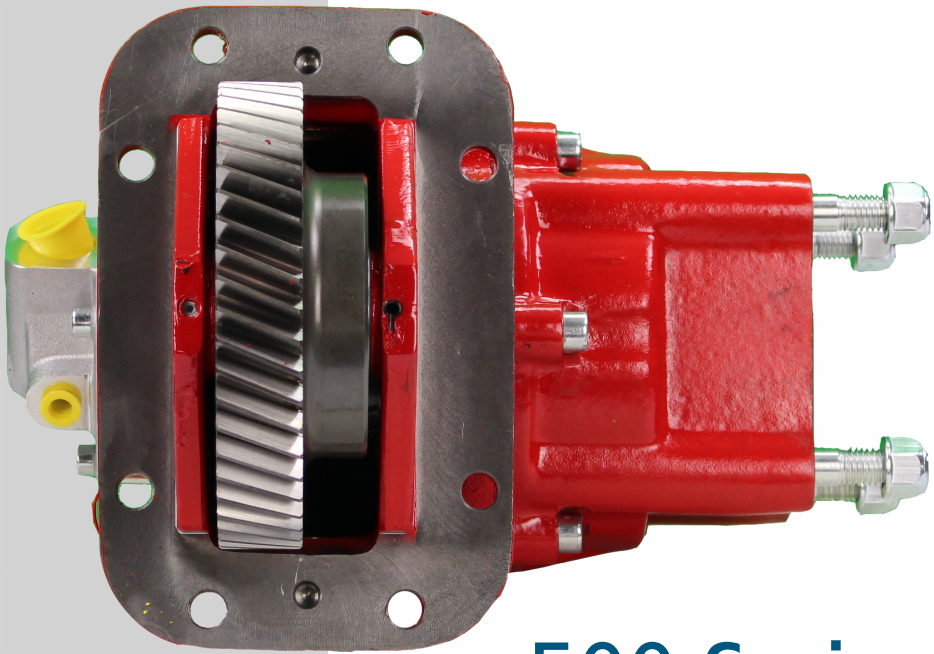




Hydraulic Systems

# Hot Shift PTO

User Manual



## 500 Series

for ZF PowerLine 8AP  
& Torqueflite HD

REV. 03/2026

Building our World

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<b>Warning</b>	Follow all local, state and federal safety precautions. Also adhere to all company safety procedures before, during and after PTO installation.
<b>Caution</b>	Protect wiring for most severe environmental and corrosive conditions. It is recommended the installer ensures all wired connections are sealed to help prevent moisture intrusion and reduce possibility of corrosion. We recommend using heat shrink butt connectors. Following this recommendation may ensure better performance in severe environmental and/or corrosive conditions.
<b>Note</b>	Read the truck manufacturer operation's manual before starting the install.

## Safety Information

### CAUTION

#### TO PREVENT POSSIBLE INJURY:

DO NOT go underneath the vehicle with the engine running.

DO NOT attempt to work on an installed Power Take-Off with the engine running.

DO NOT operate the controls of the Power Take-Off or other driven equipment from underneath the vehicle with the engine running.

DO NOT operate the controls of the Power Take-Off or other driven equipment in any position that could result in getting caught in the moving machinery.

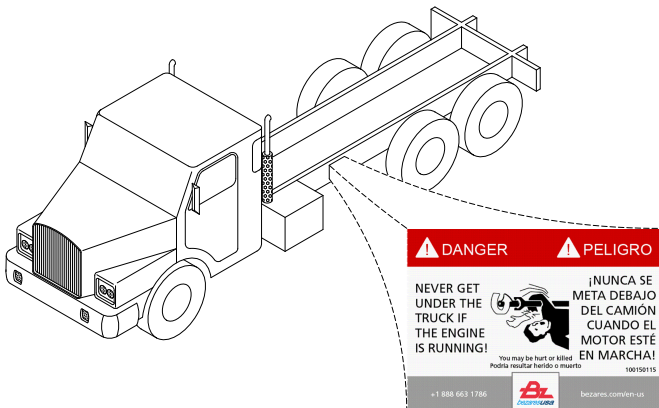
### CAUTION

Make sure to block any moving or raised device that may injure a person working on or under the truck. A lever or its linkage may be accidentally moved causing movement of the device which could cause injury to a person near the device.

### IMPORTANT

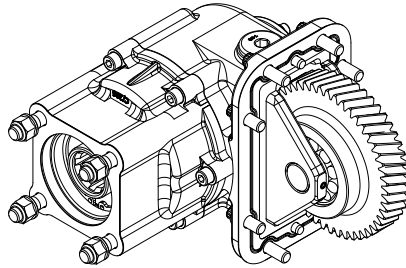
Because most of our Bezares Power Take-Offs and P.T.O. drive lines are sold through distributors, the product applications and the resulting degree of exposure to danger of the operators are not responsibility of Bezares

Therefore, the proper installation of the P.T.O. and its associated equipment, and the decisions of whether to install guards and/or warning signs shall be the responsibility of the designers or installers.



Since our main purpose is to show you how to get additional and more profitable miles from truck, tractor and trailer components, we want to provide you with information on the installation of 500 Series.

We all realize that an inadequate transmission will overwork any Power Take-Off in a very short period of time. In addition, a mismatched transmission/P.T.O. combination can result in unsatisfactory performance of the equipment right from the start.



P.T.O. 500 SERIES

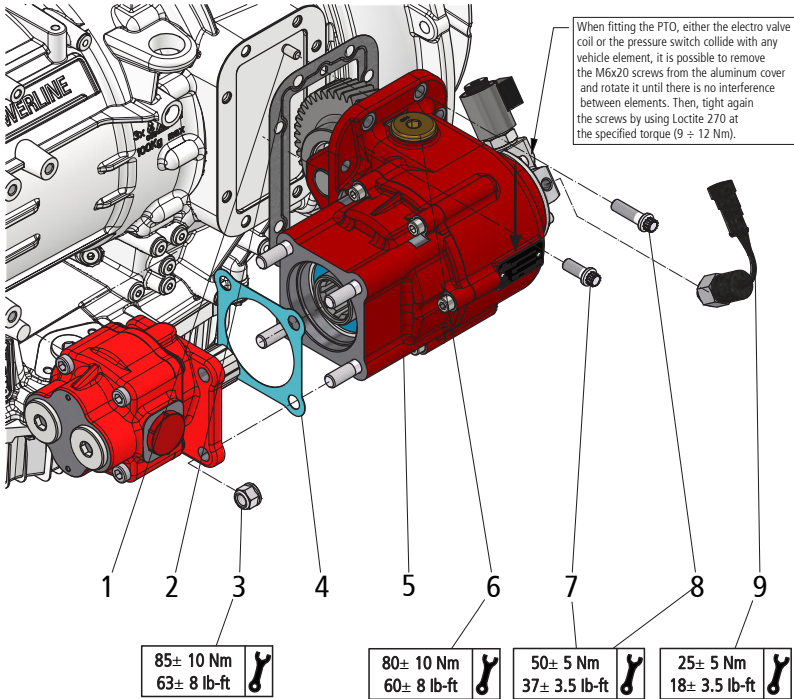
Before you order new trucks be sure that you're getting the right transmission/P.T.O. combination. It is of vital importance for efficient performance to have adequate power. To help you select the proper type, size and design of P.T.O. it is advisable to discuss your specific requirements with a Bezares P.T.O. specialist. They know their products and Power Take-Offs. They can inform you about everything you need to know about power, at the right time, before you specify components.

Here are some of the questions that are relevant to the Proper Selections of Transmission mounted Power Take-Offs.

1. What is the make and model of your transmission?
2. Which P.T.O. opening will be used?
3. What accessory is to be driven?
4. How much horsepower is required to drive the accessory?
5. What is the required rotation of the P.T.O.?
6. What is the required P.T.O. output shaft speed as a percent of engine speed?
7. What is the required method of shifting the P.T.O., mechanical or pneumatic?

Once all of these answers have been determined, a transmission mounted P.T.O. can be selected to meet the horsepower, speed and rotation requirements.

# Mounting P.T.O. To Transmission



## General Information

The following installation instruction for fitment of the PTO 500 Series should be followed in order to ensure good performance and long life.

Where it is obvious that this instructions have not been followed, then warranty claims will not be accepted.

## Mounting Instruction List

Items	Description
1	Dowel pin (2x)
2	Steel Gasket
3	Nut M12 (4x)
4	Gasket
5	PTO housing
6	Inspection plug (2x)
7	Screw M10x25 (2x)
8	Screw M10x35 (6x)
9	Hidraulic pressure switch

## Installation Method

Fit the screws / studs. If the thread is not impregnated, use Loctite 270.

Dismount the inspection plug and check the backlash by turning the PTO input gear back and forth. The backlash shall be 0.15-0.3 mm (0.006-0.012").

Use grease to facilitate the installation of the seals and to prevent damage to it during this process.

Apply some lithical grease to PTO shaft before mounting the pump.

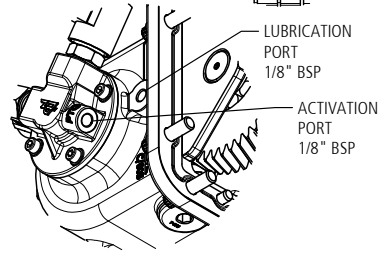
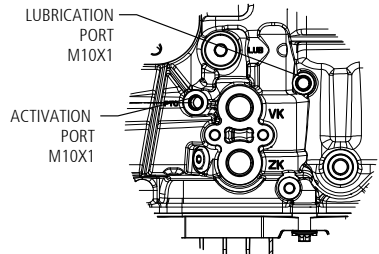
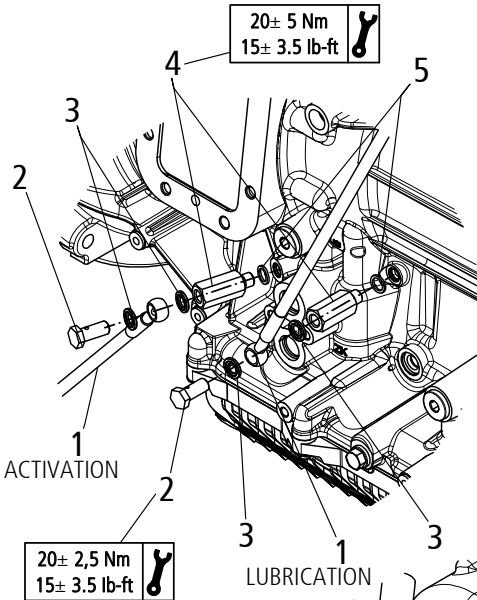
Do not forget to refill the gearbox with suitable oil and up to level.

Drive the vehicle for a short distance, park the vehicle and shut down, then verify.

## Warning

Drain the gearbox and clean the coverplate and surrounding area to prevent ingress of dirt. Remove the PTO cover and clean the sealing surface.

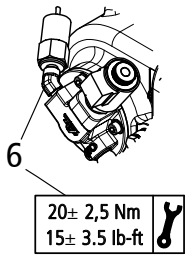
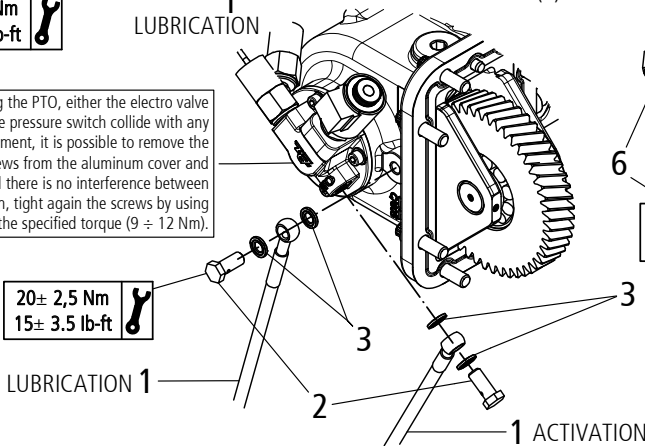
# Mounting P.T.O. To Transmission



(\* ) FOR RAM VEHICLES ONLY

20± 2,5 Nm  
15± 3.5 lb-ft

When fitting the PTO, either the electro valve coil or the pressure switch collide with any vehicle element, it is possible to remove the M6x20 screws from the aluminum cover and rotate it until there is no interference between elements. Then, tight again the screws by using Loctite 270 at the specified torque (9 ÷ 12 Nm).



## Mounting Instruction List

Items	Description
1	Lubrication / Activation pipe (2x)
2	Holey screw (4x)
3	Metaloplastic washer (8x)
4	Adapter plug (2x)
5	Aluminium washer (2x)
6	Pneumatic fitting 45°(*)

## General Information

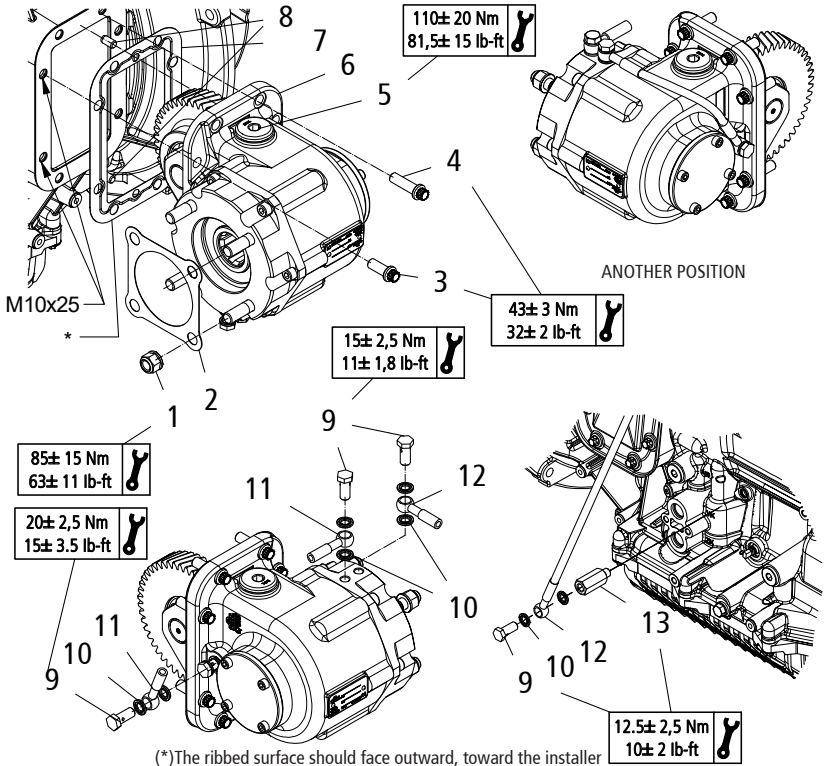
The following installation instruction for fitment of the PTO should be followed in order to ensure good performance and long life.

Failure to comply with these instructions will invalidate the acceptance of any product warranty.

Do not forget to refill the gearbox with suitable oil and up to level.

Drive the vehicle for a short distance, park the vehicle, shut down and check before to carry on.

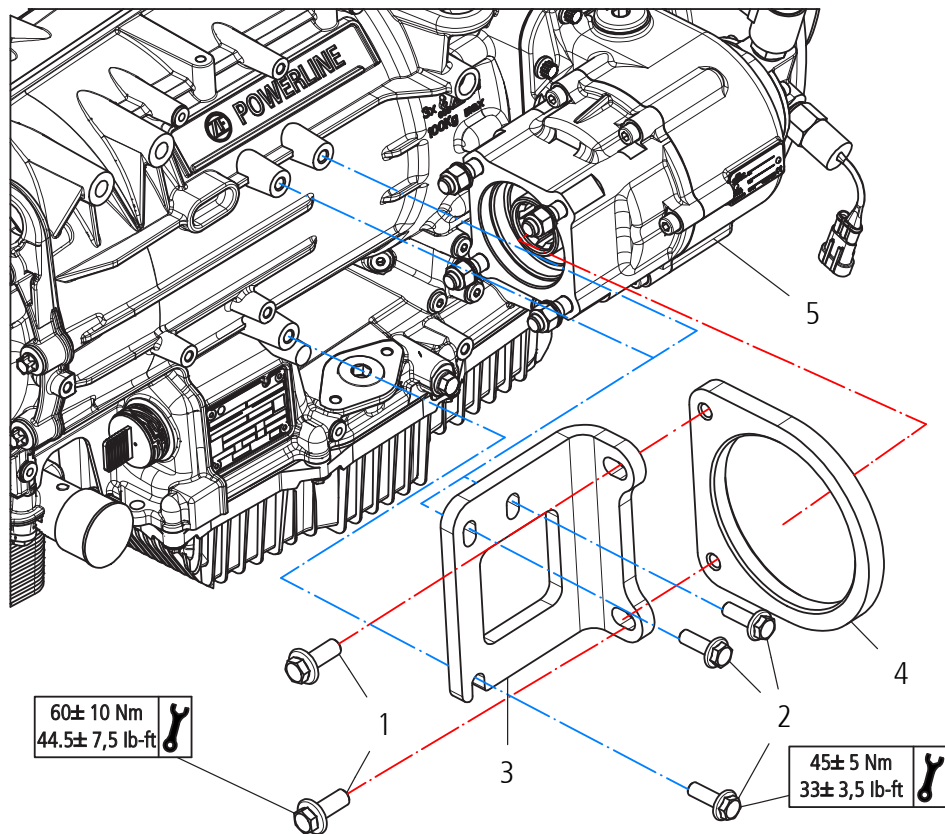
# Mounting Constant Mesh P.T.O. To Transmission



## Mounting Instruction List

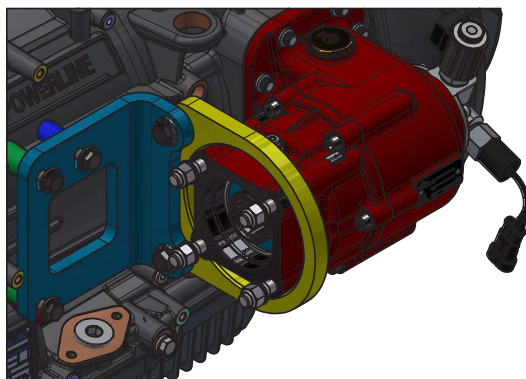
Items	Description
1	Nut (4x)
2	Gasket
3	Screw M10x25 (2x)
4	Screw M10x35 (6x)
5	Inspection plug (2x)
6	PTO housing
7	Gasket
8	Dowel pin (2x)
9	Banjo fitting (4x)
10	Washer Metaloplastic (8x)
11	90112399
12	9092299
13	Adapter plug

# Mounting Bracket Support To Transmission



## Mounting Instruction List

Items	Description
1	Screw M12x30 (2x)
2	Screw M10x30 (3x)
3	90° Bracket
4	Bracket
5	PTO



# Mounting P.T.O. To Transmission ONLY FOR RAM CHASSIS

1

Remove the molding and pull flooring back



2

Install the hoses, pressure switch, valve and solenoid before attempting to install the P.T.O.

Follow the P.T.O. installation instructions of page 6.



3



Note how close the P.T.O. is to the exhaust system and protect it if needed. Wrap exhaust pipe with heat reflective material. Exhaust header pipe wrap may be used or an aftermarket heat shield. It is also necessary to install reflective loom or heat protection sleeve on pressure switch wires as well as wiring to coil.

4

Install P.T.O. Wire harness PTWHDAS69RC: Wires from solenoid and pressure switch are polarized so, do not switch them.



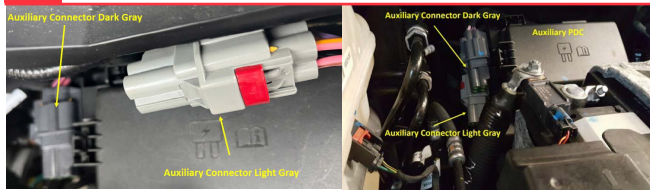
# Mounting P.T.O. To Transmission ONLY FOR RAM CHASSIS

## 4.1

DIN connector to solenoid valve and 3-pin AMP connector to pressure switch



## 4.2

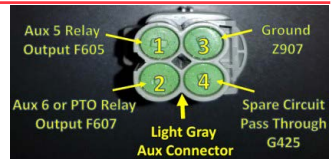
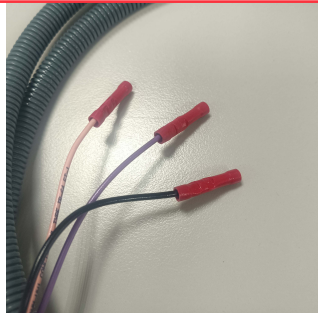


Identify Light Gray Connector Attached to the Drivers Side Firewall in Engine Compartment and Wiring Harness located in glove compartment which are supplied with chassis when ordered with Build Codes "RBV" for right hand PTO or "LBV" for left hand PTO

## 4.3

Separate connector halves and use blank side of connector along with pins supplied in glove compartment to connect to Bezares wiring harness listed below

- Pink Wire - Pin 2
- Black Wire - Pin 3
- Purple Wire - Pin 4



## 5

Install PTO hoses to the transmission following instructions on page 7.

## 6

Reinstall the molding and flooring from the truck.

### CAUTION

This vehicle is equipped with a Power Take-off. Shut engine off before working on Power Take-Off or getting below vehicle. Consult operating instructions before using.

POWER TAKE-OFF OPERATION VEHICLE STATIONARY.

#### 1. Mechanical Transmission.

- A power take-off is, and should be, operated as an integral part of the main transmission.
- Before shifting the power take-off into or out of gear, disengage the clutch and wait for transmission or P.T.O. gears to stop rotating.

#### 2. Automatic transmission with manual shift P.T.O. (Includes air shift).

On automatic transmissions, the gears in the transmission turn when the transmission is in neutral, therefore, gear clashing will occur if the power take-off is shifted into gear at this time.

With converter driven gear:

- Shift transmission lever into any of drive positions. (This will stop the transmission gear from turning).
- Shift power take-off into gear.
- Shift transmission into neutral. (This will start transmission gears turning.)

This procedure should eliminate gear clash.

#### 3. Automatic transmission with power shift P.T.O.'s.

- Engage P.T.O. with engine at idle speed. Power shift P.T.O.'s: engine must be at idle when P.T.O. is engaged. See transmission manufacture's instructions for special procedures.

### IMPORTANT

Failure to follow proper shifting or operating sequences will result in premature P.T.O. failure with possible damage to other equipment.

# PTO Maintenance Guide: Keep Your Vehicle Running Smoothly

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Proper maintenance of your Power Takeoff (PTO) is crucial to ensure the longevity and optimal performance of your vehicle. Follow these tips to maintain your PTO:

Prior to PTO installation, wrap exhaust down pipe with heat reflective material. Exhaust header pipe wrap may be used or an aftermarket heat shield. It is also necessary to install reflective loom or heat protection sleeve on pressure switch wires as well as wiring to coil.

**Safety First:** Do not go under or near PTO when the engine is running. Shut off the engine and disconnect batteries on electric motor-driven PTOs (i.e., hybrid vehicles) before checking or servicing.

**Service Intervals:** The PTO, being an integral part of the transmission, should be serviced at the same intervals as the transmission. Transmission fluid changes should follow the interval recommended by the vehicle manufacturer for severe service.

**Check for Leaks:** Checking for PTO leaks and checking the transmission oil level should be done regularly. Loss of oil can significantly affect or damage the transmission. Check for leaks upon delivery of the vehicle and after initial operation of equipment.

**Maintenance Checks:** The PTO requires periodic checks. Typically, the interval for maintenance checks of the PTO depends on the application of the vehicle. For severe-duty PTO applications, it is recommended that the PTO be checked for service every 100 hours of use (this guideline can be adjusted based on past service history once you have it established). Service should include checking and lubricating direct-mount pump shaft connections on a regular basis.

**Recheck the Installation:** Within the first week of use, recheck the installation of the PTO. Check for leaks in air lines or hydraulic connections with air shift or hot shift PTO's and loose mounting hardware (studs, cap screws, nuts). Recheck the cables or lever connections for proper adjustments and lubricate moving parts, tighten and repair ALL connections, hoses, mounting hardware, cable, and lever connections.

**Visual Inspection:** It is recommended that the operator/owner do a visual inspection for leaks under and around the vehicle and equipment before entering or starting the equipment on at least a weekly basis. Any leaks should be corrected immediately.

**Anti-Seize or High-Temperature Grease:** Pumps that are directly mounted to the PTO output require the application of anti-seize or a high-temperature, high-pressure grease (unless the PTO is a wet spline option). The purpose of this grease is to help make the PTO easier to service and to reduce the effects of fretting corrosion on the mating PTO and pump shafts. PTO's under severe duty cycles and/or high torque requirements may require servicing of this pump shaft connection by periodically regreasing the shafts. Vehicles with low-speed engines are also considered severe duty applications due to the inherent vibrations of the vehicles. Fretting corrosion cannot be stopped by greasing the shafts; it is only a deterrent. Wet spline PTO's do not require servicing this connection.

Remember, failure to comply entirely with the provisions set forth in the appropriate Owner's Manual will result in voiding of ALL Warranty consideration.

For any queries, contact your equipment installer.

<https://bezares.com/en-us/pto-maintenance/>

# Maintenance

PTO DATA		
PTO P/N:	PTO S/N:	Assembled Date:
TRUCK DATA		
Make:	Model & Year:	Truck S/N
TRANSMISSION DATA		
Make:	Model & Year:	Transmission S/N:
APPLICATION DATA		
Make:	Model & Year:	Application S/N:
Power:	Speed:	Torque:
MAINTENANCE RECORD		
Date:	Remarks:	
Truck odometer:		
Date:	Remarks:	
Truck odometer:		
Date:	Remarks:	
Truck odometer:		
Date:	Remarks:	
Truck odometer:		
Date:	Remarks:	
Truck odometer:		
Date:	Remarks:	
Truck odometer:		
Date:	Remarks:	
Truck odometer:		

# Return and warranty terms

The items described in this document and other documents or descriptions provided by Bezares USA, Ltd. are hereby offered for sale by Bezares USA, Ltd. These terms and its acceptance by any customer shall be governed by all of the following Terms and Conditions. Customer's order for any such items, when communicated to Bezares USA, Ltd. verbally or in writing, shall constitute acceptance of these terms.

- 1. Terms and Conditions:** Customer's acceptance of any offer to sale is limited to these terms and conditions. Customer accepts warranty terms policy once product(s) is/are purchased. All goods not returned under these conditions will automatically be rejected. Bezares USA, Ltd. accepts no warranty for any non-direct purchase or particular purpose, or the results to be obtained for their use by its distributors, purchasers, or others.
- 2. Delivery:** Any product to be returned or claimed to be defective must be held for shipping instructions to Bezares USA, Ltd. Returned merchandise must be resalable as new to be considered for full credit (for any returns excluding claims to be defective). All OE (original equipment) parts must be returned, and any missing parts will be deducted from possible credit accordingly. Bezares USA, Ltd. holds responsibility for any product shipped from any Bezares USA, Ltd. subsidiary until the shipment is received and signed for by the customer (this condition does not apply if shipped according to customer's preferred carrier). Bezares USA, Ltd. does not hold any responsibility for returned product(s) until a Bezares USA, Ltd. employee receives and signs for shipment (Bezares USA, Ltd. holds no responsibility for any shipping inconveniences such as lost or damage in transit).
- 3. Warranty:** Bezares USA, Ltd. warranties its manufactured product to be free of defects in materials and workmanship for a period of eighteen months on PTOs, and fifteen months on hydraulic pumps and any other hydraulic equipment from its date of invoice. If requested by Bezares USA, Ltd., products or parts for which a warranty claim is made are to be returned via transportation prepaid to Bezares USA, Ltd. Any installation or use not in accordance with catalogue or package instructions, other improper use, operation beyond capacity, substitution of parts not approved by Bezares USA, Ltd., use with equipment other than the equipment on which the product is first installed, any alteration, disassembly, or repair made to the product other than by Bezares USA, Ltd. shall void this warranty. No Bezares USA, Ltd. representative is authorized to change this warranty in any way.
  - Stock Returns:** A 1:1 offsetting order will be required if the return value exceeds 2.5% of customer last year's purchase. Annual stock adjustments are limited to 5% of previous year's purchases. A 15% restocking fee will apply for all returns within the first year of original purchase, a 30% restocking fee will apply for all returns within the second year from original purchase, and a 50% restocking fee will apply for all returns after third year of purchase. No returns will be accepted after three years from original purchase. Returning merchandise must be listed in Bezares USA, Ltd.'s current price sheet, and must be returned within one year of becoming obsolete.
  - Technical Warranties:** Bezares USA, Ltd. will not be responsible in case of wrong assembly of their units by another party, in the case of damage generated by external causes, in the case of overload, inadequate lubrication, or other problems related with a wrong assembly on a transmission from preowned trucks. Customer or its respective salesmen must complete a Customer RMA Form and submit it to Bezares USA, Ltd.'s Warranty Department in order to be considered for warranty investigation.
- 4. Limitation of Remedy:** Bezares USA, Ltd. agrees to repair, credit (all merchandise credits will be on account, and must be used within a 12 month period from date of issue, otherwise credit will be forfeited – no cash refunds are permitted), or replace the product which has been proven to be defective in material or workmanship within the time period listed above. Bezares USA, Ltd. must be informed prior to any product repair that will be made at any location other than Bezares USA, Ltd. Bezares USA, Ltd. will only authorize a company to proceed with the repair after receiving and approving a repair quotation, or will inform the insurance company to cover the responsibility, otherwise, Bezares USA, Ltd. will decline any responsibility for any cost involved in such repair. Bezares USA, Ltd.'s obligation under this warranty shall not include any transportation charges or costs of installation or any liability for direct, indirect, special, incidental, or consequential damages or delay.
- 5. Special Orders:** Orders for all non-stock items in Bezares USA, Ltd. that must be shipped direct from factory, regardless of value of order, will be under prepaid and add terms. This includes all Air/Ocean freight charges and customs and duty. Special order returns/cancellations are subject to a 75% restock fee. Freight charges on Special Orders are Nonrefundable.
- 6. Force Majeure:** Bezares USA, Ltd. shall not be liable for failure to perform, nor be deemed to be in default under this agreement for any delay or failure in performance resulting from causes beyond its reasonable control including but not limited to failure of performance by the other party, acts of state or governmental authorities, acts of terrorism, natural catastrophe, storm, flood, earthquake, riot, insurrection, civil disturbance, sabotage, embargo, blockade, acts of war, or power failure. In the event of such delay, the date of delivery or time of completion will be extended by a period of time reasonably necessary to overcome the effect of any such delay.
- 7. Governing Law:** It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the United States of America without regard to the jurisdiction in which any action or special proceeding may be instituted.
- 8. Indemnification:** The customer agrees to indemnify and hold harmless Bezares USA, Ltd. and its respective affiliates, officers, agents, employees, and permitted successors and assigns against any and all claims, losses, damages, liabilities, penalties, punitive damages, expenses, reasonable legal fees and costs of any kind or amount whatsoever, which result from or arise out of any act or omission of Bezares USA, Ltd. its respective affiliates, officers, agents, employees, and permitted successors and assigns that occurs in connection with this Agreement. This indemnification will survive the termination of this Agreement. In witness whereof the parties have executed this agreement on the date set forth first above with full knowledge of its content and significance and intending to be legally bound by the terms hereof.





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