Low-travel suspension & wheel assembly process

Created by: David Rodriguez ([davidrm@dc.tohoku.ac.jp](mailto:davidrm@dc.tohoku.ac.jp))

Last update: Nov. 17, 2019

Updated by: David Rodriguez

# Assembly Process

The following step-by-step process defines the best process to follow in order to assemble and disassemble the low-travel suspension system of HERO Explorer 1 rover.

Wheel

1. Get wheel front face mounted onto the wheel rim. [ 12 x M3x10] (*NOTE: Make sure not to use a very high torque when fastening and loosening screws in order not to detach the nuts from the inside of the rim.*)
2. Attach the small metal key holder part to the front face of the wheel. [ 4 x M3x10, 4x M3 Nuts].
3. Attach the bearing to the back face of the wheel. [ Hammer needed] (*NOTE: Make sure both the back face of the wheel outer surface and the bearing outer plane are flat.*)
4. Attach the motor housing to the wheel knuckle. [ Hammer may be needed, 6 x M3x12] (*NOTE: Make sure to tighten the safety nut at the other end of the housing. Make sure to use threadlocker on screws.*)
5. Attach the back face of the wheel with the bearing to the motor housing. [ Hammer needed] (*NOTE: Make sure you only hit the metal parts of the bearing with the hammer in order not to damage the plastic parts of the wheel.*)
6. Attach the driving motor into the housing. [6 x M3x8] (*NOTE: Make sure motor cables are pointing up or slightly to one side to facilitate wiring afterwards*.)
7. Attach the front face and rim of the wheel to its back face. [12 x M3x10] (*NOTE: Make sure not to use a very high torque when fastening and loosening screws in order not to detach the nuts from the inside of the rim.*)

Low-travel suspension

1. Assembly the L-shaped part of the low-travel suspension, i.e., the top part that connects to the geardhead of the steering motor and the attachment for the struts and control arms.
2. Add one single retainer to all the shafts.
3. Mount both upper and lower control arms to the L-shaped part of the suspension. (*NOTE: To add the retainers make sure you always press downwards (take advantage of gravity) and the best tool to use is a hammer with a rubber head. Do not hit the retainer but press against it.*).
4. Connect upper and lower control arms to the wheel knuckle.
5. Mount the two struts (i.e., springs and dampers) both on the L-shaped part of the suspension and the wheel knuckle. [4x M3x18/15] (*NOTE: Recommended to first attach struts to L-shaped part.*)
6. Pre-load the struts.

Integration on the chassis

1. Mount steering motor holder (i.e., part that connects the low-travel suspension to the rocker) onto the rocker. [2 x M4x30]
2. Attach the low-travel suspension to the steering motor gear head. [ 4 x M3x12]
3. Attach the whole assembly to the motor holder. [2 x M3x25, 2 x M3 Nuts, 2x M3x18].