

REPAIR SHEET - rear 90° steering gearbox replacement

MOTIVE: Damaged or worn out rear 90° steering gearbox

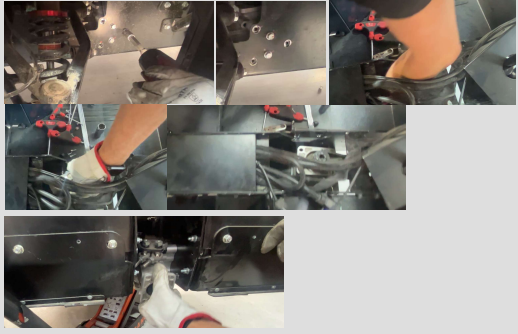
OPERATOR (2)
REGISTRATION

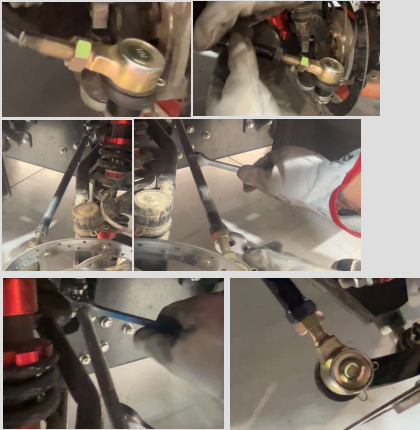
WORKSHOP	DATE
TIME 2h 20min	COST

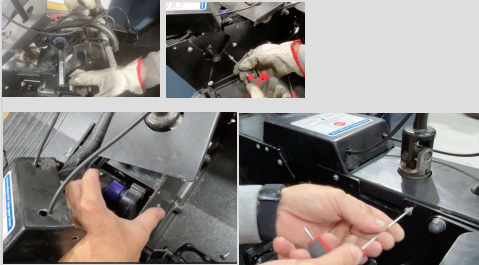
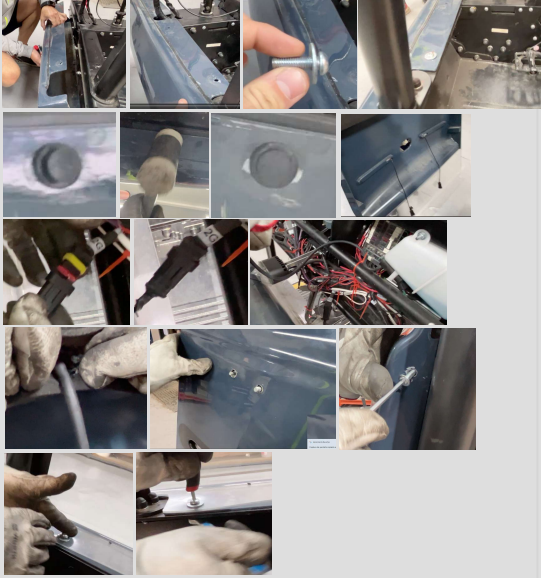
HERRAMIENTAS NECESARIAS				SEGURIDAD	
☐ 13mm, 14mm fixed hexagonal wrench	☐ 3mm,4mm,5mm,6mm,8mm allen key	☐ Flat screwdriver	☐ Gloves		
☐ 19mm, 17mm fixed hexagonal wrench	☐ Plastic spatula	☐ Impact wrench	☐ Steel toe-cap shoes		
☐ 10mm fixed hexagonal wrench	☐ Small ratchet wrench	☐ 13 and 19mm impact wrench socket			
☐ Circlip tool	☐ Wrench to hexagonal adaptor	☐ Socket extension for small ratchet			
☐ Custom extractor tool	☐ 5mm allen tool bit (hexagonal)				
☐ Plastic hammer	☐ Hydraulic jack				

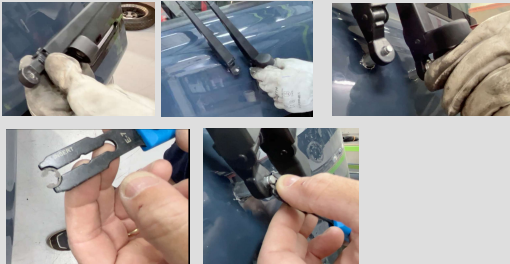
HERRAMIENTAS	PROCESO	PLANO MONTAJE	T. ESTIMADO (min)
1 Hydraulic jack	Lifting the vehicle for removal of the front wheels: To remove the front wheels, lift the BioCargo from the front until the front wheels are approximately 3 to 5 cm off the ground. IMPORTANT: Ensure that the jack is properly centered on the main chassis beam and that the vehicle cannot accidentally be lowered.		2
OBSERVACIONES			T. REAL
2 Impact wrench, 19mm impact wrench socket	Front wheels disassembly: WITH THE VEHICLE LIFTED 1- Holding the wheel, set the impact drill to counterclockwise mode and remove the 4 nuts that attach the wheel to the hub. 2- Remove the wheel by slightly moving it from side to side so that it slides along the hub bolts. 3- Repeat on the opposite side. IMPORTANT: ONCE THE WHEELS ARE REMOVED, DO NOT LOWER THE VEHICLE UNTIL THEY ARE REINSTALLED		4
OBSERVACIONES			T. REAL
3 Flat screwdriver, 10mm and 13mm fixed hexagonal wrench, 4mm allen key	front bodywork disassembly: To access the steering system, some front body components need to be removed 1- Remove the windshield wipers by prying the circlip with a flat screwdriver and unscrewing the nut with a 13mm wrench, then pull them out. 2- Remove the screws (2x) that attach the front panel, front bumper, and chassis using the 10mm wrench from below and the 4mm Allen key from above. (one on each side) 3- Remove the clips located at the bottom of the front bumper using a flathead screwdriver by prying the central pin of the clip. (4 in total) 4- Remove the front bumper. 5- Remove the side screws of the front panel with the 4mm Allen key (one on each side). 6- Disconnect the cables by passing your thumb under the connector tab and unplugging the hose (if there is fluid in the windshield washer tank, connect the hose to one of the screws near the tank) connected to the front. (2 indicator cables + 1 windshield washer fluid hose) and remove the front valance while keeping the gasket located between the windshield and the front panel.		10
OBSERVACIONES			T. REAL

	HERRAMIENTAS	PROCESO	PLANO MONTAJE	T. ESTIMADO (min)
4	3 and 4 mm allen key	pedalboard disassembly : 1- Remove the pedal cover using the 3mm Allen key (6 screws, three on each side), remove the main cover, and set aside the front one. 2- Unplug the pedal connector by twisting the colored part and pulling the connector out. 3- Unscrew the screws with the 4mm Allen key (3 on each side, 6 in total) and remove the pedal by passing it under the cables.		10
		OBSERVACIONES	T. REAL	
5	Impact wrench, Socket extension, 13mm impact socket, 13mm fixed hexagonal wrench, Flat screwdriver, Plastic hammer, 6mm allen key	front 90° steering transercase disassembly: Disassembling the front drive shaft is necessary in order to be able to disassemble the rear drive shaft. 1- Remove the nut cover by prying with a flathead screwdriver (3 on each side, 6 in total). 2- Unscrew the three nuts that hold the drive shaft using an impact drill, a medium extension, and a 13mm hex socket (hold the bolt on the opposite side with a 13mm wrench if necessary) and remove the bolts (use a plastic hammer if needed). 3- Using a 6mm Allen wrench, unscrew the bolt securing the steering joint and pull it until it disconnects completely from the vertical shaft of the drive. 4- Repeat the previous step but with the joint connected to the horizontal shaft of the drive. 5- Remove the front drive shaft from the front of the chassis.		5
		OBSERVACIONES	T. REAL	
6	14, 19 and 17 mm fixed hexagonal wrench	Disassembly of the tie rods: The tie rods are connected to the rear steering gearbox through the steering actuator. To remove it, it is necessary to disassemble them. 1- Holding the rod with a 14mm wrench, unscrew the nut on the side closest to the knuckle using a 19mm wrench by turning the nut clockwise. 2- Holding the rod with a 14mm wrench, unscrew the nut on the side opposite the knuckle using a 17mm wrench clockwise. 3- With the 14mm wrench, loosen the rod counterclockwise until it can be removed. 4- Repeat on the opposite side.		10
		OBSERVACIONES	T. REAL	

	HERRAMIENTAS	PROCESO	PLANO MONTAJE	T. ESTIMADO (min)
7	Impact wrench, Ratchet socket extension, 13mm impact wrench socket, 13mm fixed hexagonal wrench, Plastic hammer	Rear steering gearbox disassembly : 1- Unscrew the three bolts that hold the steering gearbox with the impact drill, the extension, and the 13mm hex socket while the second operator holds the bolt on the opposite side with a 13mm wrench. 2- Remove the three bolts (using a plastic hammer if necessary). 3- To remove the rear gearbox, reach through the pedal opening in the chassis and remove the connecting shaft between the front and rear steering gearbox, slide the rear gearbox until it can be reached from the front opening of the chassis (it cannot be removed through the space left by the pedal assembly), and finally remove it through the front part of the chassis in the same way as the front steering gearbox.		10
		OBSERVACIONES		T. REAL
8	???	Desensamblaje del conjunto renvio-actuador: ?????	 ???	
		OBSERVACIONES		T. REAL
9	Plastic hammer, 5mm allen key	Assembly of the rear gearbox-actuator assembly: Once the new gearbox is on hand, we will install the actuator on the shaft. 1- Apply grease to the gearbox shaft. 2- Slide the actuator along the vertical shaft of the rear gearbox, paying attention to the alignment of the actuator shaft key and the gearbox shaft pin. Use a plastic hammer to finish fitting the actuator onto the shaft. 3- Place and tighten the set screw at the rear of the actuator using a 5mm Allen key.		2
		OBSERVACIONES		T. REAL
10	Plastic hammer, Impact wrench, Socket wrench extension, 13mm impact wrench socket, 13mm fixed hexagonal wrench, 5mm allen key	Rear steering gearbox assembly: 1- Apply grease to the gearbox shaft and mount the drive shaft knuckle on the rear gearbox shaft, aligning the drive shaft with the rear differential horizontal shaft pin. Make sure to tighten the set screw with a 5mm Allen key. 2- To position the rear steering gearbox in place, slide it into the chassis through the front opening, using the space left by the pedal assembly to push it into position by hand. To keep it in place, insert the three screws (using a plastic hammer if necessary). 3- Apply a small amount of thread sealant to each screw and thread the nut, tightening it with an impact drill with a medium extension and a 13mm socket while holding the nut on the opposite side with a 13mm wrench.		10
		OBSERVACIONES		T. REAL

	HERRAMIENTAS	PROCESO	PLANO MONTAJE	T. ESTIMADO (min)
11	13mm fixed hexagonal wrench, Impact wrench, Impact wrench socket extension, 13mm impact wrench socket	Front transfer case assembly: 1- Install the second part of the driveshaft into the front transfer case following the same steps as for the rear driveshaft. 2- Slide the assembly so that the rear driveshaft fits into the front driveshaft. Once the transfer case is in position and the shaft is engaged, insert the three bolts to secure the transfer case in place (if necessary, with the help of a plastic hammer). 3- Apply a small amount of threadlocker to each bolt and screw on the nut, tightening with an impact drill while holding the bolt with a 13 mm open-end wrench. 4- Install the plastic bushings (3 per side, 6 in total) on each bolt.		10
		OBSERVACIONES		T. REAL
12	14, 17 and 19mm fixed hexagonal wrench	Steering Rod Assembly: 1- Turn the nut of the outer and inner elbow clockwise to the maximum, turn the actuator towards the side where the steering rod is being installed. 2- The wider side of the central rod (this end has a welded hex nut) is the side pointing outward of the vehicle. Once in position, align the two bolts with the rod threads so that it screws in the same distance on each side; to screw, turn the rod clockwise. If one side screws in before the other, unscrew the rod and try again. Screw the rod until it is approximately halfway along the threads. 3- Center the actuator and adjust the rod. If the brake disc appears to point inward toward the vehicle, turn the rod clockwise; if the brake disc appears to point outward, turn the rod clockwise. When the brake disc appears straight, tighten the nuts on the outer elbow counterclockwise with a 19mm wrench and on the inner elbow with a 17mm open-end wrench while holding the central rod with a 14mm wrench. 4- Repeat on the opposite side.		20
		OBSERVACIONES		T. REAL
13	Impact wrench, 19mm impact wrench socket	Front wheel assembly: 1- Align the holes of the wheel with the hub bolts and slide it all the way in. 2- Screw on the nuts (4 per wheel) and tighten them by hand as much as possible. Make sure the wheel is properly in contact with the hub surface. 3- Tighten the nuts in a star pattern. 4- Repeat on the opposite side.		4
		OBSERVACIONES		T. REAL

	HERRAMIENTAS	PROCESO	PLANO MONTAJE	T. ESTIMADO (min)
14	5mm allen key, Small ratchet, Wrench to socket adapter, 5mm allen tool tip, 8mm allen key	Steering Adjustment: It is likely that the steering wheel is not aligned with the steering system. To fix this, the position of the steering wheel needs to be readjusted. 1- Remove the screws of the omega bearing of the steering system using the 8mm Allen key, remove the fixing screw of the steering wheel shaft with the 5mm Allen key, and unhook the steering shaft from the steering wheel shaft. Now the steering shaft should rotate independently of the steering wheel. 2- Turn the steering shaft until the key of the vertical shaft of the front gearbox fits into the steering shaft, screw in and tighten the fixing screw with the 5mm Allen key. 3- Straighten the steering wheel and insert the steering wheel shaft into the bushing of the steering shaft. Screw in and tighten the fixing screw with the small Allen key using the 5mm Allen key. 4- Screw in and tighten the screws of the omega bearing of the steering system with the 8mm Allen key. 5- Then, follow the steps in the repair sheet "steering alignment."		15
		OBSERVACIONES		T. REAL
15	3 and 4mm allen keys	Assembly of the pedal board: 1- Slide the pedal board under the cables with the pedal board connector facing forward. 2- Align the pedal board with the screw holes (6x, three per side) and tighten them with the 4mm Allen key. 3- Plug in the pedal board cable by turning the red retainer and pushing. 4- Align the two covers so that no cable gets pinched. Tighten the 6 screws (3x on each side) with the 3mm Allen key.		10
		OBSERVACIONES		T. REAL
16	3 and 5mm allen keys, 13mm fixed hexagonal wrench, Plastic spatula	Front body assembly: 1- Align the front bumper and insert its screws (2x, one on each side) to keep it in position. 2- From the bottom of the bumper, insert the 4 pins and tap them in with a plastic hammer, remove the two screws from the top part. 3- Position the front piece with the transparent part facing down and connect the two turn signal cables and the windshield washer hose; the two holes in the front must be aligned with the windshield wiper actuators. 4- Place the gasket between the windshield and the front piece. If it gets pinched, use a plastic spatula between the windshield and the gasket to ensure a proper seal. 5- Once the gasket is in place, align the front with the two holes on the sides and insert the screws using a 3mm wrench (1x on each side, 2x in total). 6- Put the two screws that pass through the front, the bumper, and the chassis, insert the two screws and screw on their nuts. Using a 5mm Allen key, tighten each screw while holding the nut with a 13mm open-ended wrench.		12
		OBSERVACIONES		T. REAL

	HERRAMIENTAS	PROCESO	PLANO MONTAJE	T. ESTIMADO (min)
17	13mm fixed hexagonal wrench, Circlip tool	Windshield wipers reassembly: 1- Lift the nut covers and position the wiper. Screw in the right post nut and tighten with a 13mm open-end wrench. FRAGILE, TIGHTEN WITH CAUTION 2- Using the tool, install the circlip on the left post. 3- Lower the nut covers.		6
	OBSERVACIONES			T. REAL