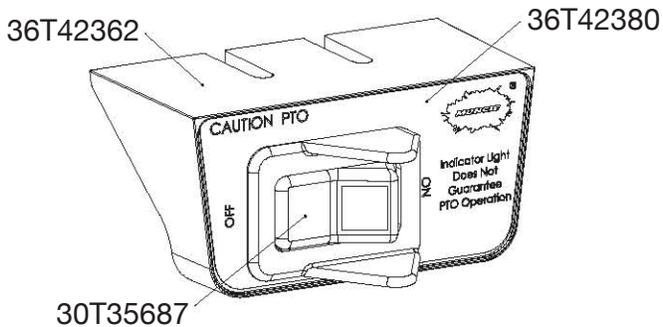
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	12T36872	O-Ring
2	2	12T36280	O-Ring
3	1	15TA6474	Cover, Standard
		15TA6475	Cover, Muncie Start®
4	3	19T36588	Capscrew

ITEM	QTY.	PART NO.	DESCRIPTION
5	2	19T62950	Capscrew
6	1	35T43600	Solenoid Valve
		35T62496	Solenoid Valve (Muncie Start®)
7	1	49T62436	Solenoid Clamp Ring

PART NO.	DESCRIPTION	F20GSK (GASKET KIT)	F20RBK (REBUILD KIT)
		QTY.	QTY.
10T21017	Bearing	-	1
10T39072	Bearing	-	1
10T62471	Needle Bearing	-	1
10T65008	Bearing	-	1
10T65009	Bearing	-	1
11T63830	Shaft Seal	1	1
12T36280	O-Ring	2	2
12T36872	O-Ring	1	1
12T36878	Housing O-Ring	1	1
12T39023	O-Ring	2	2
12T64059	Piston O.D. O-Ring	1	1
13T64490	Gasket	1	1
21T62472	Thrust Washer	-	2
24T36470	Snap Ring, Output	-	1
24T39182	Snap Ring	-	1
24T65083	Snap Ring	-	1
27T61827	Piston Return Spring	-	1
27T63431	Coil Spring	-	4
49T36258	Spacer Disc	-	8
49T36259	Friction Disc	-	9

# INSTALLATION KITS

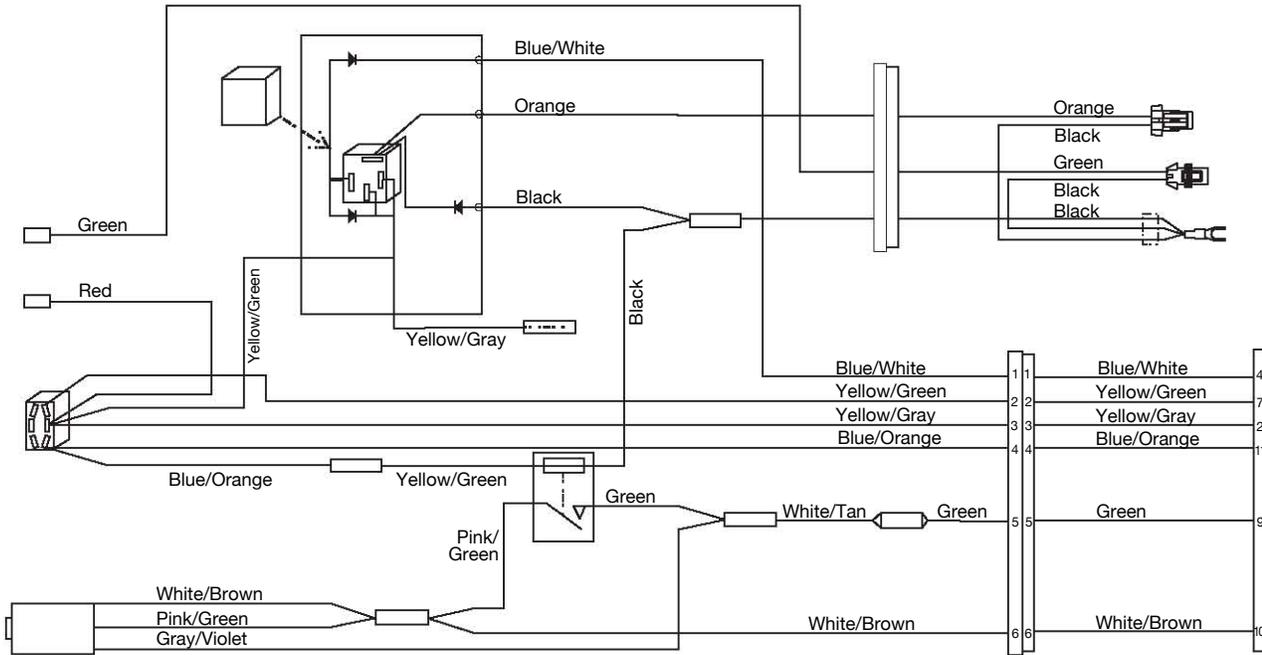
PART NO.	DESCRIPTION	QUANTITY IN KIT				
		48TK6501 DIESEL (SINGLE) D*-5**PX	48TK6502 DIESEL (DUAL) D*-5**PB	48TK6503 GAS (SINGLE) G*-5**PX	48TK6504 GAS (DUAL) G*-5**PB	48TK6516 "R" Shift R*-5**PX
13T64490	Gasket	1	1	1	1	1
19T64695	PTO Mounting Bolt	7	7	7	7	7
20T64143	M10 x M8 Stud	2	2	2	2	2
21T64303	Flat Washer	7	7	7	7	7
22T65300	M8 Nut	2	2	2	2	2
28T35442	Cable Tie	6	6	6	6	-
30T35687	Rocker Switch - Single Mode (PX)	1	-	1	-	-
30T41975	Rocker Switch - Dual Mode (PB)	-	1	-	1	-
30T60223	Pressure Switch	1	1	1	1	1
32MSR12V	12V Red Light	-	1	-	1	-
34T43730	Wire Harness - Diesel Single (PX)	1	-	-	-	-
34T44005	Wire Harness - Diesel Dual (PB)	-	1	-	-	-
34T43735	Wire Harness - Gas Single (PX)	-	-	1	-	-
34T44000	Wire Harness - Gas Dual (PB)	-	-	-	1	-
34T42527	Wire Harness - R Shift (R*)	-	-	-	-	1
36MK5660	Switch Kit Bolts	1	1	1	1	-
36T42362	Bracket	1	1	1	1	-
36T42380	Face Plate - Single Mode (PX)	1	-	1	-	-
36T42383	Face Plate - Dual Mode (PB)	-	1	-	1	-
37T35674	Grommet	1	1	1	1	-
43T42792	90° Elbow (PTO)	1	1	1	1	1
43T65280	90° Elbow (Trans)	1	1	1	1	1
45T65570	Hose Assembly	1	1	1	1	1
48TK6545	Label Kit	1	1	1	1	1



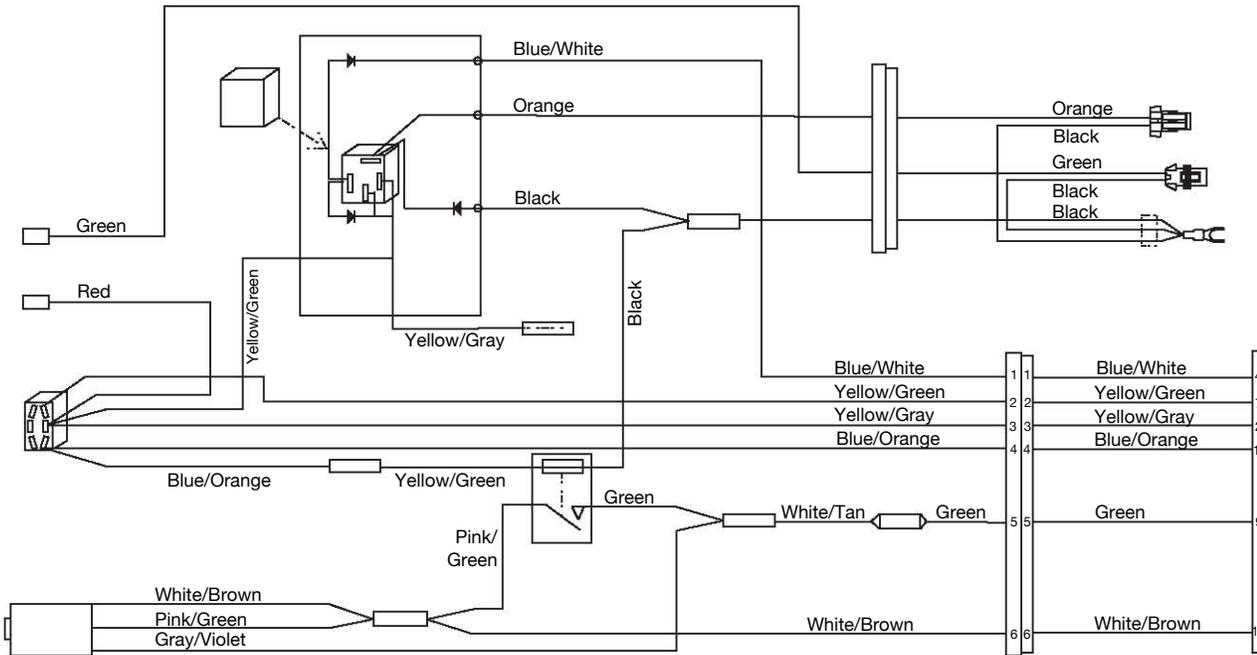
# WIRING HARNESSSES

## Dual Mode Harnesses (PB)

### 34T44005



### 34T44000



**Diesel (34T44005)**

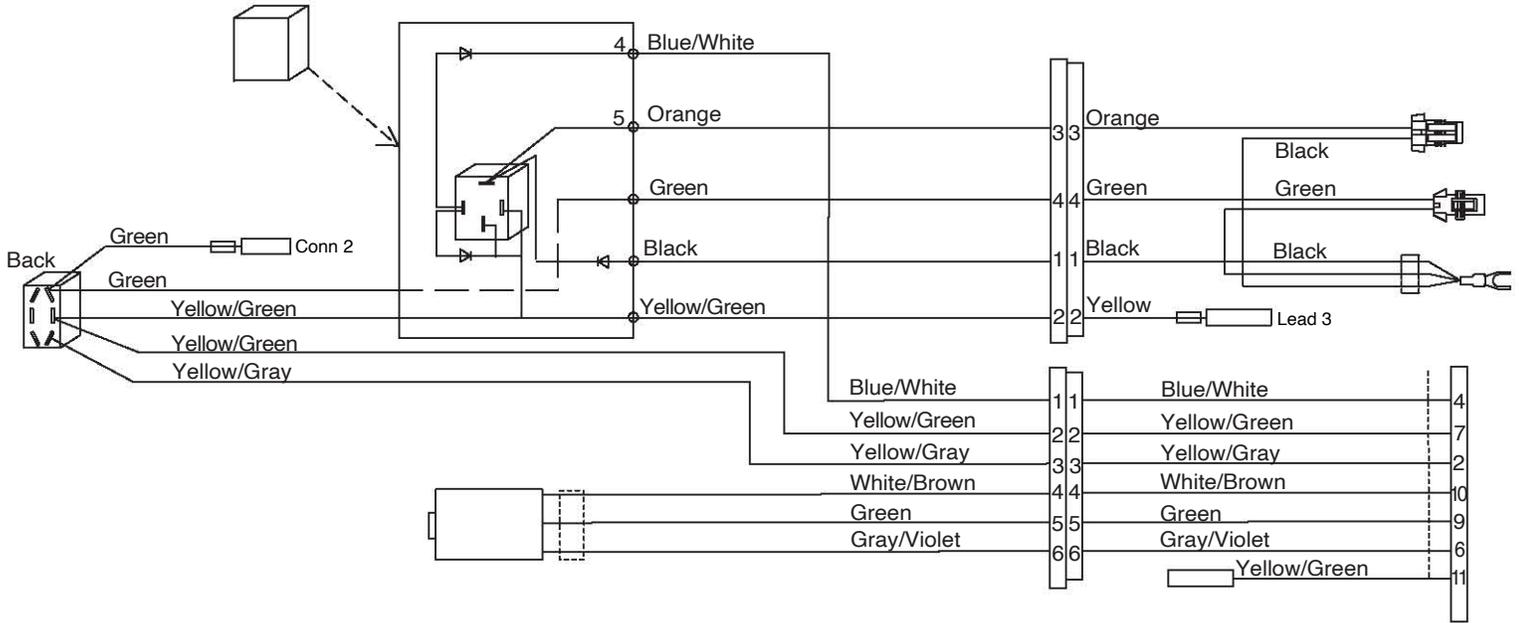
**Gas (34T44000)**

MUNCIE HARNESS COLOR	FORD WIRE COLOR	PIN#
White/Brown	White/Brown	10
Green	Green	9
Yellow/Green	<b>STATIONARY</b> - Yellow/Green	7
Blue/Orange	<b>MOBILE</b> - Blue/Orange	11
Blue/White	Blue/White	4
Yellow/Gray	Green/Orange	2

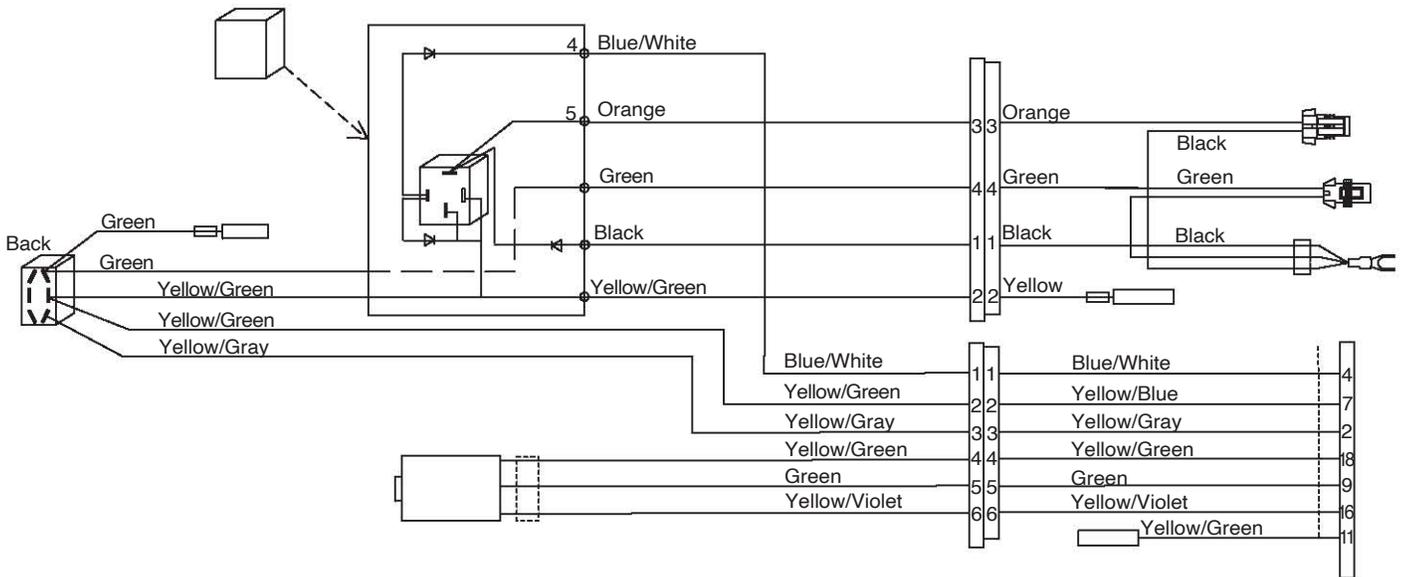
MUNCIE HARNESS COLOR	FORD WIRE COLOR	PIN#
White/Brown	Yellow/Green	18
Green	Green	9
Yellow/Green	<b>STATIONARY</b> - Yellow/Green	7
Blue/Orange	<b>MOBILE</b> - Blue/Orange	11
Blue/White	Blue/White	4
Yellow/Gray	Green/Orange	2

# SINGLE MODE HARNESS (PX)

## 34T43730-01



## 34T43735-01



### Diesel (34T43730)

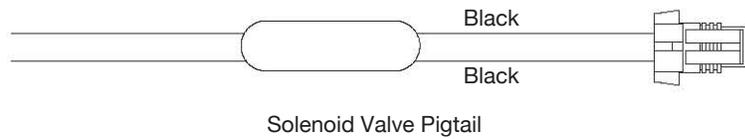
MUNCIE HARNESS COLOR	FORD WIRE COLOR	PIN#
White/Brown	White/Brown	10
Green	Green	9
Yellow/Green	<b>STATIONARY</b> - Yellow/Green	7
	<b>MOBILE</b> - Blue/Orange	11
Gray/Violet	Gray/Violet	6
Blue/White	Blue/White	4
Yellow/Gray	Green/Orange	2

### Gas (34T43735)

MUNCIE HARNESS COLOR	FORD WIRE COLOR	PIN#
Yellow/Green	Yellow/Green	18
Green	Green	9
Yellow/Blue	<b>STATIONARY</b> - Yellow/Green	7
	<b>MOBILE</b> - Blue/Orange	11
Yellow/Violet	Yellow/Violet	16
Blue/White	Blue/White	4
Yellow/Gray	Green/Orange	2

# R SHIFT HARNESS (R\*)

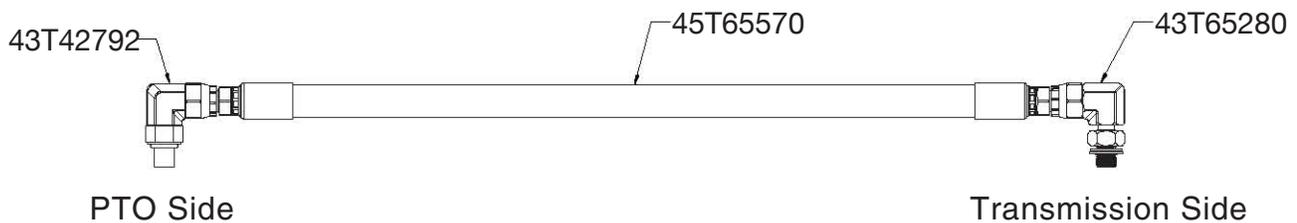
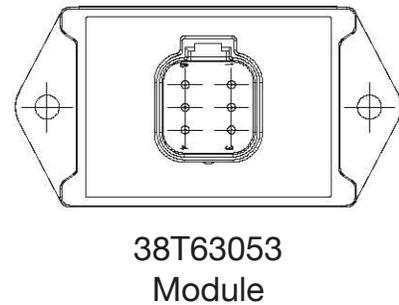
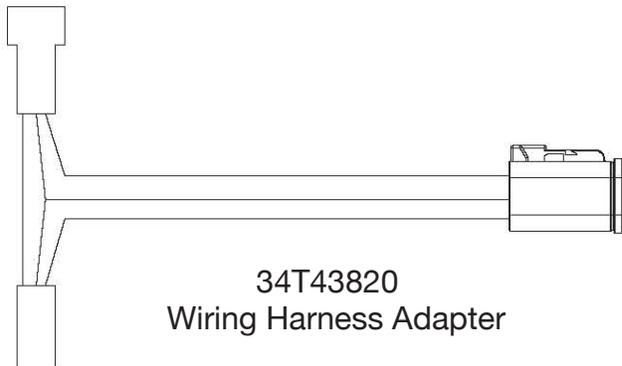
## 34T42527 (Includes both pigtail assemblies)



## MUNCIE START KIT PARTS LIST

(GS, DS, and RS Shift ONLY; Connects to included Wire Harness)

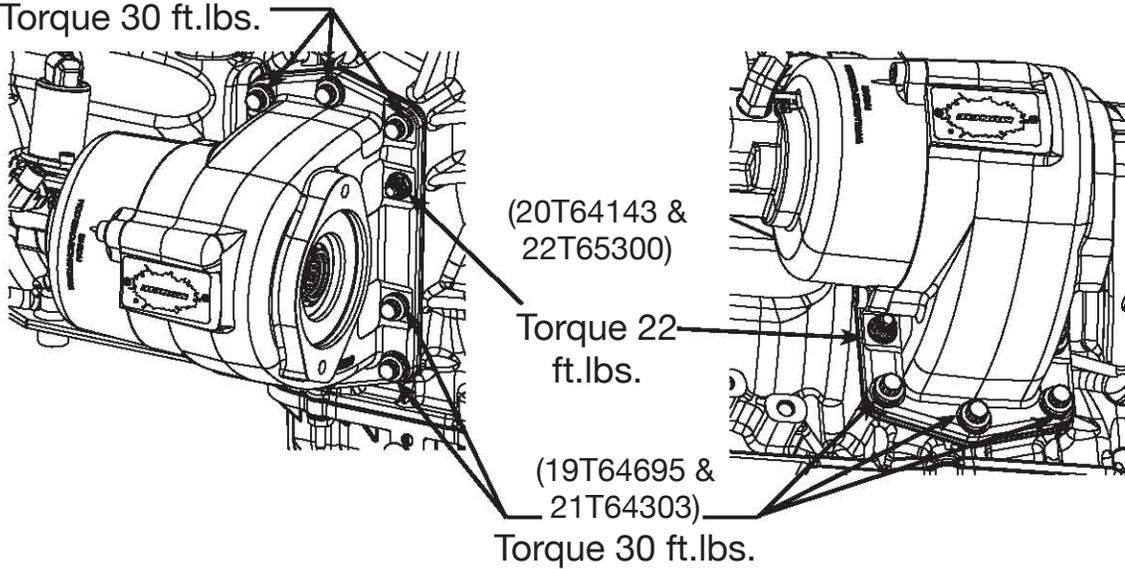
### 48TK6508



# BOLT KIT - 20TK6546

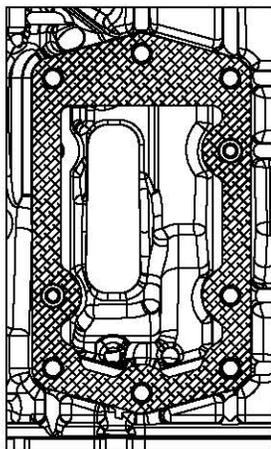
(19T64695 & 21T64303)

Torque 30 ft.lbs.



QTY.	PART NO.	DESCRIPTION
7	19T64695	PTO Mounting Bolt
7	21T64303	Flat Washer
2	20T64143	M10 x M8 Stud
2	22T65300	M8 Nut

## ORIENTATION FOR GASKET (13T64490)



## “UU” OUTPUT PUMP MOUNTING KIT - 48TK6631

QTY.	PART NO.	DESCRIPTION
1	12901552000	Gasket
3	19M15002	Cap Screw
4	21T20526	Lock Washer



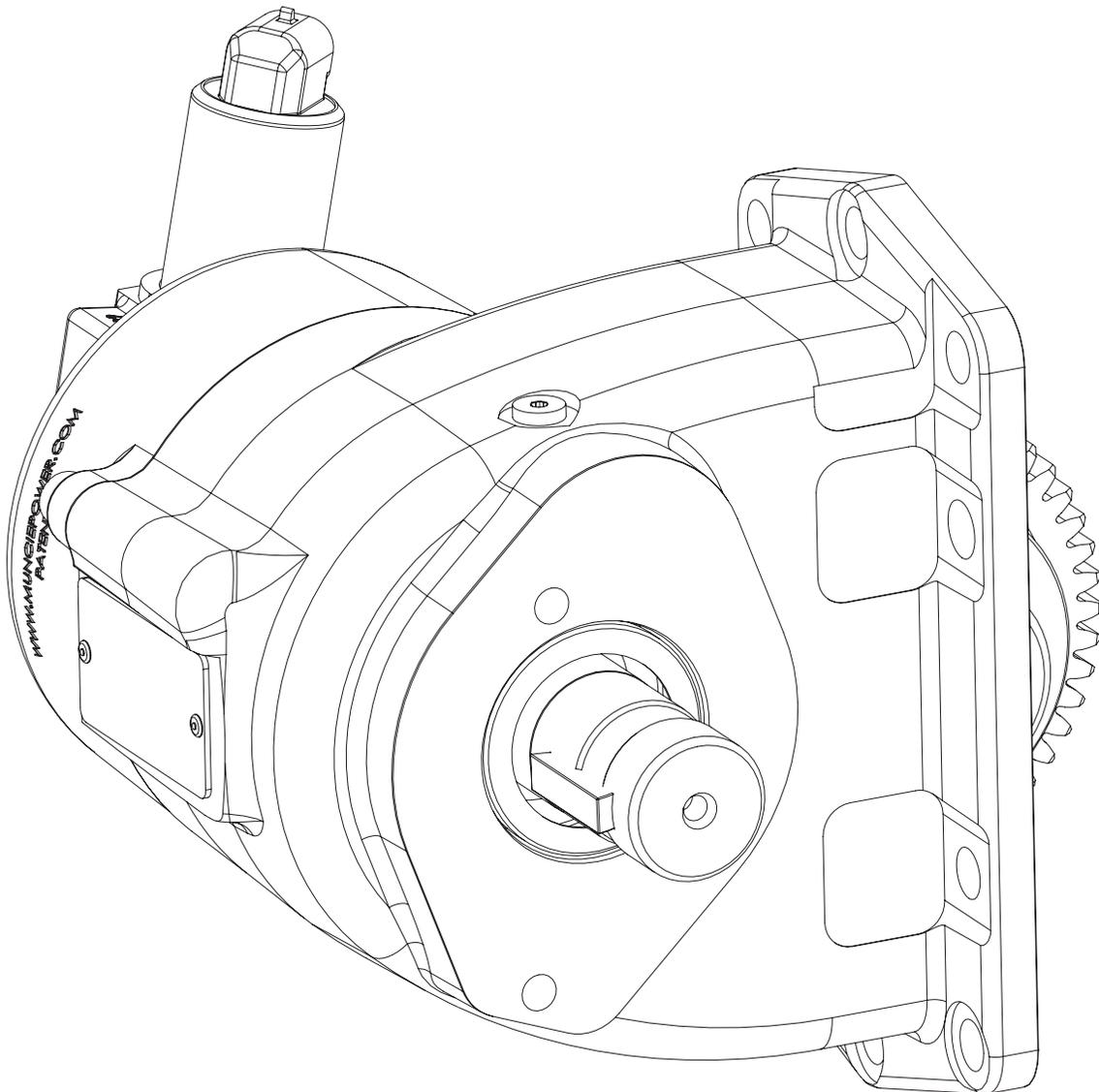
**Muncie<sup>®</sup>  
Power  
Products**

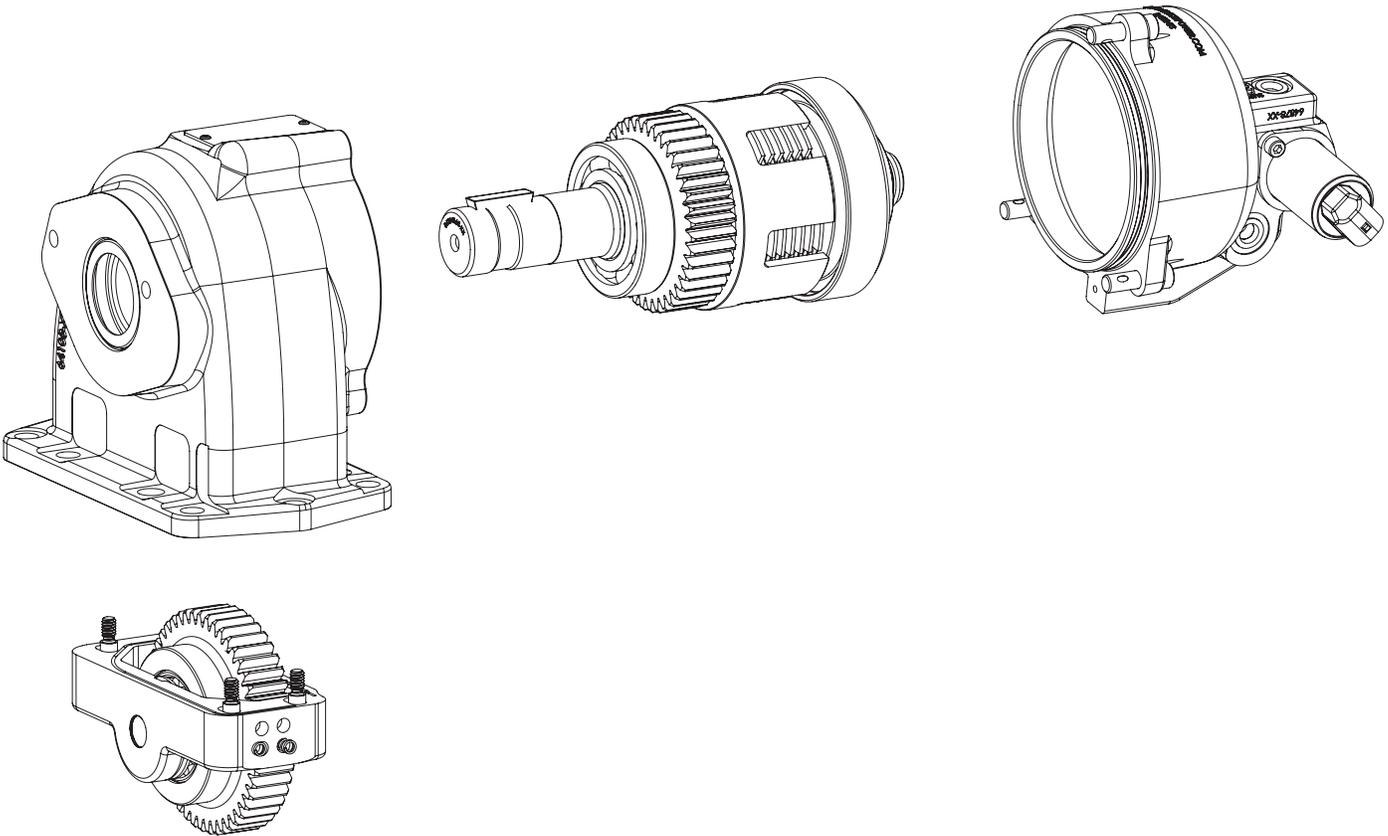
# F20 PTO

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## REBUILD INSTRUCTIONS

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## **TOOLS REQUIRED FOR REBUILD**

Press

Torque Wrench

15/16 Slotted Screw Driver Set

Bearing Puller

Rubber Mallet

Small Ball Ping Hammer

$\frac{3}{16}$  Drift Punch

Retainer Ring Pliers

$\frac{3}{32}$ ,  $\frac{5}{32}$ , and  $\frac{1}{4}$ " Allen Wrench and or Sockets

90° Pick

### **Preparation**

These instructions are for the rebuilding of the F20 Power Take-off. The rebuild kit includes all new bearings, snap rings, clutch plates, springs, seals, and shims.

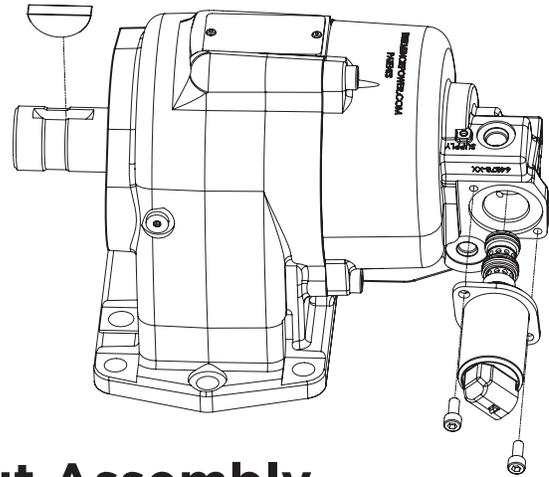
Before beginning the rebuilding process of the PTO, verify that all necessary tools have been obtained. Clean unit thoroughly and inspect the gears for signs of excess wear or damage prior to beginning the rebuild process.

# DISASSEMBLY

## Section 1 – Woodruff Key & Solenoid

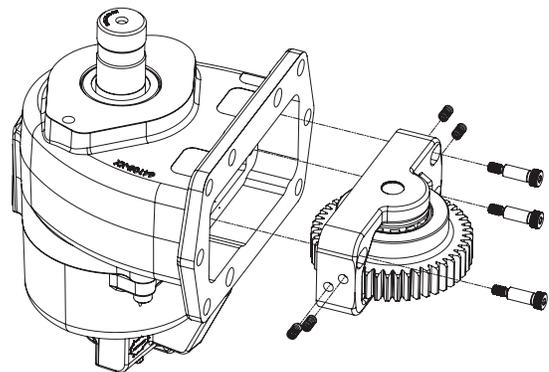
**Step 1:** Remove Woodruff key from output shaft.

**Step 2:** Remove solenoid from rear cover by loosening the 2 bolts.

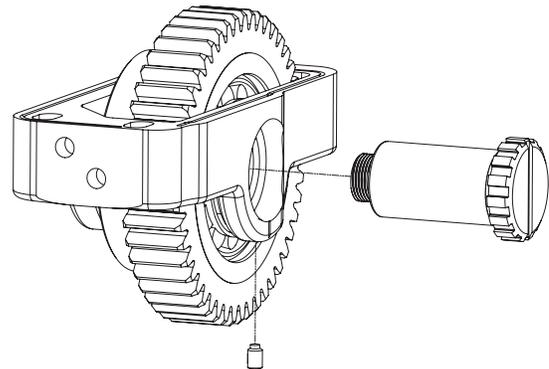


## Section 2 – Input Assembly

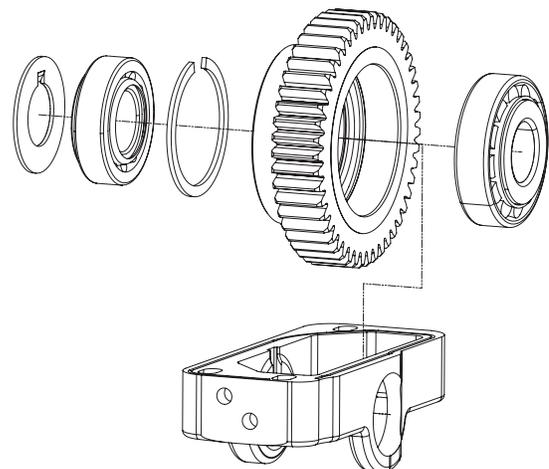
**Step 3:** Remove input assembly from housing by loosening the 3 carrier bolts. Carrier also houses 4 springs.



**Step 4:** Remove set screw first. Then remove the input shaft.

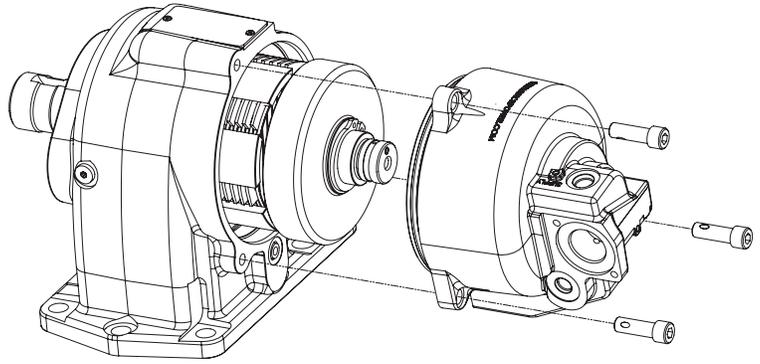


**Step 5:** Remove Input gear assembly and tabbed washer from the carrier. Remove both bearings and retaining ring from the input gear assembly.

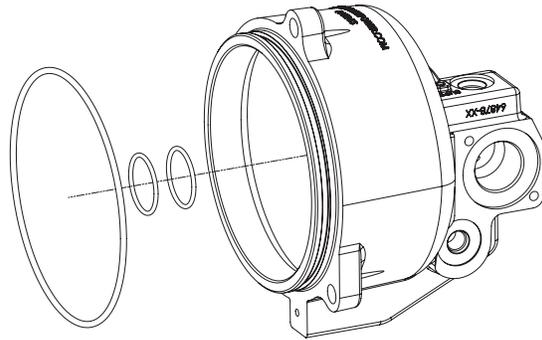


## Section 3 – Rear Cover & Housing

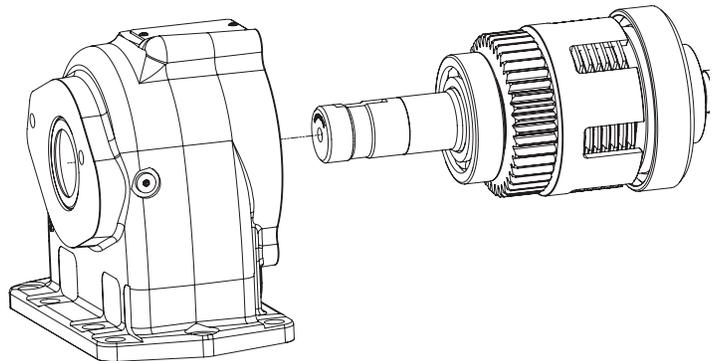
**Step 6:** Remove rear cover and O-Rings.



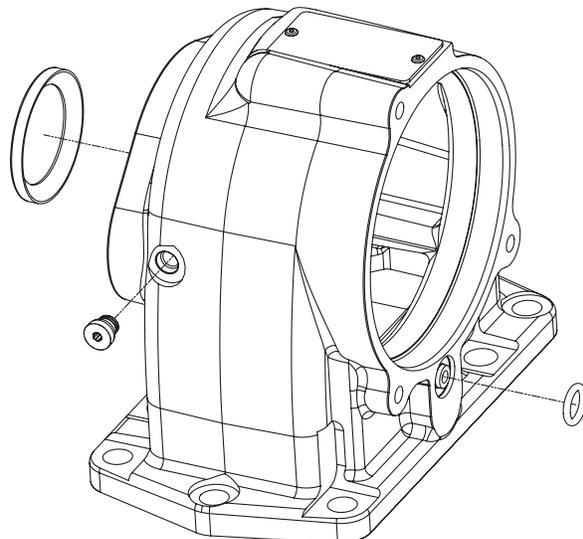
**Step 7:** Remove O-Rings from rear cover.



**Step 8:** Remove output shaft assembly from housing.

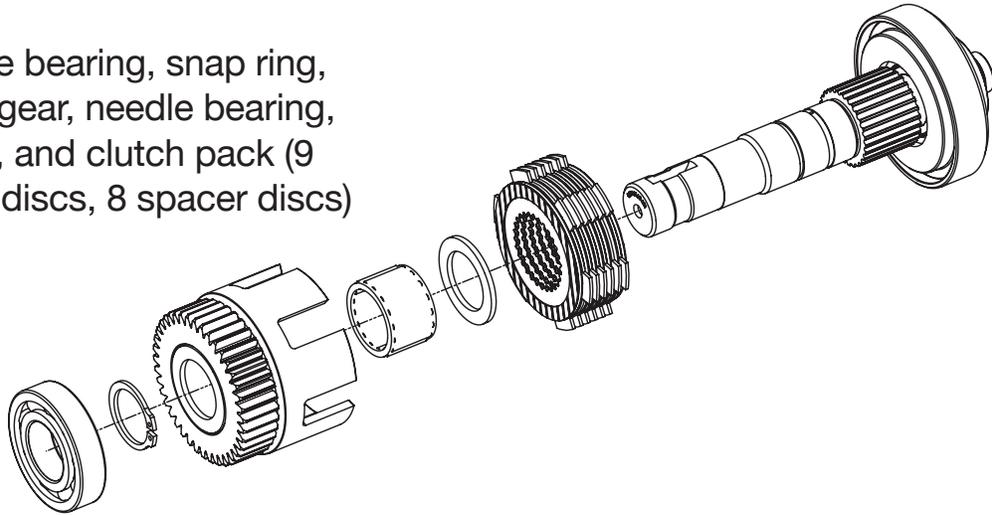


**Step 9:** Remove housing seals and plug.

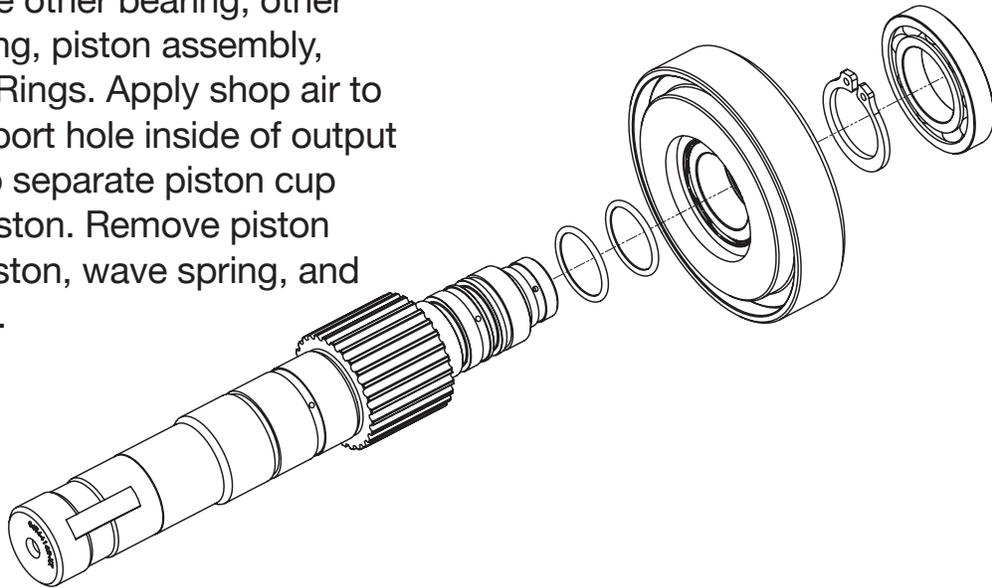


## Section 4 - Output Shaft Assembly

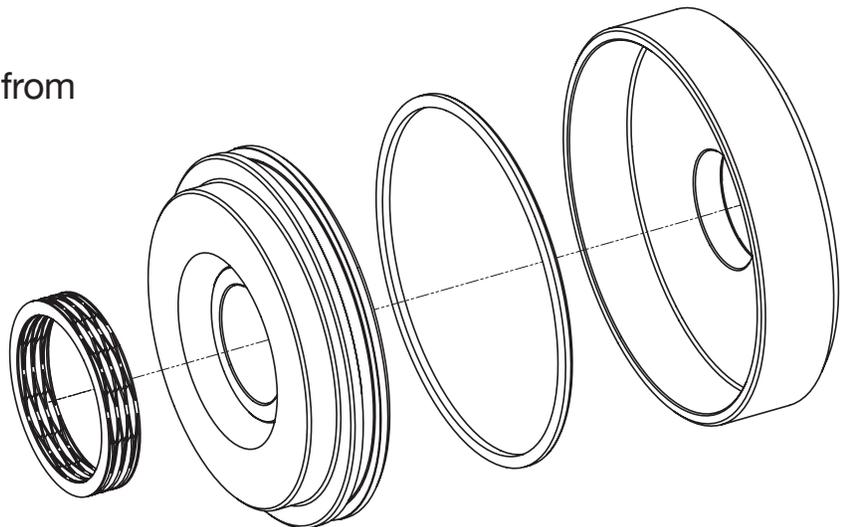
**Step 10:** Remove bearing, snap ring, output gear, needle bearing, washer, and clutch pack (9 friction discs, 8 spacer discs)



**Step 11:** Remove other bearing, other snap ring, piston assembly, and O-Rings. Apply shop air to clutch port hole inside of output shaft to separate piston cup from piston. Remove piston cup, piston, wave spring, and O-Ring.



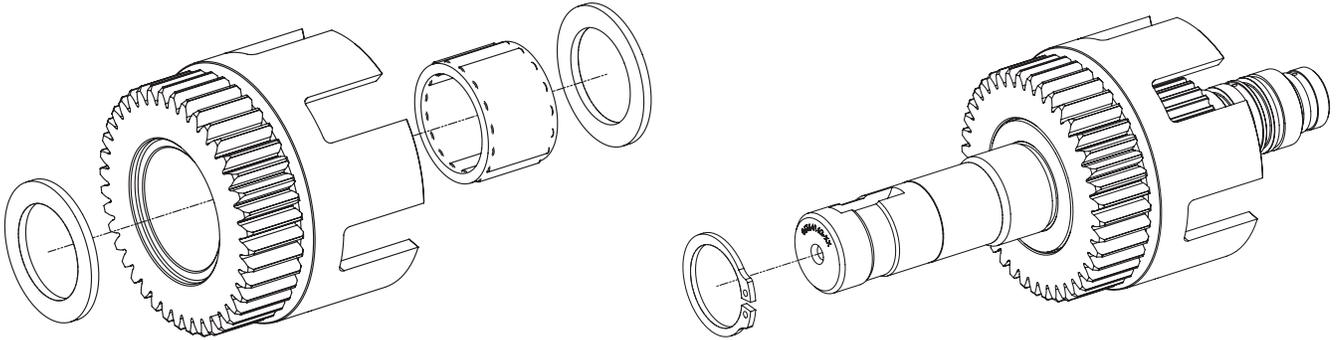
**Step 12:** Remove O-Ring from piston cup.



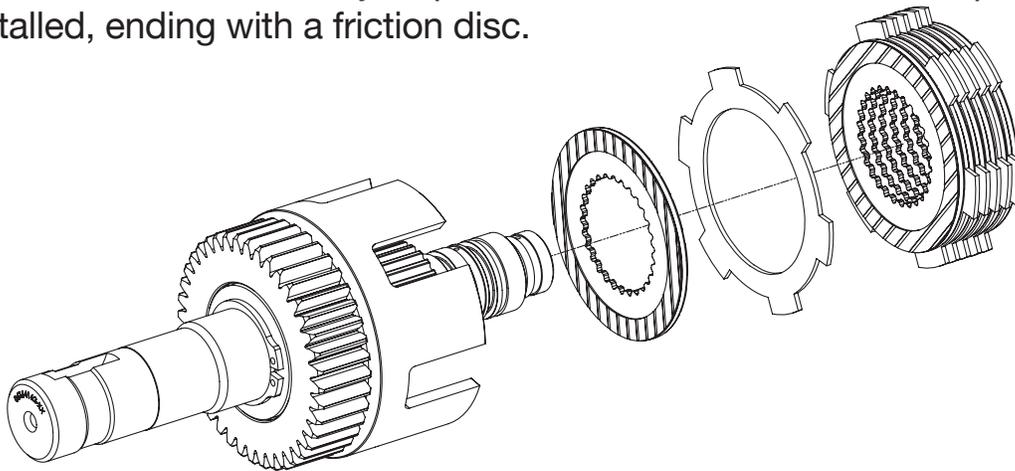
# ASSEMBLY

## Section 1 - Output Shaft

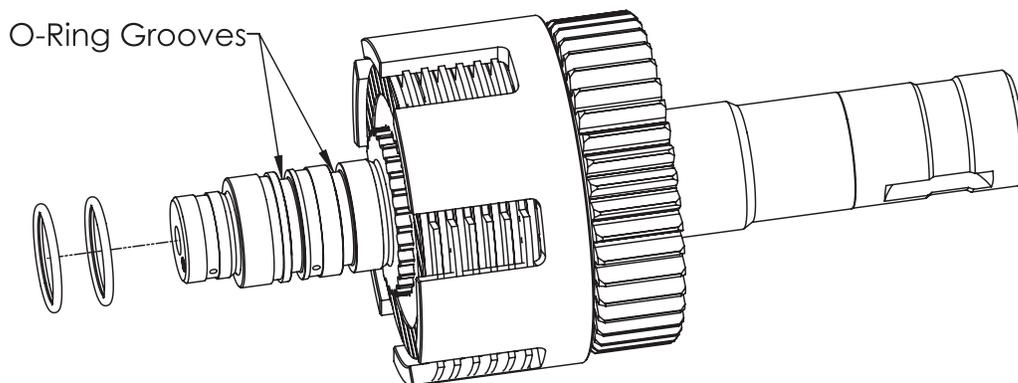
**Step 1:** Install washers (21T62472) and needle bearing (10T62471) into the output gear (02T65196). Install output gear onto output shaft (06T641\*\*). Install snap ring (24T36470) on “output side” of shaft.



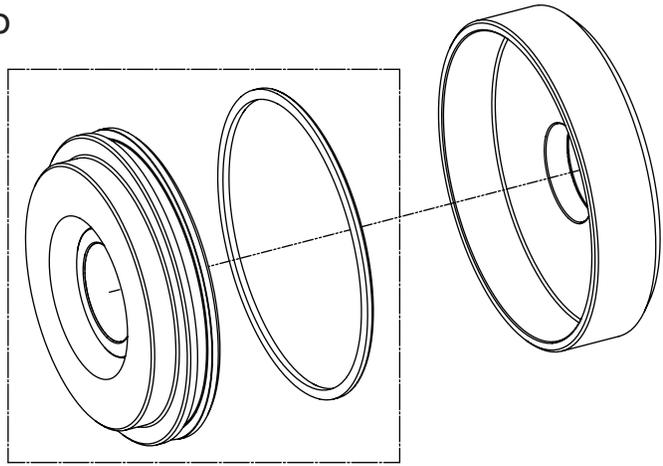
**Step 2:** Install 9 friction discs (49T65367) and 8 spacer discs (49T36258). Start with a friction disc, followed by a spacer disc. Alternate until all components are installed, ending with a friction disc.



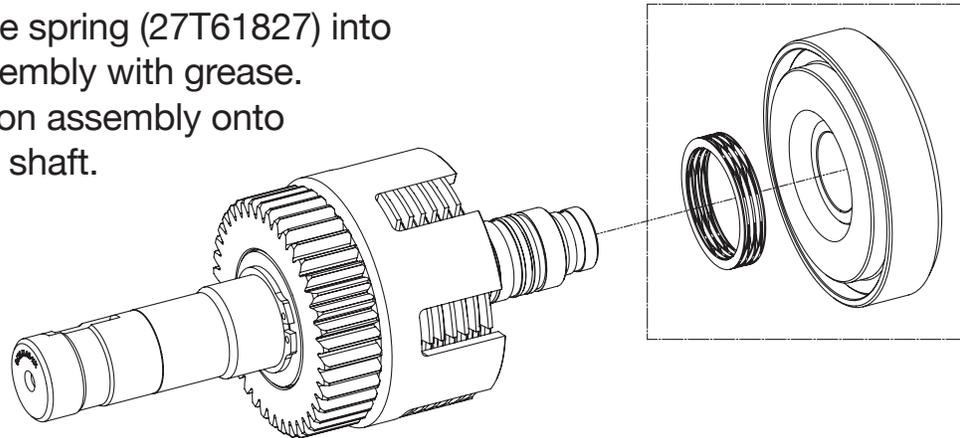
**Step 3:** Install O-Rings (12T39023) onto output shaft. Add grease to O-Rings.



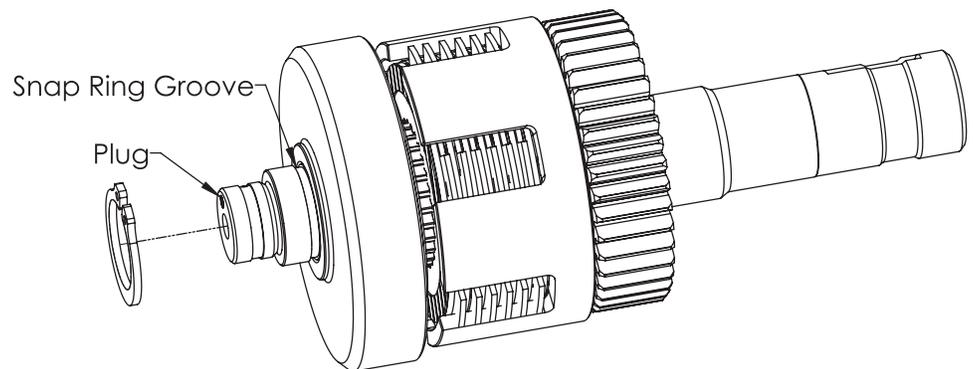
**Step 4:** Install O-Ring (12T64059) onto the piston (49T64056). Add grease and press into piston cup (49T64057).



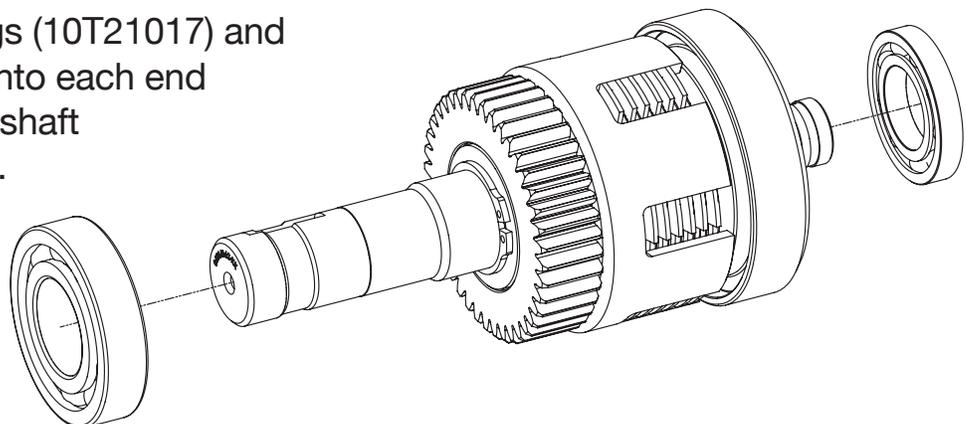
**Step 5:** Install wave spring (27T61827) into piston assembly with grease. Install piston assembly onto the output shaft.



**Step 6:** Depress wave spring to install snap ring (24T39182). Ensure that the output shaft has a plug inserted.

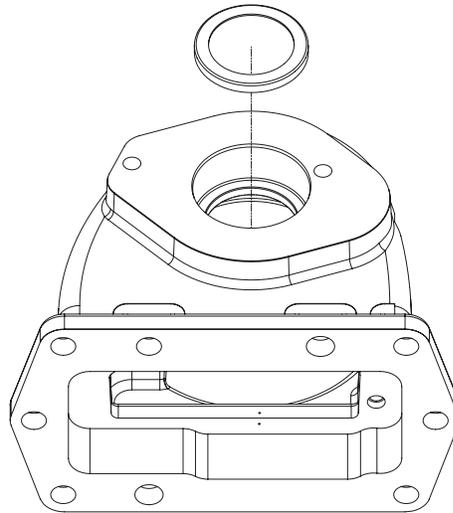


**Step 7:** Install bearings (10T21017) and (10T39072) onto each end of the output shaft using a press.

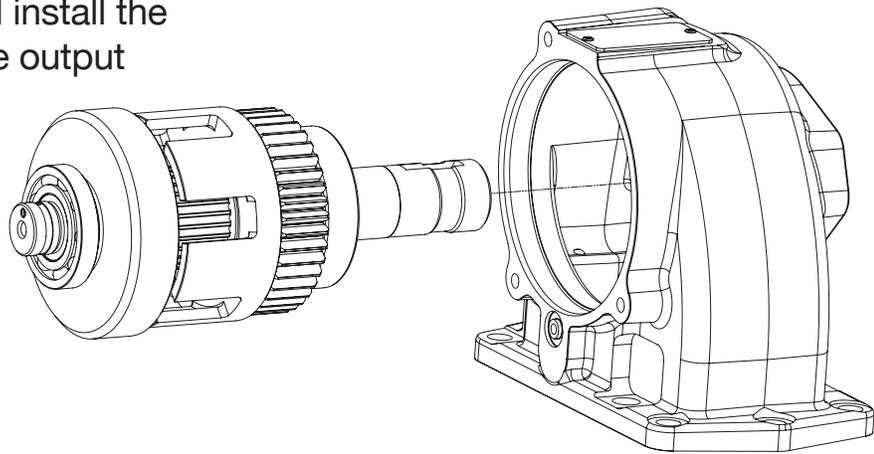


## Section 2 - Housing

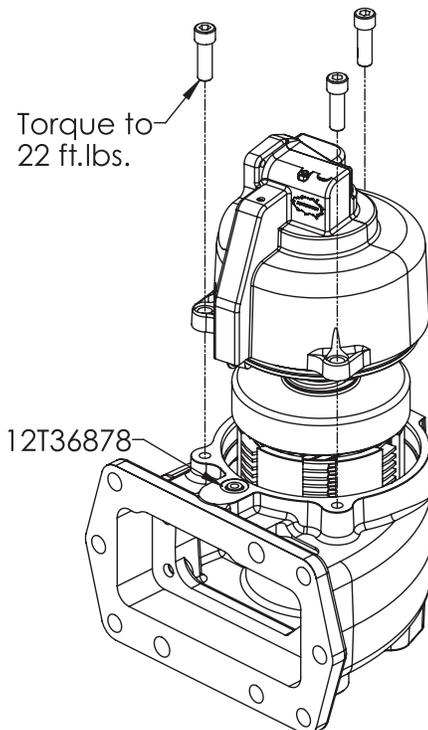
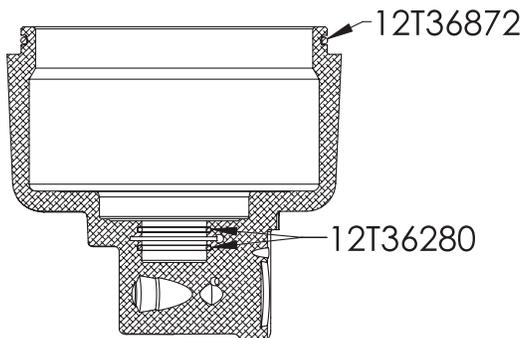
**Step 8:** Install shaft seal (11T63830) into housing using a press.



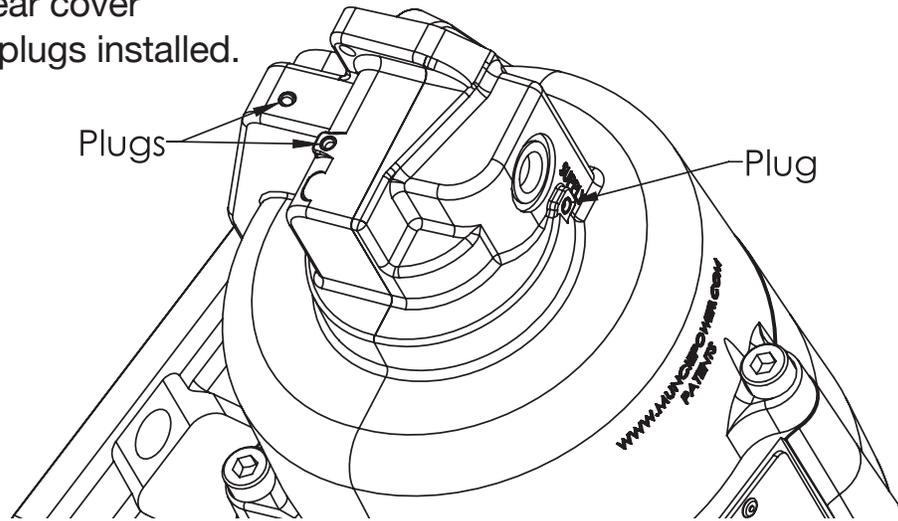
**Step 9:** Place shaft seal thimble over output shaft and install the housing onto the output shaft assembly.



**Step 10:** Install rear cover O-Rings (12T36872 and [2] 12T36280), add grease to O-Rings. Install O-Ring (12T36878) into groove on Housing. Place rear cover over output shaft and secure the 3 bolts (19T39257). Torque to 22 ft.lbs.

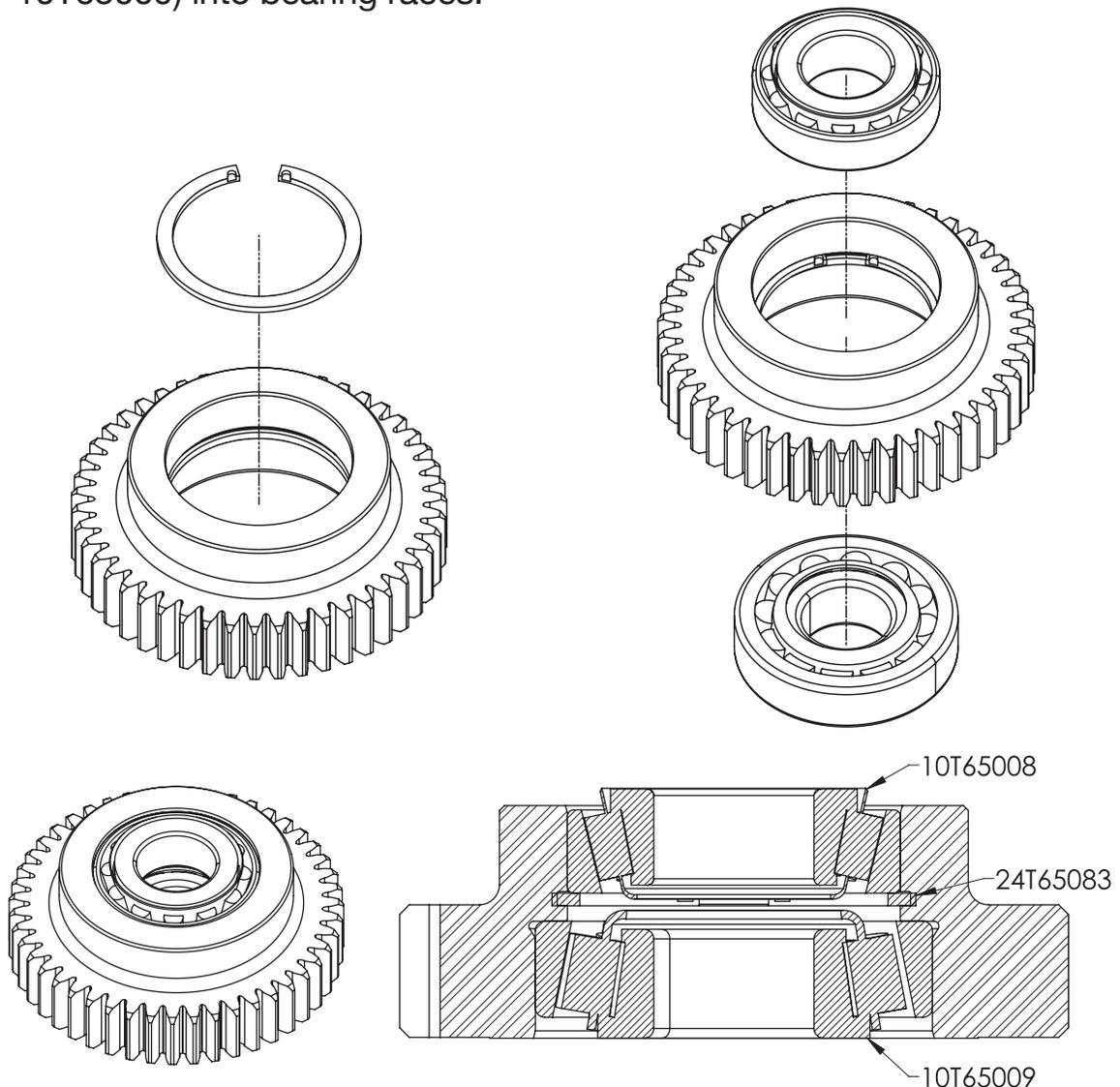


**Step 11:** Ensure rear cover has all 3 plugs installed.

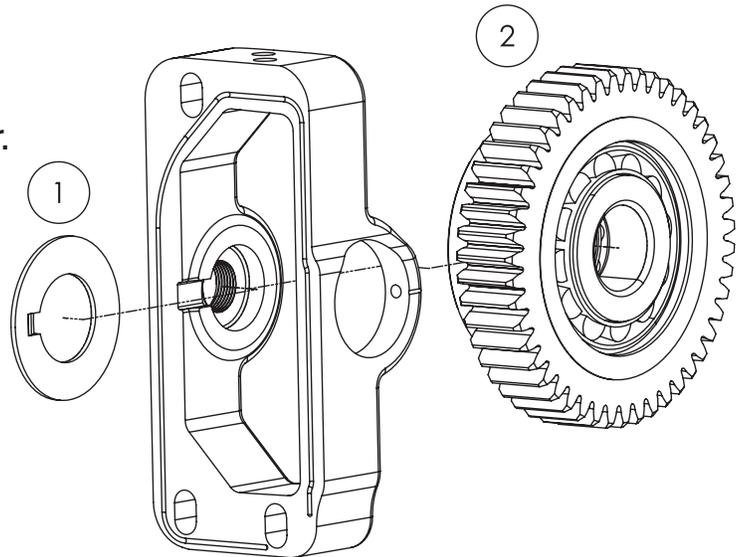


### Section 3 - Carrier Assembly

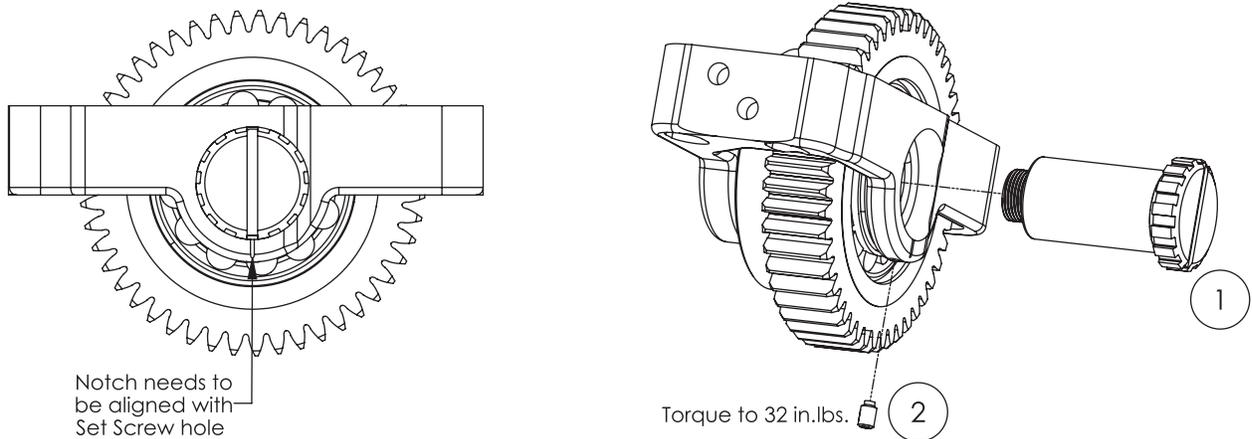
**Step 12:** Install retaining ring (24T65083) into idler gear (03T64153). Press bearing races into idler gear until fully seated. Install bearings (10T65008 and 10T65009) into bearing races.



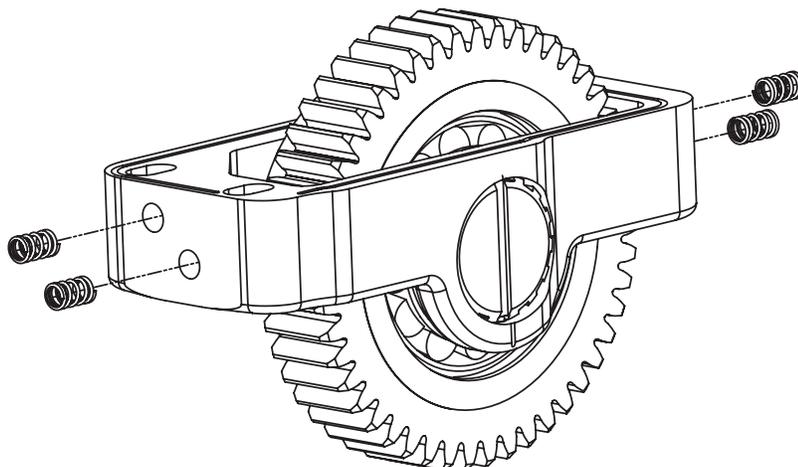
**Step 13:** First, install tabbed washer (21T62316) into carrier (49T64798). Tab on washers sits in the groove on the carrier. Next, install the bearing and gear assembly into the carrier.



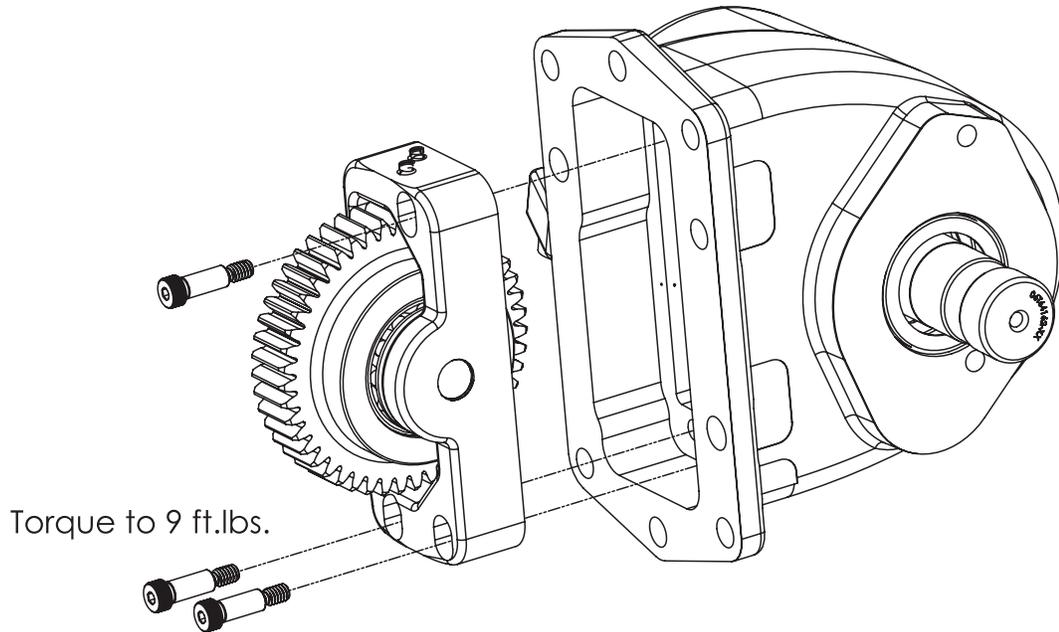
**Step 14:** First, install idler shaft (07T64145), tighten to 60 in.lbs. Then, back idler shaft off until notch is in alignment with the set screw (19T36846) hole. Next, insert set screw and tightened to 32 in.lbs.



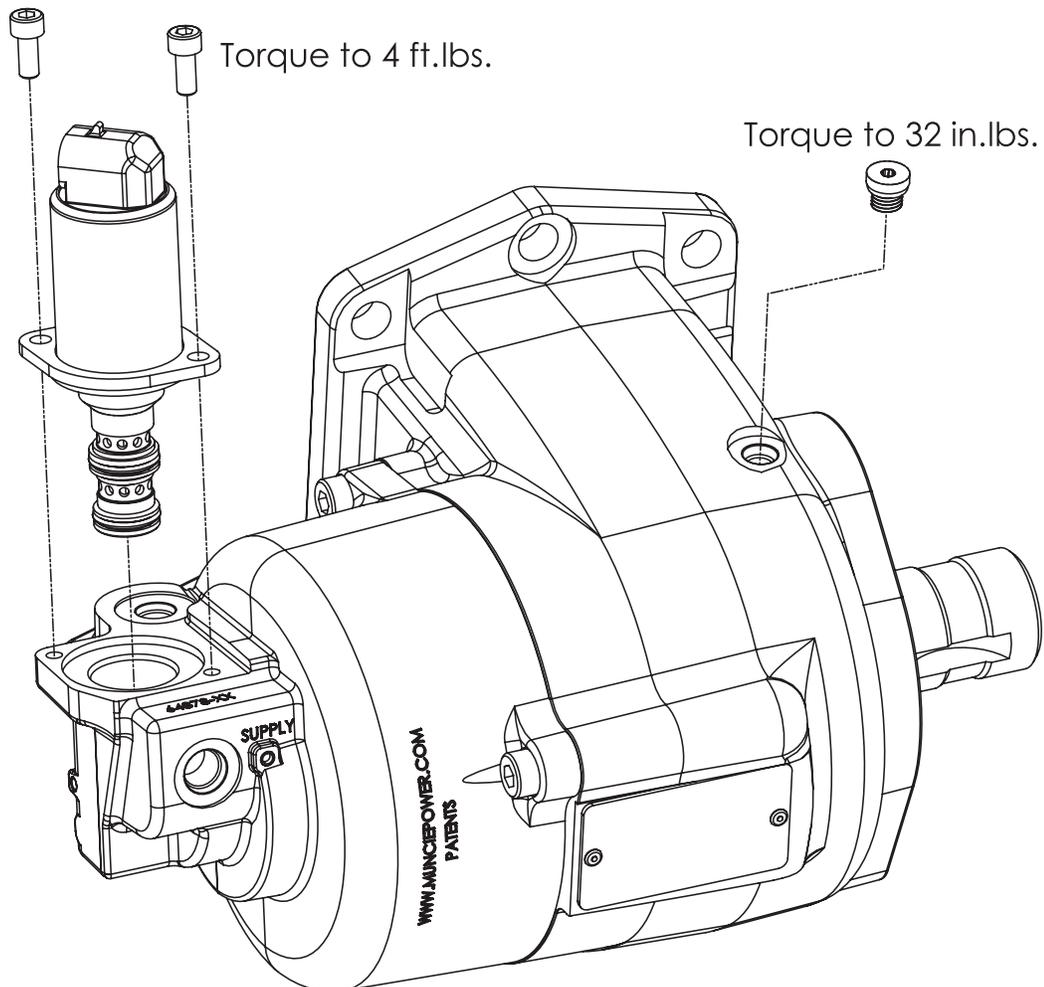
**Step 15:** Install coil springs (27T63431) into the holes on each side of the carrier. Dab grease on the springs to help hold them in place.



**Step 16:** Install carrier assembly into housing using shoulder bolts (19T65081) and torque to 9 ft.lbs.



**Step 17:** Install solenoid (35T43600) into housing. Secure using bolts (19T62950) and torque to 4 ft.lbs. Install housing plug (25T65492) into housing and torque to 32 in.lbs.



**Step 18:** For “B” shafts, install Woodruff key (26T01627).

