FuelTech

PRO H SHIFTER

FuelTech H-V Drag Race Shifter

Installation and Operation Manual

Summary

1 Presentation

This lever was especially designed for drag racing use, and does not allow downshifts without deactivating the safety pin that prevents the pilot from making a mistake when shifting gears.

The gearbox is fully protected against unintended downshifts that can cause its immediate breakdown, as long as the lever is properly adjusted.

The gears shift is done by the original H system and, due to its construction, allows an H-V shifting just by moving the lever back and front so that the shifting is done from 1st to 4th gear.

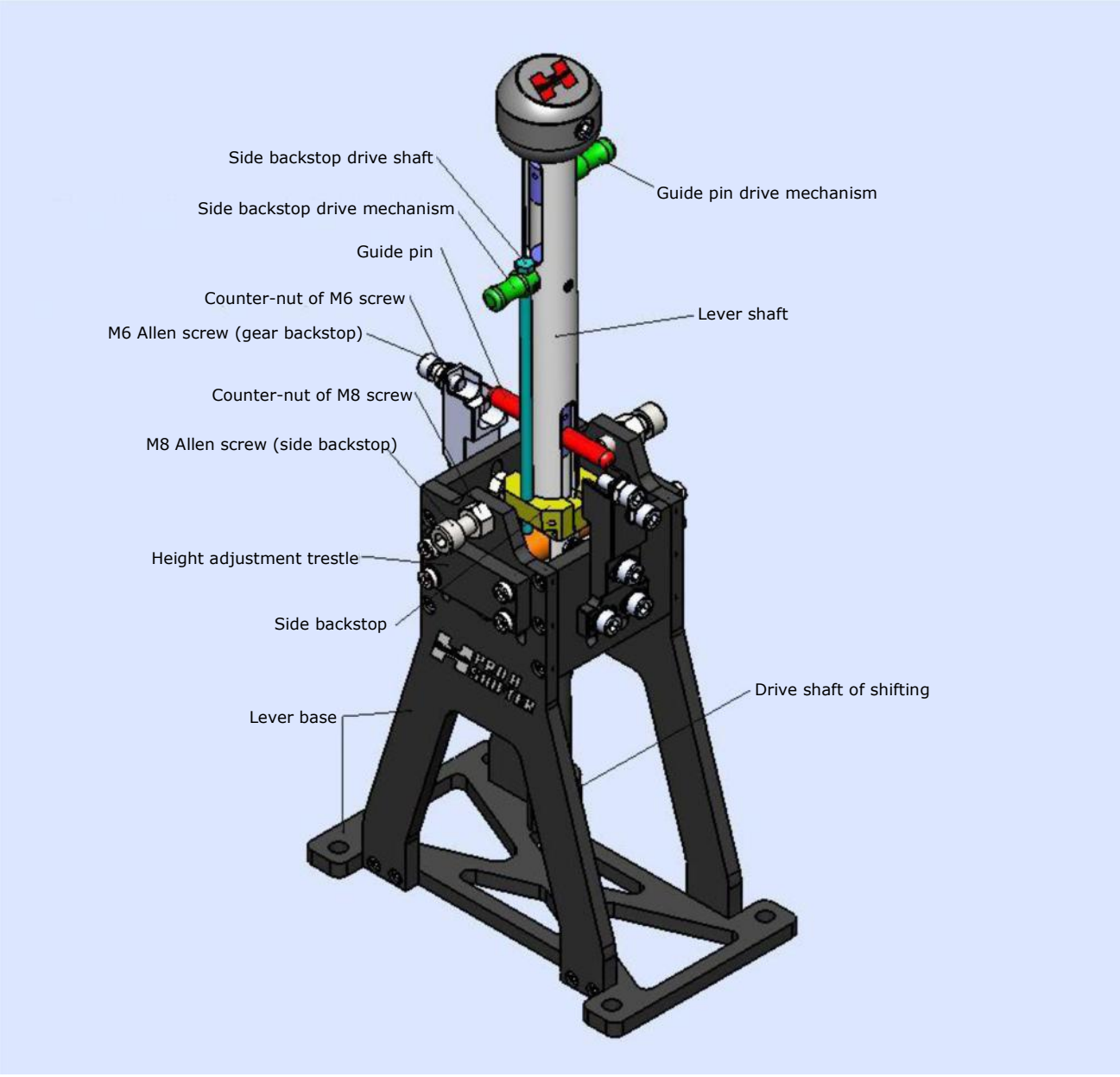
There is also a pin that allows the engagement of the reverse gear and another one that releases all the safety mechanism, so that it is possible to engage the 5th gear on cars that have it.

NOTE: The 5th gear is not engaged in sequence after the 4th gear. To engage it, first you must unlock the protection mechanism by pulling the corresponding pin on the lever.

Drag ways with high grip tend to bend the monoblock of the vehicle, making gear shifts more difficult. That is because the engine and the gearbox are both fixed to the monoblock with rigid pads and the vehicle is not equipped with the roll cage or this accessory does not effectively locks the monoblock. This allows the tunnel of the car to bend**, locking the shifter shaft to the gear that it is engaged, blocking the shift**. In this case, **there is a problem in the construction of the vehicle** which must be corrected **hardening the roll cage** for the system of the lever to work effectively.

Manual version 2.1 – december/2011

2 Lever Parts



Lever Base

GM – Chevrolet*:*
It should use the Kadett's original base and shifter shaft. It is recommended a welded reinforcement and a plate on the side of the original base.

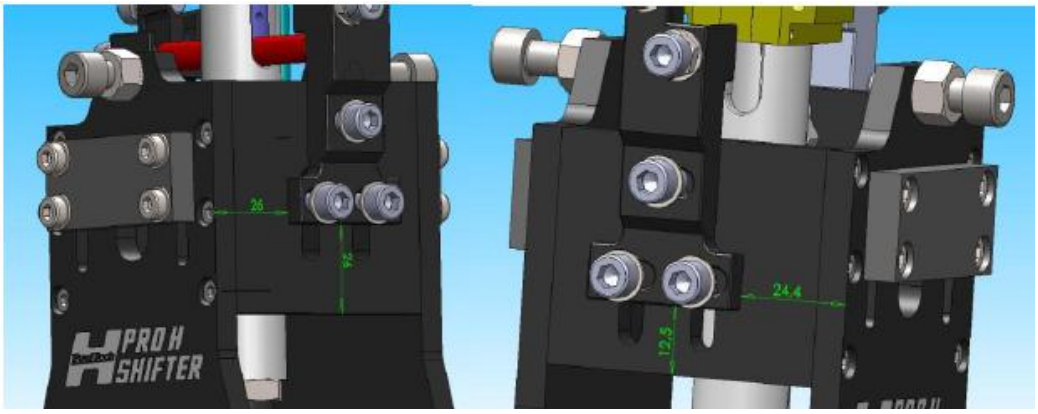
VW:
Use the original shifter shaft.

Note: The shifter shafts are original, but with metal bushings and joints, with no gaps or flexible parts. (This is **ESSENTIAL** for the functioning of the lever).

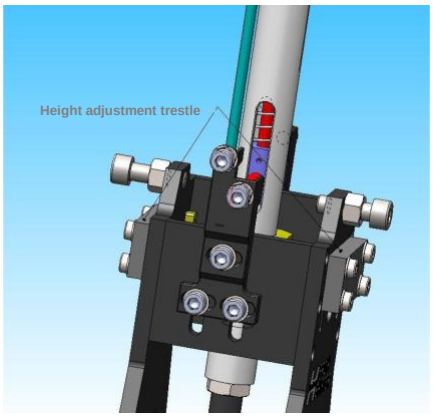
3 Initial Adjustment Prior to the Mounting of the Lever in the Car

3.1 Factory Default Adjustment

Measurements of the guide pin protection of the 1st and 3rd gear with 26 mm at the bottom and 26 mm on the side. Guide pin protection to 2nd and 4th gears with 12.5 mm at the bottom and 24.4 mm on the side, according to images below:



Maintain the height adjustment trestles up, according to the image below.



Note: By the end of this examination it is important to retighten all screws.

3.2 Fixing the Lever in the Car

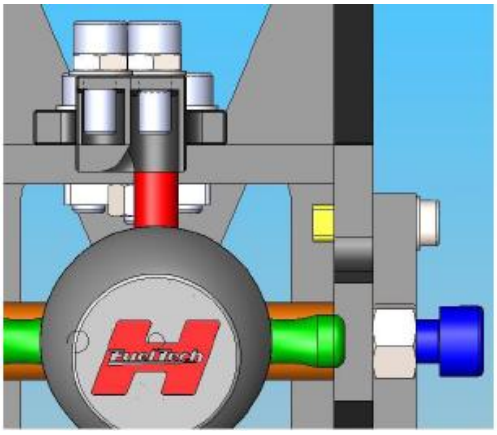
Check if the original fixation point in the tunnel is leveled in order to prevent warping of the base of the lever. Install the lever in the original fixing points.

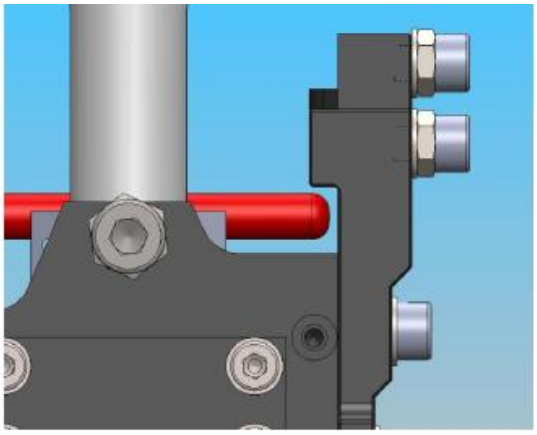
3.3 Adjustment and Fixing the Shifting Lever

In this adjustment it is recommended that the shifter shaft and the lever is leveled and without gaps. This leveling is obtained by moving the threaded shifting lever. In VW vehicles, it is advisable to leave the M14 counter-nut loosen from the shifting lever, which creates a minimum gap required for the H engagement, making the engagement of the gears easier.

4 Initial Adjustment of the Lever

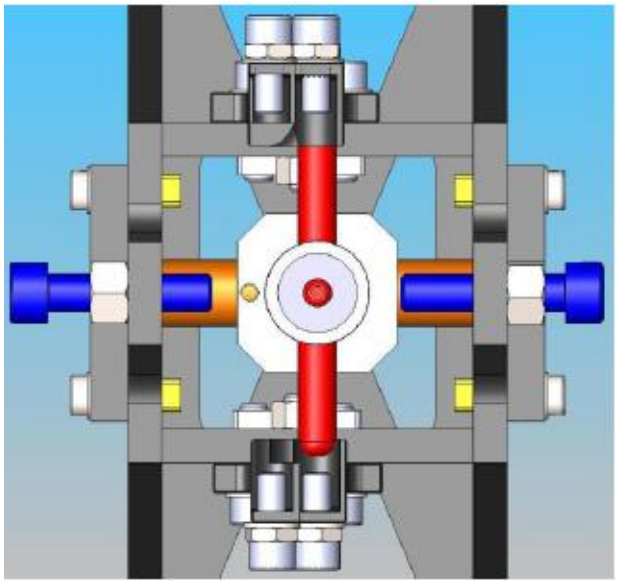
Align the guide pin (red-colored) of the lever in the 3rd gear position when in neutral (left image below). Maintain the pin below the gear engagement (right image below) with the movement mechanism of the guide pin switched-off. In this position, tighten the fixing screw between the shifting and the shaft that connects the gear to the lever.





5 Backstop Adjustment

5.1 Adjustment of side movement



The side screw adjustment of the 3rd and 4th gears (Allen M8: blue, to the left of the image) should be done after the alignment of the guide pin (red-colored) to the engagement site.

Loosen the counter-nut from the screw, tighten it until it gets close to the next side backstop of the lever, leaving a maximum gap of 1 mm between the screw and the backstop.

The adjustment of the 1st and 2nd gears' side screw (Allen M8: blue, to the left of the image), should be done according to the following steps:

1 Pull the mechanism straight from the lever (which releases the guide pin) and move it towards the 1st gear's position.

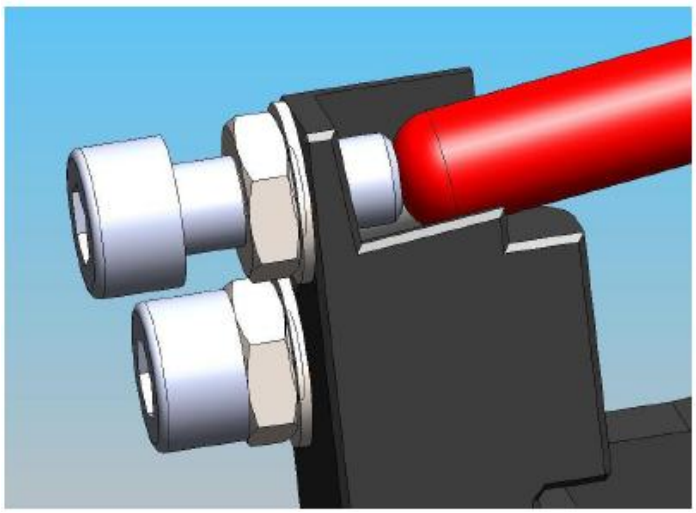
2 Release the mechanism, loosen the counter-nut of the screw (blue), press it until it gets close to the side backstop of the lever leaving a maximum gap of 1 mm between the screw and the backstop, according to the image.

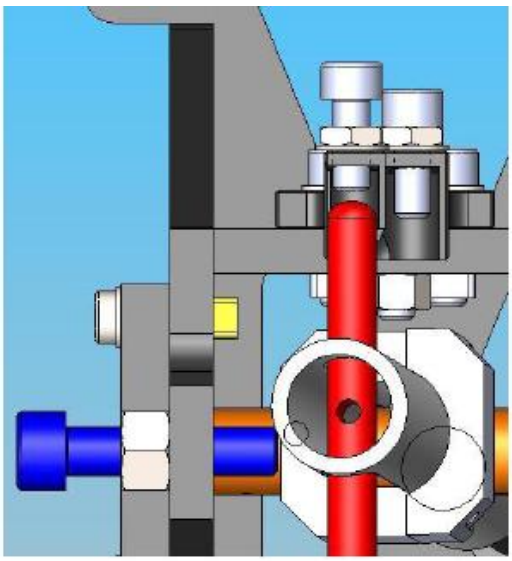
5.2 Adjustment of the backstop limit for each gear

This procedure avoids the over effort on the gearbox internal mechanisms through the shift and should be repeated to every gear.

1 Place the guide pin (red) on the desired gear, checking if it is engaged in the gear lever.

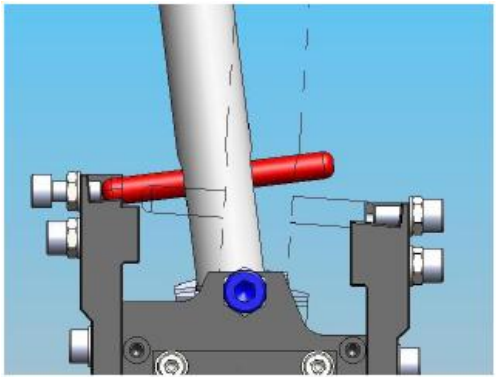
2 Loosen the nut and tighten the Allen M6 screw to establish the end of the movement, according to the image below.





5.3 Checking the height of backstops

It is important that there is a height difference in the engaging position of the guide pin for the gears, since the safety of the lever is based on a progressive system ("cascade"). The position of the guide pin (red) when in 2nd gear, should be lower than when the 1st gear is engaged. The same should happen for the other gears. This prevents the lever from going back to a previous gear.



5.4 Cautions and recommendations for the proper functioning of the system

- The gaps of the shifter shaft and the gearbox (internal mechainsm) should be minimized as much as possible with the replacement of worn parts (forks and gloves) and rubber/plastic joints (joints and shifting) by metallic ones;
- The shifter shaft route should be completely unobstructed and on the original shape;
- The original lever system of the car and the adjustment with positions perfectly established for all gears end up compensating the twisting movements in the shifter shaft, its joints, chassis and the base of the lever. FuelTech PRO H Shifter lever does not tolerate these twisting and will not be able to compensate them, what will make the shifts not to be engaged correctly.
- The lever should be kept lubricated with anti-rust products, like Jimo Penetril and WD-40. Otherwise, its mechanism will oxidize quickly, causing its movements and functioning to be damaged.
- The internal part of the main tube of the lever, where there is the up/down movement, should always be lubricated, any dirt or work without lubrication may cause scratches, burrs and interlock.
- With the use of a lubricated lever, the dirt will accumulate on its mechanism, what may damage its functioning. For this reason, it is recommended a regular cleaning and lubricating process.
- Prior to any competition, it is important to review the screws' torque from the lever. In case of loosen screws (which is normal due to the vehicle vibrations), check if the gear engagement is working after the tightening.
- In the event of a corrective maintenance of the vehicle with the removal of the lever, it is important to repeat all the procedures indicated in the manual.
- The pads of the engine and transmission should be rigid to prevent movements of the whole assembly in relation to the lever.
- The structure of the car (tunnel) should have a good stiffness to prevent the chassis from twisting, which may make it difficult to shift gears at the time of the competition.

6 How-to guide

These directions simply describe the usual operation of the lever. It is mandatory that all the steps of the previous pages of this manual have been followed to avoid damages to the gear and the lever.

Engaging the 1st gear – drive the guide pin movement mechanism (right) and lead the lever to the 1st gear position, releasing the mechanism.

Engaging the 2nd gear – with the lever placed at the 1st gear, pull to the 2nd gear position. The side backstop should not allow the engagement of other gear.

Engaging the 3rd gear – with the lever on the 2nd gear, simply push the lever to the front. The guide pin should be taken straight to the 3rd gear position.

Engaging the 4th gear – with the lever on the 3rd gear, pull it back to engage the 4th gear. The side backstop should lead to the 4th gear engagement.

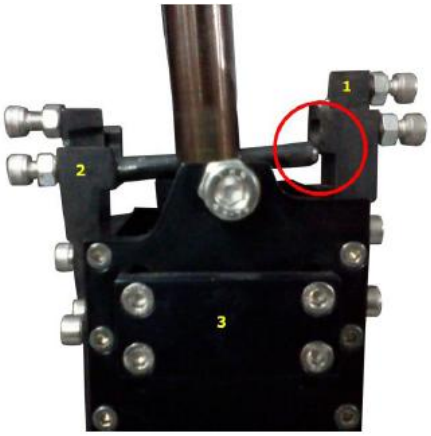
Disengaging the 4th gear – with the lever on the 4th gear, just push the lever to the front. The guide pin should not allow the engagement of the 3rd gear and will make it stop on the neutral position.

Engaging the 5th or reverse gear – to engage the 5th or reverse gear, pull the two mechanisms of the guide pin up and direct the lever to the desired gear. By moving the levers up, the backstop side is also shifted up allowing a higher action from the lever to the sides. **WARNING**: after doing this, any gear can be engaged, because the mechanism that drives the engagement is loosen.

7 Common Problems

7.1 Difficults Disengaging (Back to Neutral)

The red circle in the image shows that the guide pin is not entering under the 3rd gear engaging, which would be the neutral position. To correct this problem, parts 1 and 2 should be raised.



This problem may be caused by an incorrect adjustment of part 3. It is not recommended to change the original height of this part under any circumstances. Observe in the picture below where the height of part 3 was changed.

The M8 screw (part 5) restricting the lever's side movement should touch part 4, but it is hitting axle 6. This will cause crushing and twisting of the axle, by locking the engagement movement of the gears. Difficulty in releasing the guide pin mechanism:

When it is hard to move the pin (6) that releases the locking mechanism of the guide pin, the following should be checked:

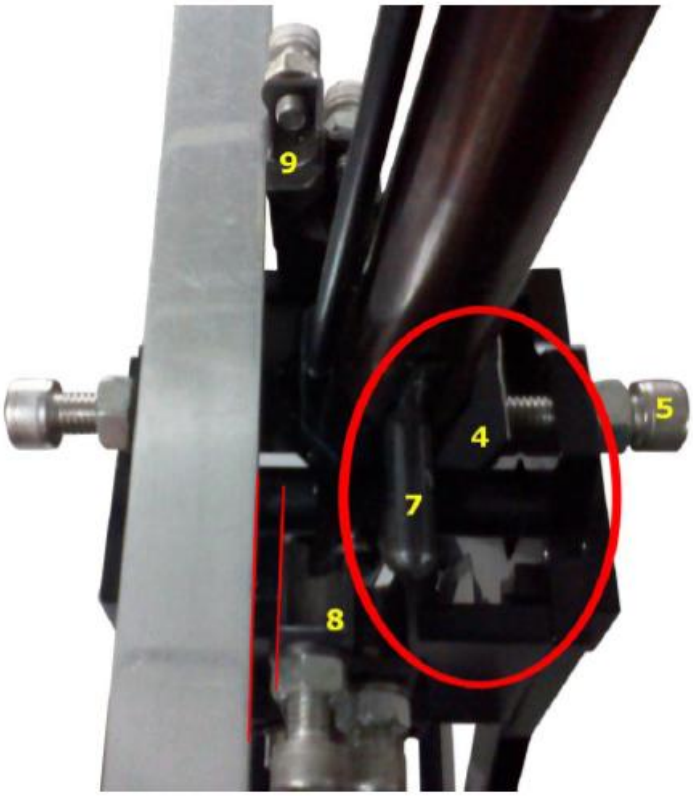
- The lubrication of the entire lever system;
- The nut at the end of axle 6 should not be overtighten.

7.2 Warping of the Base of the Lever

The images show the twisting that happened to the base of the lever, caused by fixing it on the tunnel of the vehicle. The original fixing place was warped and ended up forcing all the base of the lever.

7.3 Alignment of Engagements

With the assistance of a ruler it may be seen that the engagement of the 1st and the 3rd gears (9) is misaligned with the engagement of the 2nd and 4th gears (8). The recommended measurements for this alignment are described in chapter **Factory Default Adjusment** in this manual.



It may also be seen in the image above that the adjustment of the side backstop is incorrect, because axle 7 is not engaged to part 8.

To correct this, the position of part 5 should be changed until it pushes part 4, forcing the entire central assembly and aligning the guide pin with the 4th gear.

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