Warranty

Scope of Warranty

- This product only
- Problems with the normal use of this product
- Design defects of this product
- Failure other than normal fatigue

Warranty Period

- 3 years or 30,000 km, whichever comes first.

Not covered by Warranty

- Malfunction due to normal use
- Malfunction due to improper use
- Malfunction due to improper installation
- Malfunction due to improper maintenance
- Wages, gaskets, oil, and other consumables
- Vehicle disposal, substitute car fees

Be sure to do the regular vehicle inspection (or once every two years) for this product.

MAMBA Co., Ltd.

[Established when the conditions as below are met] (1) The customer received a sufficient explanation about the product from the store it was purchased. (2) The name and address of the store are filled out with a stamp in the designated field below. (3) After the customer was introduced to the product by the retailer, the customer read this manual on their own and understood the explanation from the retailer good enough before signing the papers. (4) Regarding this warranty, only this kit is covered by the warranty.
[Request from the Store] Please fill in all required items in the entry field and send us a FAX within one week. The warranty period is 3 years or 30,000 km, whichever comes first.

[Owner Entry Field]

I received an explanation of the "Manual Revers Gear Kit" from the store, read the "Operating Method" in this manual, and have a good understanding of the product.

Name: **Vehicle Model:**

Type: **Sidecar** **Motorcycle** **Tricycle** *circle either

Mileage **Vehicle ID Number:**

Installation Date: **Registration Number:**

[Store Entry Column]

Store: **Operator:**

Serial Number:

Updated June, 2020

Reverse gear system

ALL MODELS

Instruction Manual

MAMBA Ltd.JAPAN

Dear Customer

Thank you for purchasing our Revers Gear Kit. Our product, which is based on the vision of realizing "Safe and Easy-to-Use H-D", has been consistently undergoing development and mounting tests from the design stage. We are proud of Mamba Co., Ltd. to have a unique structure and function, with the reliability of quality, we believe we will receive tremendous support from our customers.

This product is a model that has been originally developed, manufactured, and sold by Mamba Co., Ltd. and after thoroughly reviewing the model we put in efforts to simplify the structure and improve the quality, which has been our goal for many years. We are confident that you will be satisfied with its performance, reliability, and quality once it is installed in your vehicle.

Please enjoy a comfortable H-D life.

Ichiro Mamba
Mamba Co., Ltd

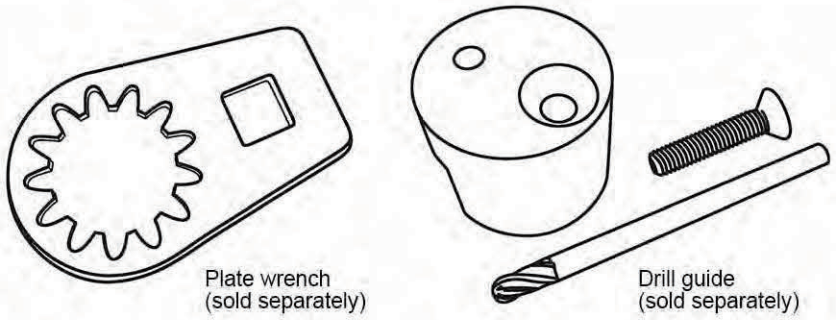
[Working precautions and Tools used]

- Carefully read this manual and understand before starting.
- Assemble and adjustment at a company designated store or service shop.
- A special tool is required to assemble this kit. Please prepare in advance.
- For other tools, use the appropriate tool that suits the task.

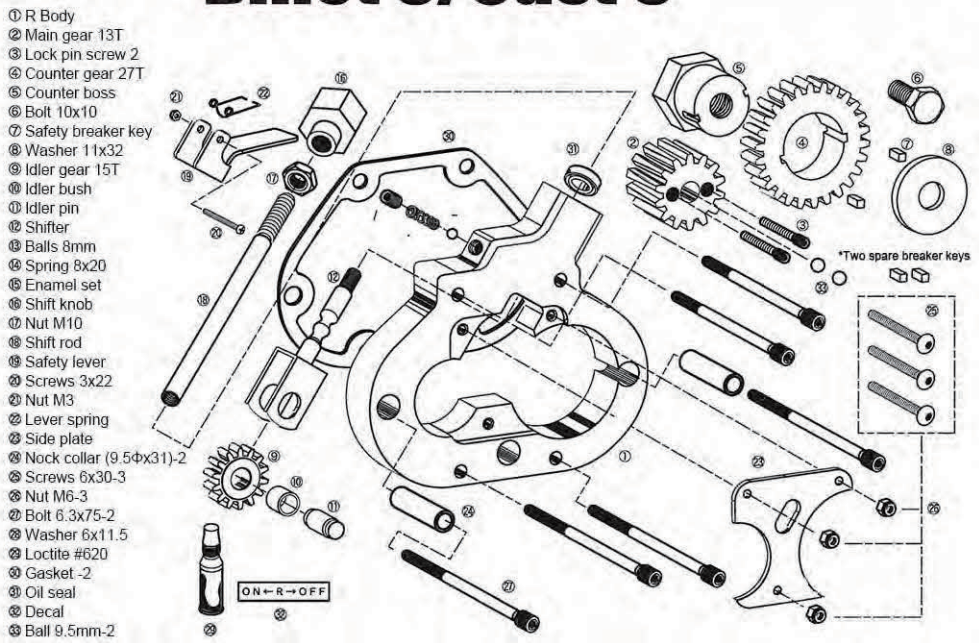
[Tools used]

1: Special tool: Mamba plate wrench (sold separately)
2: Special tool: Mamba drill guide (sold separately)
3: Carbide R2.5mm ball end mill (attached to the drill guide)
4: Loctite #620 (green) / #272 (high strength)

[WARNING] Using adhesives other than those specified may cause damage. Be sure to use the locking agent specified above.



Billet 5/Cast 5



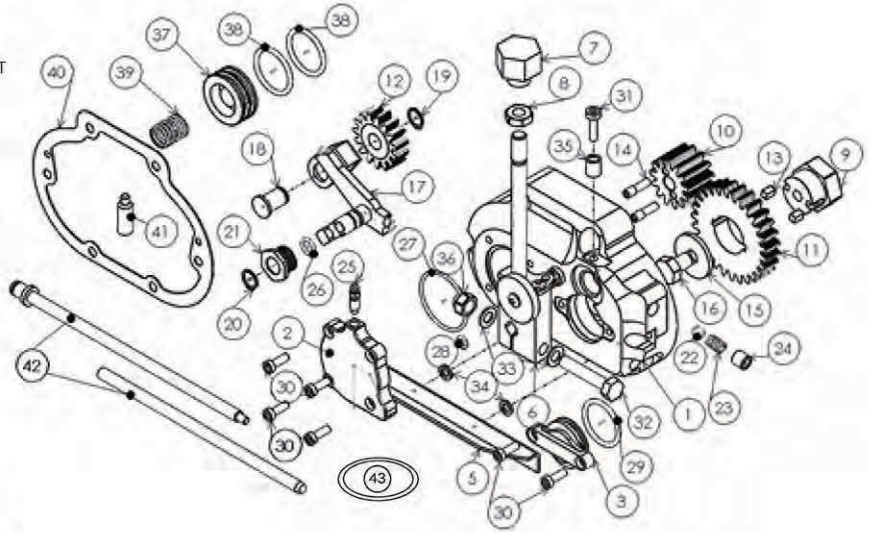
Check all parts before starting work. The contents in the package are as follows.

Warning: Make sure that it is set up properly and that it operates smoothly before proceeding.

1 Revers Gear body
2 Gaskets x2
3 Shift lever xlst
4 Cap screws x6
5 Washer x6
6 Nock collar x2
7 R counter gear (22T) xlst
8 R main gear (13T) xlst
9 9.5mm push rod extension balls x2
10 Safety trigger xlst
11 Caution label
12 Loctite #620
13 Spare breaker key
14 Decal

Billet 6SCP

1 R body
2 Bleeder plate
3 Inspection breathing cap
4 Sleeve
5 Heat guard
6 Shift lever
7 Knob
8 Six-sided nut
9 Counter boss
10 Main gear 13T
11 Counter gear 27T
12 Idler gear 15T
13 Key
14 Lock pin
15 Washers 32Φ
16 Bolt I0xl5
17 Shifter
18 Idler pin
19 Snap ring
20 Snap ring SUS
21 Shifter bushing
22 Ball 8mm
23 Spring
24 Enamel set
25 Bleeder valve
26 O-ring 12
27 O-ring 45Φ
28 O-ring 9.5Φ
29 O-ring 36Φ
30 Screw 5Xl5
31 Screw 6X20
32 Bolt 8x45
33 Washer M8
34 Washer M6
35 Collar I0xl2
36 Nut M8
37 Release piston
38 O-ring (piston)
39 Spring (piston)
40 Gasket
41 Loctite (#620)
42 Push rod (396mm)
43 Seat damper spring



Check all parts before starting work. The contents in the package are as follows.

[WARNING] Make sure that it is set up properly and that it operates smoothly before proceeding.

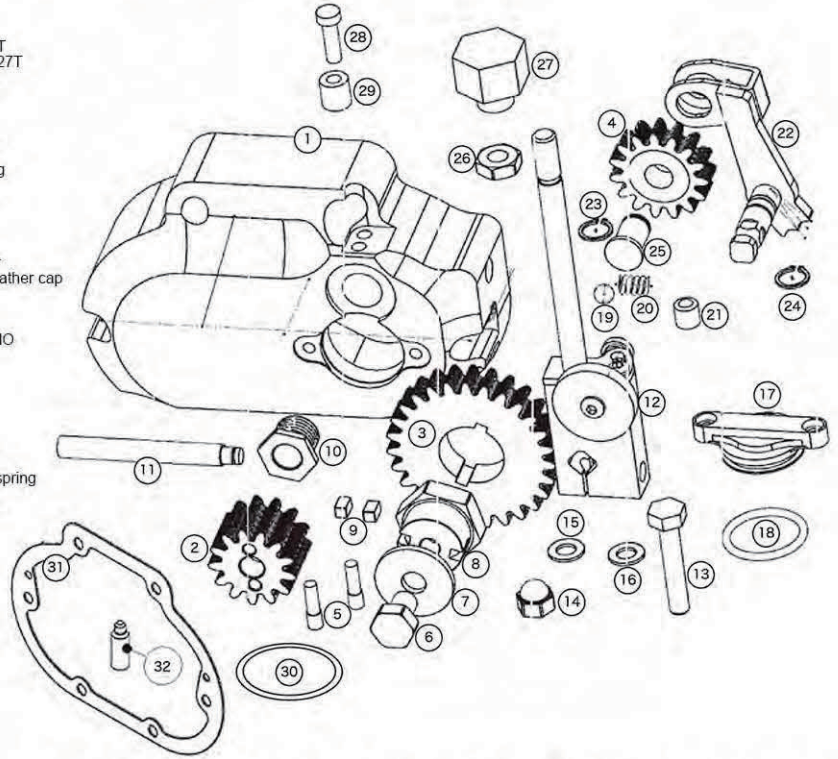
1 Reverse gear body
2 Gasket xl
3 Shift lever xlst
4 R counter gear (27T) xlst
5 R main gear (l3T) xlst
6 Caution label
7 Loctite #620
8 Breaker key kit xl + spare

The total thickness of spring dampers and seat damper springs (clutch internal parts) for vehicles in FY2019 has been changed from 3.5mm to 4.5mm. Therefore, due to individual differences (thick or thin) in the spring damper (1) clutch disengagement worsens and (2) clutch wear becomes faster with the operation (3) there may be problems such as slippery clutches.

Therefore, we recommend that you remove the spring damper and seat damper spring or replace it with a Mamba (0.8mm) seat damper spring.

Billet 6S-II

1 R Body
2 Main gear 13 T
3 Counter gear 27T
4 Idler gear 15T
5 Lock screw
6 Bolt I0Xl2
7 Washer
8 Counter boss
9 Key
10 Shifter bushing
11 Pushrod end
12 Shift lever
13 Bolt 8 x 45
14 Nut MIO
15 Washer
16 Spring washer
17 Inspection breather cap
18 O-ring
19 Ball 8mm
20 Spring
21 Enamel Set MIO
22 Shifters
23 Snap ring
24 Snap ring S
25 Idler pin
26 Nut mlo
27 Knob
28 Screw 6X20
29 Stopper collar
30 Seat damper spring
31 Gasket
32 Loctite (#620)



Check all parts before starting work. The contents in the package are as follows.

[WARNING] Make sure that it is set up properly and that it operates smoothly before proceeding.

1 Reverse gear body
2 Gasket xl
3 Shift lever xlst
4 R counter gear (27T) xlst
5 R main gear (l3T) xlst
6 Caution label
7 Loctite #620
8 Breaker key kit xl + spare

Billet 6SCP Billet 6S-II
Billet 5 CAST5

Work Procedure

1) Remove the main shaft and countershaft nuts. *Do not remove the washers for Billet S/CASTS.

2) Degrease the main shaft and R main gear (13T) in the kit.

3) Next, thoroughly apply Loctite #620 to the screw hole of the R main gear and slightly tighten by hand.

4) Fully tighten with special plate wrench. Tighten this part with torque 110Nm. It takes 24 hours to cure Loctite.

5) After tightening the R main gear, make a hole to insert the lock pin to the R main gear. The R main gear of the kit already has a hole as a guide. Drill using this hole as a guide. When using the exclusive drill guide (sold separately), refer to diagram 1 and remove the core before drilling.

6) Drill to the depth of 22mm from the surface of the R main gear toward the back main shaft. Apply oil to the cutting edge (transmission oil is usable) and air-blow the facet while drilling 1mm at a time, since it may cause damage to the tool.

7) When drilling is complete, screw in the lock pin. Do not apply the lock agent to the lock pin.

8) After degreasing the counter boss and the countershaft screw thread, sufficiently apply Loctite #620 to the shaft side screw thread of the counter boss, lightly tighten with your hands, and firmly tighten it with a plate wrench at 110 Nm.

9) Apply grease to the contact section between the counter boss and the counter gear, insert the counter gear into the counter boss, and insert the breaker key into the groove.

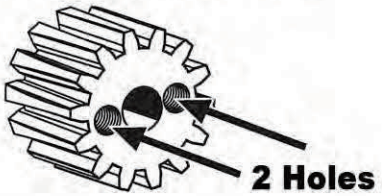
Never apply the lock agent to the breaker key.

10) Tighten the bolts (10x10) with 25Nm and apply Loctite (high strength) to the thread.

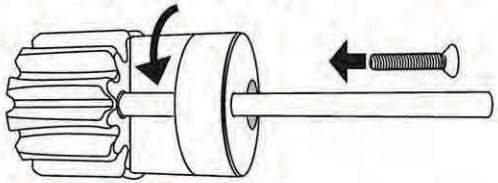
Diagram 1: Drill guide (sold separately)

Installation of Drill Guide

①Check the guide hole for R main gear



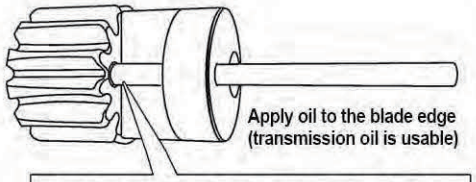
②Insert the drill into the hole for drilling, temporarily tighten the screw, get rid of looseness, and after centering, tighten the screw fully.



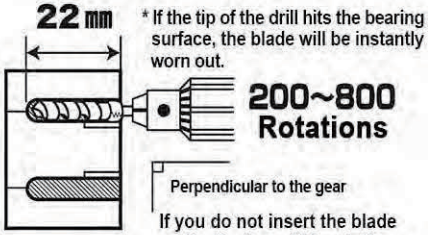
For 6S-II

Install genuine thrust bearing for the pushrod end

R Main Gear Drill Processing



Since the facets are not discarded, drill 1mm at a time and air-blow or it may damage the tool.



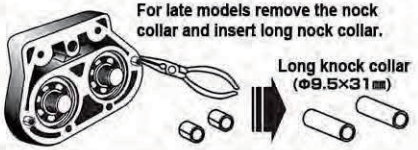
* If the tip of the drill hits the bearing surface, the blade will be instantly worn out.

If you do not insert the blade vertically, it could break the gear!

Warning! Reuters cannot be used because of high rotation speed

5-speed transmission

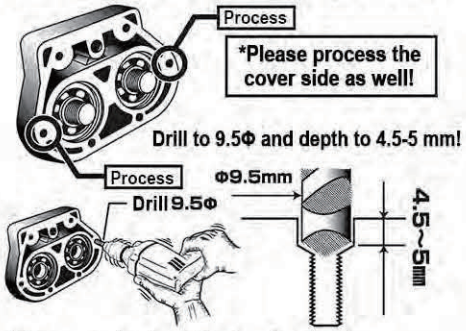
For late models remove the nock collar and insert long nock collar.



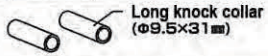
REVERSE GEAR

Nock processing for old model (5-speed transmission)

Process the area of the diagram with a drill (total 4 areas)



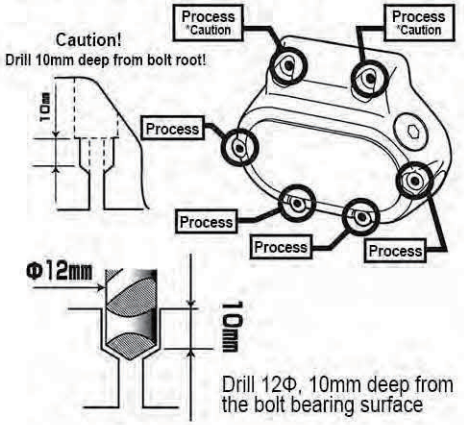
After processing, insert the long knock collar.



REVERSE GEAR **CUSTOM MC MAMBA**

Processing Transmission Cover Bolt Bearing

Process the area on the diagram with a drill (6 total areas)



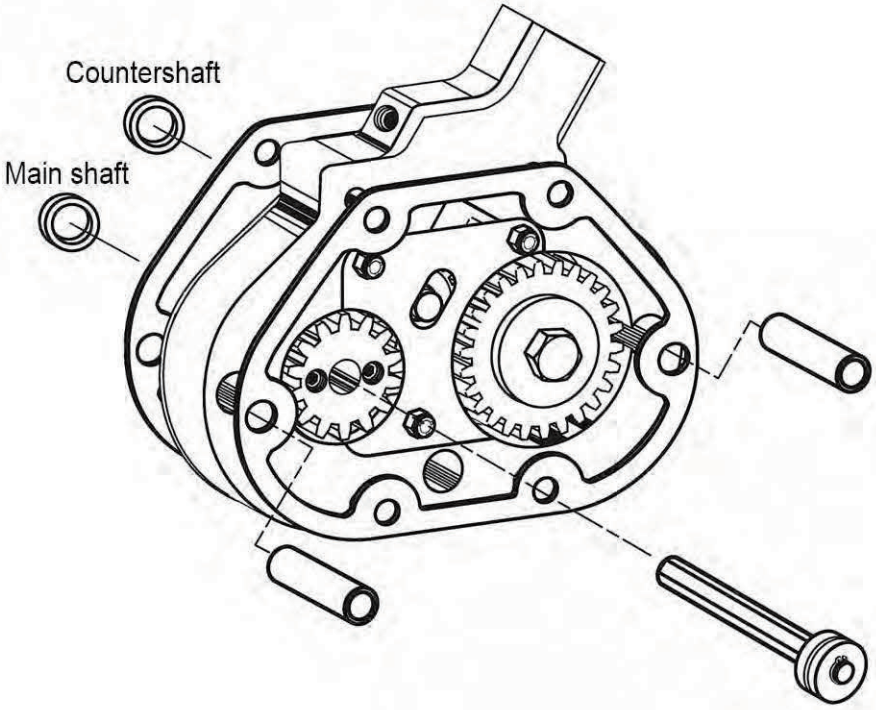
Drill 12Φ, 10mm deep from the bolt bearing surface

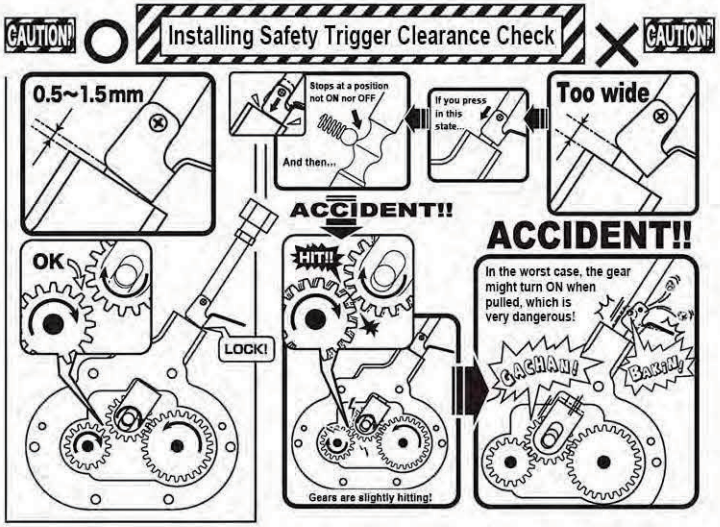
Billet 5/CAST5

R Body Assembly Procedure

After assembling the long nock collar and thrust bearing rod as shown in the diagram, assemble the cover

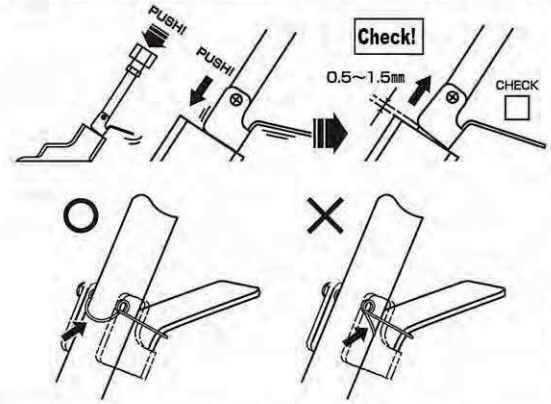
*Do not remove washer from Billets/CASTS.





REVERSE GEAR

Caution on lever spring installation



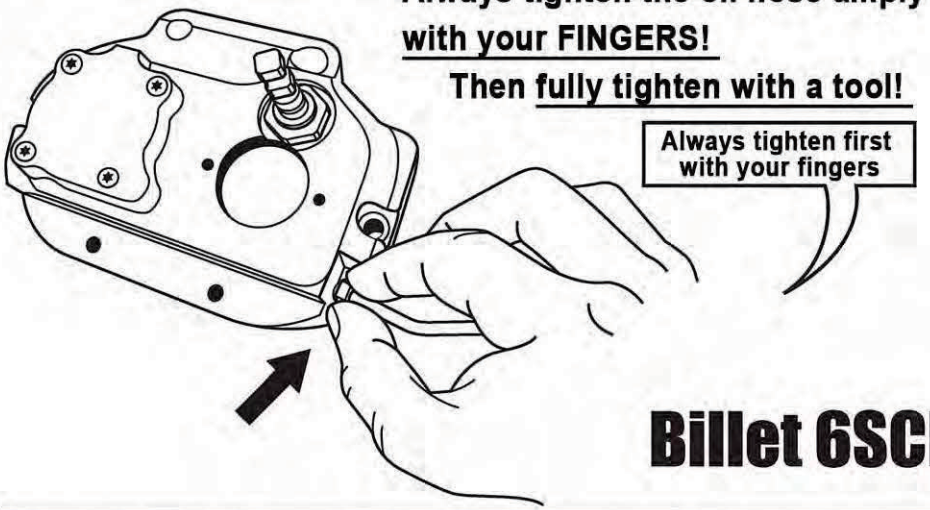
First, make sure that the shifter of the main unit is turned OFF, then open a 0.5 to 1.5mm gap between the main unit and the trigger and determine the drilling point. When the drilling point is determined, remove from the body unit, and drill a screw hole with a 3mm drill. Apply an appropriate amount of Loctite (high strength) to the internal thread on the shift arm side and attach it. In the end, test the trigger if it works smoothly.

Apply a drop of Loctite (high strength or green) to the second thread inside the shift rod and attach. In addition, when you rotate to tighten, the tightening is finished when the screw stops. Tightening furthermore may cause malfunction.

WARNING: Overpainting can cause spills leading to malfunctions.

Always tighten the oil hose amply with your FINGERS!

Then fully tighten with a tool!

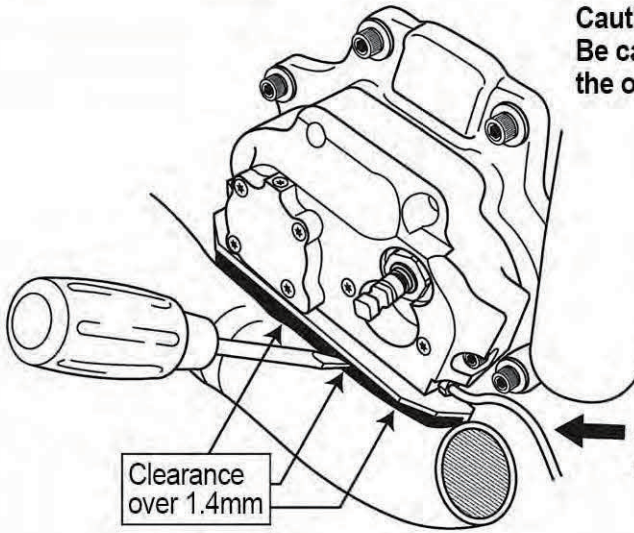


Billet 6SCP

*** Be careful not to insert it tilted, as it will damage the screw thread!**
Match the angle that fits best. It is not a right angle. (11 degrees diagonal)
If the screw threads are difficult to put in, try tapping. (M10x1mm)

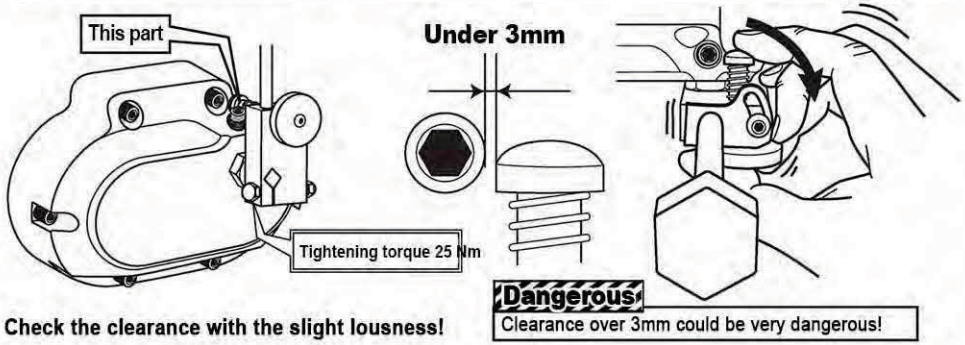
WARNING! Do not use volatile cleaning agents such as brake cleaners

It will damage the rubber of the piston seal!!



How to install the shift lever

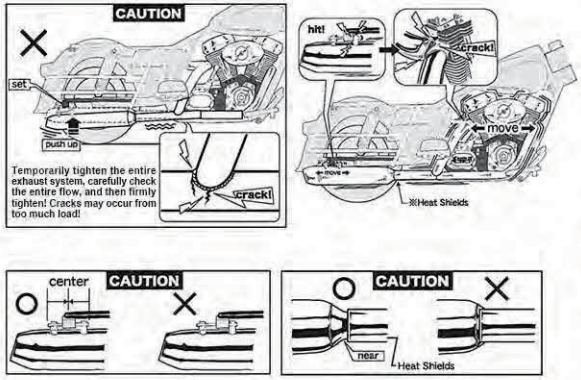
After installing the shift lever, move it in the direction shown on the diagram with your hand to check the clearance. (under 3mm)



Check the clearance with the slight lousness!

All models

A piece of advice!



REVERSE GEAR **All models**

Removing the R gear

To remove R gear, please use plate wrench (sold separately)
Stack 2 to 3 and remove at 110 Nm or more.
*Could be damaged if it is one piece.

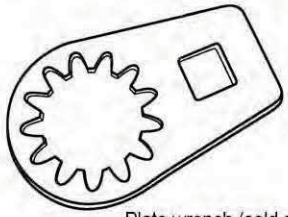


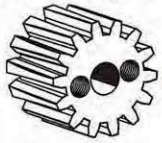
Plate wrench (sold separately)

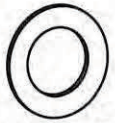
Lock pinhole adjustment when replacing the main gear

How to align the new gear hole with the already prepared lock pinhole of the main unit when replacing the main gear

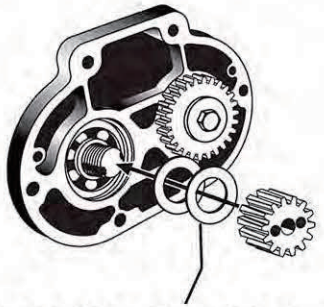
Please use several wheel bearing sim types before 1999 and adjust the lock pinhole with torque wrench 110-140 Nm.

New main gear





Wheel pairing sim (type before 1999)

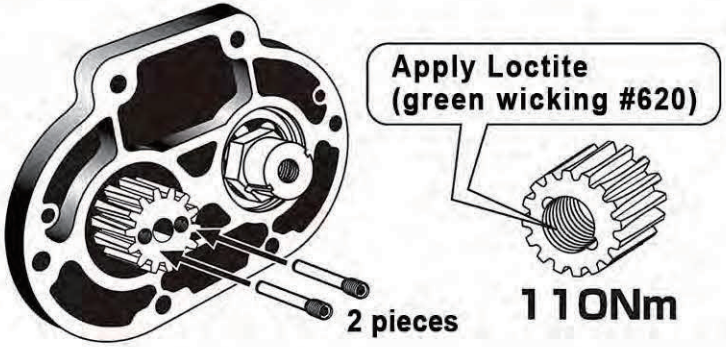


Adjust the lock pinhole using several pieces

Adjust with torque wrench 110-140 Nm

REVERSE GEAR **All Models**

R Main shaft gear torque wrench



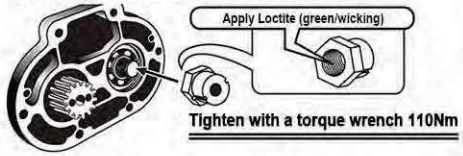
1) Loctite on the internal screw of the gear
   Apply plenty (green wicking #620).
2) Tighten gear with a torque wrench 110Nm.

Caution!
*Be careful not to apply Loctite (wicking #620) to the lock pin!

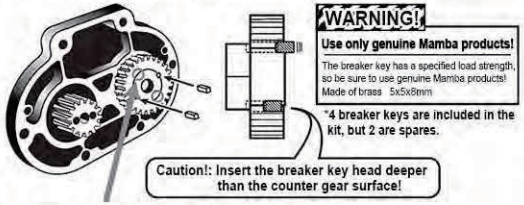
REVERSE GEAR **All Models**

Assembling counter gear

1) Screw the counter boss into the countershaft

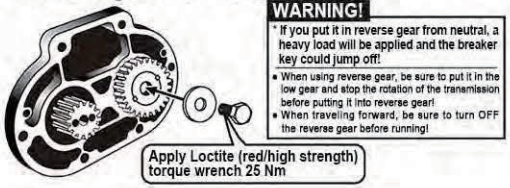


2) Install the counter gear and insert the breaker



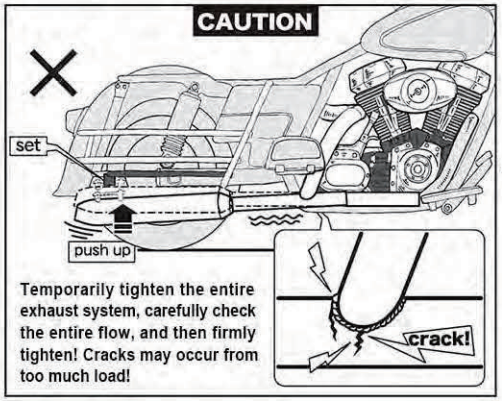
Apply transmission oil!

3) Assembling washers and screws

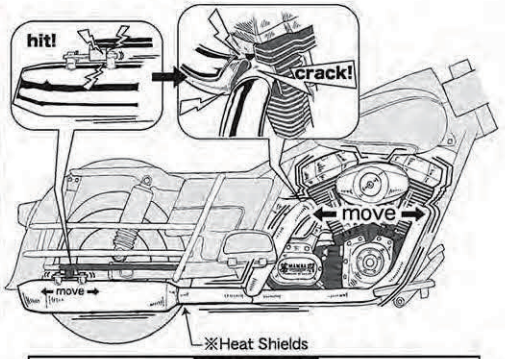


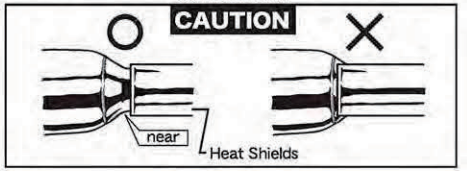
All Models

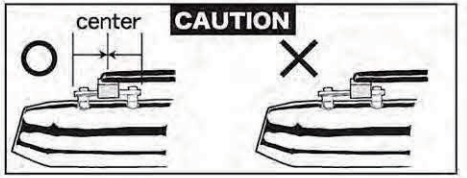
A piece of advice!



Temporarily tighten the entire exhaust system, carefully check the entire flow, and then firmly tighten! Cracks may occur from too much load!

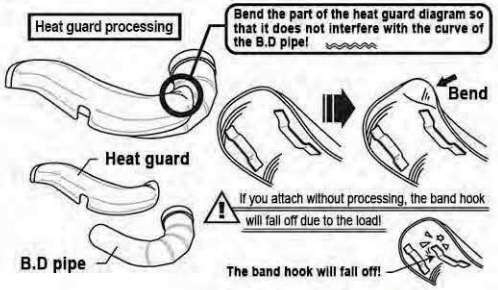






REVERSE GEAR

Processing B.D pipe heat guard
(Baggers dual pipe)



Adjustment

After the entire R gear installation is completed, adjust the clutch. View the procedure below.

1 Remove the derby cover.

2 Loosen the clutch wire as much as possible.

3 Next, loosen the lock nut of the clutch adjuster.

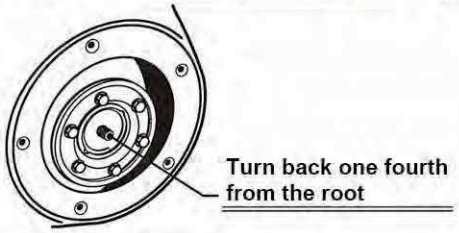
4 When the lock nut is loose, tighten the adjuster with your finger as much as possible, and when you are done, loosen one quarter, and then lock the lock nut.

5 When the adjustment on the shaft side is completed, adjust the loosened wire appropriately.

6 After adjusting the clutch, attach the derby cover and the work is finished.

REVERSE GEAR **All Models**

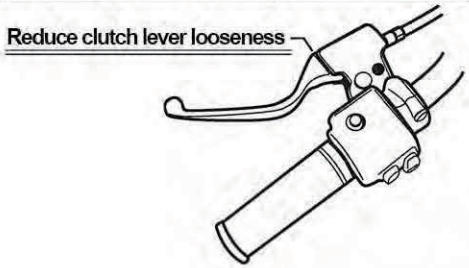
Adjustment of adjusting screw



Turn back one fourth from the root

REVERSE GEAR

Clutch lever adjustment

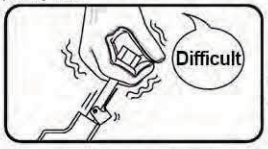


Billet 6H/Billet 6&5/Cast Black 6&5/Cast 6&5

A piece of advice!

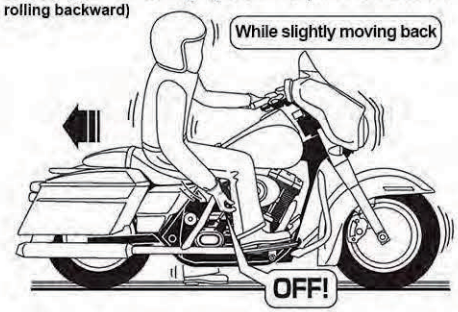
Tips for turning OFF the reverse gear

The reverse gear may be difficult to turn OFF when the vehicle is completely still.



When it is hard to turn OFF

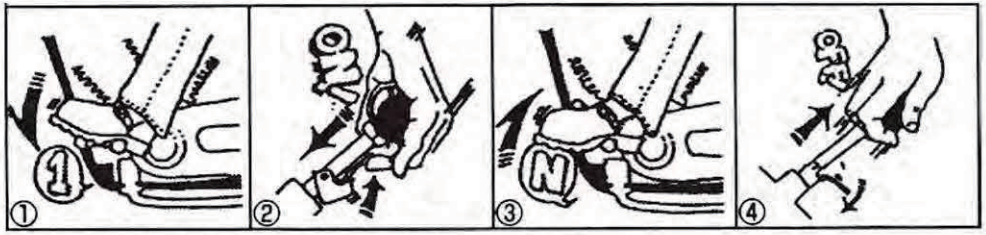
- If you operate just before stopping (while it is moving), the gear will smoothly turn OFF.
- If the vehicle is fully stopped, the gear can be turned OFF smoothly by moving the vehicle slightly backward. (When rear tires are rolling backward)



Note: If the stroke of clutch disengagement is small, the R gear will not be properly turn OFF.

Note: Due to the structure of billet 6S, the degree of adjustment will change slightly due to thermal expansion.

Billet 5 CAST5 Method of Operation



1 Hold the clutch and shift to 1st gear.

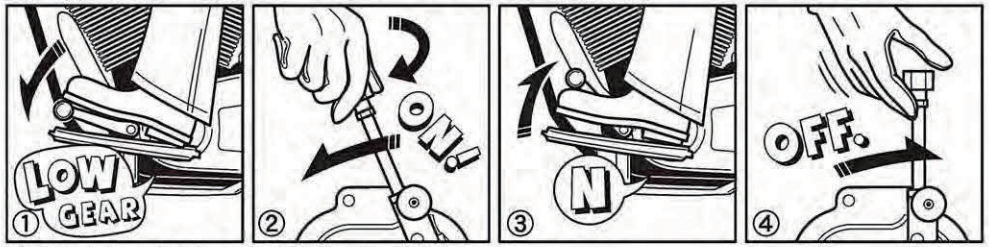
2 Raise the safety trigger and press the shift knob.

3 Reverse ON when shifting from 1st gear to neutral. Operate the clutch and brake to move backward.

4 Reverse OFF returns to normal operation simply by returning the shift lever.

Note: If you do not follow the movement of the rod when pulling up the shift knob, it may cause a malfunction. Ideally, pull up the shift knob with your reverse grip, as in 4.

Billet 6SCP Billet 6S-II Method of Operation



1 Hold the clutch and shift to 1st gear.

2 Turn the R shift knob and turn ON R gear.

3 Reverse ON when shifting from 1st gear to neutral. Operate the clutch and brake to moving backwards.

4 Reverse OFF returns to normal operation simply by returning the shift lever.

[Common precautions]

1) When moving backward, the accelerator needs to be almost fully closed. The best condition is something close to idling (about 1300 rpm).

2) Do not move forward with the R gear turned ON. Just in case you shifted the gear to move forward, the R gear will be released, but in rare cases, it may stop halfway, so move the R gear to the [OFF] position.

3) Never operate the R gear while traveling forward. The gearbox may be damaged and lead to a serious accident.

Be sure to put into low gear and stop the rotation of the transmission before moving backward.

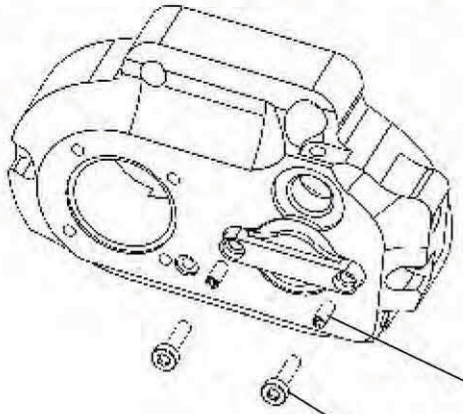
Warning: If you shift from neutral to R gear without shifting to 1st gear, the safety breaker will turn OFF. If the safety breaker is operated, turn OFF the R gear before traveling. Then immediately replace the breaker.

The breaker key is a wearable item. It may wear out before a regular inspection.

Inspection Cover Puller

How to remove the inspection cover

WARNING The oil will leak since 6S-II has a screw hole penetrating through. Apply sealant or lock adhesive.

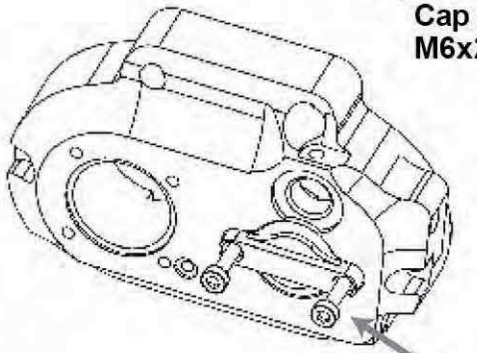


Inspection cover puller kit
Enamel set (slotted set screw) x2 Cap screw x2

The inspection cover cannot be removed by just removing the cover screw since the O-ring is in close contact.
Do the removal work as follows.

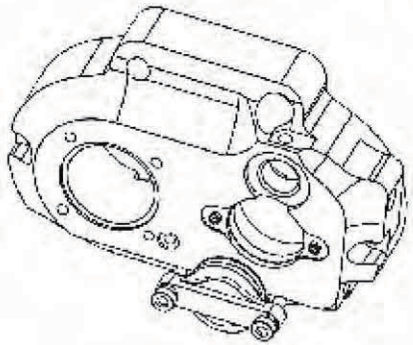
Enamel set (slotted set screw) M5x12

Cap screw M6x20



① Screw the enameled set into the body.
② Tighten the cap screws evenly left and right and remove the inspection cover horizontally.

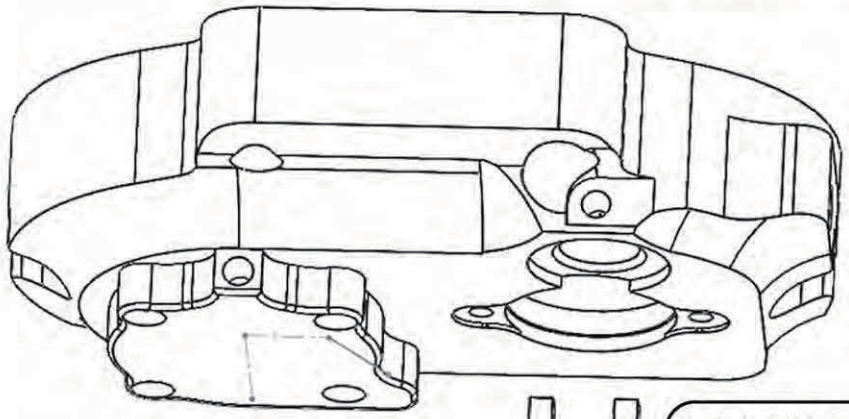
Left and right evenly!



Remove horizontally

Breaker key replacement

Breaker key kit
Key x4 Bolt x2
Washer x20 Ring x2



Apply Loctite (red/high strength)
Tightening torque 25 Nm

Apply transmission oil to the O-ring!

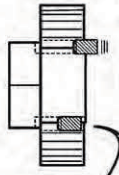
CAUTION

The oil will leak since 6S-II has a screw hole penetrating through. Apply sealant or lock adhesive.

WARNING

***If you put it in reverse gear from neutral, a heavy load will be applied and the breaker key could jump off!**

- When using reverse gear, be sure to put it in low gear and stop the rotation of the transmission before putting it into reverse gear!
- Make sure to turn OFF the reverse gear before traveling forward!



WARNING

Use only genuine Mamba products!

- The breaker key has specified load requirements. Be sure to use a genuine Mamba product! 5x5x8mm Made of brass

*There are 4 breaker keys in the kit, but 2 are spares.

Note! : Insert the breaker key head deeper than the counter gear surface!

Billet 6SCP Billet 6S-II

Periodic Inspection
(every 2 years)

Inspection Date:

Vehicle ID Number:

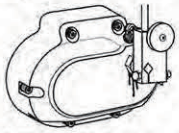
Registration Number:

Owner:

Person in Charge Stamp

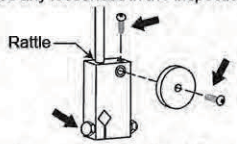
Exterior

1) Is there any oil leak from the lever base?



CHECK ☐

2) Are there any loose screws on any part of the lever? Is there any looseness in the inspection and lever?



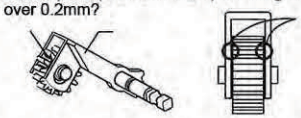
CHECK ☐

3) Is the clearance between the shift lock pin and cap screw appropriate? Check for rattle!

CHECK ☐

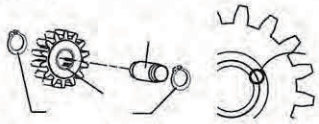
Interior

1) Is side plate (side looseness) of idler gear and shifter over 0.2mm?



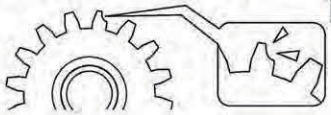
CHECK ☐

2) Is the idler gear, metal, and idler shaft clearance normal?



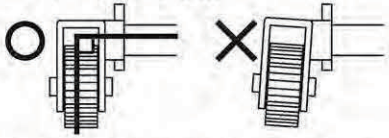
CHECK ☐

3) Is there any deformation of the idler gear?



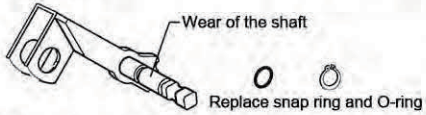
CHECK ☐

4) Is the shifter alignment correct?



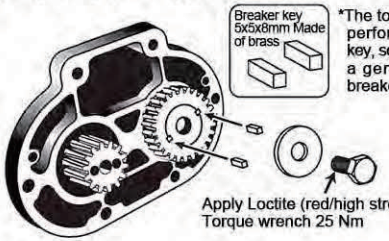
CHECK ☐

5) Is the shaft of the shifter worn out? Replace the snap ring and O-ring.



CHECK ☐

6) Replace the breaker key on the counter gear.



*The torque control is performed with this key, so be sure to use a genuine Mamba breaker key!

CHECK ☐

Release piston "O-ring"
(Inner kit)
Replace if the cylinder has damage. replace the inner kit at the time of vehicle inspection or every two years.

CHECK ☐

Since the clutch plate is a wearable item, if the clutch is wearing out:
1) Disengaging clutch will not work properly.
2) Problems such as slippery clutches may occur. In this case, we will give you advice on replacing with a Mamba seat damper spring (0.8 mm) or removing the genuine spring damper and seat damper spring.
It is possible to make the clutch plate last longer.

CHECK ☐

Billet 5 CAST5

Periodic Inspection
(every 2 years)

Inspection Date:

Vehicle ID Number:

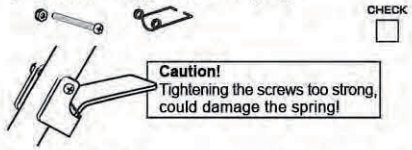
Registration Number:

Owner:

Person in Charge Stamp

Exterior

1) Replace the trigger screw and spring.



CHECK ☐

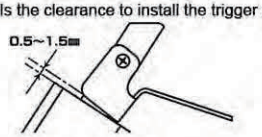
2) Check that the trigger moves smoothly after mounting.

CHECK ☐

3) Is there any rotation in the shift rod?

CHECK ☐

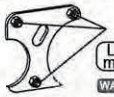
4) Is the clearance to install the trigger sufficient?



CHECK ☐

Interior

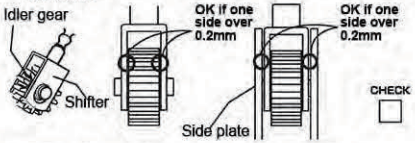
1) Is there any looseness to the screws on the side plate?



Tighten torque **5.5Nm**
Use lock nut
+ Loctite (green/wicking)
Note: Apply plenty of Loctite.
WARNING Screws and nuts cannot be reused

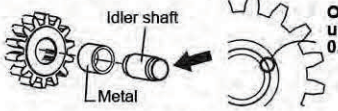
CHECK ☐

2) Is the side plate (side looseness) of the idler gear and shifter over 0.2mm on one side? Also, is the clearance between the shifter and the side plate over 0.2mm on one side?



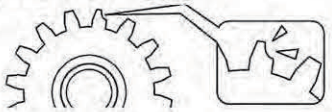
CHECK ☐

3) Is the clearance between the idler gear metal and the idler gear shaft normal?



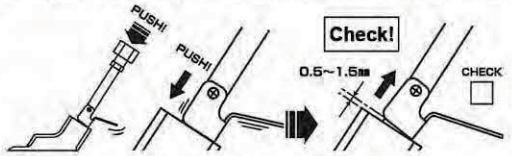
CHECK ☐

4) Is the idler gear deformed?



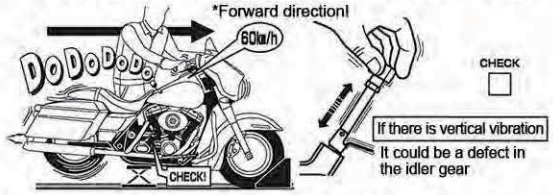
CHECK ☐

5) Press the shift rod and check if the clearance returns to the normal level.



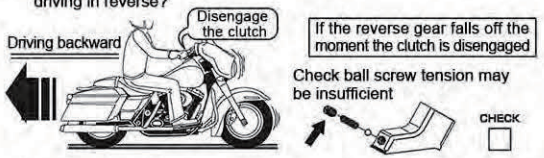
CHECK ☐

6) Perform a vibration test on the shift rod
- Start the engine while it is jacked-up and speed up to 40-60km/h (forward)
- Check if the shift rod of the reverse gear vibrates up and down or not.



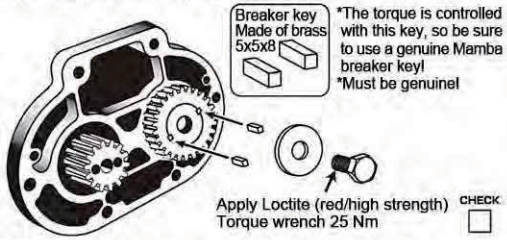
CHECK ☐

7) Does the reverse gear fall off when the clutch is disengaged when driving in reverse?



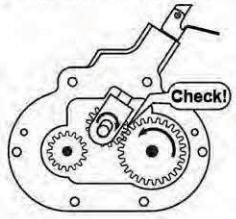
CHECK ☐

5) Replace the breaker key on the counter gear.



CHECK ☐

6) Make sure that the idler gear and the counter gear mesh smoothly.



Rotate the rear tires in the forward direction and check that the gears mesh (no stiffness) smoothly!

CHECK ☐