ARCTIC CAT SUPERDIFF

INSTRUCTIONS AND PROCEDURES

These instructions cover: ARC-3333-052-HD

OVERVIEW

The Weddle 4-spider gear Superdiff is designed to drastically increase strength by adding two extra spider gears in the differential carrier to extend the life of the factory spider and side gears. The extra gears help to distribute the loads across more gear teeth, resulting in longer service life and reduced chances of cracks developing in the spider and side gears.

Due to the factory differential gears cracking and breaking under moderate use, it is highly recommended to install new spider and side gears with the Superdiff kit to ensure there will be no failures after installation. Any used gears should be inspected for cracks via magnaflux or other crack inspection method before using again.

The service life of the entire front differential unit is greatly improved when used in conjunction with the Weddle billet sidecover kit (ARC-3333-017-HD-KIT or ARC-3333-058-HD-KIT), even under extreme racing conditions.

DESIGN FEATURES

The Weddle Superdiff has been designed and manufactured with much tighter tolerances and fitments for all of its components to prevent the common wear and failure points typically seen with the factory differential units, specifically with the spider gear cross shafts, ring gear fitment on the diff carrier, and ring gear location to allow for proper gear lash. The factory diff locker function is also retained and can be utilized to lock the front wheels when climbing over obstacles.

RELIABILITY, LONGEVITY, AND SERVICE INTERVALS

Due the extreme loads that the factory spider and side gears are subjected to in offroad applications, they will always be subject to cracking and eventual failure with use, and therefore should be inspected regularly and replaced as needed. Most recreational type driving will rarely require a full teardown and inspection of the internal components unless there are particles in the gear oil and on the drain plug magnet, this will be based on how hard the vehicle is driven over rough terrain. For desert racing applications, it is recommended to remove and fully inspect the front differential components every 1000-1200 race miles. For short course type racing applications, it is recommended to inspect the components every 8-10 rounds (practice, qualifying, race)

ASSEMBLY INSTRUCTIONS:

These instructions only cover the assembly of the Weddle Superdiff component, refer to the factory service manual for further instructions not covered. Failure to follow these instructions may result in damage to parts. Due to much tighter tolerances on the fitment of components, assembly will require greater care and take a little longer to ensure parts are not damaged. Some parts will require to be heated prior to assembly. The long spider gear cross shaft will be reused from the factory 2-spider diff carrier. Inspect the shaft for any galling from the spider gears. Ok to lightly sand the shaft to clean up any light galling.

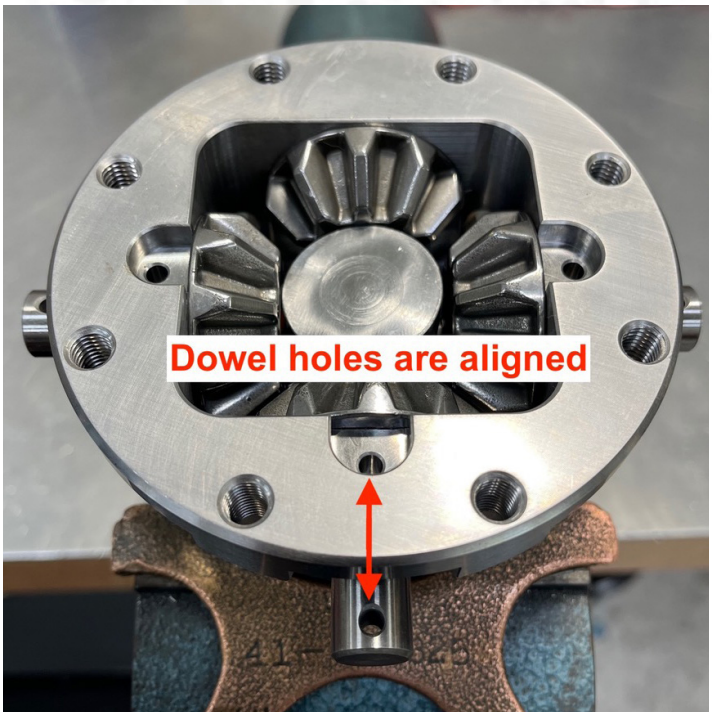
- Start by laying out items on bench and ensuring all items are checked off list on invoice/packing slip. (Individual parts listed under ARC-3333-052-HD part number description on packing slip or on website). Contact Weddle Industries immediately if any items are missing from kit.
- Thoroughly clean all rust preventative off all parts prior to assembly.
- Heat up diff carrier with heating element to 220ºF to aid in assembly (opens up bores for cross shafts and aids in assembly)
- Place the splined end of the heated diff carrier in bench vise with soft blocks or rags over the jaws. Take care to not damage the splines of the diff carrier or overly squeeze carrier in vice jaws.
- Install right side gear (with external splines) in diff carrier.

- Install long and short spider gear shafts into the bores so the 4mm dowel holes will be aligned with the dowel holes in the carrier once the shafts are tapped into place. Use a brass mallet or brass punch to tap the shafts into the diff carrier just far enough to slightly protrude through the inside wall of the diff carrier, leaving room for the spider gears to be installed.

- Place all (4) spider gears and center block in their positions inside the diff carrier.

- Start tapping the long cross shaft through the 1st spider gear with a brass mallet/brass punch using light to moderate force, making sure the shaft is not catching on the inner bore of the gear, wiggle the gear to make sure the shaft is slipping through the gear. As the shaft protrudes through the 1st spider gear, make sure the centerblock is aligned to the shaft. Tap the shaft through the centerblock just until the shaft reaches the opposite spider gear.

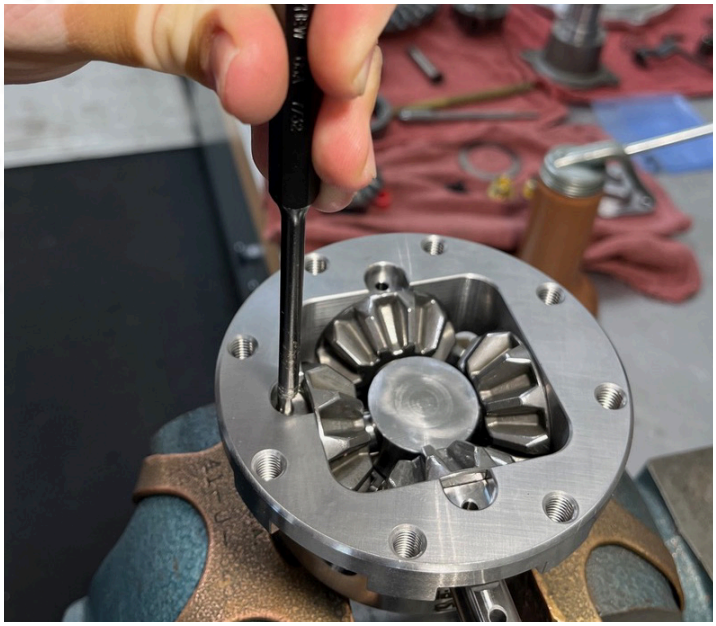
- STOP! Make sure the 4mm dowel hole is aligned with the dowel hole in the diff carrier. Use a 4mm punch or small round screwdriver to rotate the shaft and line up the holes so they are vertical before tapping into its final position in the carrier.



- Continue tapping the long crass shaft through the opposite spider gear until the cross shaft is fully in the carrier. Check to make sure the dowel hole in the cross shaft is aligned as best as possible with the hole in carrier.

Tech Tip: Use a lightly oiled/greased 4mm or 5/32" punch to slip through the 4mm hole in the carrier and through the cross shaft to help align the dowel holes to aid in installing the 4x35mm dowel in the next steps

- Use a drop of assembly oil or light grease and install a 4x35mm dowel into the carrier and cross shaft using a small hammer and punch until the dowel is just below the flat surface of the diff carrier. DO NOT force the dowel with any more than a light tapping force, the dowel can break apart with too much force. If the dowel does not want to easily tap into place through the cross shaft, use a 3mm or smaller punch and remove the dowel from the other side of the carrier, then realign the cross shaft in the carrier and try to install the 4x35mm dowel again.



- The two short cross shafts can then be tapped into place, taking care to line up the center block with the short cross shafts as they are tapped into place. Install the 4x35 dowels in the same manner as above.

- Place left side gear (smooth outer surface) with ARC-3333-052-03 thrust washer in position.

- Thoroughly clean all bolt threads in diff carrier with brake or carb cleaner to remove any contaminates. Any oil, grease, or rust preventative coating will interfere with the loctite required for the ring gear bolts.

- Use heating element to heat up the ring gear to 220ºF. Install on diff carrier with left side gear and thrust washer in place, ensuring bolt holes are lined up with threaded holes on ring gear. Install (4) ring gear bolts with light torque to retain ring gear position on diff, and allow to cool for 20-30 minutes. The ring gear will shrink as it cools resulting in a tight fitment on diff carrier.

- Thoroughly clean threads of ring gear bolts and apply a small drop of high strength Loctite 272 (red) to bolt threads and install after ring gear has cooled.

- Torque ring gear bolts: Factory TORX head bolts, 22 ft/lbs. (Weddle Allen head bolts, 35 ft/lbs, install safety wire)

- Remove diff carrier assembly from vice and make sure diff gears rotate inside diff carrier. It is common for these types of diff gears to be slightly notchy when turning over each other.

- Install the small round splined ring for the diff locker over the splined portion of the right side gear, then install the snap ring to retain the splined ring on the side gear. Make sure the snap ring is fully seated in the groove.

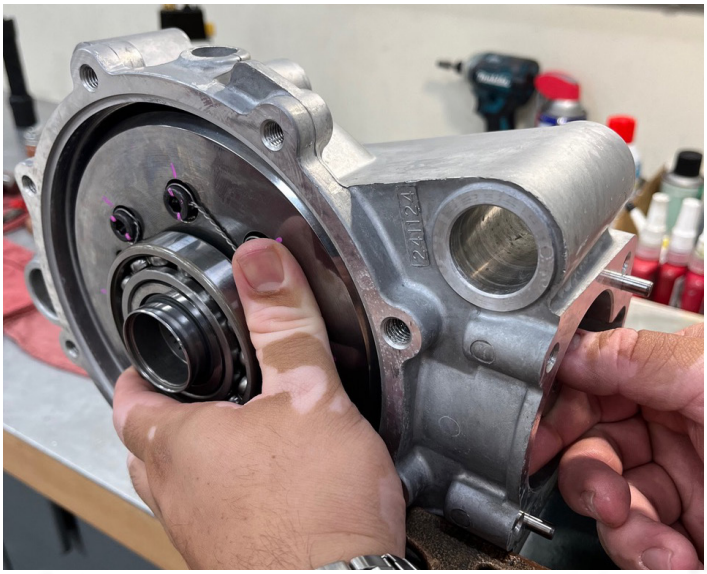
- Install the 55mm I.D. shims on the diff carrier before installing the right side carrier bearing. It is best to start with 0.80mm – 0.90mm (0.030" – 0.035") shim as this typically sets up the best amount of gear lash and bearing preload.

Note: It is not uncommon for some of the supplied diff adjustment shims to be slightly undersized and need to be reamed out to fit over the bearing journal.

- Install the diff carrier assembly into the main housing ensuring the splines for the diff locking sleeve are aligned with the splined ring for the side gear and diff carrier when loading in the main housing.

- Make sure the diff carrier assembly with ring gear is fully seated into the main housing, tap into place with a soft plastic or rubber mallet if needed. Apply pressure against the ring gear into the diff housing and check for gear lash on the pinion gear by hand. If there is no gear lash, install more/thicker shim under right side carrier bearing.

Note: It is difficult to measure gear lash with a dial indicator as there are no good places to indicate from on the ring gear or pinion shaft. This needs to be done by feel.



- Install side cover (Refer to instructions ARC-017HD-INST if installing a Weddle billet sidecover kit) and use a minimum (4) bolts to torque the sidecover to the main housing. Check to make sure there is gear lash by rotating pinion shaft against ring gear teeth.
- If there is no gear lash with sidecover installed and diff rotates easily, a thicker shim will need to be installed under the right side carrier bearing.
- If there is backlash on R&P gears, but the diff does not rotate by hand via pinion shaft rotation, there is likely too much shim and some will need to be removed.
- Once the proper amount of shim has been determined for best gear lash and bearing preload, the sidecover can be installed with o-ring and hardware.
- The differential can then be assembled following the factory service manual instructions.
- Fill diff with gear oil and install in chassis.

BREAK IN INSTRUCTIONS:

All new components should be broken in by performing 4-5 heat cycles on the component as installed in the chassis. Drive the vehicle easily for 30-45 minutes on smooth roads/terrain and operate long enough to build heat into the diff unit. Stop and let cool down to ambient temperatures. Repeat cycle 4-5 times for best results. Do not drive vehicle over extremely rough terrain or at high speeds until break in procedure is completed. A proper break in procedure will result in stronger, longer lasting components.

IF YOU HAVE ANY QUESTIONS

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