



Hydraulic Systems

# Hot Shift PTO

3000, 3100 and 3300 Series



**3000**  
series



**3100**  
series



**3300**  
series



**3300**  
SAE output

User Manual

Building our world

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**CAUTION:****TO PREVENT POSSIBLE INJURY OR DEATH:**

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 beyond the knowledge and controls of BZ U.S.A.

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.

**! DANGER****! PELIGRO**

**NEVER GET  
UNDER THE  
TRUCK IF  
THE ENGINE  
IS RUNNING!**

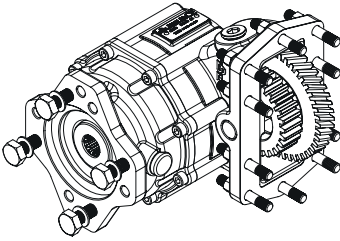


**You may be  
hurt or killed.**

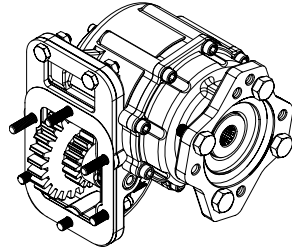
**¡NUNCA SE  
META DEBAJO  
DEL CAMIÓN  
CUANDO EL  
MOTOR ESTÉ  
EN MARCHA!**

Since it is our major objective 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 3000, 3100, and 3300 Series.

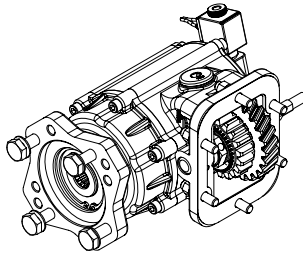
We all realize that an inadequate transmission will overwork any Power Take-Off in a very short period of time. In addition, a mismatched transmission/P.T.O. combination can result in unsatisfactory performance of the equipment right from the start.



P.T.O. 3100 SERIES



P.T.O. 3000 SERIES



P.T.O. 3300 SERIES

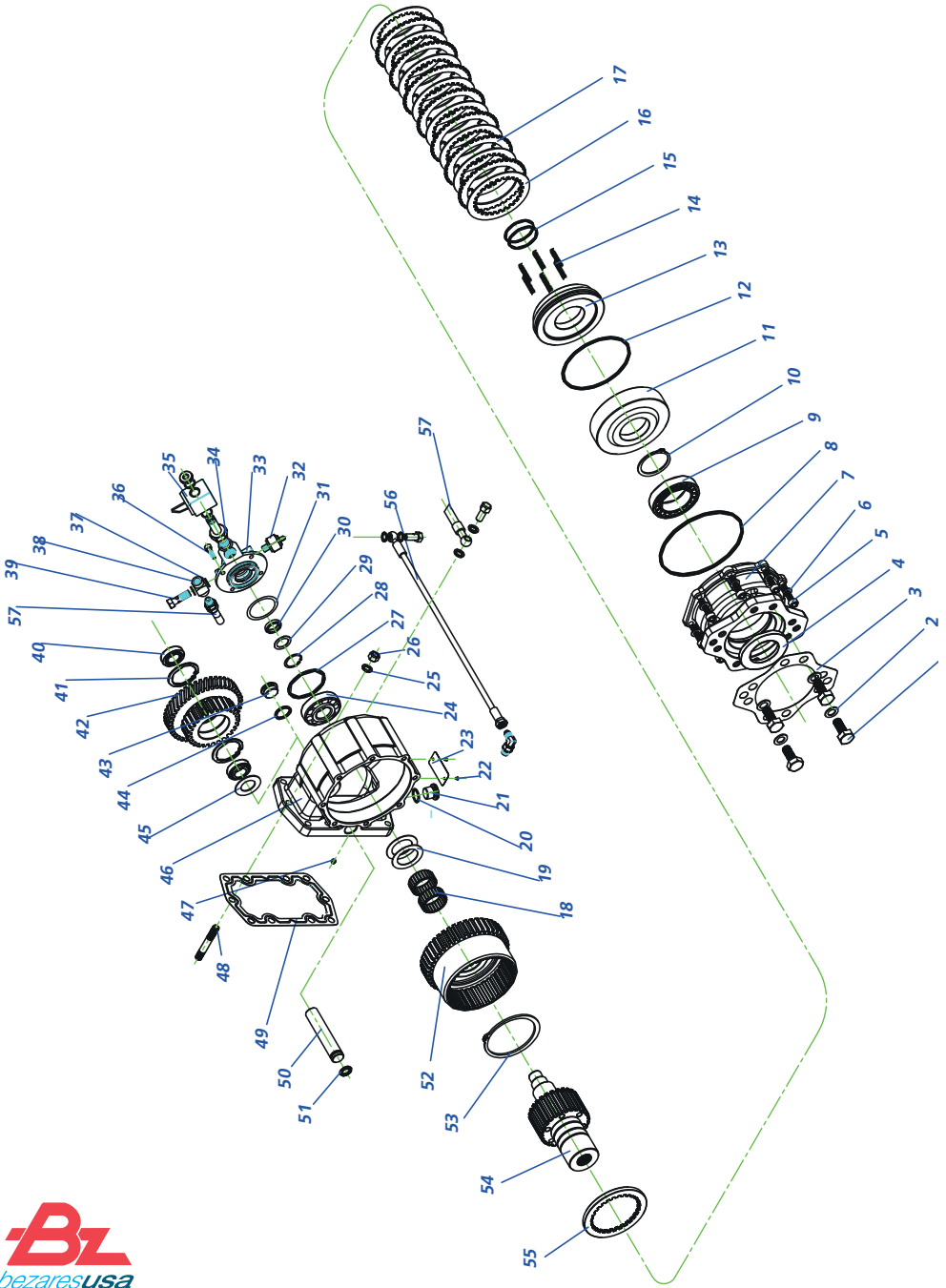
Before you order new trucks be sure that you're getting the right transmission/P.T.O. combination. It is of vital importance for efficient performance to have adequate power. To help you select the proper type, size and design of P.T.O. it is advisable to discuss your specific requirements with a Bezares 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.

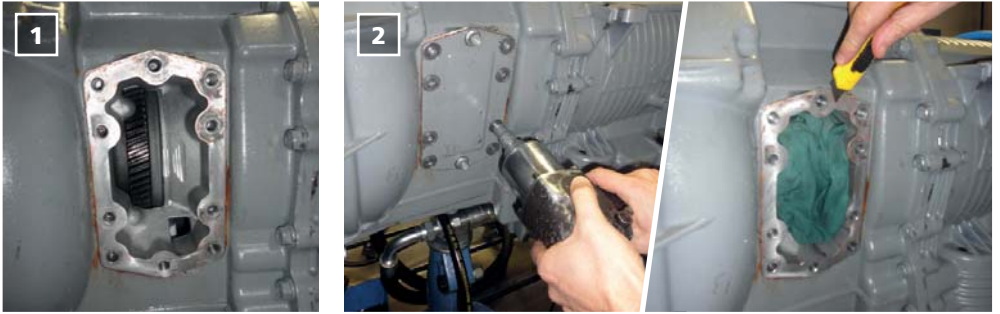
Here are some of the questions that are relevant to the Proper Selections of a Transmission mounted Power Take-Offs.

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?

Once all of the answer to these questions have been determined, a transmission mounted P.T.O. can be selected to meet the horsepower, speed and rotation that you require.

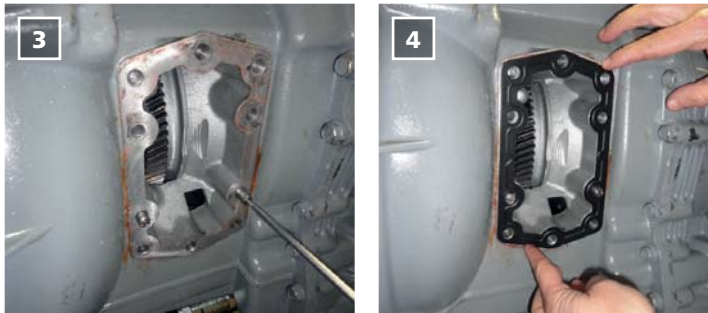
Having made the selection of a P.T.O. you are ready to start the installation.





1. Drain the oil from the transmission and the PTO aperture cover plate.
2. Discard the cover plate and cover plate gasket, then clean the aperture pad using a putty knife or wire brush.

**Note:** Stuff a rag in the aperture opening to prevent dirt from entering the transmission while you are cleaning it.



3. Install the proper studs and pins (furnished with the PTO) in the pto aperture pad. (See also specific mounting instruction furnished with the PTO).
4. Place the steel gasket over studs using grease, if necessary, to keep it in place. The ribbed surface should face towards the installer. Fit at least 4 nuts in each corner before checking the backlash. Check the suitable backlash. It should be between 0,006" and 0,015".

## 8 Mounting P.T.O. To Transmission

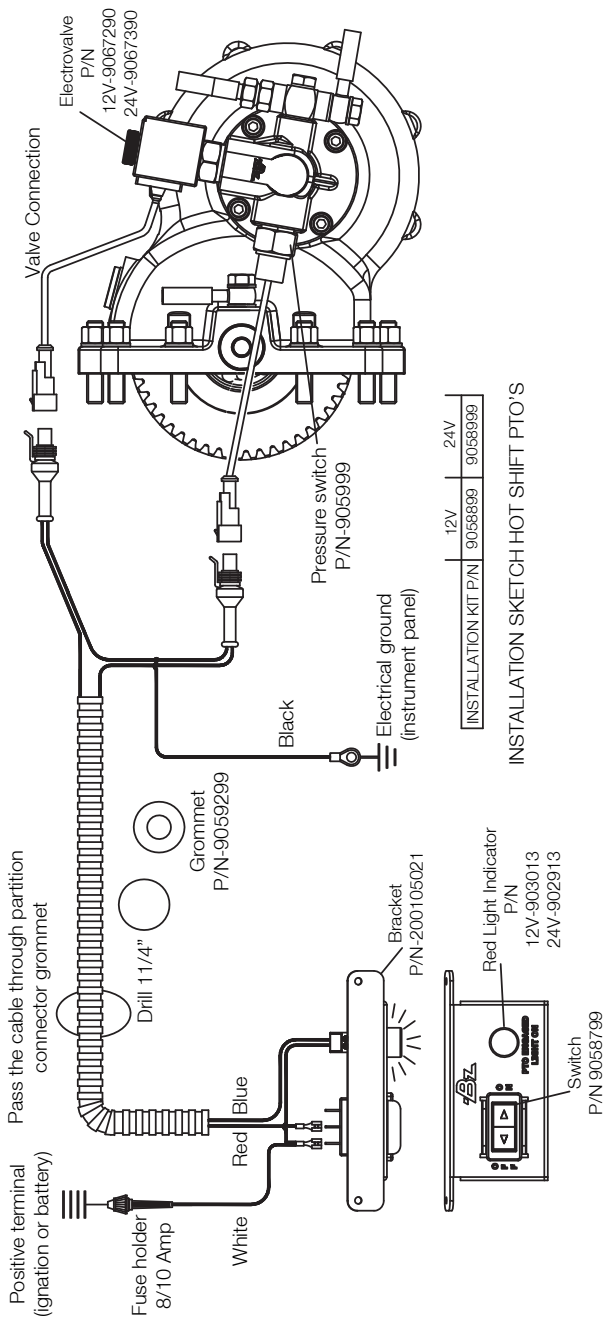
5. Fasten the PTO to the transmission by means of the bolts and remaining nuts.
6. Install the lubrication and engagement hoses (see specific mounting instructions pag. 11)



7. Fasten the high pressure line to the transmission and checking for proper oil level and signs of oil leakage, the best check is conducted with the transmission at operating temperature.
8. Finally install the electrical connection.

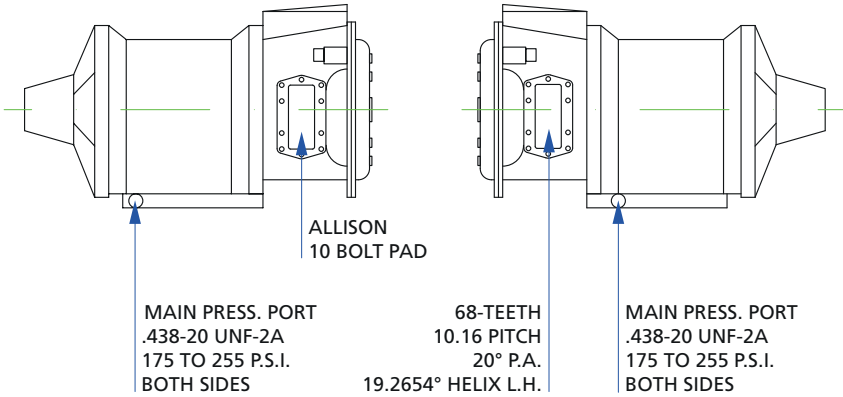




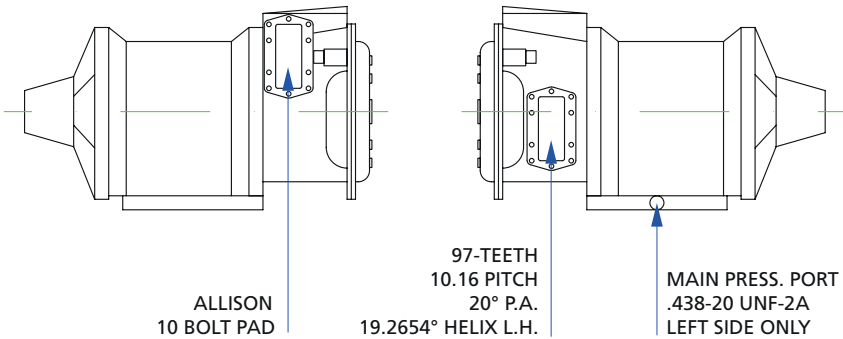


**THESE DRAWINGS REPRESENT LEFT AND RIGHT VIEWS OF THE MD AND HD PRESSURE PORT ON THE TRANSMISSION.**

## MD

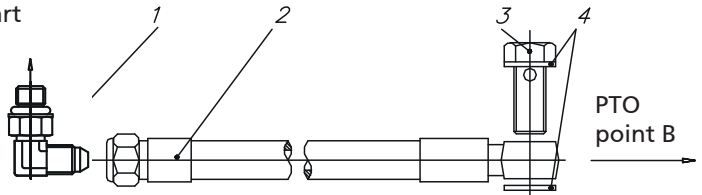


## HD



Shifting Kit Part  
N° 900899

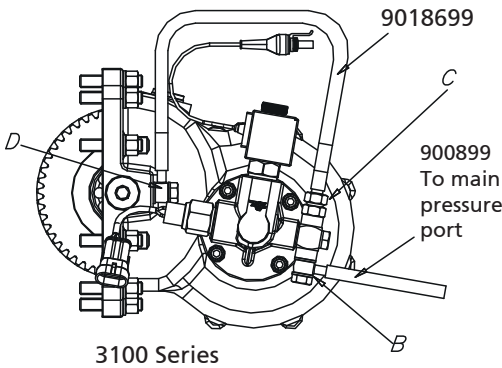
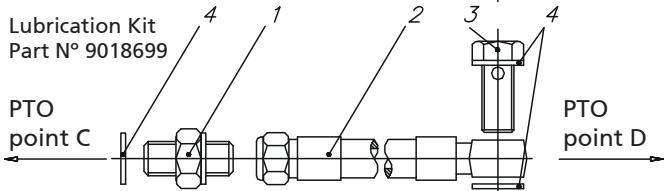
GEARBOX  
point A



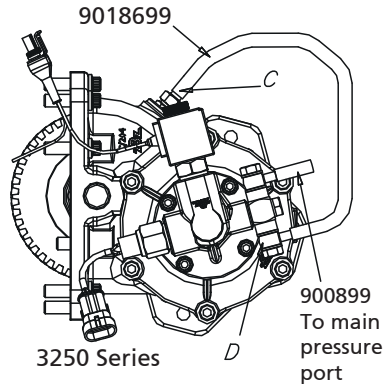
### LIST OF CONTENT

Item	Description
1	Fitting
2	Hose
3	Fitting
4	Washer

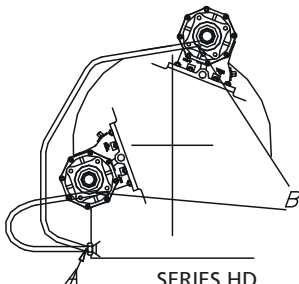
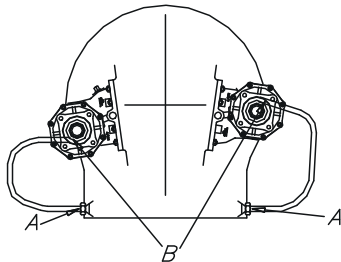
Lubrication Kit  
Part N° 9018699



3100 Series



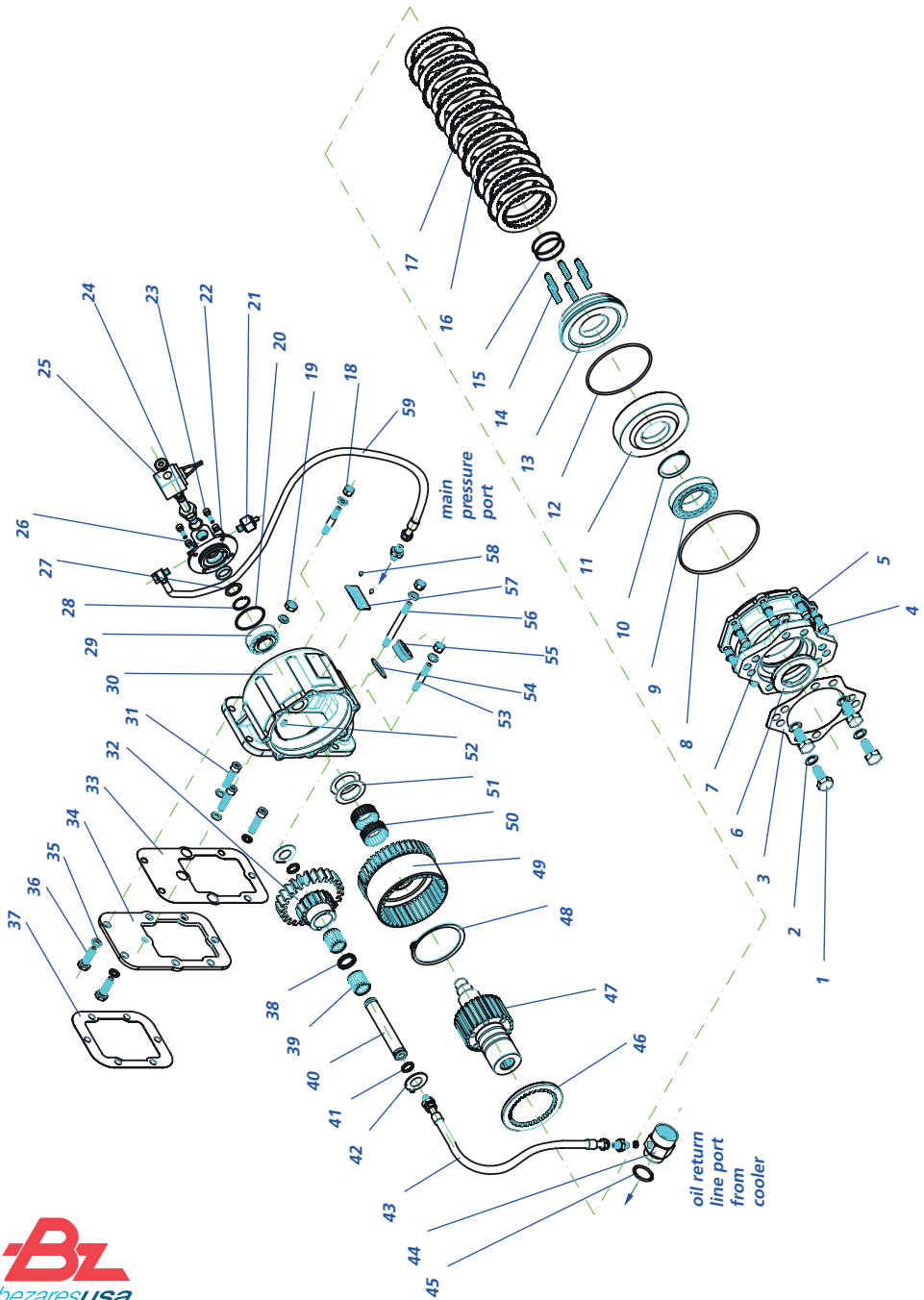
3250 Series



SERIES HD  
Rear View

### INSTALLATION METHOD

1. Remove the gearbox plug in position (A) and fit the fitting available in the kit (1) and fit the fitting available in the kit (1)
2. Remove the protection plug placed on the PTO (B).
3. Fit the pressure Hose (900899) on the (A) and (B) position by means of the hose and fitting (3).
4. Fit the Lube hose (9018699) on the (C) and (D) position with the fitting (3) and washers (4)

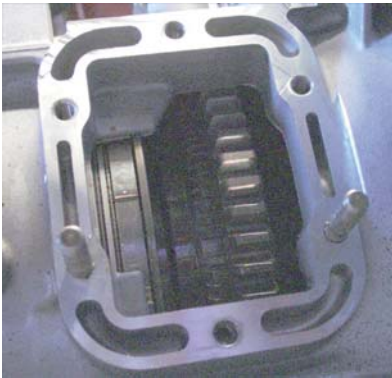


1. Discard the cover plate and cover plate gasket, then clean the aperture pad using a putty knife or wire brush.

**Note:** Stuff a rag in the aperture opening to prevent dirt from entering the transmission while you are cleaning it.

2. Install the proper studs (furnished with the PTO) in the PTO aperture pad. See also specific mounting instructions (furnished with the PTO).

## DO NOT USE SEALING COMPOUNDS IN AUTOMATIC TRANSMISSIONS

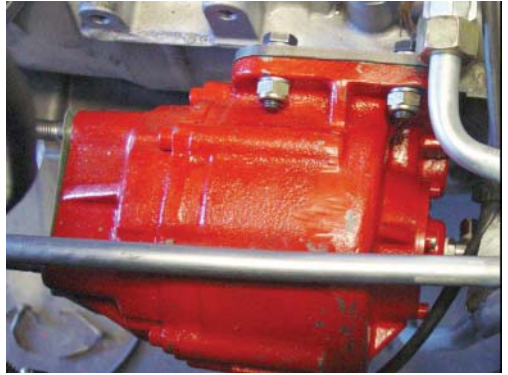


3. Place the correct number of gaskets over studs. Do not use paste between gaskets because you may want to add or subtract gasket to obtain proper backlash. Do not use more than 3 gaskets together, Usually one gaskets 0.020" (0.5 mm) will be required.

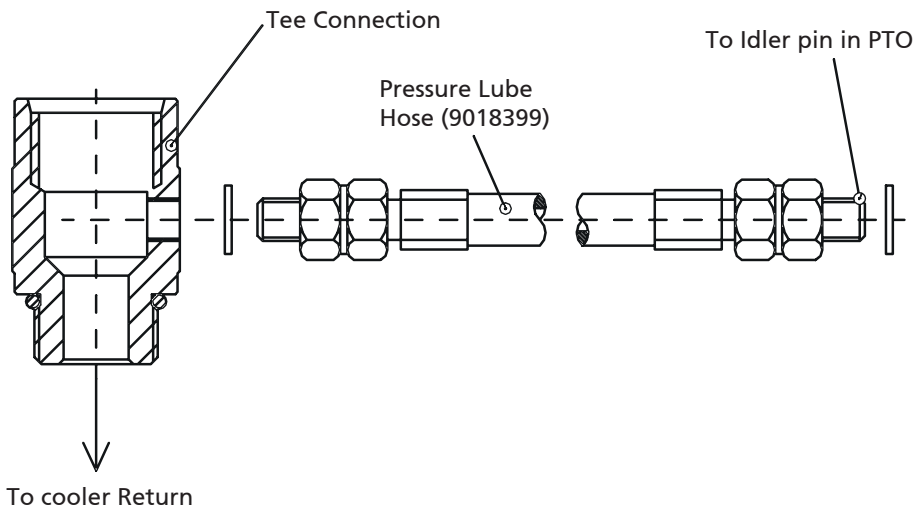


4. Install the lubrication and engagement hoses (specific instructions for each transmission pag. 18, 19, 20). Lubrication hose is connected to point coming from cooler.

5. Install the PTO to the transmission by means of the bolts and remaining nuts. Torque to 30-35 lb-ft (41-47Nm). (See specific mounting instructions).



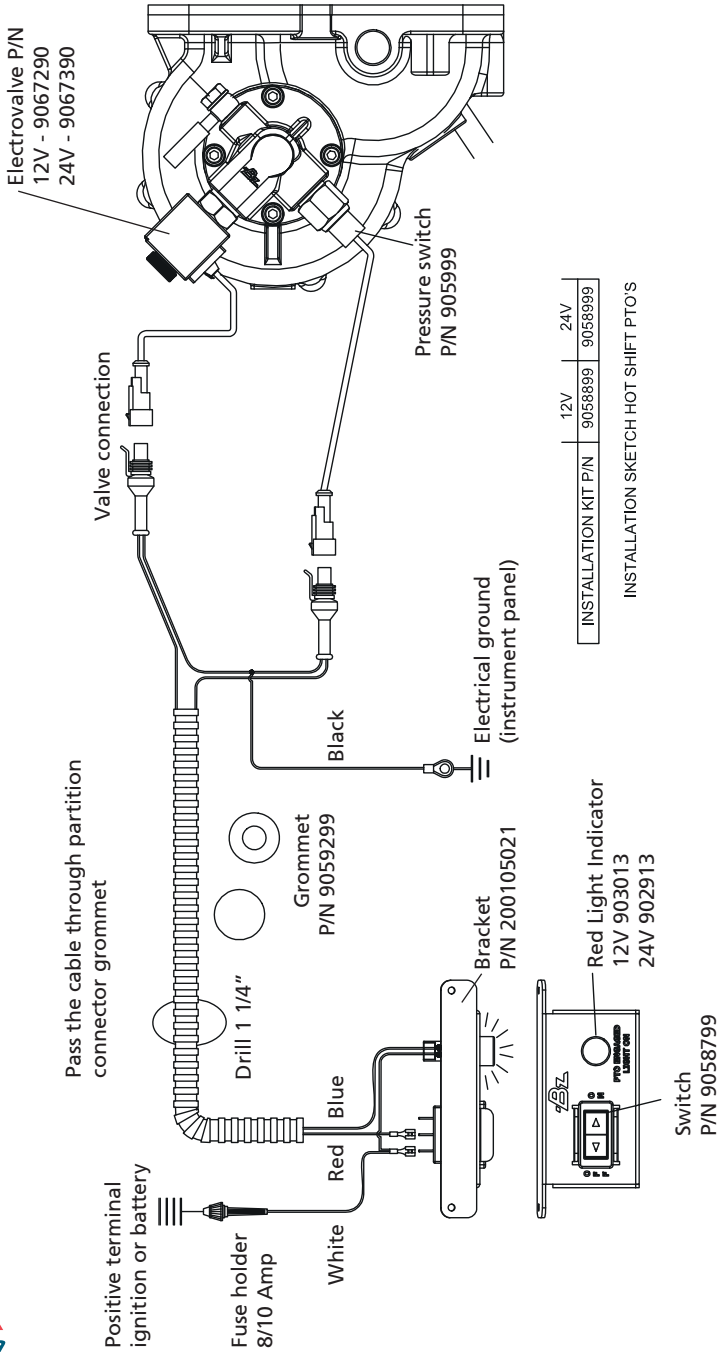
6. After fastening the high pressure line to the transmission, circuit need to be checked for proper oil level and signs of oil leakage. The best check is conducted with the transmission at operating temperature.
7. Finally install the electrical circuit.



TRANSMISSION	AT - 500	MT - 600	HT - 700
"T" CONNECTION P/N	FI511	FI511	FI521

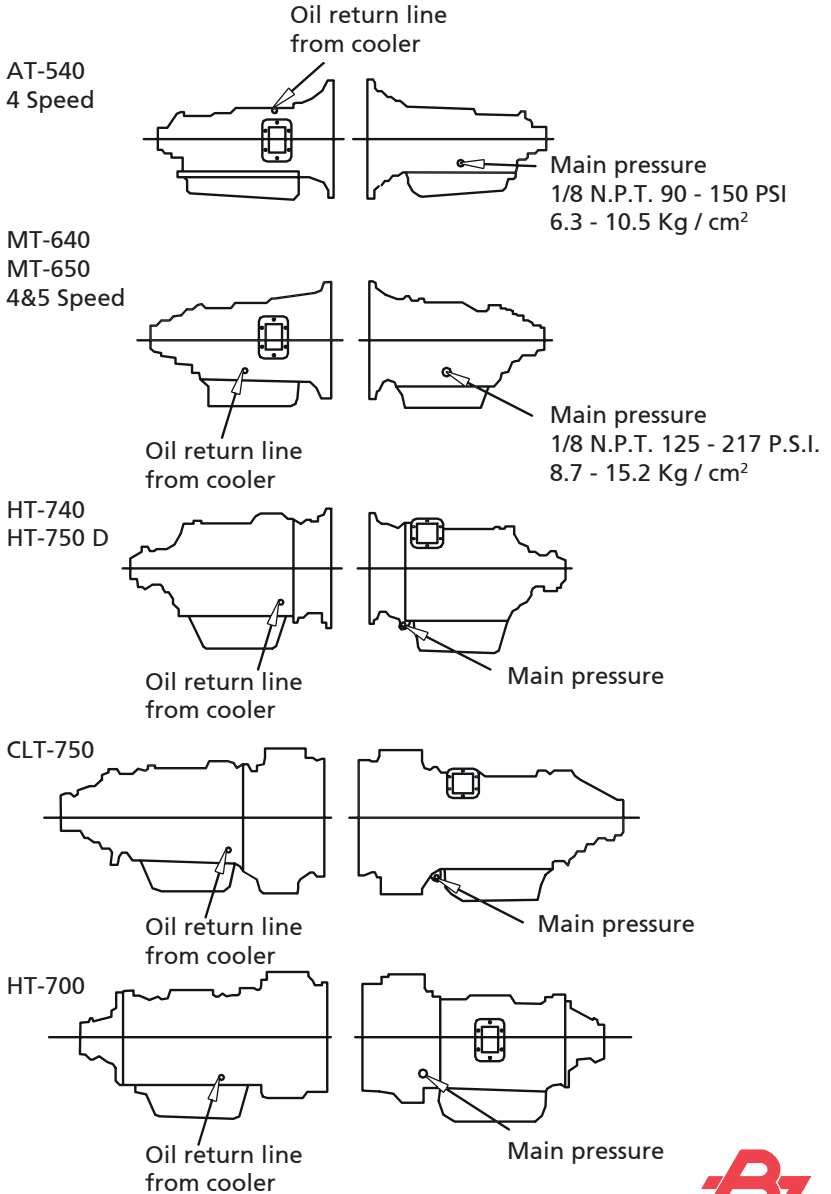
TRANSMISSION	1000 / 2000, 2400	
"T" CONNECTION P/N	FI831	FI401

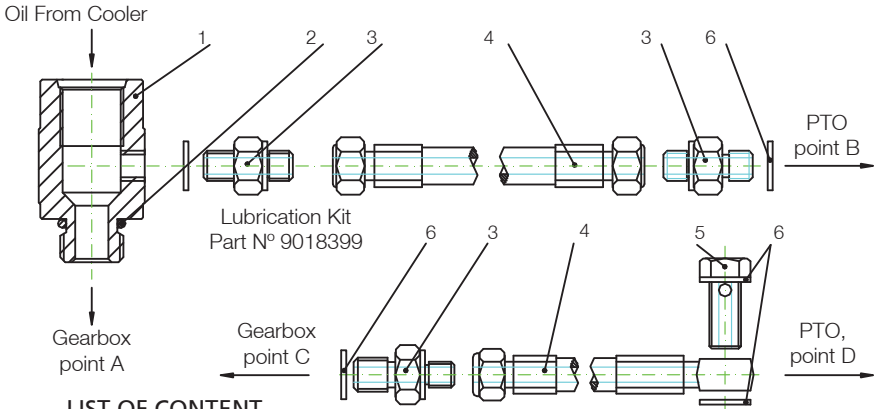
# Shifter Component 3000 Series Installation Sketch





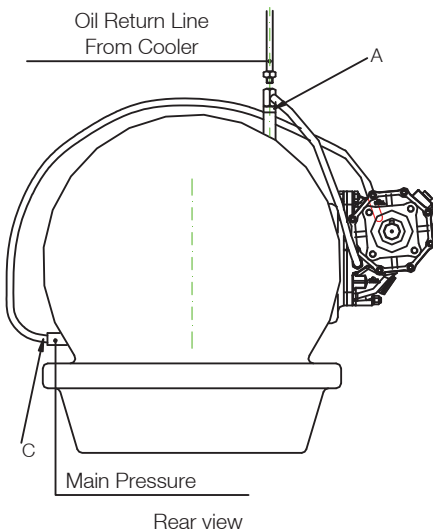
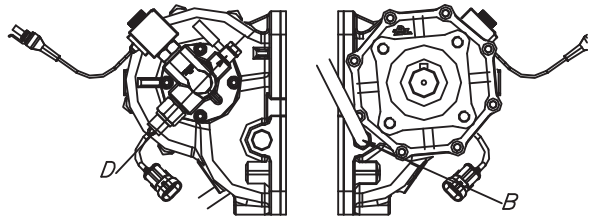
**THESE DRAWINGS REPRESENT LEFT AND RIGHT VIEWS OF THE AT-500, MT-600 AND HT/CLT-700 PRESSURE PORT ON THE TRANSMISSION**





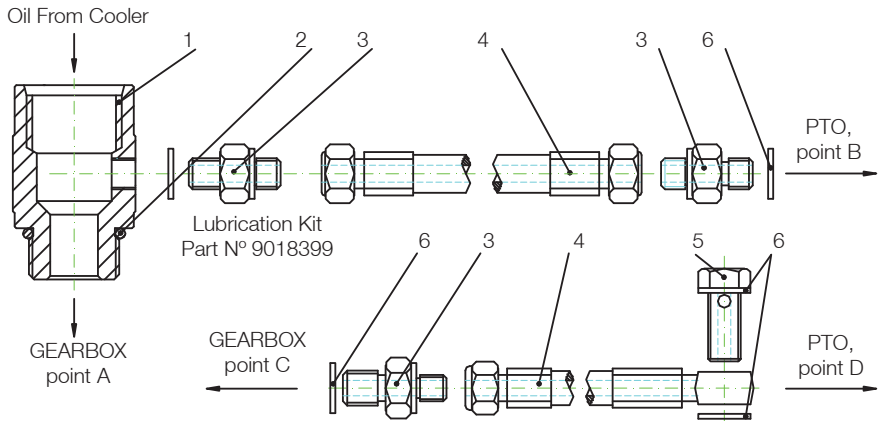
## LIST OF CONTENT

Item	Description
1	"T" Fitting
2	O-ring
3	Fitting
4	Hose
5	Fitting
6	Washer



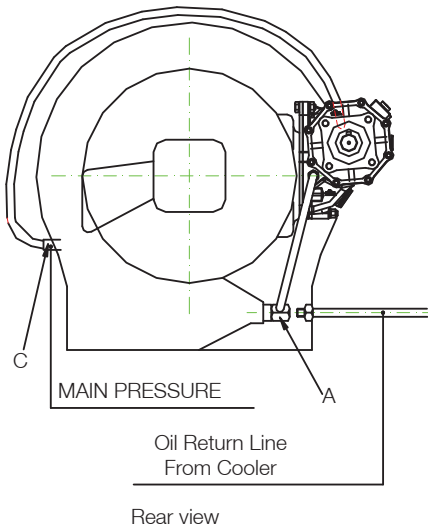
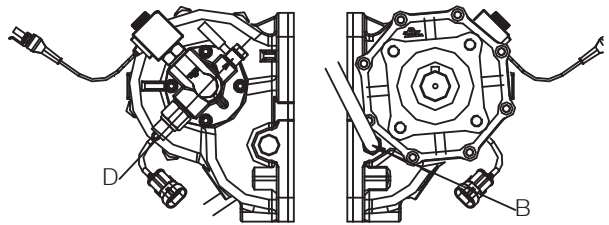
## INSTALLATION METHOD

1. Install the "T" fitting (1) into the oil line returning to the transmission from cooler (A) position.
2. Connect the lubrication hose (9018399) to the "T" fitting (1) by means of fitting (3).
3. Connect the lubrication hose to the PTO (B) position by means of the fitting (3)
4. Fit the Pressure hose (9019499) into the main pressure to the transmission (C) position, with the fitting (3).
5. Fit the Pressure hose on the (D) position with the fitting (5) and washers (6).



### LIST OF CONTENT

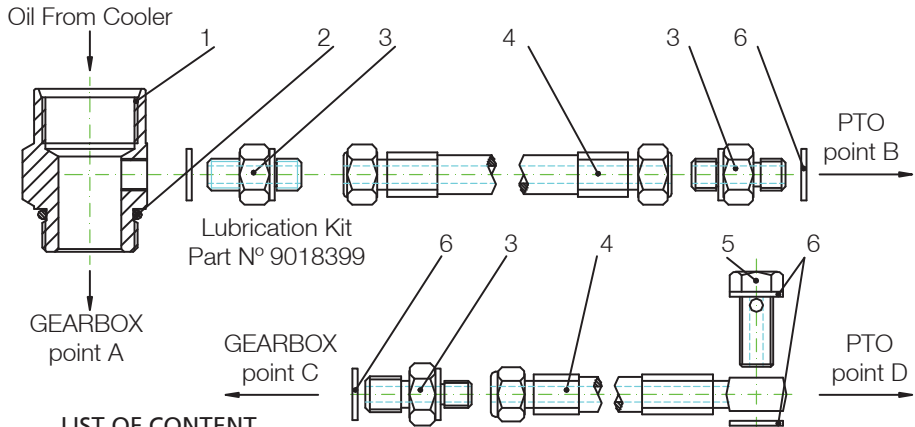
Item	Description
1	"T" Fitting
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3	Fitting
4	Hose
5	Fitting
6	Washer



### INSTALLATION METHOD

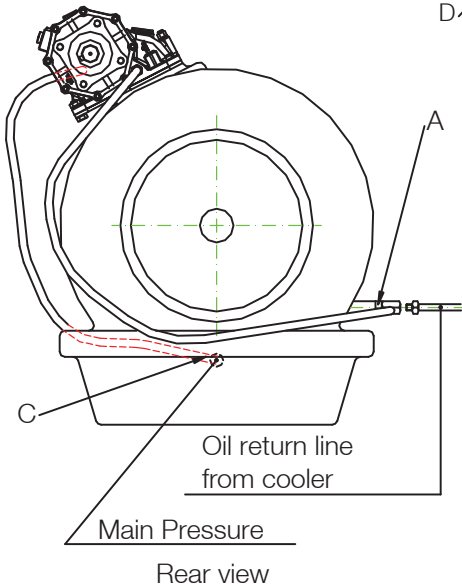
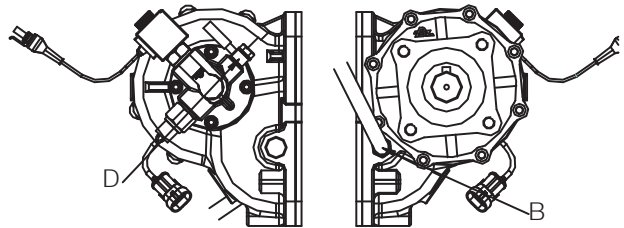
1. Install the "T" fitting (1) into the oil line returning to the transmission from cooler (A) position.
2. Connect the hose (9018399) to the "T" fitting (1) by means of fitting (3).
3. Connect the lubrication hose to the PTO (B) position by means of the fitting (3)
4. Fit the Pressure hose (9019499) into the main pressure to the transmission (C) position, with the fitting (3).
5. Fit the Pressure hose on the (D) position with the fitting (5) and washers (6).

\* After installation of the PTO the transmission should be carefully checked for proper oil level and signs of oil leakage. The best check is conducted with the transmission at operating temperature.



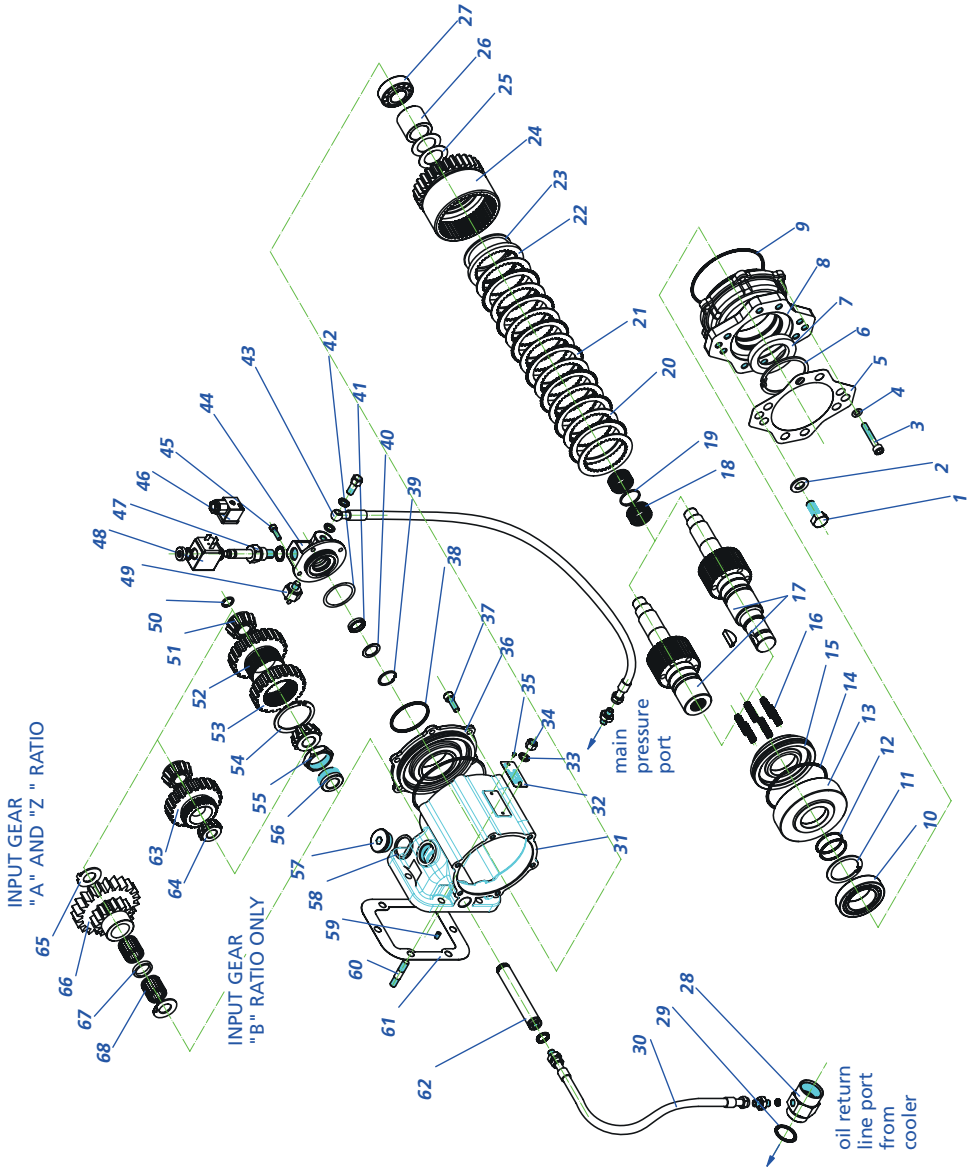
## LIST OF CONTENT

Item	Description
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3	Fitting
4	Hose
5	Fitting
6	Washer

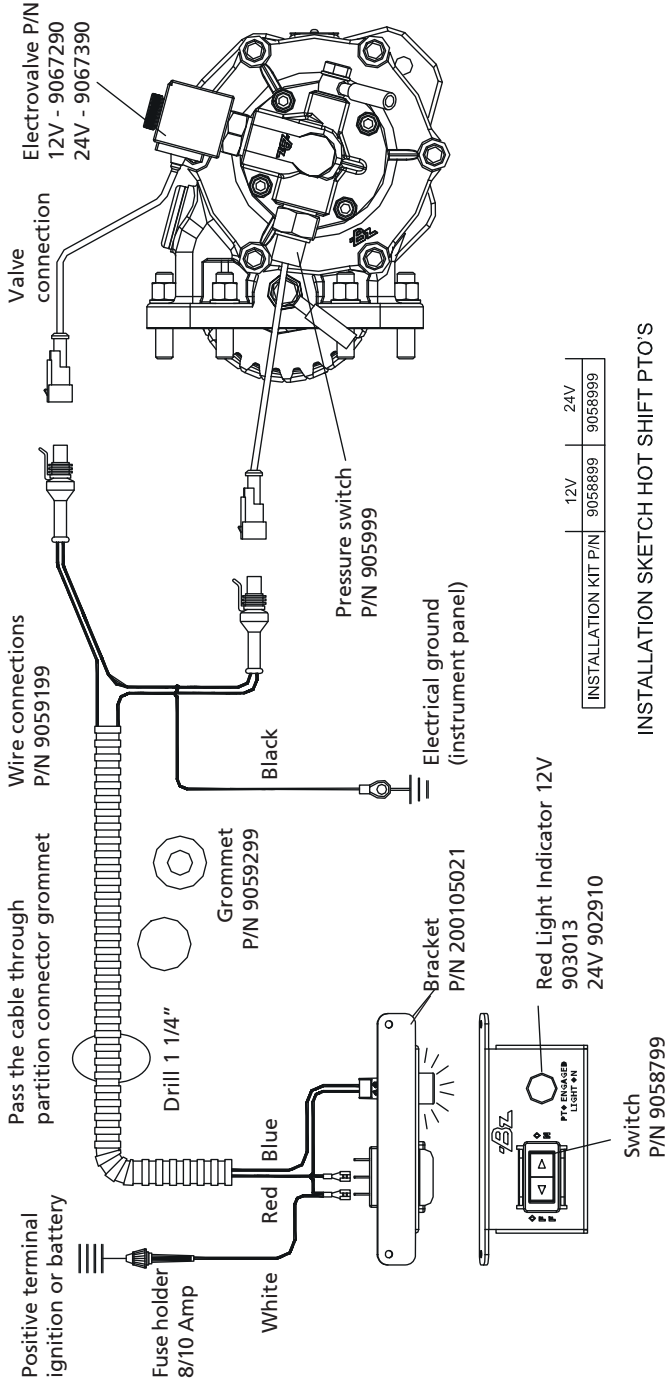


## INSTALLATION METHOD

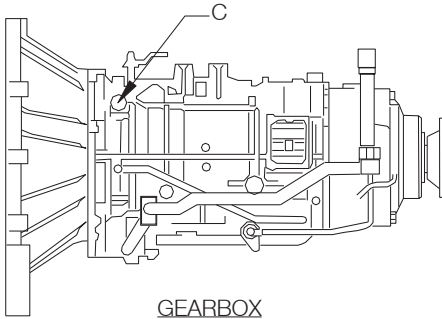
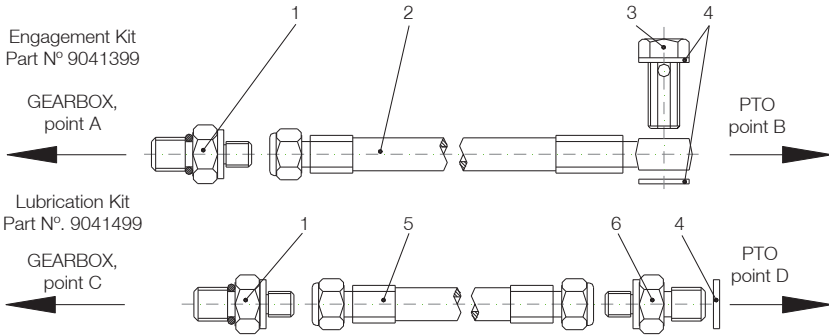
1. Install the "T" fitting (1) into the oil line returning to the transmission from cooler (A) position.
2. Connect the lubrication hose (9018399) to the "T" fitting (1) by means of fitting (3).
3. Connect the lubrication hose to the PTO (B) position by means of the fitting (3)
4. Fit the Pressure hose (9019499) into the main pressure to the transmission (C) position, with the fitting (3).
5. Fit the Pressure hose on the (D) position with the fitting (5) and washers (6).



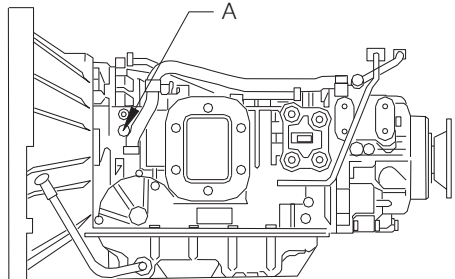
# Shifter Component 3300 Series Installation Sketch



INSTALLATION SKETCH HOT SHIFT PTO'S



**GEARBOX**  
Viewed from top side



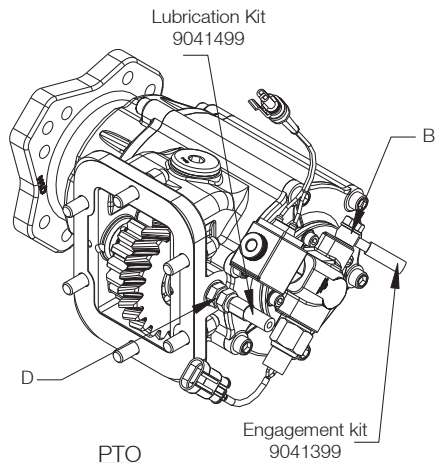
**GEARBOX**  
Viewed from left side

## LIST OF CONTENT

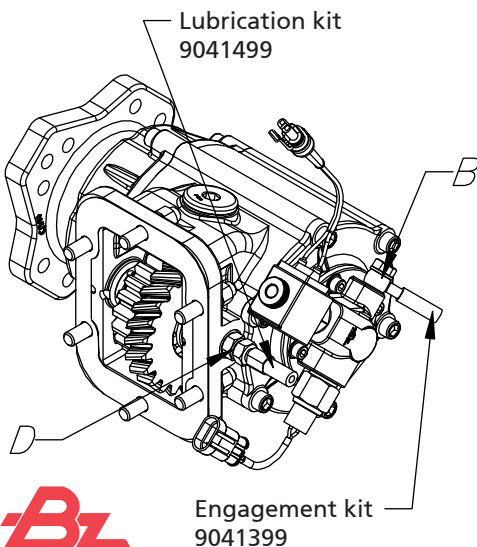
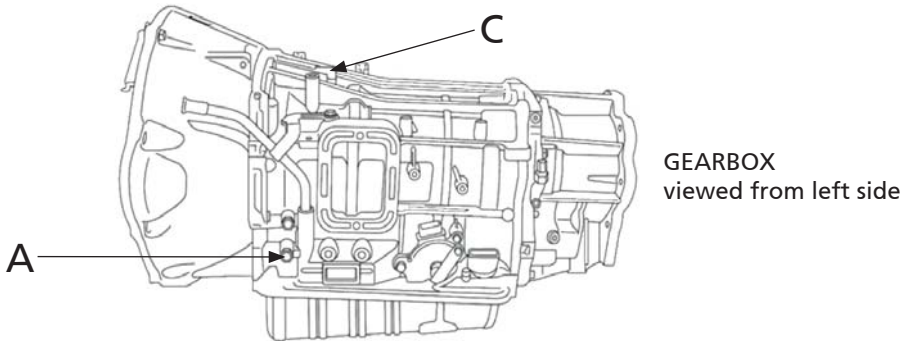
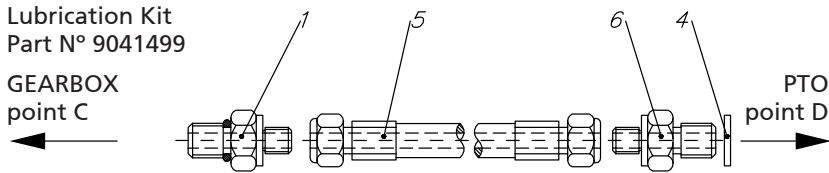
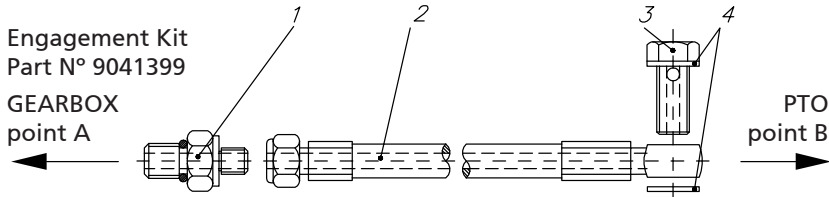
Item	Description
1	Fitting 1/2" UNF
2	Engagement hose
3	Fitting M10x1
4	Washer
5	Lubrication hose
6	Fitting 1/8" BSP

## INSTALLATION METHOD

1. Remove the gearbox plug in "A" and "C" position
2. Remove the protection plugs placed on the PTO in "B" and "D" position.
3. Fit the engagement kit (9041399) in "A" and "B" position
4. Fit the lubrication kit (9041499) in "C" and "D" position.



## (DODGE RAM Vehicles)



## LIST OF CONTENT

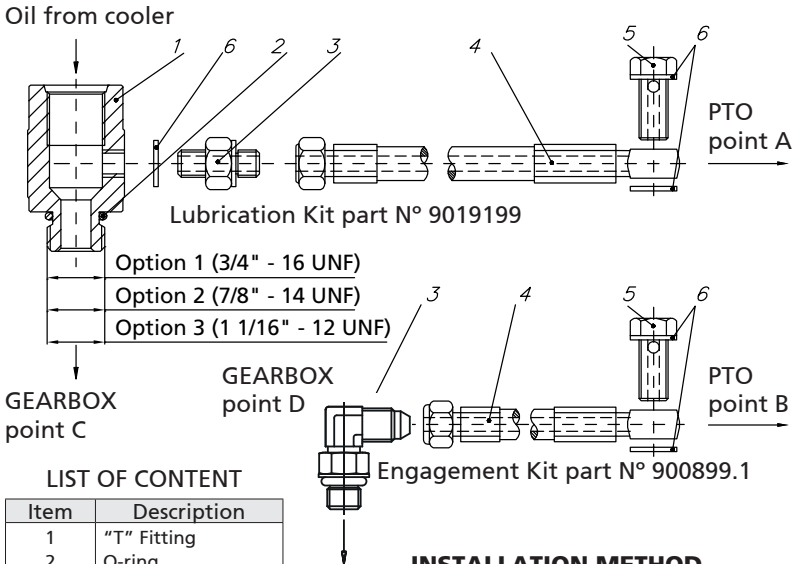
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6	Fitting 1/8" BSP

## INSTALLATION METHOD

1. Remove the gearbox plug in "A" and "C" position
2. Remove the protection plugs placed on the PTO in "B" and "D" position.
3. Fit the engagement kit (9041399) in "A" and "B" position
4. Fit the lubrication kit (9041499) in "C" and "D" position.



## Allison/1000/2000/2400



### LIST OF CONTENT

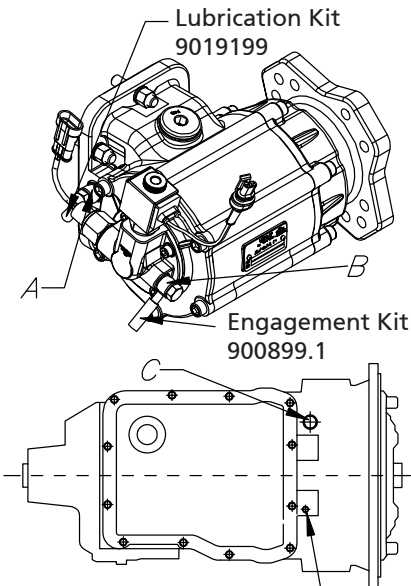
Item	Description
1	"T" Fitting
2	O-ring
3	Fitting
4	Hose
5	Fitting
6	Washer

### INSTALLATION METHOD

1. Install the "T" fitting (1) into the oil line returning to the transmission from cooler (point C).
2. Connect the hose (9019199) to the "T" fitting (1) by means of fitting (3).
3. Connect the lubrication hose to the PTO (A) position by means of the fitting (5) and washers (6).
4. Fit the Pressure hose (900899.1) into the main pressure to the transmission (D) position, with the fitting (3).
5. Fit the Pressure hose on the (B) position with the fitting (5) and washers (6).

### PTO

\* After installation of the PTO the transmission should be carefully checked for proper oil level and signs of oil leakage. The best check is conducted with the transmission at operating temperature.



(Main pressure port D  
0,438-20UNF)  
Gearbox, bottom view

**CAUTION:** This vehicle is equipped with a Power Take-Off. Shut engine off before working on the Power Take-Off or getting below the vehicle.

Consult the operating instructions before using the P.T.O. (see sun visor)

## **POWER TAKE-OFF OPERATION - VEHICLE STATIONARY**

### **Automatic Transmission with Power Shift P.T.O.'s**

Engage the P.T.O. with the engine at idle speed.

**NOTE:** Power Shift P.T.O.'s: The engine must be at idle or below 1000 RPM when the P.T.O. is engaged. See the transmission manufacturer's instructions for special procedures.

### **IMPORTANT:**

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

### **Warning: Cold Weather Operation of Power Shift P.T.O.'s**

During extreme cold weather operation [32°F (0°C) and lower], a disengaged Power Shift Power Take-Off can momentarily transmit high torque that will cause unexpected output shaft rotation. This is caused by the high viscosity of the transmission oil when it is extremely cold. As slippage occurs between the Power Take-Off clutch plates, the oil will rapidly heat up and the viscous drag quickly decreases.

The Power Take-Off output shaft rotation could cause unexpected movement of the driven equipment, resulting in serious personal injury, death, or equipment damage.

### **To avoid personal injury or equipment damage:**

- Driven equipment must have separate controls.
- Driven equipment must be left in the disengaged position when not in operation.
- Driven equipment must not be operated until the vehicle is allowed to warm up.



