Horstman® HDC-5A and HDC-5B Clutch Manual

2010

Foreword

The HDC-5A one disc model is designed for use on the Yamaha KT100SC kart engine in Rookie/Jr Sportsman class. The HDC-5B 2 disc model is for Jr or Sr Sportsman or Super Can classes where rules permit. This manual will help you obtain the correct setup for each class of competition.

Warning!!!

When the engine starts the clutch and chain may spin at high speeds if brake is not applied. Do not operate vehicle without proper guards in place. Do not attempt to adjust, repair, or lubricate clutch or chain with engine running. The cerametallic friction disc has a very aggressive lock up. When leaving the grid to enter track it is possible to have clutch chatter however it that will not affect performance on the racetrack.

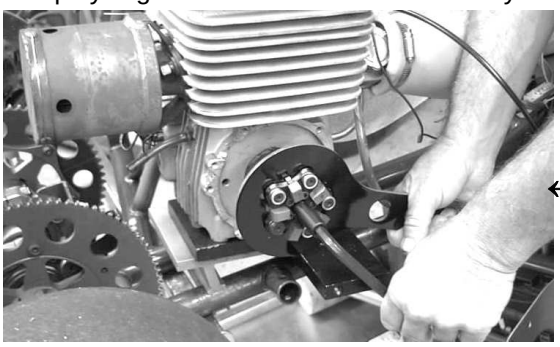
Installation

1. Install spacer with chamfer facing engine (See Figure 1)
2. Apply thin coat of grease to the bearing in the drum
3. Slide drum onto crankshaft…sprocket faces engine
4. Insert woodruff key into crankshaft
5. Slide the drive hub assembly onto tapered area of crankshaft. Make sure the keyway in the drive hub is aligned with the woodruff key in the crank. Rotate the drum to allow the outer lugs of the friction disc to align with the slots in the drum.
6. Install starter nut (item 15) Torque to 350 inch lbs
   The optional spanner wrench p/n 336062 is helpful in holding clutch during installation, removal, and disassembly. See Figure 2
7. Check end play (Figure 3)
8. Install chain and clutch support system as required by rules.

Figure 1

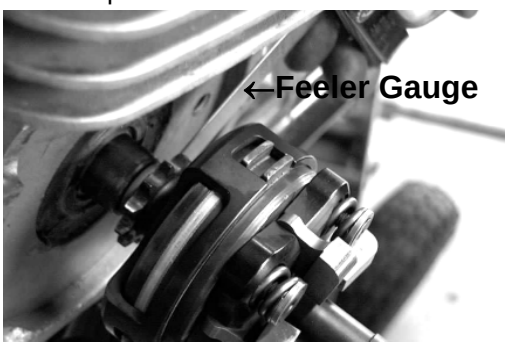
End Play (lateral movement of drum)

Proper end play allows the clutch to spin freely. Zero end play will not allow the engine to start.
Check end play with feeler gauge. Measure between sprocket and spacer. (Fig.3) Minimum end play is .005" and maximum is .025". If end play is below .005" you must remove the clutch and grind or sand material from the spacer. If end play is greater than maximum contact your dealer for purchase of a wider spacer.



← Figure 2

Figure 3 →



Stall Speed

Stall speed is the RPM that the clutch locks up solid. For top performance it is important to adjust the stall speed to match the peak torque of the engine. This allows the engine to operate within its power band for quicker acceleration. Factors that affect stall speed such as metallurgy, friction material, lever design, and surface finish are engineered into the product therefore you only need to be concerned with proper springs and adjusting the spring tension.

Stall Speed Adjustment

Adjusting the stall speed of the clutch may be intimidating if you are a newcomer to the sport however it is relatively easy to learn. Data acquisition with memory is needed to log accurate data. Setting the clutch stall speed to the engine's peak torque should produce the fastest lap times. If the stall speed is set more than 100 rpm above peak torque lap time may be slower and the clutch will run hot which causes excessive wear and possible warping. Of course if the stall speed is below peak torque lap time may also be slower.

Steps

1. Install the recommended springs from the Stall Speed Chart and adjust the height from column Initial setting. **See figure 4** for spring adjustment measuring method.
2. Go onto the track and observe tachometer reading while kart is accelerating. The stall speed is the rpm reading when the clutch engages solid and the kart begins accelerating rapidly. Warning! If the stall speed is above the range on the chart below you must exit the track in a safe manner and return to your pit to adjust the stall speed lower to prevent overheating the clutch. If the stall speed is within the prescribed range on the chart you may drive enough laps to get the engine up to proper temperature and get comfortable with the track configuration. Run about five to ten laps to establish your performance base line while the friction disc(s) seat in.
3. Return to your pit and look at the tachometer data. Log the stall speed off tightest corner …also log Max RPM, MPH, lap times, and engine temp.
4. Adjust stall speed if necessary and make another test session. Keep making clutch adjustments until you determine the best stall speed for the fastest lap. Now you can look at gear ratio changes as well as chassis adjustments to test for even faster lap times. **Warning! Wear protective gloves as clutch will be hot!**

Stall Speed Chart*

Class	Clutch Model	Spring	Stall Speed Range	Initial Setting
KT-100 Yamaha Jr Sportsman Jr Super Sporstman	HDC-5A HDC-5A	3282Y 3130Y	7400-7600 8000-8600	.650” .650”
KT-100 Jr Super Sporstman KT-100 Sr Sportsman	HDC-5B	3130Y	8400-8800	.640”

* Chart is a guideline only …exact setting must be accomplished by track tests

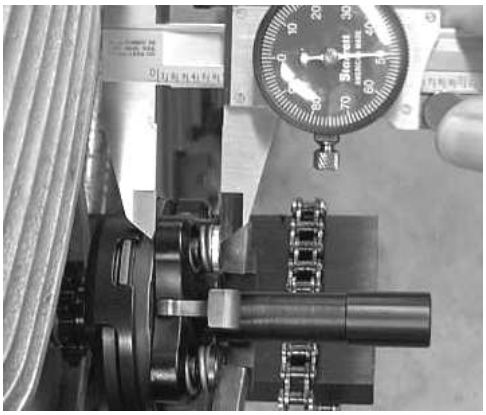


Figure 4

← Measure from edge of lever support (item 8) to top of spring retainer (item 12)

How to raise Stall Speed

Increase spring tension by inserting 1/8” allen wrench into adjusting screw (item 13) and turn clockwise. Adjust all five screws equally. 1/4 turn will raise stall speed approximately 100-150 rpm.

How to lower Stall Speed

Decrease spring tension by inserting 1/8” allen wrench into adjusting screw(item 13) and turn counterclockwise. Adjust all five screws equally. 1/4 turn will lower stall speed approximately 100-150 rpm.

Spring Adjustment Limits

The clutch can only be adjusted within a finite range. **See Figure 5**
Do not adjust below the minimum height .600” because the springs will coil bind. Coil bind is when the spring is fully compressed and becomes a solid object. Coil binding of the springs will prevent the pressure plate (item 7) from moving the full distance to allow total lock up and the clutch will get hot and be ruined. Do not adjust above the maximum height of .680” because the adjusting screws will not stay in place. Put a drop of blue locktite on the screws (item 13).

Figure 5

Air Gap

Air gap is the space between the disc (item 5) and the pressure plate (item 7) Correct air gap will allow a neutral mode for starting the engine. The air gap is preset at the factory at .030” +/- .006” .When regrinding or sanding components it is important to stay within factory tolerance for best performance. Optional thick floaters are available to reduce excessive air gap in 2 disc model. Also thin floaters are available to increase air gap. Max air gap is .045” .

Cleaning

Use disc brake spray cleaner for best results. **Do not** use solvents, gasoline, water, or household cleaners as rust or contamination of the friction disc can occur. Wear safety glasses and protective gloves when cleaning and performing maintenance. Dispose materials at prescribed waste sites.

Removal … Allow clutch to cool before touching

1.Remove starter nut (item 15)
2.Remove the 5 top assembly screws (item 14)
3.Thread 5 bolts in optional puller into clutch hub and tighten center bolt until clutch pops off taper. See figure 6 **Figure 6→**

Maintenance

Drum/ sprocket

Check drum for wear in slots (**See Figure** 7) replace when wear exceeds .050" deep. Inspect sprocket and replace when teeth are worn to a point or broken as chain will keep coming off. Normal sprocket life is 2-3 race events on a 10T and 3-5 race events on an 11T under ideal conditions. **USE OF QUALITY RACING CHAIN LUBE WILL INCREASE SPROCKET LIFE. SPRAYS WITH TEFLON ARE GREAT FOR LUBING BEARINGS HOWEVER WE ARE NOT AWARE OF ANY THAT SAY" FOR RACING CHAIN" ON THE CAN!…** Worn chain, improper lube on chain, track surface (dirt vs asphalt) , over tight chain, misalignment, causes the sprocket to wear faster. ***Apply grease to bearing before each race day.*** Also keep spare spacers (item 1) as they will wear or crack from constant pounding when cornering. **Use the correct diameter sp**acer or chain will not seat correctly over the sprocket. ALWAYS INSTALL A NEW CHAIN WHEN INSTALLING A NEW SPROCKET.

Friction Disc (item 5) is subjected to high surface heat during engagement cycles and will wear and glaze. Deglazing the disc will improve performance and can be accomplished easily. Just lay a clean sheet of 100 grit emerypaper onto a flat surface then place the disc onto the emerypaper. Now make a figure 8 motion while sanding the disc. Most glazing can be removed in about 60 seconds . Sand both sides of the disc. A disc will have useful life until worn to .123" overall thickness. If you have the 2 disc model sand the floater to remove glaze. When installing new friction discs it is wise to install a new floater to insure proper bedding in and better bite. Use genuine Horstman discs for best performance.

Lever Support (item 8) The lever support is made from alloy aluminum and has a hard coating for corrosion protection and wear resistance. Check frequently for excessive wear in the slots where the levers pivot. Replace when deeply worn.

Levers (item 10) The levers are made from hardened alloy steel and will last a long time. After every ten race events check for wear at the pivot hole and replace when oval shaped.

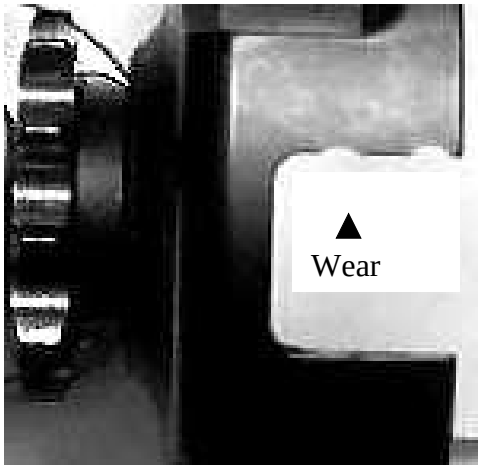
Dowel pins (item 9) Subject to high forces from levers. Replace after 10 races
Tip … apply a light coat of anti-seize lube to the dowel pins and the levers will move freely and last longer

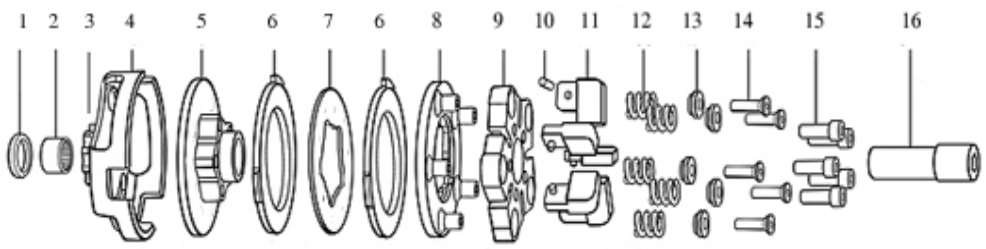
Springs (item 11) Springs are subjected to heat and stress and must be inspected every five races. When free length is below .475" replace the springs.
Use genuine Horstman springs because our cryogenic treatment and shot peen process greatly improves consistency.

Assembly

Insert a dowel pin (item 9) into each lever (item 10) and install into lever support.
Insert pressure plate onto lever support
Install springs and adj screws but do not adjust yet
Install friction disc(s) and floater on 2 disc
Slide top assembly onto drive hub
Insert five screws (item 14) and tighten to **95** inch pounds, replace screws after each rebuild because screws stretch when tightened.

Now adjust the spring height per Stall Speed Chart **Figure 7 →**





Patent D,487,760S

Item No	Part Number	Description	Units Required
1	322300	Spacer .145" x .670" ∅ for 10T #219 drum only	1
	323800	Spacer .145" x .740" ∅ for 11T #219 drum only	1
	325900	Spacer .145" x .830" ∅ for 12T-15T #219 drum	1
2	330132	Bushing for 10T #219	1
	300300	Bushing for 11T #219	
	300400	Bearing for 12T-15T #219	
3	330133	Sprocket, bolt on 10T #219	1
	330138	Sprocket, bolt on 11T #219	
	330139	Sprocket, bolt on 12T #219	
4	336065A	Drum only, aluminum less sprocket HDC-5A	1
	336065S	Drum only, steel less sprocket HDC-5A optional	
	336065E	Drum aluminum w/ bolt-on 10T #219 spk HDC-5A	
	336065F	Drum aluminum w/ bolt-on 11T #219 spk HDC-5A	
	336065G	Drum aluminum w/ bolt-on 12T #219 spk HDC-5A	
	336066A	Drum only, aluminum less sprocket HDC-5B optional	
	336066S	Drum only, steel less sprocket HDC-5B	
	336066N	Drum ,steel w/bolt-on sprocket 10T #219 HDC-5B	
	336066P	Drum, steel w/bolt-on sprocket 11T #219 HDC-5B	
	336066Q	Drum, steel w/bolt-on sprocket 12T #219 HDC-5B	
5	336020	Drive hub, HDC-5A one disc	1
	336025	Drive hub, HDC-5B two disc	
6	336023	Friction disc	1or2
7	336027	Floater, .095" thick standard size with HDC-5B clutch	1
	336027A	Floater, .090" thick optional	
	336027B	Floater, .085" thick optional	
	336028	Floater, .100" thick optional	
	336029	Floater, .105" thick optional	
8	336021	Pressure plate	1
9	336022	Lever support	1
10	330027	Dowel pin	5
11	336036	Lever 12.2 grams	5
12	5142Y	Spring (Matched set of 5) .075" wire ∅ Optional 6000 rpm stall speed	
	3282Y	Spring (Matched set of 5) .085" wire ∅ Comes in HDC-5A Clutch	1
	3130Y	Spring (Matched set of 5) .091" wire ∅ Comes in HDC-5B Clutch	1
13	334700	Retainer	5
14	334800	Screw, spring adjusting 10-32 flat head	5
15	336038	Screw, 10-32x3/4 socket head	5
16	703600	Starter nut	1
	309300	Woodruff key 3mm	1
	336061	Puller	Optional
	336062	Spanner wrench	Optional