

# Installation Manual for: NWF EcoBox

## Part 2 of 2

### *Building EcoBox & Mounting to NP205*



SKU #: BBE00-3031-Z

Date: 05/16/2022

For Any Questions Regarding this Installation Manual Please Contact us at:

[info@northwestfabworks.com](mailto:info@northwestfabworks.com)

Phone: 250-248-6024

## Table of Contents

Attention.....	3
Application.....	3
Parts.....	3
Torque Specifications: .....	4
Tools Used in Assembly: .....	5
Installation Instructions .....	6
Gather Components for Assembly .....	6
Building the lid.....	7
1. Installing the ring gear into the lid.....	7
3. Inserting planetary and input assembly into lid .....	9
4. Install input bearing retainer .....	10
Assembling the base.....	11
1. Insert shift collar .....	11
2. Insert output shaft .....	12
3. Install snap ring.....	12
4. Install seal .....	13
Determining Clock Orientation .....	14
Straight Through Orientation .....	15
Ford/Jeep to GM Orientation.....	15
GM to Ford/Jeep Orientation.....	16
Combining lid and base.....	16
Installing EcoBox onto NP205 Transfer Case .....	17
1. Remove input housing.....	17
2. Installing Studs.....	17
3. Torquing EcoBox to 205 .....	18
Additional Rotating/Clocking Notes .....	19
Notes on Installing EcoBox in the Vehicle.....	19
Oil Specifications .....	19

### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

## Attention

The instructions contained in this document are provided for the benefit of experienced automotive mechanics. These products are not department of transport (DOT) certified. Customers assume all risks associated with the modification of their vehicle and the installation of this product.

## Application

Bringing the quality and craftsmanship of the original, the EcoBox was designed for the 4x4'er on a budget. While retaining the originals technology, quality and durability, the Eco is minimized to reduce cost. Designed to be a DIY builder kit; cases are shipped empty, and the customer provides the gears, and does the install and assembly. The installation requires an intermediate level of mechanical aptitude, we also provide an installation overview.

Part 2 of the instruction manual will cover assembling the EcoBox using your extracted components and mounting to a Ford NP205 transfer case.

## Parts

Parts included for assembly of EcoBox and mounting to NP205.

Parts Included		
Part Number	Description	Qty
BBE00-1000-T	EcoBox Lid Standard	1
BBE00-1100-M	EcoBox Base Standard	1
BR-6307N	Small Bore Input/Output Bearing	1
SNAP-BB-OB	BlackBox Output Bearing Spiral Snap Ring (80mm)	1
SL-6903	BlackBox Shifter Seal	1
BB-SHIFT-SHAFT	BlackBox Shift Shaft	1
BBX00-1200-M	BlackBox Shift Rocker	1
HW-SP-732-1	7/32" x 1" Spring Pin	1
HW-58-FW-NY	5/8" Nylon Flat Washer	2
SNAP-BB-SS	BlackBox Shift Shaft Snap Ring (5/8")	1
BB-SHIFT_DETENT	BlackBox Shifter Detent	1
HW-38-38-NC-SSSNT-SS	3/8" x 3/8" NC Nylon Tip Socket Set Screw Stainless Steel	1
CSK12-1001-L	EcoBox Shift Rocker Arm	1
HW-38-FW-P	3/8" SAE Flat Washer Plated	1
HW-38-LW-P	3/8" Lock Washer Plated	1
HW-38-NF-N-P	3/8" NF Nut Plated	1
BB-SHIFT-FORK-C	BlackBox Shift Fork (Complete)	1
BB-INSK207	BlackBox Shift Forks Pads	1
BBE00-1031-O	EcoBox Output Shaft, 31 Spline	1
SL-19407	BlackBox Standard Output Seal	1
HW-38-NC-SHCS	3/8" x 3" NC Socket Head Cap Screw Bare Metal	6
HW-38-38-B-BARB	3/8" NPT x 3/8" Brass Barb	1

### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

HW-38-B-SPP	3/8" NPT x 3/8" Brass Socket Pipe Plug	3
HW-38-2-NC-STUD	3/8" x 2" NC Engine Stud	12
HW-38-NC-N-P	3/8" x 2" Lock Washer Plated	12
HW-38-NC-N-P	3/8" NC Nut Plated	12
HW-516-34-NC-SHCS	5/16" X 3/4" NC Socket Head Cap Screw Bare Metal	4
SNAP-BB-OS	BlackBox Output Shaft Snap Ring (35mm)	1

## Torque Specifications

Please consult your Factory Service Manual for any bolts related to your OEM parts.

Torque Specifications		
Location	Description	Torque
Input Bearing Retainer	3/4" Socket Head	244 inch-lbs
Mating Lid to Base	3/8" Socket Head	32 ft-lbs
Transfer Case to EcoBox	9/16" Bolts on Studs	44 ft-lbs

### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

## Tools Used in Assembly:

1. External Snap Ring Pliers
2. Ratchet
3. Ratchet Extension
4. 3/4" Socket Head
5. 3/8" Socket Head
6. 9/16" Wrench (Socket is too large)
7. Torque Wrench
8. Rubber Hammer
9. Hydraulic Press
10. RTV Silicon / Gasket Maker

### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

## Installation Instructions

---

**PLEASE READ THROUGH ALL THE INSTRUCTIONS ONCE BEFORE BEGINNING**

---

### Gather Components for Assembly

To build the EcoBox, the following parts are required.

- Input shaft
- 6 Pinion Planetary
- Planetary Snap Ring
- Ring Gear
- 2x Plastic Thrust Washers
- Steel Thrust Washer
- Input Bearing with inner and outer snap rings
- Input Bearing Retainer with Seal and Shift Collar

These components can be extracted using part 1 of the manual set, *Disassembling 231 / 241 Transfer Case*.



Figure 1: Extracted components

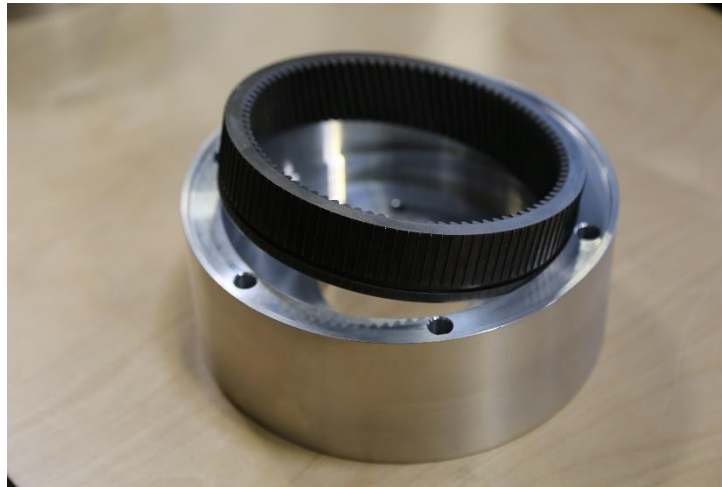
### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

## Building the lid

### 1. Installing the ring gear into the lid

Install the ring gear into the lid with the machined relief facing down into the lid. See Figure 2. As the ring gear presses into the lid the chips will push into this groove. If the ring gear goes in upside down the chips will go in between the ring gear and the lid and will not allow the ring gear to seat fully.



*Figure 2: Placing the ring gear*

Using a 20-30 Ton Press, press the ring gear into the lid slowly and evenly making sure it goes into the lid square. Once it looks seated press around the outside edge all around the ring gear to make sure it is 100% seated. You can check this by using a straight edge to make sure the ring gear is even or slightly below the lid edge.



*Figure 3: Pressed ring gear*

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

## 2. Installing input bearing into lid

Tap the bearing with a hammer or use a press to get the bearing to fit. Ensuring the bearing goes in square.



Figure 4: Input bearing placed on lid

Ensure that the snap ring around the bearing is flush with the top of the lid.



Figure 5: Input bearing pressed into lid

### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.



### 3. Inserting planetary and input assembly into lid

Insert the input shaft and gearing into the bearing from the bottom. You may need to use a hammer or a press and tap it into the bearing.



*Figure 6: Inserting input shaft and planetary gears*

Once the groove on the input shaft is past the bearing, install the original snap ring from your 231 / 241 transfer case as demonstrated in Figure 7.



*Figure 7: Input shaft seated with snap ring*

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

#### 4. Install input bearing retainer

If there isn't a seal installed into the bearing retainer do that first. Make sure the mating surface between the lid and the retainer are perfectly clean. Apply a thin skim of RTV Silicone or Gasket Maker to the mating surface on the bearing retainer.



Figure 8: Bearing Retainer and the 5/16" x 3/4" Screws

Slide the bearing retainer over the input shaft and line up the four mounting holes, this is not an even pattern and will only fit on one way. Once all the holes line up install the **(4) supplied 5/16" x 3/4" Socket Head Cap Screws** and **torque to 244 Inch/Lbs.**



Figure 9: Installed bearing retainer

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

## Assembling the base

### 1. Insert shift collar

Shift the internal shift mechanism so it is away from the bearing in the bottom of the case.



Figure 10: Adjusted shift mechanism

Slide the shift collar into the shift fork with outside teeth to the top of the case as shown. Ensuring that the guides are still between the shift fork and collar.



Figure 11: Shift collar installed

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

## 2. Insert output shaft

Slide the EcoBox output shaft into the shift collar with the smaller splines going in first until it fully seated with the output bearing. This may require a tap from a hammer. Refer to Figure 12 for an example.



Figure 12: Example of shaft installed

## 3. Install snap ring

Install the supplied snap ring on the EcoBox output shaft.

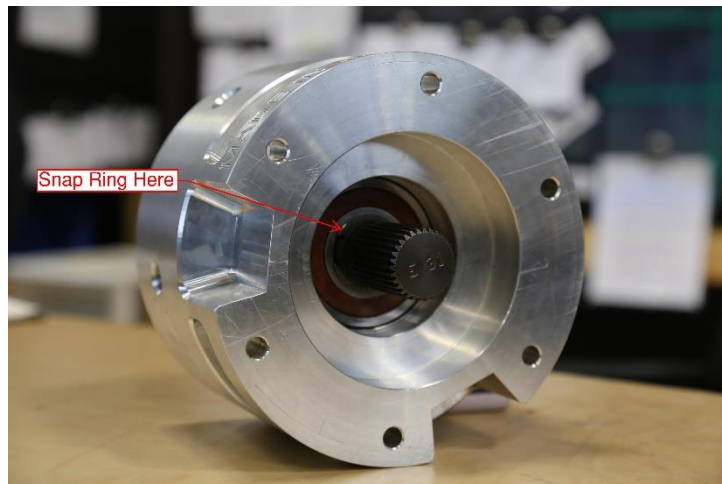


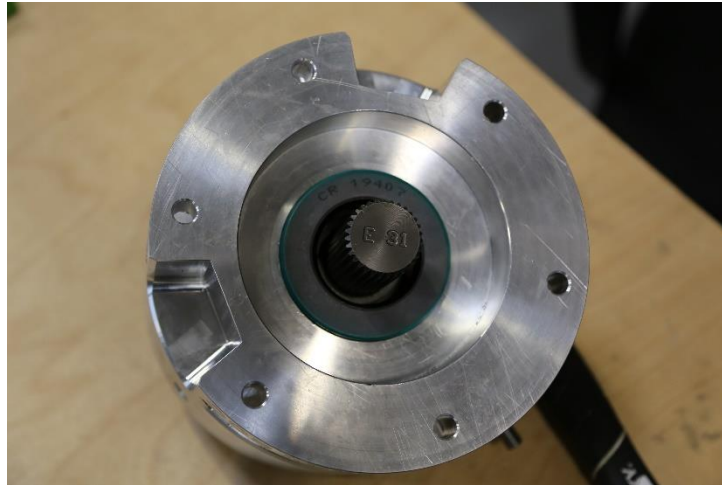
Figure 13: Seated snap ring on output shaft

### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

#### 4. Install seal

Install the supplied seal so it covers the bearing as shown in Figure 14.



*Figure 14: Seated seal on output shaft*

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

## Determining Clock Orientation

There are three main clocking orientations that we see with the EcoBox.

1. Straight Through Orientation
2. Ford/Jeep to GM Orientation
3. GM to Ford/Jeep Orientation

Depending on the make of vehicle components the EcoBox will be mounted to, it is important to mount the base and lid together in a certain way. The orientation is chosen by matching certain thread holes on the base to a “W” on the lid.

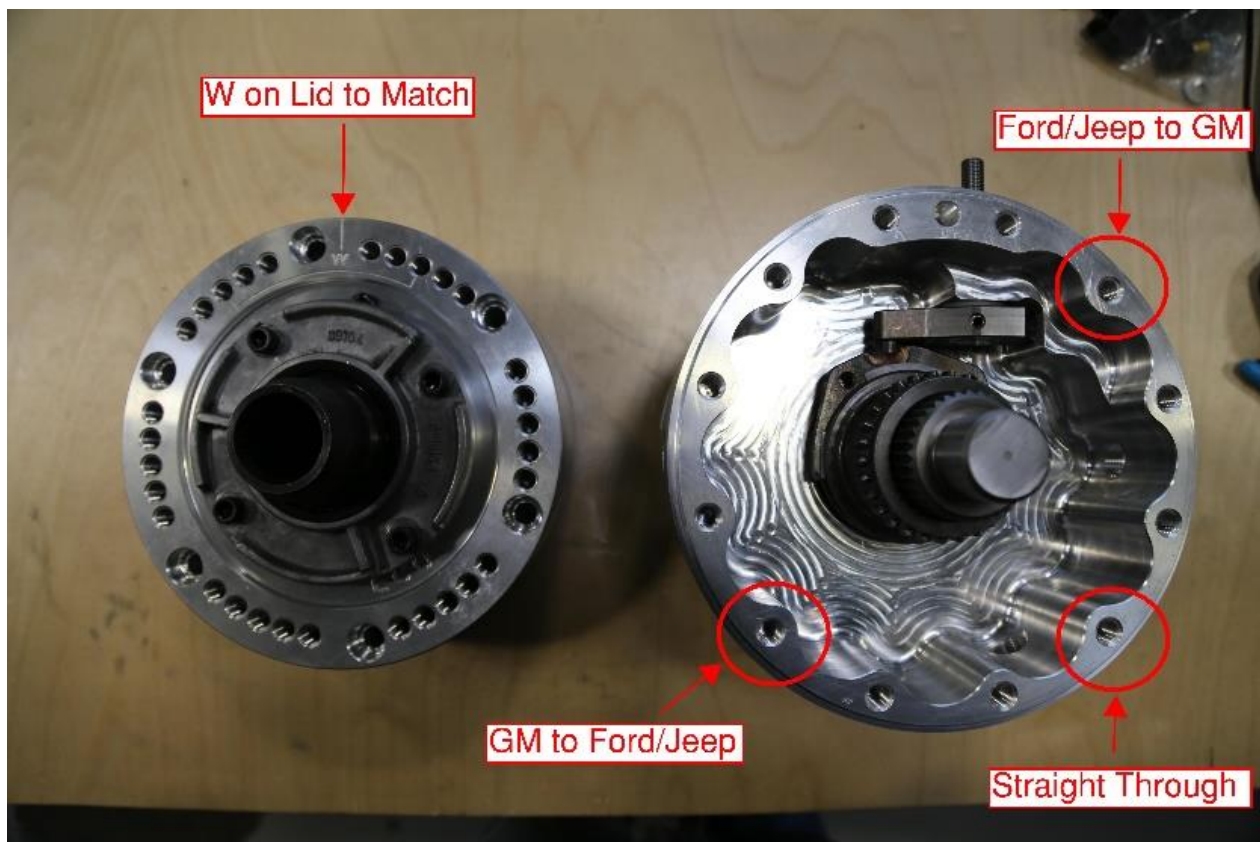


Figure 15: All Orientations Highlighted

### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

### Straight Through Orientation

First is the “Straight through Orientation” this means mounting Ford to Ford, GM to GM or Jeep to Jeep. Using this orientation, the EcoBox will allow you to keep your transfer case in a stock rotation or allow it to clock up or down 2 different positions. The highlighted threaded holes indicate the hole that needs to line up on the lid marked with a “W.”



Figure 16: Straight Through Orientation

### Ford/Jeep to GM Orientation

This orientation is for mounting a Ford or Jeep Transfer Case to a GM Transmission (with a Factory Adapter). Using this orientation, the EcoBox will allow you to keep your transfer in a stock rotation or allow it to clock up or down 2 different positions. The highlighted threaded holes indicate the hole that needs to line up on the lid marked with a “W.”

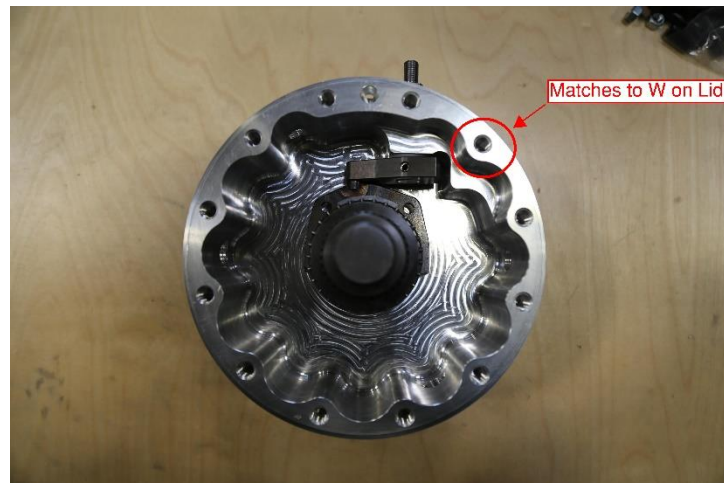


Figure 17: Ford/Jeep to GM Orientation

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

### GM to Ford/Jeep Orientation

This orientation is for mounting a GM Transfer Case to a Ford or Jeep Transmission (with a Factory Adapter or some Aftermarket Adapters). Using this orientation the EcoBox will allow you to keep your transfer in a stock rotation or allow it to clock up or down 2 different positions.

The highlighted threaded holes indicate the hole that needs to line up on the lid marked with a "W."



Figure 18: GM to Ford/Jeep Orientation

### Combining lid and base

Prior to mounting the halves together, ensure the lid and base are in the correct orientation for your situation.

Apply a bead of RTV Sealant to the EcoBox Base being careful to avoid the threaded holes. The bead of sealant is to be applied evenly to the entire face of the meeting surface. Clean off excess sealant.

Combine the lid and the base together using the provided **3/8" x 3" Socket Head bolts** and **torque to 32 ft/lbs in a star pattern.**



Figure 19: Assembled EcoBox

### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.



## Installing EcoBox onto NP205 Transfer Case

### 1. Remove input housing

Locate and remove **(6) 9/16"** bolts around the perimeter of the housing.



Figure 20: Input Housing of 205

### 2. Installing Studs

Insert studs, shown in Figure 20, and install them into the highlighted positions in Figure 21.



Figure 21: Studs, Washer, 9/16" Nuts

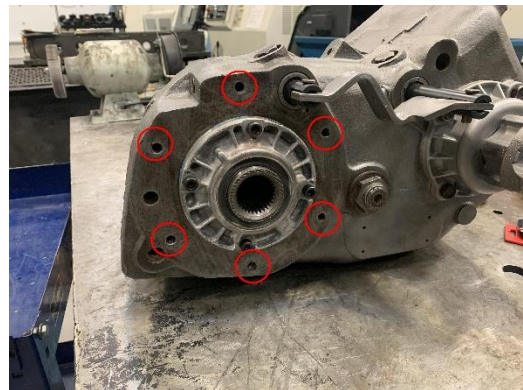


Figure 22: Stud Positions

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

### 3. Torquing EcoBox to 205

Install the EcoBox onto the NP205 until it is flush with the transfer case. On each stud, ensure there is a **washer and nut** then torque the nut to **31 ft-lbs**.



Figure 23: Torquing EcoBox

Once the EcoBox is torqued, Figure 24 is the finished product of the EcoBox installed onto a NP205.



Figure 24: Finished Product

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.

### Additional Rotating/Clocking Notes

You will notice the lid has 6 groups of 5 threaded holes. The middle of the 5 threaded holes will clock your transfer case in a Stock Position.

If you wish to rotate your drivers drop transfer case up or passenger, drop transfer case down move the installation studs clockwise of the middle threaded holes. The first hole will rotate the transfer case roughly 1.5" and the second hole will rotate the transfer case roughly 3".

If you wish to rotate your drivers drop transfer case down or passenger, drop transfer case up move the installation studs counter clockwise of the middle threaded holes. The first hole will rotate the transfer case roughly 1.5" and the second hole will rotate the transfer case roughly 3".

### Notes on Installing EcoBox in the Vehicle

Once you have the EcoBox mated to the transfer case and to the transmission install the supplied brass breather to the highest hole on the EcoBox case, and the brass plugs into the remaining 2 holes.

When routing the breather hose keep the hose away from heat sources as much as possible, never let the hose dip below the fluid level of the EcoBox and route the hose as high in the vehicle as possible.

### Oil Specifications

The EcoBox uses 500ml or just over 1/2 Quart of Redline MT90 Full Synthetic Gear Oil (Old Design)

The EcoBox uses 946ml or 1 Quart of Redline MT90 Full Synthetic Gear Oil (New Design May 2019)

*End of all parts of the Installation Manual*

#### DISCLAIMER

**This product is for off road use only.** The products supplied in this kit are manufactured and assembled specifically for this conversion type. Modification to components will void any possible warranty or returns unless said modifications have been approved and authorized by the company. Northwest Fabworks (NWF) is not responsible for damaged components that are not included in the purchased product. NWF is not responsible for damaged NWF products caused by the failure of non-NWF parts. NWF does not cover damage caused by incorrect installation and/or assembly. NWF does not warranty products that have been used outside of their intended use. **Installation of the following product may void automotive manufacturer warranty.** The following information is provided as a guide, it is strongly recommended to use the Factory Service Manual for your specific vehicle application.