

CARBONETIC Carbon Clutch operating instructions

Thank you very much for your purchase of the CARBONETIC carbon clutch. Please read these instructions before operating the carbon clutch.

Warranty

- If the installation is impossible due to defective or incorrect parts, the proper parts will be supplied by ATS&ACROSS.
- · Once the clutch is installed or used in anyway, there will not be any warranty.

Warning

- It is extremely important that the flywheel is properly installed since an improperly installed flywheel might cause a serious accident. Use new bolts of proper length for flywheel assembly. Refer to the service manual for tightening torque.
- Clean the splines of input shaft and apply light transmission oil. Do not use heavy grease since grease tends to attract the dust and might cause insufficient clutch disengagement.

Attention

- The installation should be performed by an experienced mechanic at a properly equipped garage.
- CARBONETIC clutch should be installed only to the car/transmission specified by each model number.
- A long time half clutch operation will generate too much heat and will cause an engagement problem.
- Use only CARBONETIC genuine parts for maintenance and adjustment of the clutch

Disclaimer

CARBONETIC products are manufactured for racing use. The user shall determine the suitability of our products and assume all the risks and responsibility in connection with their use. Regarding the legality of the products, the local laws vary from state to state. Please check with your local law enforcement.





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CARBONETIC carbon clutch installation

- Removal of the transmission. Please follow the service manual of the car.
- Clearing of input shaft Please clean the splines of the input shaft. Check any damage or deformation of the splines and if there are, use a new parts.
- For a clutch with casing. If you remove the casing from flywheel, use new bolts for re-assembly. The tightening torque is 2.0 kg-m (14.5 lb-ft)
- Flywheel assembly. Please pay the extra attention for the flywheel attachment since the inappropriate flywheel assembly might cause a very serious accident. Use new bolts for the attachment and use the right tightening torque specified by the service manual of the car.

Flywheel tightening torque

For other cars — use the torque specified by the manufacturer's service manual

Skyline GT-R, R32, R33, R34 tightening torque 14.5 -15.5 kg-m (104.9 - 112.1 lb-ft). Silvia S13, S14, S15 tightening torque 8.5 - 9.5 kg-m (61.5 - 68.7 lb-ft).

EG6,EK4, EK9, DC2 tightening torque 10.5kg-m.

CN9A, CP9A, & CT9A tightening torque 13.5kg-m.

FC3S & FD3S tightening torque 6.2kg-m.

Subaru WRX GC8,GDA,GDB tightening torque 7.6kg -m. (55.0 lb-ft)

- Use the stock clutch release parts. A big slave cylinder, different shape pivot and clutch fork might cause the insufficient disengagement due to the change of clutch stroke
- Set the free travel (pedal play) between clutch pedal and master cylinder and the location of the pedal stopper to the stock specification
- Remove the cover-ASSY, pressure plate, clutch plate A, clutch plate B, clutch hub from the flywheel. The casing is fixed to the flywheel. **Pressure plate and clutch hub have the top and bottom sides. It might be a good idea to mark the direction at this point.** Clutch has been assembled in the right direction when it is shipped out form the factory.
- Install the flywheel to the engine
- Sequence of clutch assembly clutch plate B, clutch hub, clutch plate A, clutch plate B (clutch plate A ===), Pressure plate, and cover ASSY. Please refer to the diagram in the separate sheet.
- Pressure plate assembly. (If the pressure plate is not fixed to the cover) The hook of the pressure plate should face the cover.
- Cover ASSY (tentative tightening) assembly. Tighten the bolt in a diagonal sequence. Do not tighten fully until the disk and bearing are aligned correctly.
- Attach the cover ASSY to the casing lightly and use a centering tool to match the center of the hub to the center of the crank shaft. (This process is very important to center the disk and hub on the flywheel)
- With the disk aligned, tighten the attaching bolts. Tightening torque for cover bolt 1.8 2.0 kg —m





- Release parts assembly By referring to the service manual, follow the proper procedure for your car.
 Pay enough attention not to damage the splines of input shaft against the clutch plate. Unnecessary pressure will damage the disks. Make sure you use a transmission jack.
- Clutch fork (release fork) location. While the clutch bearing is in contact with clutch spring, make sure
 the clutch fork is almost making a right angle with the mission axis. If the angle is out by more than 5 degrees, a change of spline sleeve size might be necessary.
- Air removal from slave cylinder If the assembly involves loosening a bolt on the slave cylinder to relocate or realign the laying pipe, air removal (bleeding) becomes necessary.
- Clutch pedal adjustment. Adjust the rod between the pedal and the master cylinder so that the free
 travel is as close as zero. It is important to make the free travel as small as possible <u>but never set it</u>
 negative refer to another page (free travel adjustment)

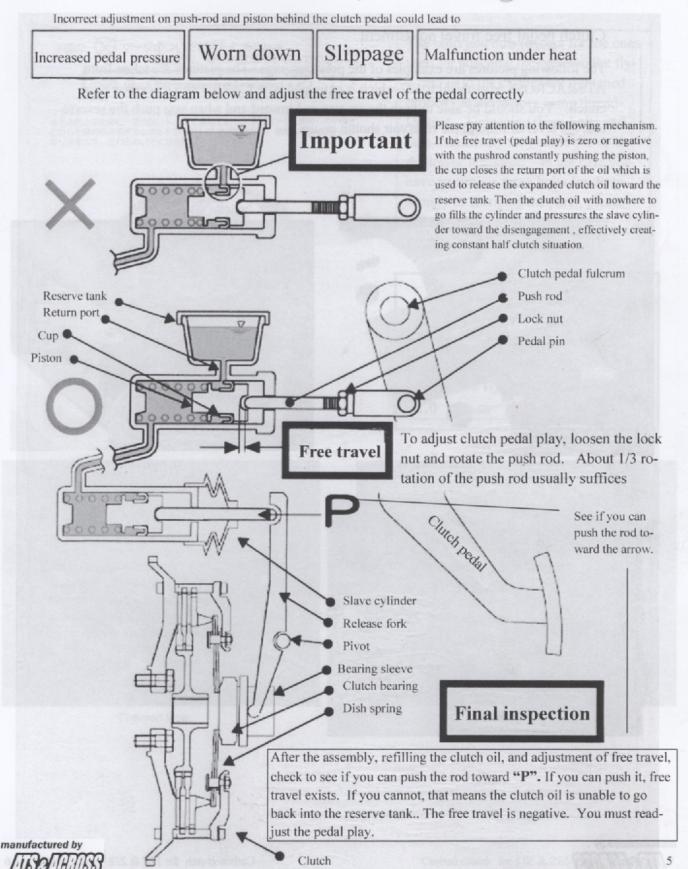
Brake in Drive around 800 to 1000 miles on the street. A drag race type start during the brake in period will significantly reduce the life of carbon clutch. Also please avoid a dyno test at full power before finishing the brake in period.

Avoid a long half clutch Long half clutch causes heat accumulation and hastens the warping of pressure plate and floating plate resulting in a disengagement problem and difficulty of changing gears. For an extended life of carbon clutch, try to engage the clutch with as little half clutch as possible. Carbon plates have a property of lubrication and can handle a very short clutch engagement with little half clutch.



Clutch pedal free travel adjustment

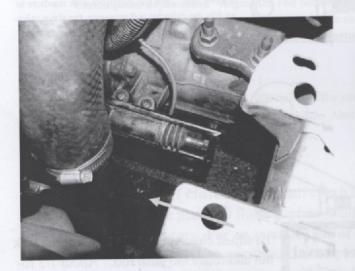


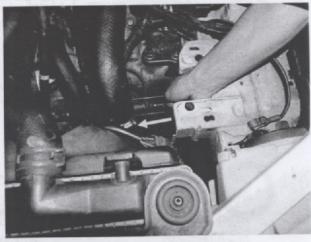




Clutch pedal free travel adjustment

The following pictures are examples of the previous page. The pictures are taken from ATS&ACROSS Mitsubishi Evo 7 which is equipped with CARBONETIC carbon twin clutch. You should be able to push the reverse rod inward and when you push the reverse rod, the level of fluid in the reservoir should go up.







Push the rod to the direction of the arrow, the fluid level in the reservoir should go up. If you cannot press the rod, the free travel is negative and you have to make an adjustment.

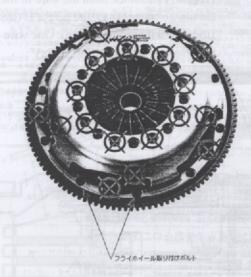


下図の マークのついたポルトとナットは、 緩めたり、締め付けたりしないでください。

Don't touch the bolts and nuts marked



フライホイール取り付けポルト以外の、ナットや六角穴付きポルトは、 ゆるみ防止のだめに一定の強いトルクで締めており、ネジロックを併用しています。 これらを締め込み過ぎるとポルトやナットガネジ切れたり、変形してゆるみやすく なりますので、さわらないでください。



The bolts and nuts (except for the ones used for attaching the cover to the flywheel or to the casing) are tightened properly at the factory using thread-lockers. Tightening those bolts and nuts excessively may cause the deformation or breakage. In the case you have to remove those bolts for disassembly or changing the parts, please refer to ATS&ACROSS.

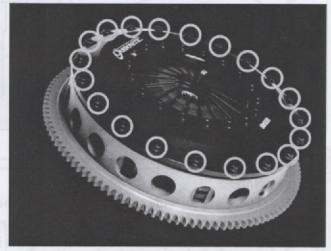
0

The bolt-nuts for cover to flywheel or casing are shown in the circle

Tightening torque for cover ASSY to flywheel or casing is 2.0 kg -m (14.5 lb-ft)



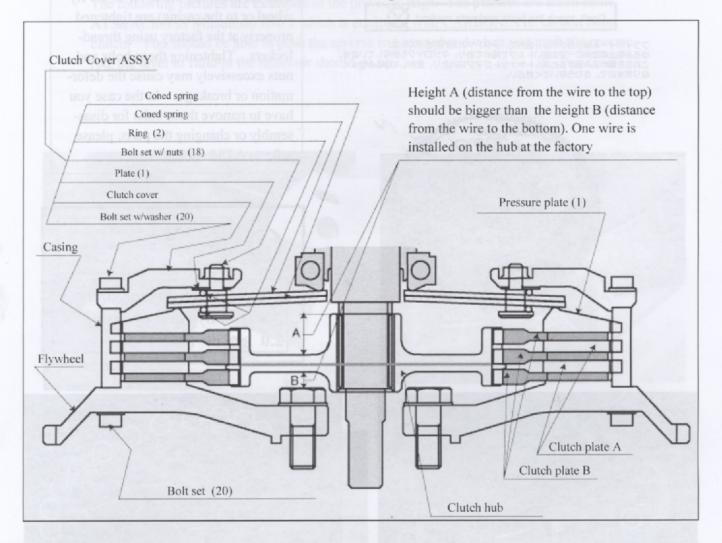
Compact type



Casing type



CARBONETIC Carbon Triple Clutch Diagram



Note:

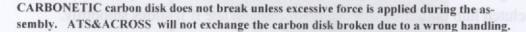
There are top side and bottom side for the pressure plate and clutch hub. Please pay attention to install them in the correct direction. Clutch plate A & B for new one do not have the sides. (Once you use a clutch, it is important to place back all the plates with same order / side during the reassembly.)



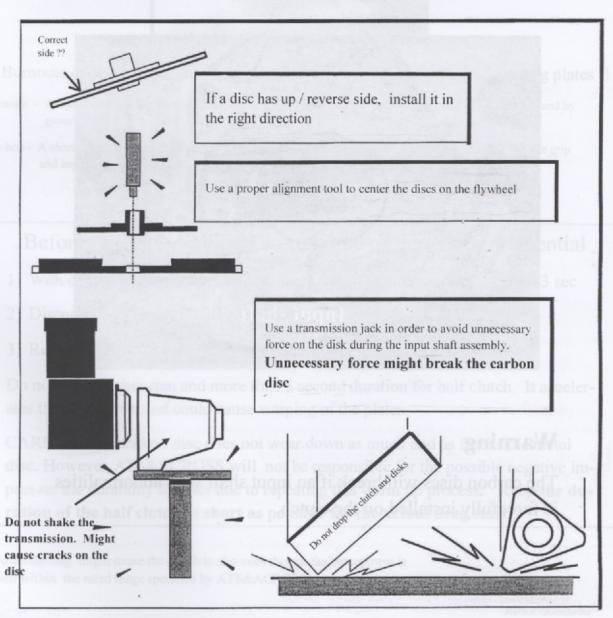


ATTENTION Important points for clutch assembly

CARBONETIC carbon disc is very strong and does not break under the normal use. However, under unusual circumstance it might break like when the significant force is applied perpendicular to the disk. Even though the disk might not break, the force might cause a crack and result in disk failure during the driving. In order to avoid the possible damage to the carbon disk, please pay the attention to the points described below.





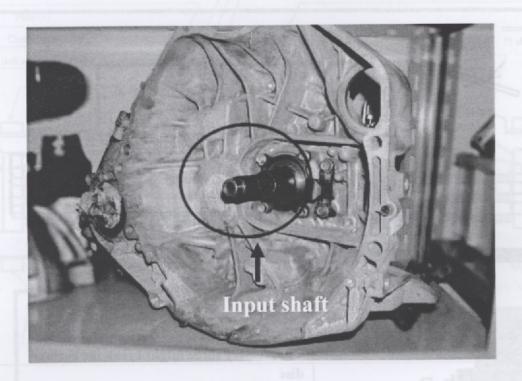




Caution for clutch assembly of stolog tostrogmi. MOITMATETA

Inspect the input shaft splines for possible warp, twist, and rust before attaching the clutch to the mission. If there are any abnormalities, repair it or use new parts.

*** Checking abnormalities like deformation, twist, and warp of splines *** Insert the clutch hub onto the input shaft splines and see if it slides smoothly.



Warning

The carbon discs will break if an input shaft with abnormalities is forcefully installed on the clutch.





When drag racing, please pay attention to: Attention:



Burnouts & dry hop without warm up will warp the pressure plate and floating plates !!

- Burnouts A method, at the start, to increase the tire grip to the maximum by intentionally inducing wheelspin and by generating heat in the tires.
- Dry hop A short practice launch. By bringing an engine up to a launch rpm, then launching to examine the tire grip and engine response. Depending on how the car reacts, you will adjust your launch rpm.

Before burnouts / dry hop, a warm up of the clutch is essential

- 1) With emergency brake applied, maintain the half clutch at 2,000 rpm for 3 sec
- 2) Disengage the clutch for 20 to 30 sec
- 3) Repeat the above mentioned process 5 to 10 times.

Do not - use higher rpm and more than 3 second duration for half clutch. It accelerates the wear down and could cause warping of the plates.

CARBONETIC carbon disc does not wear down as much and as fast as the metal disc. However, ATS&ACROSS will not be responsible for the possible negative impact on the durability of discs due to repeating this warm up process. Keep the duration of the half clutch as short as possible for the actual drag start.

Powershifting might cause the clutch to slip even though the horsepower is well within the rated range specified by ATS&ACROSS





Warning

Page 5, 9, & 11 are especially important. Please make sure you and your mechanic read those pages and follow.

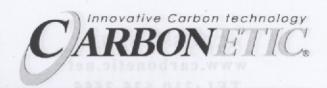
Page 5 - clutch pedal free travel adjustment. If the free travel is not adjusted correctly (as described in the page with effective constant half clutch situation, the carbon discs wear out very quickly and cause early malfunction.

Page 9 - close to 100% of early failure/break of the carbon discs are caused by cracks made during the installment. Use a transmission jack and do not shake the transmission onto the engine at the installment.

Page 11 - Even though the carbon discs last much longer than metal under the same operation, they produces more heat. The heat accumulation from an extended half clutch (slipping clutch) at high RPM will warp the pressure plate causing early failure of the clutch. Our carbon clutch due to its surface lubricated characteristics (the surface of the carbon disc acts like as if oil is applied on it) can handle a rapid engagement.

Use half clutch as short as possible, preferably less than 3 second. (At the drag racing) was trade as detailed and to notice





Instruction manual to convert pull style to push for Toyota 1JZ-GTE and 2JZ-GTE carbon clutch

Necessary parts (for both 1JZ-GTE and 2JZ-GTE except for the clutch bearing) Those are included in the kit

- *Toyota bolt (flywheel bolt) 90910-02103 x 8
- *Toyota slave cylinder 31470-22120 x 1
- *Toyota pivot (support) 31236-20070 x 1
- *Toyota release fork 31204-20111 x 1
- *Toyota release clip (release fork spring to tie the fork and sleeve) 31232-20031 x 1
- *Nissan clutch bearing 30502-21000 x 1 for 1JZ-GTE
- *Isuzu clutch bearing 5-09803005-0 x 1 or NSK TK45-4B for 2JZ-GTE
- *Mazda flexible oil hose F044-41-380B x 1

Parts also enclosed with the kit (for 1JZ-GTE)

Bearing sleeve, spacer, cylinder bracket, copper washer x 2, E-shape stopper, washer x 1, bolt M8x20 (w/SW) x 6

Parts also enclosed with the kit (for 2JZ-GTE)

Bearing sleeve, spacer, cylinder bracket, copper washer x 2, E-shape stopper, washer x 1, bolt M10x25 (w/SW) x 2, M8x25 (w/SW) x 1, and M8x20 (w/SW) x 3

SW — Spring washer The bearing is attached to the bearing sleeve at the factory

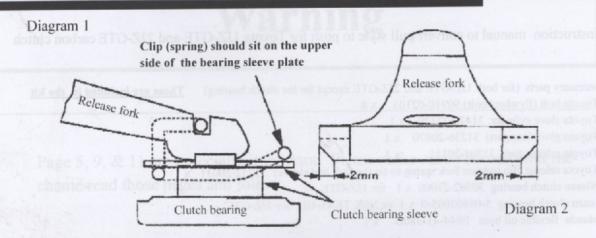
Pull style to push style conversion process

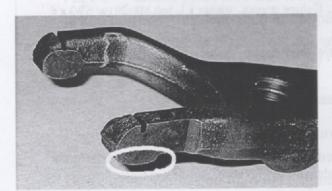
Note: 1) apply grease to the metal contact areas of pivot, sleeve, and cylinder rod 2) Use the torque specified by the Toyota service manual for tightening the flywheel bolts. (Tighten the flywheel bolts with 5Kg-m torque first, then the bolts further by 90 degrees.)

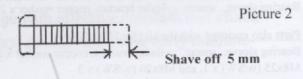
- (1) Before removing the clutch oil hose from the slave cylinder, check if you can push the piston of the slave cylinder manually by your hand. If you can push it, the free travel is fine. If you cannot, the free travel is not sufficient (negative). Please adjust the free travel level by referring to the attachment "Clutch pedal free travel adjustment".
- (2) Check the parts which are possibly worn out (like the piston of master cylinder.) If necessary, replace them with new parts.
- (3) After removing the transmission from the engine, clean the main input shaft and make sure if you can insert the main input shaft into the carbon clutch smoothly. If there is extensive rust on the shaft or if the shaft is damaged or deformed, either fix it or replace it. (Refer to one of the attachments Caution for clutch assembly)
- (4) Remove the stock release fork, the stock pivot, and the stock slave cylinder.
- (5) Grind / shave off the edge of both side of release fork by 2 mm. Please refer to the diagram 2, and the picture 1. This is to avoid an interference with the CARBONETIC bearing sleeve which has slight R (curved portion).
- (6) Shave off the tip of stock M10 bolt used for bolting the engine and the transmission by about 5mm in order to avoid an interference with the bracket. Please refer to the picture 2.

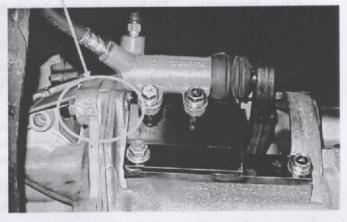












Picture 1

Shave off the circled portion by 2mm for both sides of the fork

- (7) Attach the pivot (Toyota 31236-20070) to CARBONETIC spacer provided in the kit. Refer to the picture 3.
- (8) Tentatively bolt down the CARBONETIC spacer with the pivot (Do not tighten fully. You may want to adjust it slightly later). Pay attention to the direction of the spacer. After the process #14, align the center of the release fork and the slave cylinder, then tighten the bolt fully. Specified bolts are: for 2JZ M10xL25 (w/SW[spring washer]) x 2, for 1JZ M8xL20 (w/SW) x 2.
- (9) Please skip this. [The bearing is already pressure pressed on the bearing sleeve at the factory. A spacer might be used between the bearing and the sleeve for 2JZ model] Insert the clutch bearing (Nissan 30502-21000 for 1JZ, and Isuzu 5-09803004-0 or NSK TK-45-4B for 2JZ) onto the bearing sleeve.





Picture 3 Pivot

M8x20 & Spring washer for 1JZ-GTE. Use M10x25 & Spring washer for 2JZ-GTE

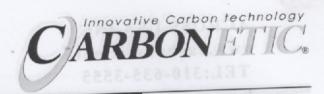
Picture 4

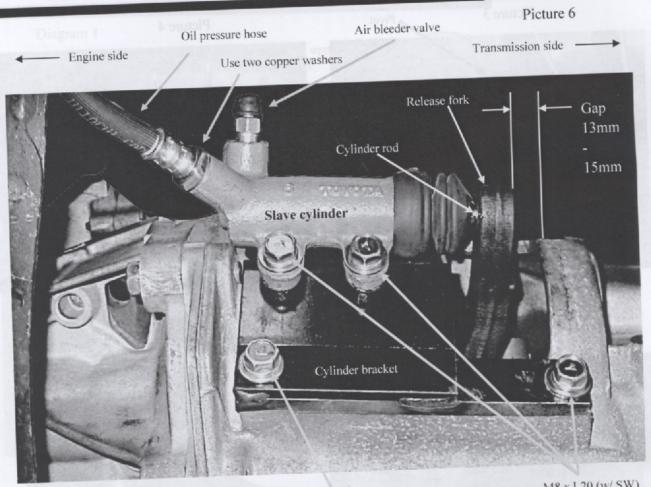
Picture 5

Attaching the release fork and clip (spring) to CAR-BONETIC bearing sleeve



- (10) Attach the release fork and release clip (31232-20031) to the CARBONETIC bearing sleeve. Referring to the Picture 5 and diagram 1, make sure the clip (spring) is attached correctly. Improper installment of the clip hampers the smooth operation of the clutch.
- (11) Install the release fork and clutch bearing (assembled in the process #10) into the clutch housing.
- (12) Bolt down the slave cylinder to the CARBONETIC bracket. Specified bolts M8 x 20 (w/SW) x 2





SW- Spring Washer

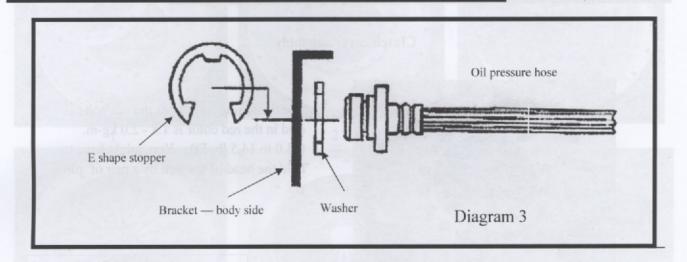
For 2JZ, M8xL25(w/SW), for 1JZ M8xL20(w/SW)

M8 x L20 (w/SW)

- (13) Tentatively fix the bracket (assembled in the process #12) to the clutch housing. Specified bolts: for 2JZ M8xL25 (w/SW) x 1 and M8xL20 (w/SW) x 1 [L25 is for the engine side]. for 1JZ M8xL20 (w/SW) x 2. Refer picture 6
- (14) Align the center of the release fork (assembled in the process #10) and the slave cylinder (assembled in the process of #13). If the center is not aligned, check the location of the pivot—check to see if the direction of the spacer is correct, and check and adjust the location of the slave cylinder. Attach the release fork again and align the center again. Once the centering is finished, tighten the bolts fully for the bracket.
- (15) Assemble the release fork and the clutch bearing into the clutch housing again like the process #11.
- (16) Assemble the clutch to the engine and attach the transmission to the engine.







- 17) After the assembly of the release fork and the slave cylinder, check to see if the gap in the picture 6 is 13mm to 15mm. If the gap is beyond this specification, check if the pivot is fully tightened or if the clutch bearing is fully inserted. Adjust if necessary. The cylinder stroke movement at the full clutch pedal stroke is about 11mm.
- 18) Fix the oil pressure hose on the bracket (body side) by using the one washer (included in the kit) and E-shape stopper (also included in the kit). Attach the other side of the hose to the slave cylinder with two CARBONETIC copper washer. Refer to the diagram 3 and picture 6.
- 19) Refill the clutch oil and bleed the air.

Important

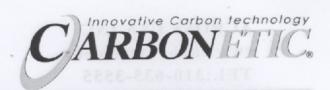
Pedal free travel

At the final stage of the assembly, check to see if the clutch disengages and engages without any problem by pressing the pedal. The disengagement point becomes deeper than the stock. However, it is not a malfunction. After bleeding the air completely, adjust the disengagement point by minimizing the free travel, by adjusting the rod at the end of the pedal, or by adjusting the stopper on the pedal.

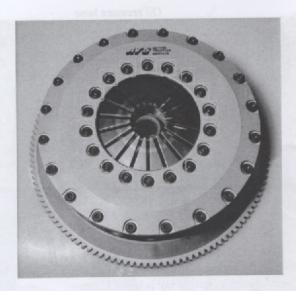
After the pedal free travel adjustment, make sure

- 1) you can push the piston of the slave cylinder by hand
- 2) If you cannot, adjust the free travel again



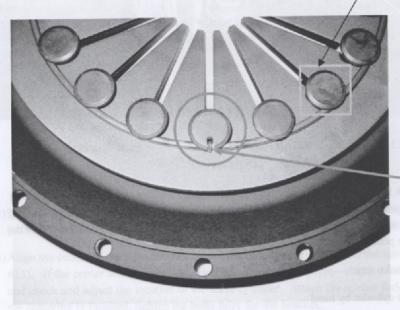


Clutch cover assembly



The tightening torque for the nut/bolts circled in the red color is 1.8 - 2.0 kg-m. (13.0 to 14.5 lb. Ft). You might have to hold the head of the bolt by a pair of pliers

You might want to hold this bolt head by a pair of pliers when tightening the nut by a torque wrench or by a air wrench.

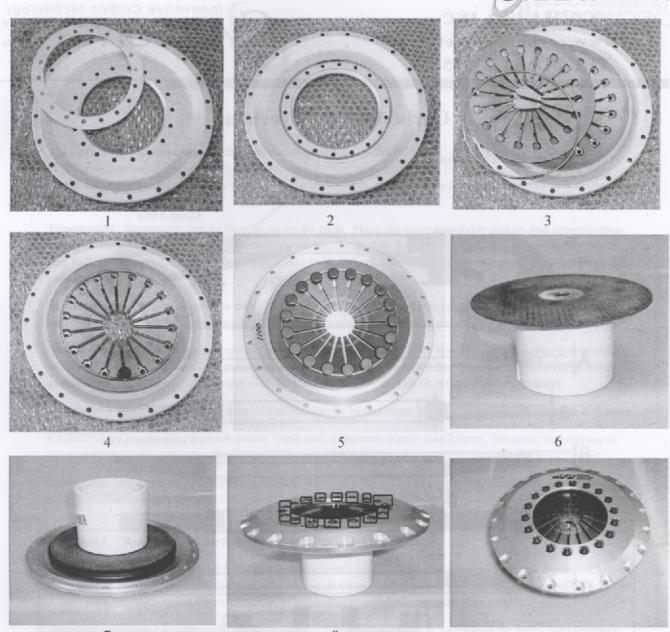


If the ring you place between the coned disc spring (diaphragm) and the bolt heads has a protuberance, make sure

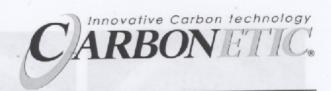
- * it does not face the coned disc spring
- * the ring should be placed so that the protuberance is between the bolt heads.

For the entire clutch cover assembly, refer to the next page





- 1) Place a 1mm plate on the back side of the cover
- 2) Place a ring (which does not have any protuberance) on the plate
- 3 & 4) Set two coned disc spring and then place a ring (this ring could have a protuberance) on it
- 5) Insert the bolts
- 6) It helps if you have a tool shape like this to keep the bolts from falling
- 7) By keeping the bolt from falling, turn the cover so that the upper side faces you
- 8) Insert the nuts and hand tighten them. Then use a torque wrench or air wrench with 1.8 to 2.0 kg-m tightening torque



Carbon Clutch overhaul

A typical example of a worn out / warped carbon clutch Cover ASSY Pressure plate Clutch plate B (1) Clutch plate A (1) Clutch plate B (2) Clutch plate A (2) Clutch hub Clutch plate B (3) *Flywheel

Even under the proper usage, the internal parts of CARBONETIC carbon clutch wear down after several years of operation. This will provide some solutions if the clutch becomes slippery or starts experiencing the disengagement problem.





Carbon clutch overhaul procedure

This section introduces several overhaul process to cope with a CARBONETIC carbon clutch which experiences slippage or disengagement problems due to a worn out / warped internal parts. First, measure the degree of wear and tear and/or warpage, then decide the process. Typical examples are shown here but those examples do not cover all the possible situations.

Disassembly Remove the dust by blowing air on the parts. Mark the parts (assembly orders and upper/bottom sides) — This is very important. A brand new carbon clutch plate does not have sides. However, during the usage, each side wear out differently. It is important to place back all the plates with same order / side during the reassembly.

Measurement Use a micrometer to measure the wear of a disc. Use a feeler gauge and precision straightedge to measure warpage. Measure the warpage of a flywheel without removing the casing.

Assembly Use new diagram spring(s) if necessary. (especially if the color is very blue, the change is strongly recommended). Make sure all the parts are placed back in the same orders/sides. Use new CARBONETIC bolts and tighten them at the specified torque. Do not touch the ring on the hub (it is fragile and might snap)

Disc factory spec Carbon disc 3.9mm Carbon disc for Nissan single clutch 8.0mm Clutch plate A 5.5mm

CARBONETIC carbon disc does not usually break until it becomes thinner than 2.0mm. However, the slippage or other problem might start before the disc wears down to that point.

The diagram in the previous page is exaggerated to show the points. The following is some process of overhauling CARBONETIC triple carbon clutch.

Overhaul 1 Restoration of performance without changing the plates

When the total wear of clutch plate B (carbon plates) exceeds 1.0 to 1.5mm, the pressure plate rate dramatically goes down resulting in possible clutch slippage. By adding an 1 mm plate (CARBONETIC parts number A37189-10) or 1.2mm plate (A37189-16) on the clutch cover, it is possible to restore the pressure plate rate.

Required condition Engagement / disengagement is normal. The maximum warpage of the metal parts (pressure plate, clutch plate A, and flywheel—A, B,C, D) is less than 0.5mm. Sometimes a larger warpage is acceptable when the all the original parts are used. The thickness of the clutch plate B (carbon disc) is above 2mm. A carbon disc with less than 2mm thickness has a higher chance to break.

Process Install a plate A37189-10, described as P in the diagram, on the backside of the clutch cover. There is an original plate. Do not remove it, just add the additional one on the original plate. Calculate the total wear by = 3.9 x (number of the plates 1 to 3) - (b + c + f). Add one plate (1mm) for the wear of 1.0 mm to 1.5mm. A 1.2mm plate (parts# A37189-16) could be used for a larger wear.

Note Change the metal part to a new one if the warpage is larger than 0.6mm. The partial wear of a carbon disc which contacts to the new metal parts has to be within 0.2mm. The partial wear is defined as b-a, c-d, f-e.





Overhaul 2 Replacing the metal parts (pressure plate / clutch plate A) with the new ones

If the clutch has disengagement difficulty, the warpage or distortion of the metal parts may be out of the factory spec and they need to be exchanged to the new ones. If the partial wear of the carbon disc contacting the warped metal parts is beyond the factory spec, it also has to be replaced.

Required condition The partial wear of the carbon disc has to be within the following spec. b - a within 0.2mm, c - d within 0.2mm, & f - e within 0.2mm

Process Replacing the pressure plate and/or clutch plate(s) with the new ones

Note You might experience a slight slippage right after the reassembly (150 to 600 miles). If the partial wear of a carbon disc is above 0.4mm and contacting metal part is replaced with new one, the carbon disc also has to be replaced with a new one.

Overhaul 3 Replacing the clutch plate B (carbon disc) with new ones

The case you have to replace the carbon discs only is rare. The warpage of the metal parts contacting the replacing carbon plates has to be within the factory spec. Otherwise, replacing a carbon disc only will cause a slippage problem.

Required condition The warpage of the clutch plate A and the flywheel has to be within the following spec. A, B, C, & D has to be within 0.1mm

Process Replace the clutch plate B (carbon disc) with a new one

Note You might experience a slight slippage right after the reassembly (150 to 600 miles).

Alternative for Overhaul 1

Instead of adding an extra plate on the cover, it is possible to restore the pressure plate rate by reducing the height of the casing.

Process Bring the casing to a machine shop and mill / shave the height by 1mm (possibly slightly more) by a lathe. You can reduce the height either from the top (cover side) or from the bottom (flywheel side) of the casing. This has to be performed by a trained professional.

