PRECISION
WHITE INDUSTRIES
BICYCLE COMPONENTS

Manufactured in the U.S.A.

Novato, CA 94949

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Cassette Hub

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The **White Industries TI Cassette Hub and Aft-Tracker** is the first of its kind: an ultra-light, heavy-duty cassette hub which is designed and manufactured in America. The hub was designed on a CAD system and exhaustively tested in actual use by a team of hard-core Marin mountain bikers. Like all **White Industries** products, it is manufactured to the highest standards at the company's Novato, California plant, using CNC equipment and the best available materials.

CAUTION: Since this is a custom hub, it must be custom adjusted to the bicycle on which it will be used. This adjustment requires some special preparation, which is described in the **Installation** section of this manual.

WARNING: This hub is designed to be secured to the bicycle frame with a quick-release skewer mechanism of the user's choice. White Industries accepts no responsibility or liability for damage or injury caused by incorrect use or failure of the quick release mechanism used with this hub.

SPECIFICATIONS

Model:

WHITE TI Cassette Hub or Aft-Tracker

Cog Compatibility:

Shimano 7 & 8 speed cassette gear cluster

Materials:

Hub Shell: 6061 Aluminum
Axle: Heat-treated 17/4 Stainless Steel Butted
or 4130 CRO-MO
Cassette Body: 7075 Aluminum
Ratchet: Heat-treated 4140 CRO-MO
Driver: 6AL 4V Titanium or Heat-treated Stainless Steel
Pawls: S7 Tool Steel
Springs: Beryllium Copper
Axle End, Drive Side: 6AL 4V Titanium or 4130 CRO-MO
Left Side: 6061 Aluminum
Axle Collar: 6061 Aluminum
Bearings: 6901 2RS Precision Sealed Cartridge plus
(2) 6903 Precision Sealed Cartridge or
(2) 18mm sealed needle bearings

Available Spoke Drilling:

28, 32, 36, 40 & 48 hole

Dimensions:

Flange Diameter: 55mm
Centerline to Right Flange:
19.0mm w/130mm axle
21.5mm w/135 mm axle
Centerline to Left Flange:
37.0mm w/130mm axle
34.5mm w/135mm axle
Dropout Width: 130mm/135mm

Weight:

280g TI Cassette
350g Aft-Tracker

FEATURES

Although it weighs only 280 grams (without gear cluster or Quick Release), the **WHITE TI Cassette** hub is and so versatile that it quickly and easily adapts to any road or off-road bicycle. The **Aft-Tracke**r weighing only 350g is designed for rugged off-road tandem and full suspension use. Its ruggedness and light weight are the result of ingenious design and application of materials.

• The hub shell has an oversized body, machined out of a solid billet of 6061 aluminum. The larger diameter of the hub body dramatically increases the structural rigidity of the hub without significant effect on aerodynamic drag.

• The oversized axle is internally butted, being considerably thicker on the drive side, where the stresses are greatest. The large diameter of the axle makes it stronger than conventional hub axles, at a fraction of the weight.

• The axle end pieces (titanium or CRO-MO on the drive side, aluminum on the left) are machined to fit standard dropouts. An extra left side end piece on the TI Cassette allows easy conversion between 130mm and 135mm dropout width.

• The axle rides in four oversized precision bearings. Two of the bearings support the hub shell; two support the driver and driver unit. The left driver bearing and the drive side hub bearing are separated by a thin stainless steel thrust washer.

• The driver has three S7 tool steel pawls which engage simultaneously in the ratchet. S7 tool steel is the strongest pawl material available.

• Beryllium copper is used for the pawl springs, because of its superior fatigue resistance. Leaf springs (like a clock spring) rather than wire are used because they give a more consistent performance over a longer life.

• The cog body is designed for most Shimano gear clusters. Removal or addition of a simple aluminum spacer provides the option of using either a 7 or an 8 speed cluster. Cog bodies for other cassette brands will be made available.

• **WHITE Cassette hubs** are owner serviceable with a 2mm Allen wrench.

INSTALLATION

CAUTION: *This is a custom hub, and must be custom adjusted to the bicycle on which it will be used. The correct procedure for this adjustment is described below.*

1. Build up, or have a bike shop build you, a wheel using the WHITE Cassette hub.

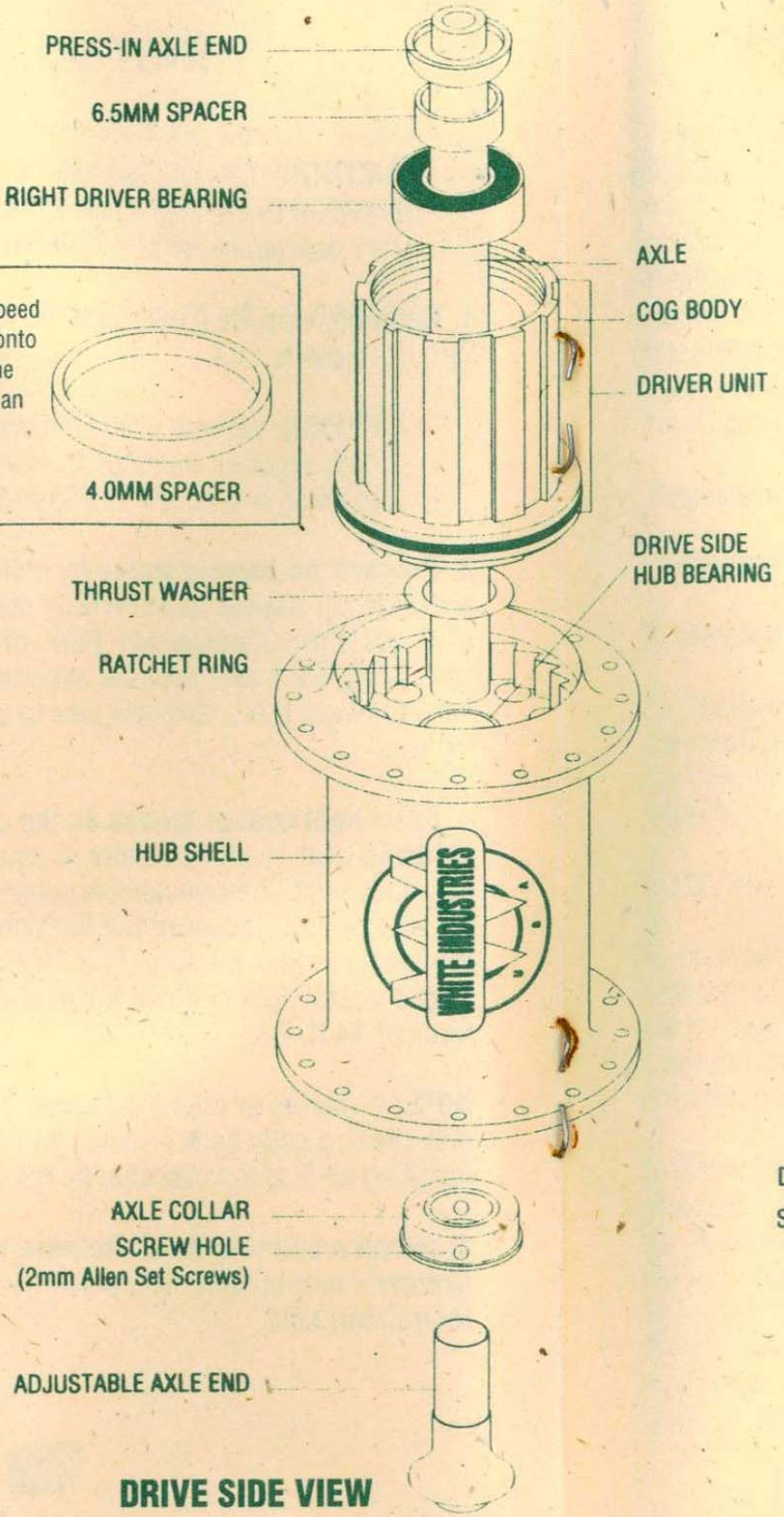
CAUTION: *Bicycle wheel building is a specialized skill which requires training, knowledge, experience and special tools, and is best left to professional wheel builders.*

2. Prepare the bicycle frame by making sure that the rear dropouts are perfectly aligned and correctly spaced. The best way to do this is by using the Campagnolo, Park, or other special tools designed specifically for frame dropout alignment and spacing. If you don't have the right tools, take the bike to a bike shop that can do the job for you.

3. Put a light coat of grease on the cog body; then slide the Shimano gear cluster cassette of your choice onto the splines of the cog body, with the *one narrow* spline of the cog body mating with the *one narrow groove* of the Shimano gear cluster cassette. Using the Shimano lock ring tool or a Shimano-approved equivalent, thread in and tighten down the gear cluster cassette lock ring to a force of 14 ft. lbs.

NOTE: If you are installing a 7 speed cassette, slip the cluster spacer onto the cog body before sliding on the gear cluster. If you are installing an 8 speed cassette, do not use the 4mm cluster spacer.

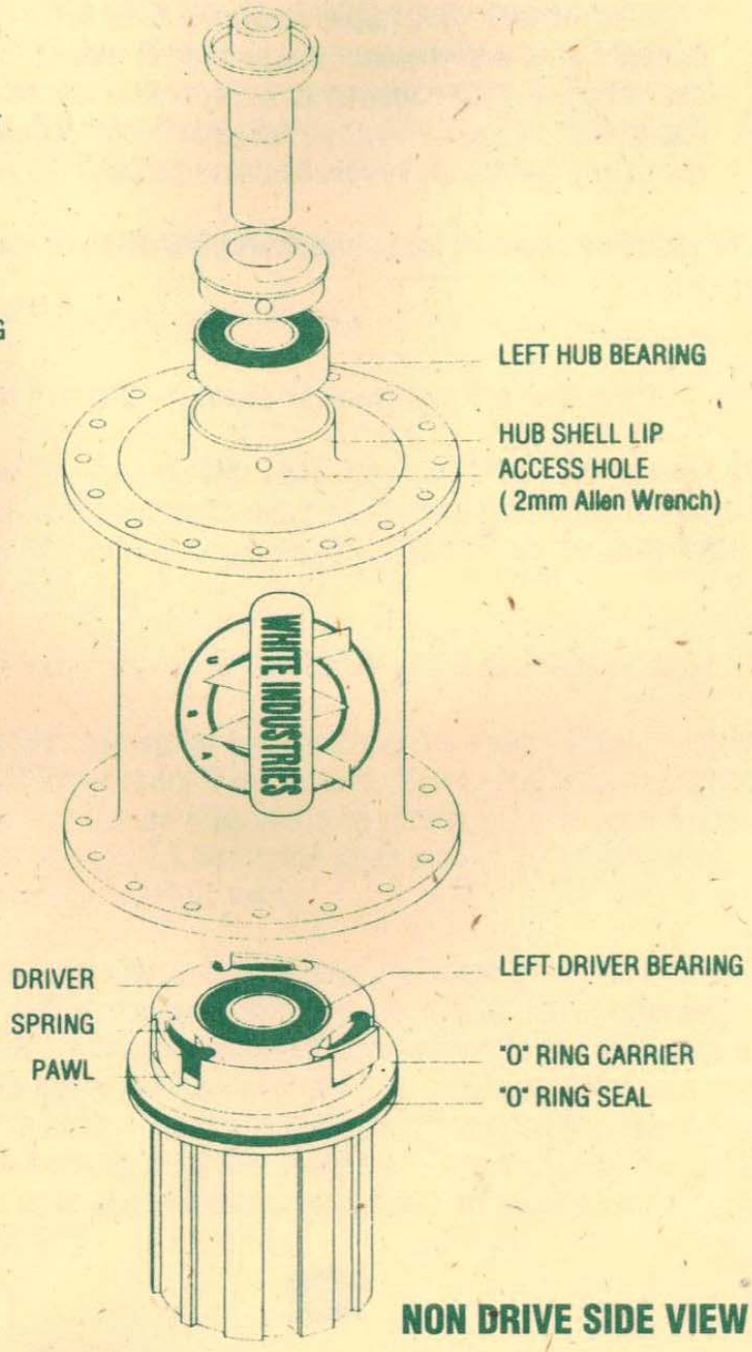
4. Install a suitable Quick Release skewer according to its manufacturer's instructions. The quick release lever should be on the left (non-drive) side.



NOTE: If you are installing a 7 speed cassette, slip the cluster spacer onto the cog body before sliding on the gear cluster. If you are installing an 8 speed cassette, do not use the 4.0mm spacer.

4.0MM SPACER

DRIVE SIDE VIEW



NON DRIVE SIDE VIEW

5. Place the wheel into the rear dropouts with the chain on the smallest cog, and lock it in place with the quick release according to the quick release manufacturer's instructions.

> **WARNING:** *This hub is designed to be secured to the bicycle frame with a quick-release skewer mechanism of the user's choice. White Industries accepts no responsibility or liability for damage or injury caused by incorrect use or failure of any quick release mechanism used with this hub*

7. Periodically check to make sure that the axle collar setscrews are tight.

MAINTENANCE

We use the very best shielded, sealed precision bearings available. But, as is true of *all* bearings, water, sand or dust *can* contaminate them under some hard-use conditions; and even the high-quality grease we specify *can* break down over time. That is why, like all **White Industries** products, the **WHITE Cassette Hub** is made to be easily serviced by a reasonably competent bicycle mechanic. **However,** because this hub is an expensive piece of precision equipment, it's not a good idea to use it for teaching yourself mechanical skill. *When in doubt, seek out an expert.*

To check, clean and re-lubricate the four bearings:

1. Remove the wheel from the bike.

2. Remove the quick release skewer from the hub axle.

3. Remove the gear cluster cassette, by undoing its lock nut with the correct Shimano-approved cassette removal tools; then pulling the gear cluster off the cog body. (See Shimano's cassette instructions for further help.)

NOTE: The lock nut is removed by turning it *counterclockwise.*

4. Loosen the axle collar by loosening the three 2mm Allen head setscrews which secure it to the axle. These setscrews are accessible through the access hole in the lip on the left side (non-drive side) of the hub shell. Loosen the Allen screws by turning each counterclockwise a single turn.

5. Remove the adjustable axle end and manually push the hub axle towards the hub shell until you are able to pull out the axle collar. Push the axle through the left hub bearing to the drive side of the hub. **Do not** whack the axle end with a hammer! You can easily damage it. If hand pressure is not enough to push the axle through the left hub bearing, hold the wheel by its rim and push the left axle end down, against a piece of wood placed on a work bench or the floor.

CAUTION: The driver unit will probably be released from the hub shell when you push the axle through. The pawls and their springs are a part of the driver unit. When the driver unit comes out of the hub shell, it is possible that the pawls and springs will fall out, Be prepared. The springs and pawls are very hard to find.

6. Remove any pawls and springs which have not fallen out yet, and put them where you can find them later.

7. Pull the axle out of the hub shell by pulling on the driver unit. Don't loose the stainless steel thrust washer which is between the drive side hub bearing and the left driver bearing. You can leave the driver unit, the press-in axle end, and 6.5mm spacer on the axle.

8. Clean the driver and ratchet ring with solvent, and dry *completely*. With a clean cloth or Q-tip, clean the rubber "o" ring seal and the surfaces it touches. *Do not* use solvent on the "o" ring or near it, or you could melt the rubber.

9. Use a pin, a razor blade or an X-Acto® knife to *carefully* remove the plastic seal from each of the four bearings. Clean the bearings with solvent; dry them *completely;* relubricate them with any high-quality bicycle bearing grease; and *carefully* reinstall the plastic seals. The writing on the seals faces *out.*

10. Put some light bicycle oil on all of the driver parts, including the ratchet ring, pawls, springs and cog body. *Do not* use grease. Grease can cause the pawls to stick in the down position. Put the springs back into the driver. Depress each spring a little as you put the corresponding pawl back into the driver. T*hink* about what you're doing, so you don't put the springs and pawls in backwards. Check the spring tension by depressing each pawl in turn. Spring tension can be adjusted by flexing the spring outward. Put the thrust washer onto the axle. Finally, spray a *light* coat of oil on the "o" ring seal.

11. Reassemble the hub by pressing the axle through the drive side hub shell bearing and start it into the left hub bearing. When the pawls touch the ratchet ring, *slowly* rotate the driver unit *counterclockwise* (the free-wheeling direction) and, at the same time, gently but firmly press the axle into the left hub shell bearing. The rotation of the driver unit *should* cause the pawls to click into place in the ratchet ring. If it doesn't, you'll need to use a screwdriver tip to press the pawls against their springs while pressing the axle into the bearing.

12. Once the axle is all the way home, take the wheel by the rim and press the press-in axle end against the work bench or the floor, to make sure that everything is properly seated.

13. Slip the axle collar over the left (non-drive) end of the axle; then insert the left adjustable axle end down into the axle. Press the adjustable axle end down until the lip of the adjustable axle end is flush against the axle. Tighten down the three 2mm Allen setscrews.

14. Replace the gear cluster cassette (see #3 under **Installation** in these instructions).

15. Put the quick release back into the axle, lever end on the non-drive side.

16. Turn to the section of these instructions headed **Installation,** and follow **Installation instruction 6.**

Major Repairs

• **The bearings** can be removed and replaced in the same way as other sealed bearing hubs, using a bearing puller or a drift punch.

• **The ratchet ring and driver** are screwed into the hub shell and driver unit, respectively; but the tremendous forces which riding puts on them in the direction of the threads has probably locked them permanently in place. Therefore, if the ratchet or driver are damaged, **do not attempt to remove them.** The chances of success are slim.

• **Everything else** is designed to come apart and go together with hand pressure.

Warranty

• **Bearings** are warrantied for three (3) months only.

• **Parts** are warrantied against manufacturers defects for one year.

• **Hub repair** service available for a flat fee.