

MHC Repair Manual

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This maintenance manual applies exclusively to the MHC inspection system.

Users are obliged to strictly adhere to the operating instructions and safety instructions contained herein.

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Safety

Read all safety instructions and instructions carefully. Failure to do so may result in electric shock, fire or serious injury:

1. Do not operate the device in potentially explosive environments (e.g. areas with flammable liquids, gases or high dust concentrations), as sparks may occur.
2. The camera unit and push cable/push rod are waterproof; the system itself is not completely waterproof.
3. Never expose the open device to water or rain.
4. Avoid use in extreme temperatures or high humidity to prevent damage to the device.
5. Do not drop the device.
6. Maintenance and repair work may only be carried out by qualified personnel.
7. Do not operate the device near high-voltage equipment.

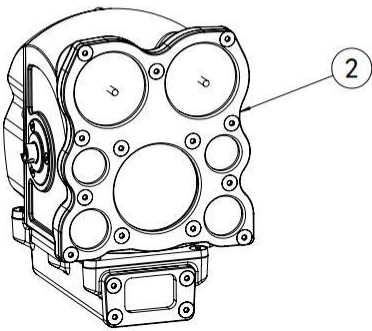
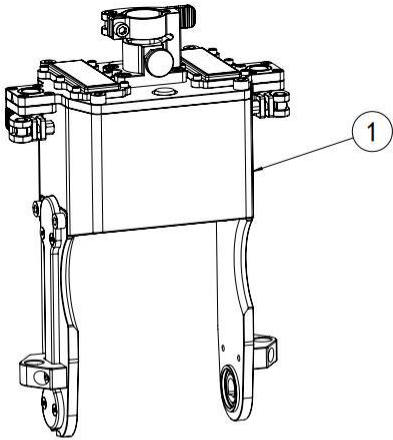
System overview



1 : MHC main components

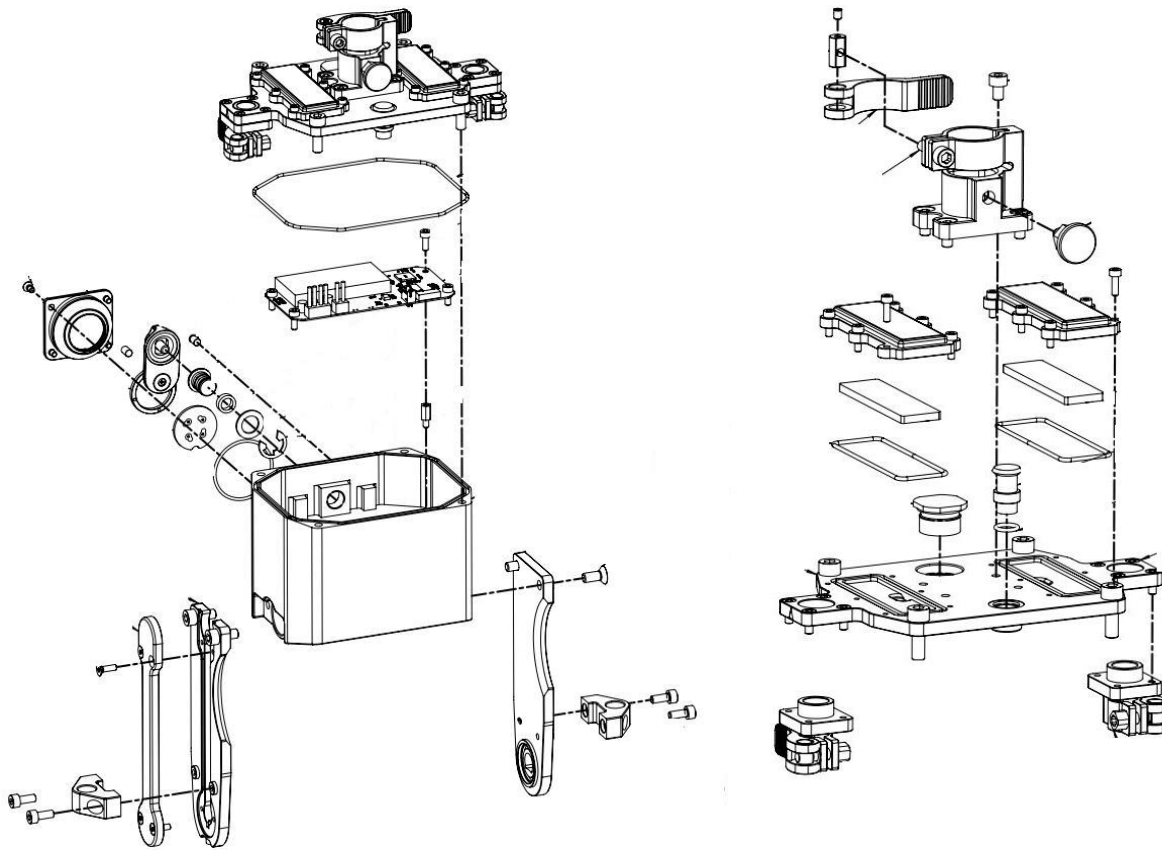
No	Designation	Item number	Quantity
1	Telescopic rod with extension	10000005	1
2	Battery	10000006	1
3	Camera unit with laser	10000020	1
4	U-bracket	10000008	1

Camera unit incl. Schematic structure

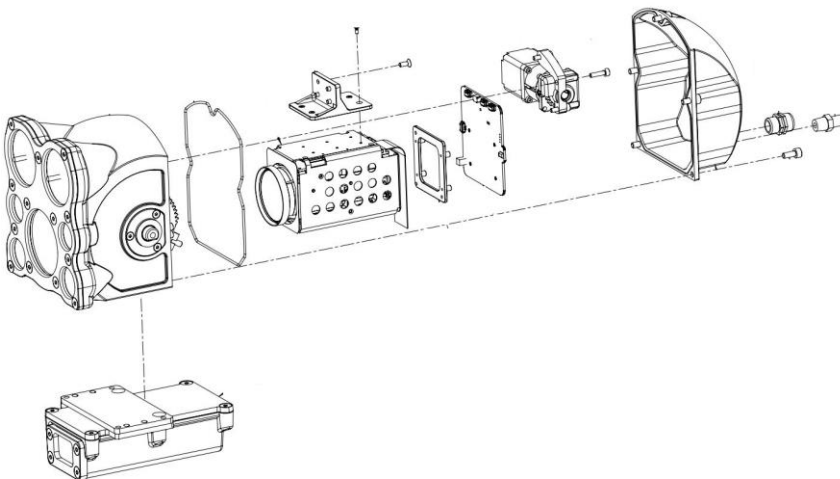


No	Designation
1	Communication unit and battery compartment
2	Swivel chamber

Communication unit and battery compartment



Swivel chamber



Accessories

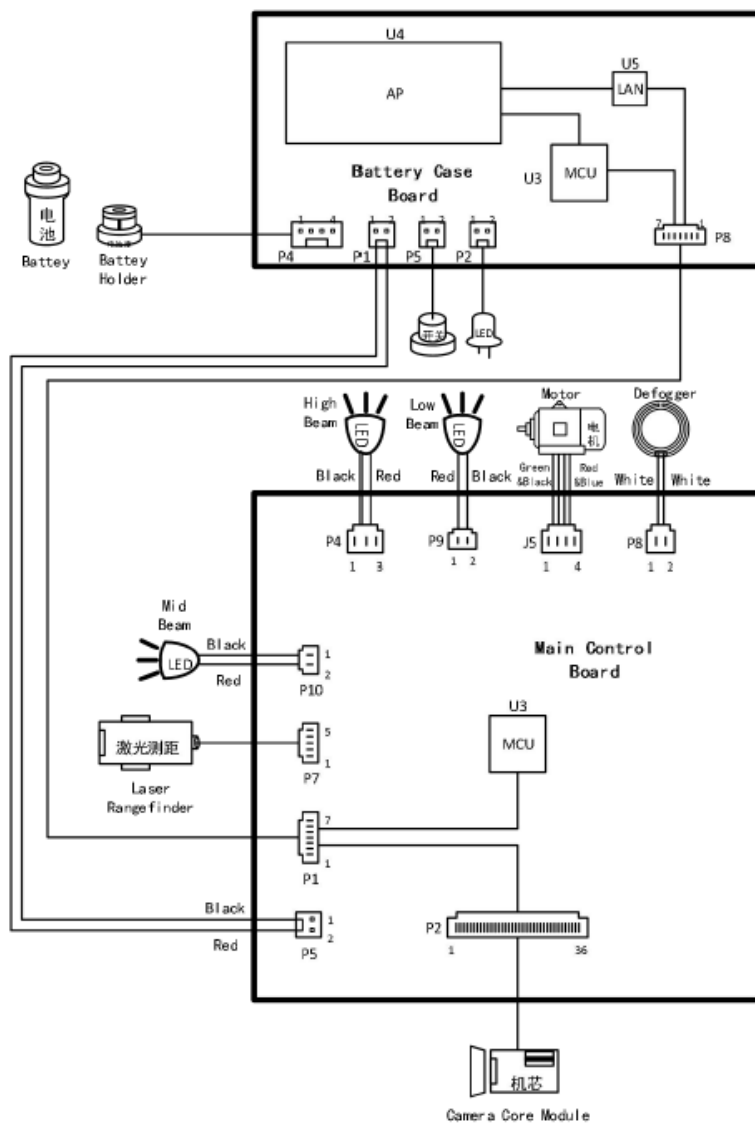
No.	Description	Item number	Quantity
1	Telescopic rod with extension	10000005	1
2	Battery	10000006	1
3	Camera unit with laser	10000020	1
4	U-bracket	10000008	1

General repair instructions

Preparation / Working environment

Before carrying out any work, switch off the device and remove the battery. Please ensure that your work area is ESD-safe to prevent damage to the electronics. Please use only original spare parts.

General circuit diagram and general information



WLAN main unit

WLAN repeater:

Password: 12345678

Circuit board connectors and connections:

Communication circuit board

	1	2	3	4	5	6	7
P1	VCC12V	GND					
P2	VCC12V	GND					
P4	BATIN+	GND	SCL	SDA			
P5	GND	SW					
P8	RXD	TXD	GND	RJ45-1	RJ45-2	RJ45-3	RJ45-6

Mainboard, motherboard

	1	2	3	4	5	6	7
P1	TXD	RXD	SGND	RJ45-1	RJ45-2	RJ45-3	RJ45-6
P4	FarLED-		FarLED+				
P5	SGND	VCC12V					
P7	TXD 232	RXD 232	SGND	3V3	VCC12V		
P8	SGND	DRS					
P9	NebyLED+	NebyLED-					
P10	LED-	LED+					
J5	A-	A+	B+	B-			

MHC Troubleshooting

Device does not switch on (red LED does not light up)

- Check the battery using the charge level indicator or measure the battery voltage (approx. 12V) with a multimeter.
- If the battery is fully charged, check the power switch again after installing the battery and make sure that the surface is clean.
- If this does not work, remove the battery and open the housing, then check the following components:
 - o Check the on/off switch again, bridge the board (connector P5) if necessary. If the device starts, replace the switch. If this does not work, check the electronics board.

The device is switched on (red LED is lit) but no connection can be established via Wi-Fi

Press the power button to switch on the MHC main unit. Piezoelectric switches require firm pressure. If the surface of the switch is dirty, clean it thoroughly before operating the device.

1. Check the Wi-Fi signal transmission of the main unit:

Use the control panel to search for the device's Wi-Fi signal.

- If the Wi-Fi signal is not visible, it means that the device is not transmitting Wi-Fi.
- If the Wi-Fi signal (MHCXXXXX) is visible, the device's Wi-Fi transmission is working properly.

Try connecting the tablet to Wi-Fi again:

If the tablet recognises the Wi-Fi signal but cannot connect:

- Check that the password (12345678) is correct.
- Restart the tablet and the Wi-Fi search and try to connect again. If necessary, you can use another device to test.

MHC Standard Repairs

This chapter describes the replacement of wear-prone parts within the MHC or standard repairs. Before replacing parts according to these instructions, please read the following safety instructions for replacement carefully and familiarise yourself with them.

Basic safety requirements

- All replacement procedures must only be performed by qualified technicians who have received formal training for this device.
- Before disassembly, disconnect the power supply and all battery connections and ensure that there is no residual electrical energy in the device.
- Do not perform any replacement work while the device is switched on, in operation or being tested.
- Before replacement, select the appropriate personal protective equipment (PPE)

according to the specific replacement scenario.

Precautions during replacement

Only original NSP3CT parts or standard components expressly specified in this manual may be used as replacement parts. Only use the special tools or suitable tools specified in this manual. Do not use non-standard tools and do not use excessive force to lever or remove components. For precision components or parts with a specific installation direction, you should label and mark the parts during disassembly to avoid incorrect installation order.

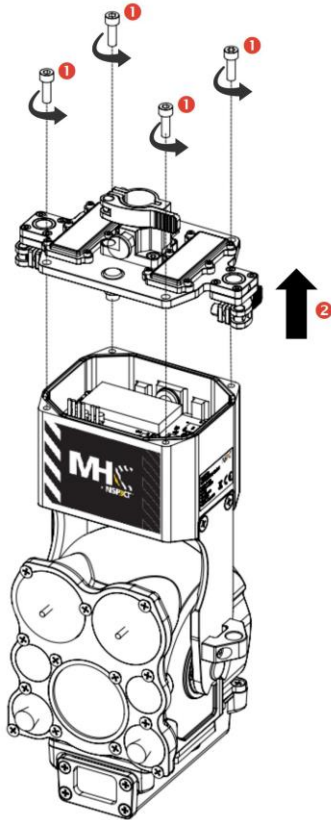
Inspection after replacement

Ensure that all fasteners are tightened to the specified torque and that all cable connections are secure and free of loose or broken contacts. After replacement, switch on the device and perform a self-test to check that the replaced parts are functioning properly. If the replacement involves drive units, motors or positioning assemblies, perform a short functional test (> 1H) after installation.

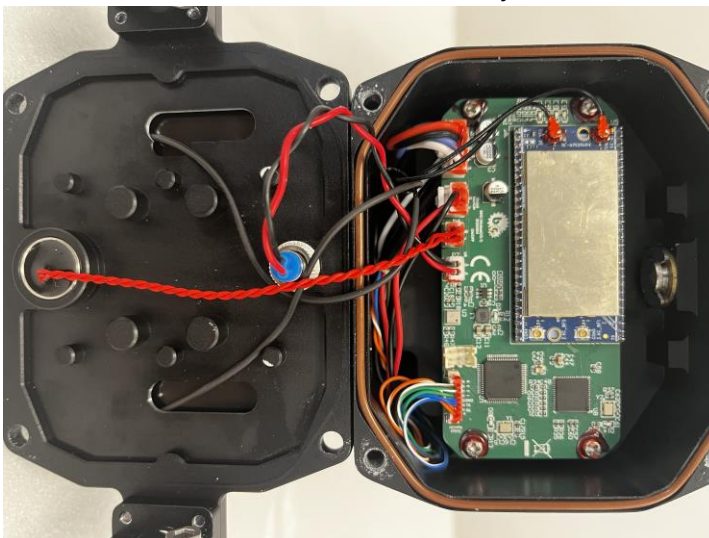
Replacing the communication board / Wi-Fi board

The communication board is located inside the main housing. Before replacing the board, have the necessary spare parts and tools ready and follow the replacement steps described below.

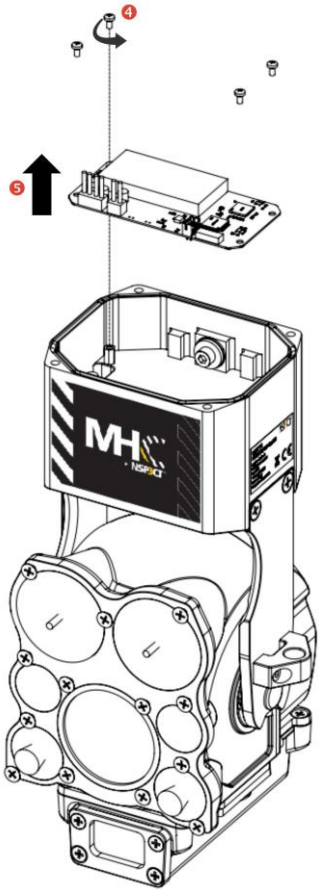
1. Open the housing as shown in the diagram



2. Disconnect all electrical connections
 - a. Use tweezers to peel the red adhesive film off the connector housing. Carefully press the connector lock on the board and slowly disconnect all electrical cables in a vertical direction.



3. Open the screws and remove the board



You can then reinstall the new circuit board in reverse order. Make sure you have the identical circuit board in front of you beforehand. Reconnect all plugs.

Info: We recommend securing the M3x6 screws on the circuit board with Loctite (do not apply Loctite to the circuit board) and tightening them to 1 Nm. Always tighten the screws diagonally. Ensure that the circuit board is installed without tension. The screws on the housing cover (M5x16) are also secured with Loctite and tightened to 5 Nm. Check the condition of the seals and O-rings before each installation.

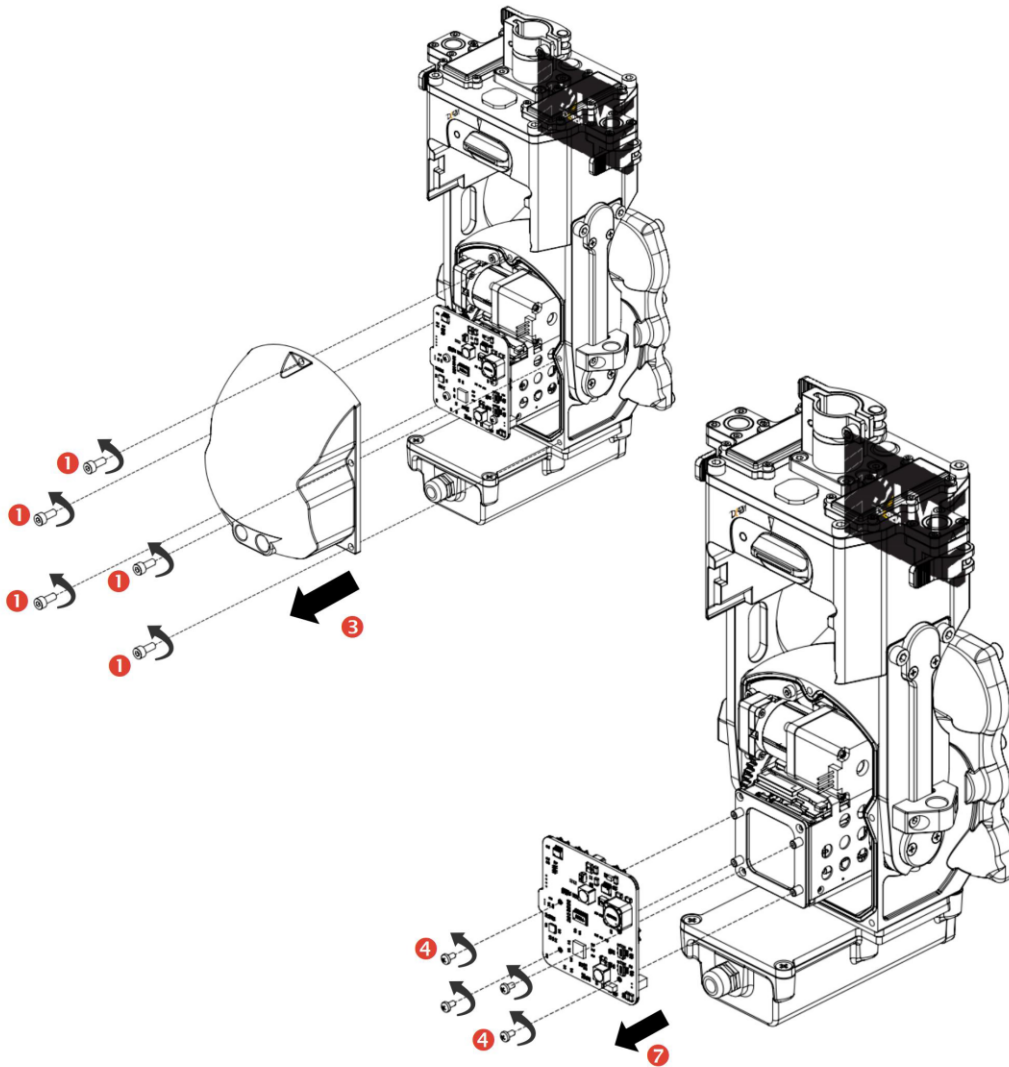
Ensure that all electrical connections are correct, then switch on the device and carry out the following function tests:

- Check that the operating indicator lights up normally.
- Start wireless transmission and test the connection stability between the device and your tablet.
- Check all functions of the device.
- Then fill the device with nitrogen and perform a leak test.

Replacing the main circuit board

The main circuit board is located in the swivel chamber, so the rear cover must first be removed. To do this, proceed as follows:

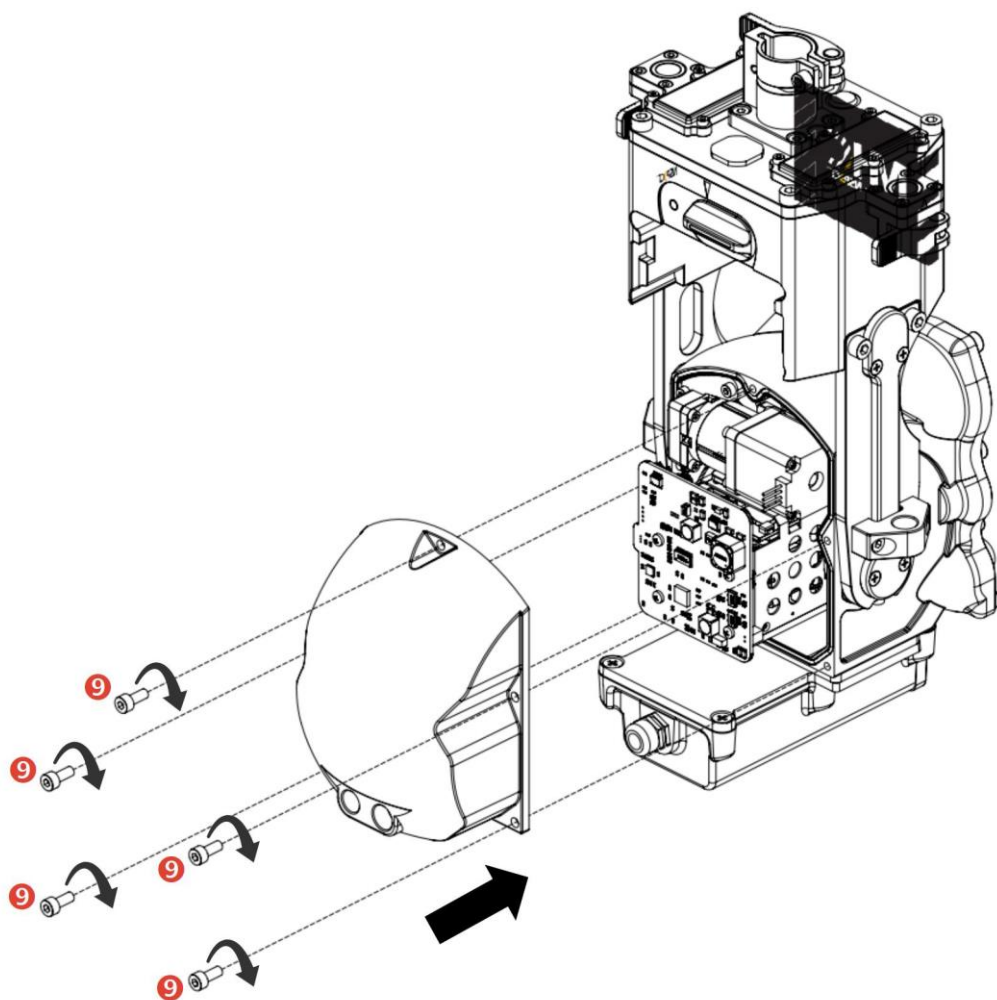
1. Remove the screws (M2 x 5).
2. Carefully open the cover towards the rear, paying attention to the cable of the laser measuring unit
3. Remove all cables, taking particular care to open the camera cable before removing it. You can then loosen the screws on the board and replace it



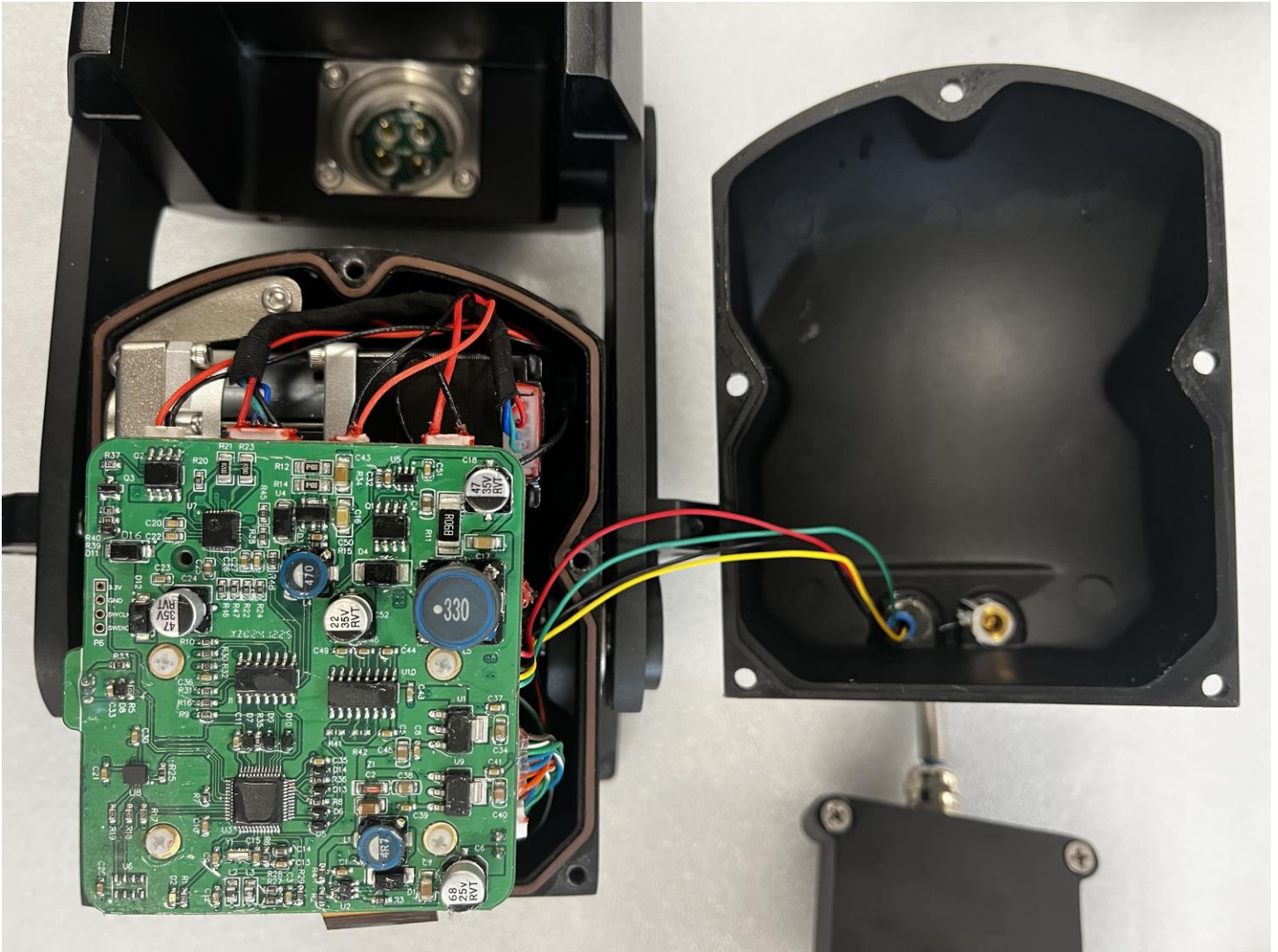
Ensure that the ribbon cable is properly reattached after replacement. The screws on the circuit board (M2 x5) must be tightened to 0.2 Nm and then secured.



Then test all functions. If all functions are working, check the seal and install the back cover. To do this, tighten the screws (M4x10) to 2Nm.

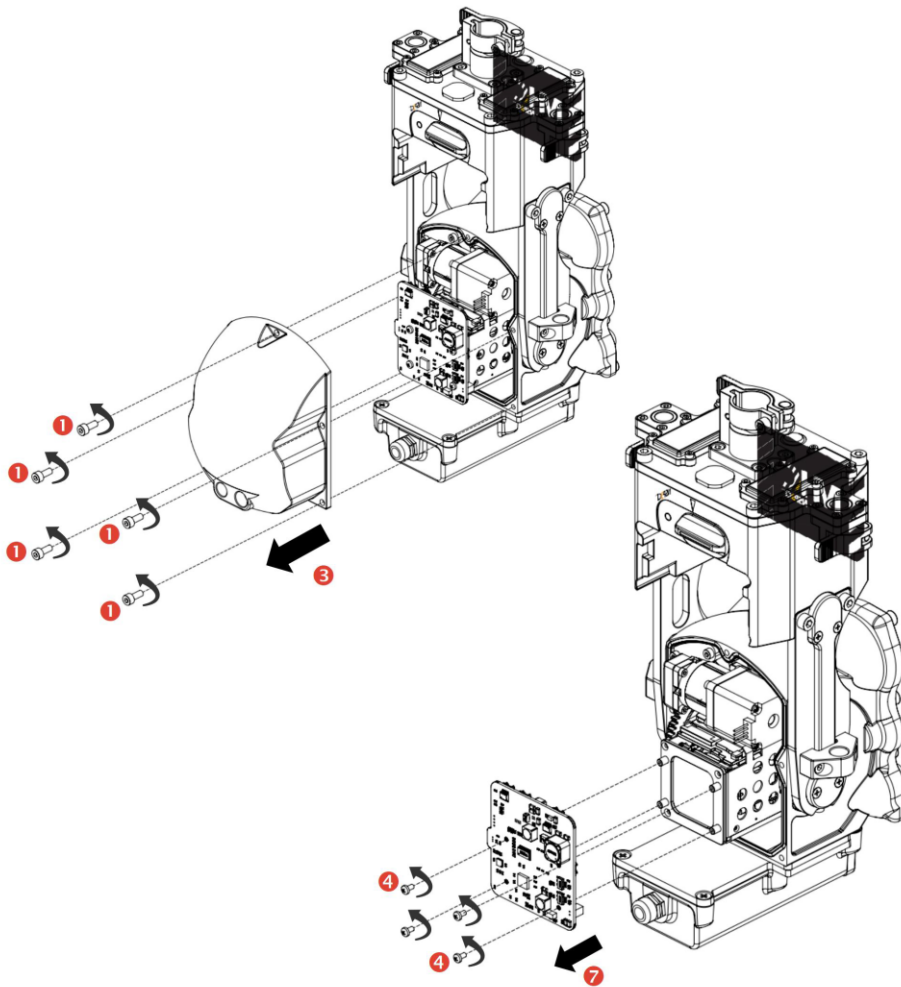


Then fill the device with nitrogen and check for leaks.



Replacing the camera module

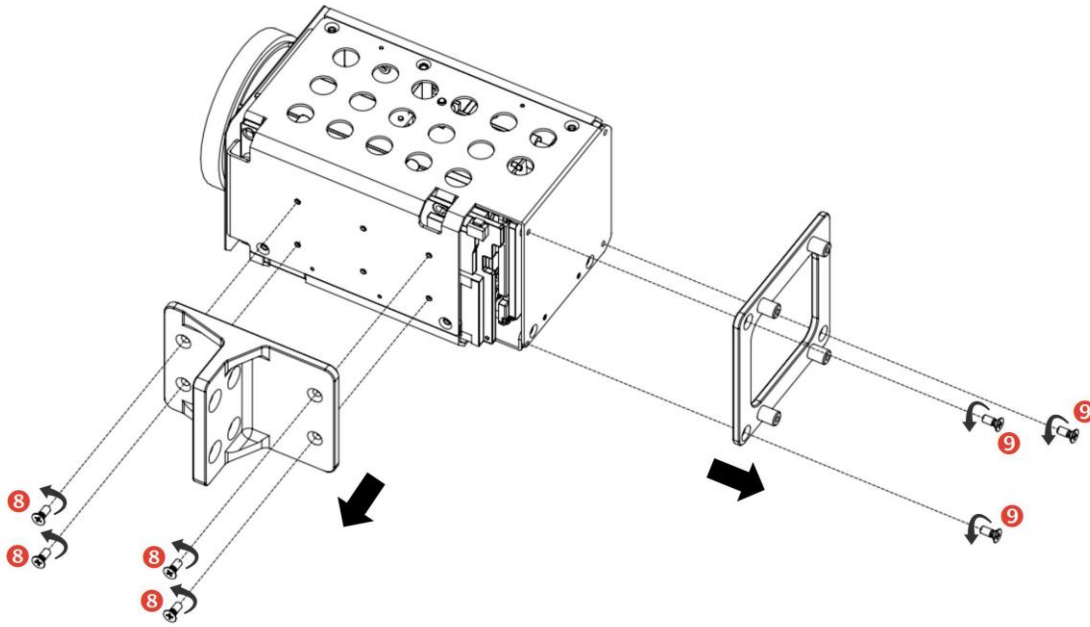
To replace the camera module, loosen and remove the five M4×10 hexagon socket screws that secure the rear cover of the swivel chamber. Carefully remove the rear cover. Be careful not to pull or damage the laser rangefinder cable connector attached to the cover. Use tweezers to carefully remove the red adhesive covering the laser rangefinder connector (connector P7, see system circuit diagram for connector definitions). Carefully press the connector lock and slowly pull the laser rangefinder cable out vertically. Then remove the rear cover. Loosen and remove the four screws in the same way as for removing the circuit board.



Next, remove the motor and gear assembly.

- Loosen and remove the three M3×12 hexagon socket screws securing the motor assembly, then remove the motor assembly from the front housing.
- Loosen and remove the four M3×8 hexagon socket countersunk screws securing the camera module, and remove the camera module from the front housing.

- Open the latch on the 36-pin (36P) flex cable connector of the camera core module on the camera core module and disconnect the flex cable from the core. Loosen and remove the four M2×5 countersunk screws with Phillips heads that secure the module mounting plate, and remove the camera module brackets.

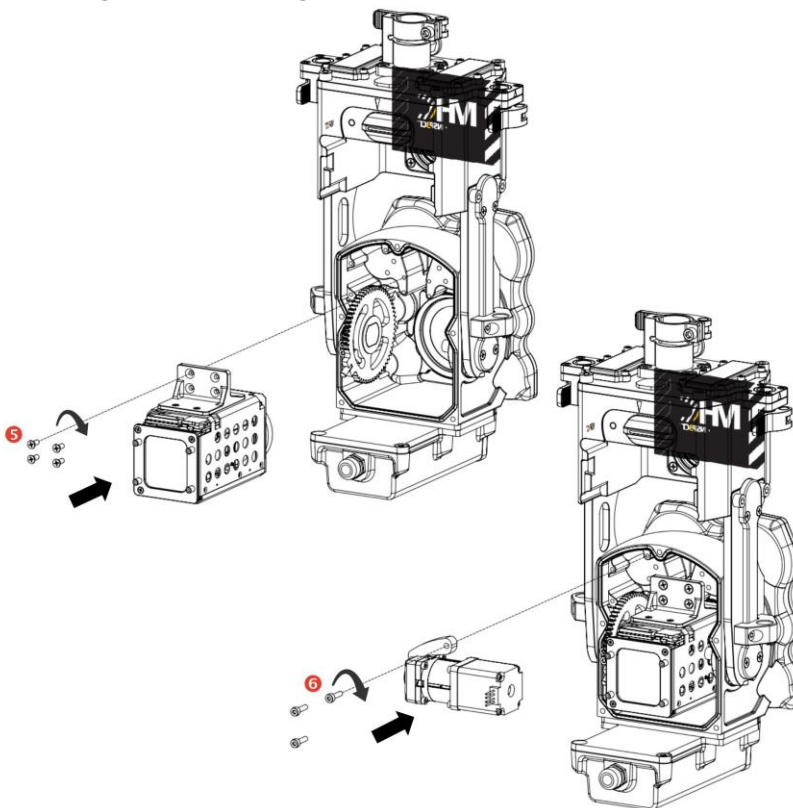


You can then install the new camera module as follows:

Take the replacement camera module and check that it is an original spare part and the same or compatible module. The use of non-original parts may result in malfunctions or damage to the device. Align the mounting plate and the bracket of the main board with the corresponding installation slots on the camera module and secure them with three M3×6 countersunk screws and four M2x5 screws. Reinsert the end of the 36-pin (36P) flex cable of the camera module and check that it is securely seated.



Now you can reinsert the camera with the holder into the housing. Then mount the motor assembly according to the drawing.



Install the mainboard according to the mainboard instructions, check the device and perform a final test.

Replacing the camera lens/light lenses

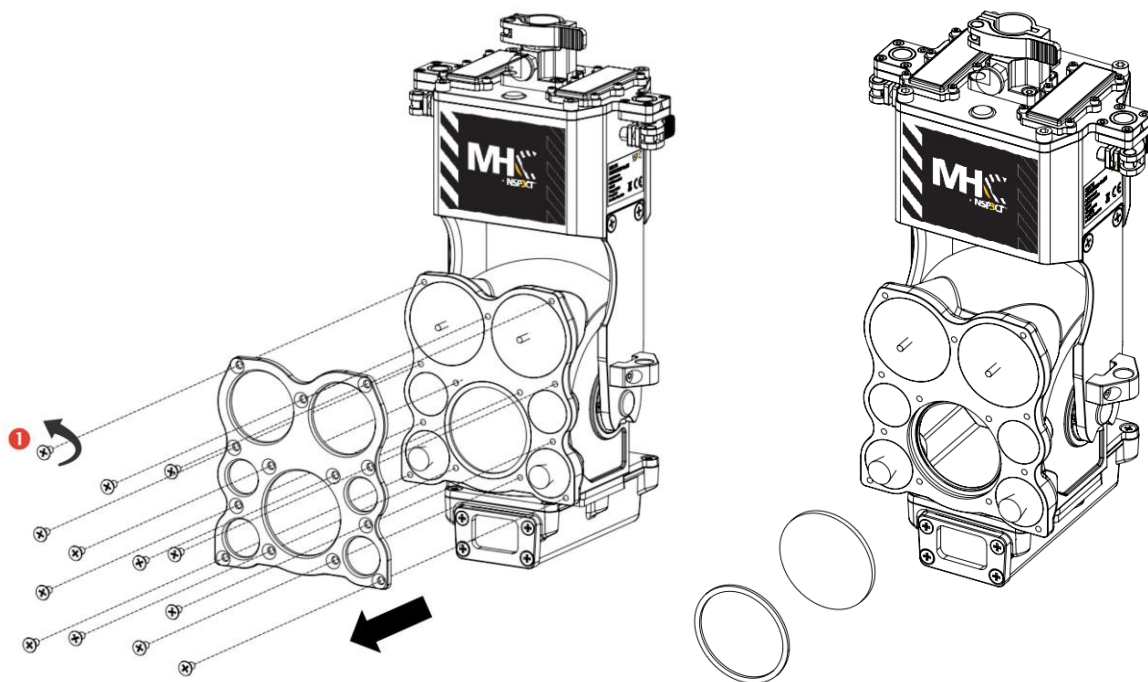
The lenses are located in the front housing. Before replacing any parts, have the necessary spare parts and tools ready and follow the replacement steps described below.

Note:

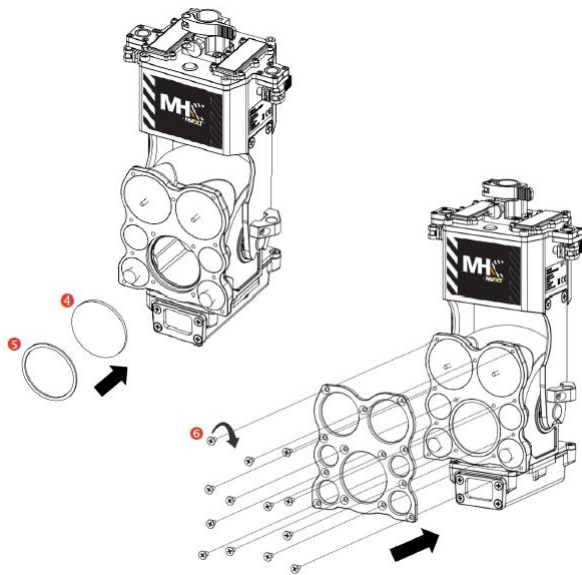
Before the camera glass can be replaced, the rear cover, main control board, motor assembly and camera must first be removed due to the heating system. Detailed instructions can be found in the respective sections. These are not repeated here.

Loosen and remove the M4×8 countersunk screws with Phillips heads that secure the housing cover. Remove the housing cover from the front housing unit.

Using tweezers, carefully peel off the red adhesive film covering the Plug socket for the front push heater connection (P8 connection; see system circuit diagram for connection definitions of the main control board) on the main control board. Carefully press the connector lock and slowly pull the connector out vertically. Remove the nylon washer. Remove the camera glass to be replaced. (The camera glass and heating foil are glued together and should be removed and replaced as a single unit).



Reinstallation is carried out in reverse order:



When replacing the camera glass, ensure that the windscreen heater is plugged back in correctly.