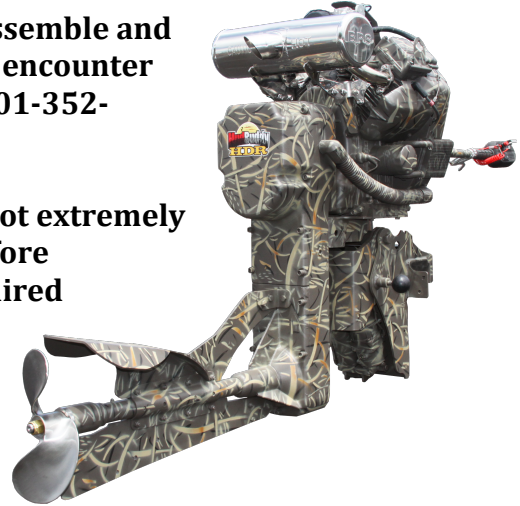


HDR Transmission/Outdrive Removal and Assembly

These instructions outline the steps required to disassemble and reinstall the HDR Transmission and Outdrive. If you encounter a problem, please call customer service for advice: 801-352-8011.

Although the steps described are involved, they are not extremely difficult. Fully read through the entire document before attempting this procedure. Ensure you have the required tools and supplies on hand and are comfortable executing the steps described. Otherwise, it is advised you have the procedure completed by a Mud Buddy Authorized Service Center.



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- **Required Tools and Shop Supplies**
 - **Removing HDR Transmission, Clutch and Motion Base**
 - **Reinstall HDR Motion Base**
 - **Reinstall Transmission Components**
 - **Reinstall the Outdrive and Belt Tension**
 - **Testing Operation**

Tools Required:

Sockets: 10mm, 7/16, 1/2, 9/16, 5/8 (optional- 5/16 Allen)

Wrenches: 3/8, 7/16, 1/2, 9/16, and, 5/16 Allen,

Torque wrench, wire cutter/stripper/crimper, Belt Tension Gauge, crow bar, putty knife/razor blade, Mud Buddy Transmission Oil Fill Syringe, Slide Hammer (if required)

Shop supplies:

RTV Gasket sealer (Permatex Ultra Black Hi Temp RTV Silicone or equivalent), Loctite-Blue, green scour pad, anti-seize lubricant, 1.25oz 10W30 Oil, 1/2"-13 x 4 bolt, plastic bags, shop towels.

Disassemble HDR Transmission, Clutch, and Motion Base:

- 1) Trim the motor up and engage the travel lock.
 - Disconnect the Positive battery cable.
 - Have some plastic bags on hand to retain hardware.

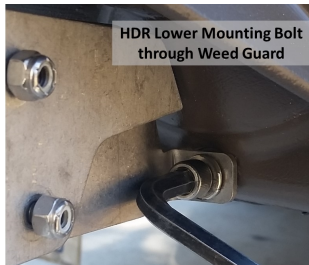
- 2) Using 5/16 Allen, remove the 3/8 x 1.5" transmission cover bolts. Support the cover while removing the final bolts.



- 3) Fold the cover down and disconnect the two-wire connector for the reverse magnets.

- 4) Starting with the bottom bolt running through the weed guard, remove the five 5/16 Allen outdrive mounting bolts.

- 5) While holding the outdrive with both hands, apply downward pressure to break the RTV seal and remove the drive.

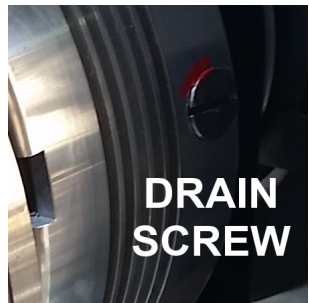


- 6) Remove the drive belt.

- 7) Locate the two fill/drain screws on the side of the Ring Gear hub.

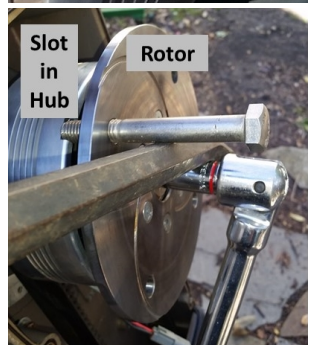
- 8) Cut a plastic bottle in half to drain the oil from the transmission

- 9) Rotate the ring gear hub so one of the drain screw is on the lower end of the hub (six o'clock position)



- 10) Remove the drain screw, allow all the oil to drain into the bottle, and reinstall the drain screw.

- 11) Turn the Rotor so one of the holes is aligned with the slot machined into the ring gear hub. Insert a 1/2" bolt through the hole in the rotor seated in the hub slot.



- 12) Insert a breaker bar with 5/8" socket on the crank shaft end bolt. Use a crow bar to leverage against the bolt and socket to steady the rotor while you remove the end bolt.

- 13) The transmission and clutch components slide onto the crank shaft but can take different amounts of effort to remove depending on how tight the Sun Gear and key fits on the shaft.

- 14) With both hands on the Ring Gear Hub, attempt to pull the transmission off the shaft as a unit. If it easily slides off, set the assembly down onto a shop towel with the clutch plate down.



- If the assembly will not move as a unit. Put both hands on the rotor and pull outward to expose the internals of the

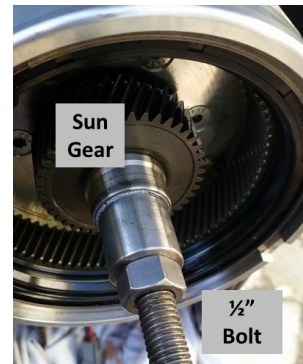


transmission and Sun Gear. Set the rotor on a shop towel with the internal gears facing upward.

- Attempt to move the Sun Gear by hand pushing side to side to see if it will come off the shaft by hand. Lightly tap with a rubber mallet on one side and then the other to see if it will release.

- If the Sun Gear is stubborn, a slide hammer may be required to pull the gear off the end of the crankshaft. Many auto parts stores have a tool lending program and a slide hammer with puller arms will work well to remove the sun gear. Insert two large washers on a 1/2"-13 pitch bolt and screw the bolt into the threads on the end of the gear until it bottoms out.

Assemble the slide hammer and place the puller arms around the large



washers. Steady the puller arms around the washer with one hand while sliding the hammer to pull the gear off

the crankshaft. Keep one hand on the bolt/gear as it may slide out with only a few taps of the slide hammer.

- 15) With the sun gear removed, slide the Ring Gear hub, upper gear, and clutch plate assembly off the shaft and set on a shop towel.
- 16) Remove the wire cover bolts on the side of the engine and expose the wiring and relays.
- 17) Locate the Ground post below the Relay bank, remove the nut and release the grounds.
- 18) Locate and disconnect the two wire connector at the end of the tiller for the Clutch and Reverse Magnet power wires.
- 19) Clip the red Reverse Magnet power wire a few inches from the connector allowing enough wire from the connector to enable splicing with a butt connector on re-assembly.
- 20) Slide the clutch bell housing forward off the shaft, feeding the wires and connector through the engine spacer plate.
- 21) Slide the crankshaft spacer off the crankshaft. Inspect the crankshaft and use a green scour pad to remove any corrosion from the shaft.
- 22) Using 9/16" and 1/2" wrenches, remove the 8 bolts on the back/engine side of the motion base.
- 23) Disconnect the Blower vent hose from the fitting on the engine blower housing flange (carefully twist and pull the hose off the fitting).
- 24) Remove the 4 bolts on the interior of the motion base using a 9/16" socket and remove the motion base off the crankshaft.



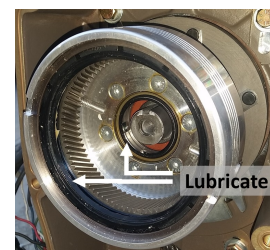
At this time the engine case cover is exposed and can be removed for operations such as installing a performance cam shaft. The Engine Spacer Plate can remain attached to the case cover and does not need to be removed. If removing the spacer plate, reinstall the bolts with Loctite and torque to 55ft bs.

Reinstall HDR Motion Base:

- 1) Ensure the L-brackets at the bottom of the frame are facing outward. Have the four interior motion base mounting bolts (3/8 x 1.5") with lock washer/washer accessible. Hold the HDR motion base up to the spacer plate ensuring the reverse magnet wires are routed under the spacer plate toward the end of the tiller. Install the four bolts using a 9/16" socket. Snug these bolts, leaving them loose enough to allow the motion base to slide up and down.
- 2) Working on the engine side of the motion base, reinstall the frame mounting bolts/washers through the motor frame. Start all of these bolts by hand, shifting the Motion Base as required to align the holes through the frame.
- 3) Once all the mounting bolts are started, snug them using 9/16" and 1/2" wrenches so the motion base is flush against the frame but is allowed to slide up and down.
- 4) Use 9/16" wrenches to loosen the belt tensioning screw on the back/engine side of the motion base. Back the screw off at least 3/4".
- 5) Slide the motion base up as high as it will go and use a 9/16" socket temporarily tighten the top two interior bolts to hold the motion base in this position. This will allow the belt to have the most slack when installing the outdrive.

Install Transmission Components:

- 1) To aid any future disassembly, apply a thin coat of the anti-seize lube to the crank shaft and inner surface of component bearings before installing the clutch and transmission components.
- 2) Slide the engine crankshaft spacer onto crankshaft ensuring the rounded side of the spacer is toward the engine.
- 3) Slide the clutch half way onto crankshaft feeding the wire leads/connector through the spacer plate and out the left side.
- 4) Seat the Clutch fully on the shaft against the spacer plate gasket and spacer ensuring the wires are clear of the gasket and are not kinked.
- 5) Next slide the Transmission Assembly Ring Gear onto the crank shaft with the planetary



housing facing outward.

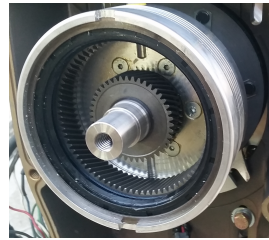
- Lubricate the inner and outer seal with a light coat of 10W30 oil.

6) Install the shaft key inside of the Sun Gear.

Align the key with the slot in the crankshaft and start to slide the Sun Gear back onto the shaft. If needed, tap with a rubber mallet until it bottoms out into the Ring Gear to seat it fully - there should be no play forward and back when the Sun Gear is fully bottomed out.



7) Slide the Transmission Assembly Rotor onto the crankshaft ensuring the gears mesh and the assembly is seated on the end of the crankshaft.

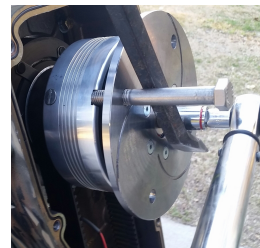


8) Install the Crankshaft End Bolt and Spacer applying blue Loctite to the threads.

- Turn the rotor so one of the holes is aligned with the slot machined into the ring gear. Insert a 1/2" bolt through the rotor and seat in the slot.



- Insert the torque wrench and 5/8 socket on the end bolt. Using a crow bar leverage the bolt through the rotor and against the socket to steady the rotor while you torque the transmission end bolt to 65ft lbs.



9) Remove one of the fill/drain plugs in the side of the Transmission Assembly (ensure the opposite plug is fully seated). Rotate the assembly so the open hole is in the 12 o'clock position. Put a shop towel behind the transmission.

10) Put the flex tube on the Oil Syringe and fill with 1.25 oz of 10W30 oil.

11) Insert the tube in the hole ensuring the tube extends into the transmission



about 1 inch. Carefully empty the 1.25 oz of 10W30 oil into the transmission. Reinstall the drain plug and wipe up any oil drips.

Reinstall the Outdrive:

1) Use a putty knife / razor blade to scrape the old RTV from the mating surface of the outdrive. Use a green scour pad to clean any residual on the mating surface.

- A wire wheel on a drill also works well for removing old RTV.

2) Remove the spaghetti gasket from the slot around the lower part of the motion base where the outdrive will be mounted. Use a green scour pad to clean any RTV off the mating surface. Inspect the spaghetti gasket, if its pinched, broken, or flattened it may need to be replaced. Reinstall the gasket in the slot.

- If installing a new spaghetti gasket, push the gasket into the slot of the motion base with the two ends meeting on the upper most side by the side vent. Carefully trim the gasket where the two ends meet so there is no gap and apply a small amount of RTV to the joint to hold down the ends.



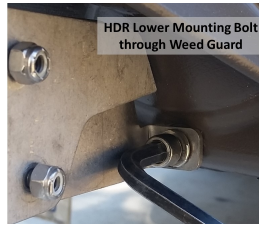
3) Hang the outdrive belt over the top sprocket behind the transmission.
4) Ensure the motion base is slid up as far as it will go so that the belt has the most slack.
5) Remove the two bolts on the stainless weed guard in front of the lower mounting hole of the HDR outdrive using 7/16" wrenches.

6) Apply a 1/8 inch bead of RTV sealant to the face of outdrive housing (not on the motion base) running the bead around all the bolt holes. Apply Blue Loctite to the allen bolts for the lower housing.



7) Hold the outdrive up in place, making sure to mesh the gear with the belt and get the 4 top bolts holding the outdrive started by hand, snug them but do not tighten them yet.

- Install the lower mount bolt through the weed guard and get started by hand. Reinstall the weed guard mounting bolts through the drive and start the nyloc bolts.



- 8) Loosen the top bolts (9/16") holding the motion base so the base slides downward to put tension back on the belt. Then retighten the top bolt to lock the motion base.

- 9) Reach in and grasp the belt and squeeze it together, raising the outdrive slightly such that the bolt holes on the drive are bottomed out against the allen mounting bolts. Keeping tension on the belt, tighten the outdrive bolts.



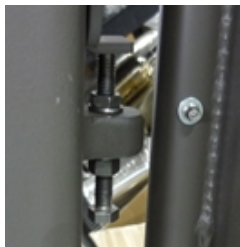
Torque each bolt to 23 ft lbs.

- Ensuring the drive is bottomed out against the bolts is important in maintaining the seal when impacting objects. There should be no play for the drive to move upward before tightening the outdrive bolts in place.
- Note- the RTV may squish out onto the outside of the drive, it's easier to remove after it has dried.
- Retighten the weed guard bolts to 20ft lbs once the lower bolt is tight.

- 10) Next set the belt tension- again loosen the top bolt on the inside of the motion base so it can slide up and down.

- 11) Remove the belt tension plug on the side of the motion base using 5/16" allen wrench.

- 12) Begin adding tension on the belt by tightening the belt tension adjuster on the back side of the motion base using two 9/16 wrenches. Once the belt begins to get tight, a 1/2 turn on the tension bolt will increase the belt tension about 2 pounds.



- 13) Set up the belt tension gauge.

- Move the rubber o-rings on the gauge to zero. Insert the tension gauge in the side hole against the belt with the black rubber end out.
- Turn the barrel of the gauge so the 'Inches' side is shown and with the gauge perpendicular and just touching the belt. Make a note where the barrel is even with

the outside edge of the motion base. Then move the o-ring on the outside barrel of the gauge to 1/4" past this reading. This is how far you will deflect the belt to get your tension reading.

- 14) With the gauge perpendicular to the belt, push the gauge against the belt for 1/4" deflection (as read on the outside barrel of the gauge). Release the tension and read where the o-ring on the tension scale marks the pressure required to deflect the belt.



- 15) Add more tension on the adjuster if needed until the gauge reads 16 lbs at 1/4" deflection.
- 16) With the belt tension set, tighten the top nut on the belt tension tensioning bolt to lock it.
- 17) Tighten the top 4 bolts on the back side of the motion base using a 9/16" wrench. Use a 1/2" wrench to tighten the lower two or four bolts through the L brackets on the frame.
- 18) Using a 9/16" socket torque the bolts mounting the motion base to the spacer plate to 30ft lbs.

- 19) Check the areas noted in the picture and add RTV in the areas shown in the photo to seal around the motion base mount holes.



- 20) Leave the Transmission Cover off at this time until **Testing Operation** section is completed.
- 21) Move the Blower Vent Tube and twist it back onto the cowling flange fitting.
- 22) Use wire strippers and crimper to add a butt connector to reconnect the Reverse Magnet power wire.
- 23) Reconnect the grey two wire connector at the end of the tiller.
- 24) Reconnect the ground wires on the ground post and ensure they are tight.
- 25) Reconnect the positive battery cable.

Testing Operation:

- 1) Operate the trim and ensure it moves up and down.
- 2) Turn the key switch to the 'ON' position and Move the Shift switch to the forward position and listen for the clutch to engage inside the motion base.
- 3) Move the Shift Switch to the Center Neutral position. Start the motor normally and let it idle.
- 4) Move the Shift switch to forward and ensure the prop is spinning.
 - With the motor idling, check the transmission and ensure there are no leaks.
- 5) Turn off the motor leaving the Shift Switch in Neutral position.
- 6) Hold the Transmission Cover against the gasket on the outdrive and connect the 2 wire plug. Reinstall the allen bolts in the cover using Blue Loctite and torquing to 23ft lbs.
- 7) Restart the motor at idle and move the Shift Switch to Reverse position and ensure the prop is now turning in the reverse direction.
- 8) Shift the switch to Forward, then Neutral, and back to Reverse positions to ensure all operations are working properly.

Contact Information:

Mud Buddy Manufacturing
7956 South, 1530 West, Suite 100
West Jordan, Utah 84088
801.352.8011 801.569.3799 fax
MudBuddy.com

Customer service:

801-352-8011

Micah@mudbuddy.com (performance components)

Keith@mudbuddy.com (customer service)

Parts Ordering:

Notice: All Mud Buddy parts and performance components are sold by BPS a separate company

BPS Parts and Accessories
385-695-3807

Torque Specifications	
Spacer Plate to Engine (7/16 x 1")	55 ft lb
Motion Base to Spacer Plate (3/8 x 1.5")	30 ft lb
Crank Shaft End Bolt (7/16 x 4")	60 ft lb
Clutch Cover (3/8 Allen)	23 ft lb
Splash Plate Bolts (5/16 x 1.5")	20 ft lb