MOVICOM

ROBYHEAD D2

Pan-Tilt head

User Manual

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1. Revision history

Revision	Date	Changes
1.0	12.2025	**Initial document revision.**

2. General description

The Robyhead D2 pan-tilt head is designed to control the orientation of a video camera in two axes – horizontal pan and vertical tilt. The device is intended for use with box cameras and lenses, both with built-in zoom/focus control and with external Tilta Nucleus M and M II motors for zoom and/or focus. The pan-tilt head can be controlled via Ethernet. The device features a built-in 4K HDMI to 12G-SDI converter, as well as loop-through channels for 3G-SDI and Genlock.

The main application areas for the device are:

- Studio broadcasting
- Outside broadcasting
- Theaters and concert halls
- Meeting and conference rooms

D2 heads can be controlled using control panels from Movicom (RHCP-2) or using AW-RP60 and AW-RP150 control panels from Panasonic.

2.1 Integration with Panasonic equipment

Special attention during development was paid to integrating the device with Panasonic AW-UB10 and AW-UB50 cameras. As a result, Panasonic control panels can manage the pan-tilt head and the camera simultaneously, as if they were a single unit. In this case, the control panel communicates only with the pan-tilt head, which executes all commands related directly to camera movement and forwards commands intended for image control to the camera. To set up the connection, enter the camera's IP address and authentication credentials in the "Cam IP address" field of the pan-tilt head's web interface.

The Panasonic control panel must be configured correctly. Set the IP address of the pan-tilt head to control it (with or without a camera). No additional control panel configuration is required to use Robyhead and a UB10/UB50 camera as a single unit.

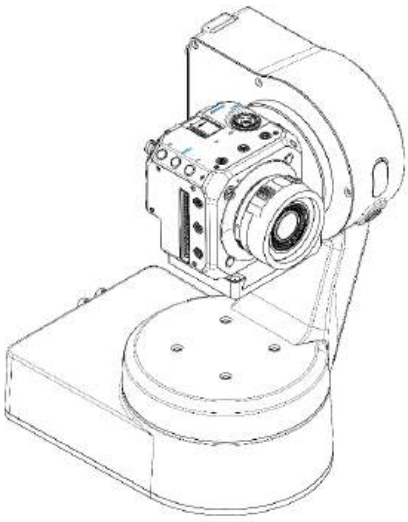


Fig. 1 Robyhead D2 Pan/Tilt head

3. Safety instructions

Follow all warnings and instructions indicated on the product and in this manual to avoid possible injury to personnel and damage to the product.

WARNING! Do not install this product on a mount (bracket or other equipment) that is not rated for its weight including the payload specified in the "Technical Specifications" section of this manual.

WARNING! Regularly inspect the product for damage.

WARNING! The product must be connected to a power source with the same voltage (V) and current (A) as indicated on the product housing and described in the "Technical Specifications" section of this manual. To avoid electric shock, do not remove covers, as there are no user-serviceable parts inside. Contact qualified service personnel at an authorized service center for servicing.

CAUTION! The product is intended for remote control only. Do not attempt to manually operate the pan-tilt unit.

CAUTION! Ensure there are no obstacles in the device's working area that physically impede its rotation. Restrict access to the working area to prevent unauthorized people from entering the area of moving parts of the device.

CAUTION! Do not use solvents, oil-based cleaners, abrasives, or wire brushes to remove dirt buildup, as they may damage the surface of the device. Use only cleaning agents based on household detergents to clean surfaces.

4. Technical specifications

Parameter	Value
Rotation Range	Pan: 320° Tilt: 215°
Rotation Speed	0,1..60 °/sec
Maximum Payload	4 kg
Camera Connections	1 x HDMI 2.0 (built-in converter to 12G SDI) 1 x 3G SDI Loop-through 1 x Genlock Loop-through 12 VDC Output Ethernet with PoE+ support (IEEE 802.3at standard)
Front Panel Connectors	Lens control (serial)
Tally	Dual-color indication of current camera status
Power Requirements	12 V DC ± 5% (11.4 V to 12.6 V), 50 W average, 100 W maximum. AC/DC adapter included
Ambient Operating Temperature	0..+40 °C (32 °F to 104 °F)
Ambient Operating Humidity	20 % to 90 % (no condensation)
Storage Temperature	-20..+50 °C (–4 °F to 122 °F)
Mass	Approx. 3,7 kg (8.16 lbs)
Dimensions (W x H x D)	210 mm x 295 mm x 255 mm (8.27'' x 11.61'' x 10.04'')
Controller Supported	Movicom RHCP-2 Panasonic AW-RP150GJ, AW-RP60GJ

5. Elements

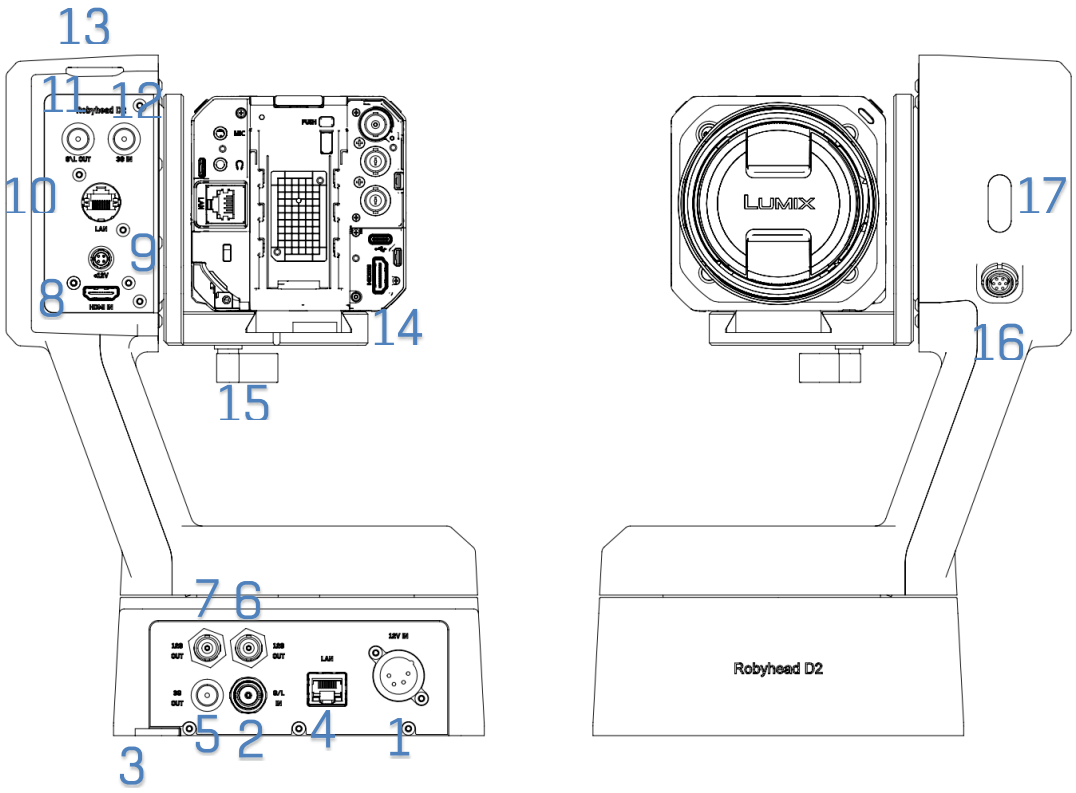


Fig. 2 Robyhead D2 front and rear view

1	Power IN, 12 VDC
2	Genlock Input
3	Safety lug
4	LAN connector for IP control (RJ-45) 100BASE-TX
5	3G SDI OUT (Loop-through)
6	12G SDI OUT
7	12G SDI OUT
8	HDMI 2.0 video input
9	12V DC Camera power output
10	LAN connector for camera control (RJ-45) 100BASE-TX with PoE+ support
11	Genlock output
12	3G SDI video input
13	Dual-color Tally indicator (rear)
14	Camera mounting plate
15	Camera mounting plate locking screw
16	Lens control output
17	Dual-color Tally indicator (front)

6. Basic application schematics

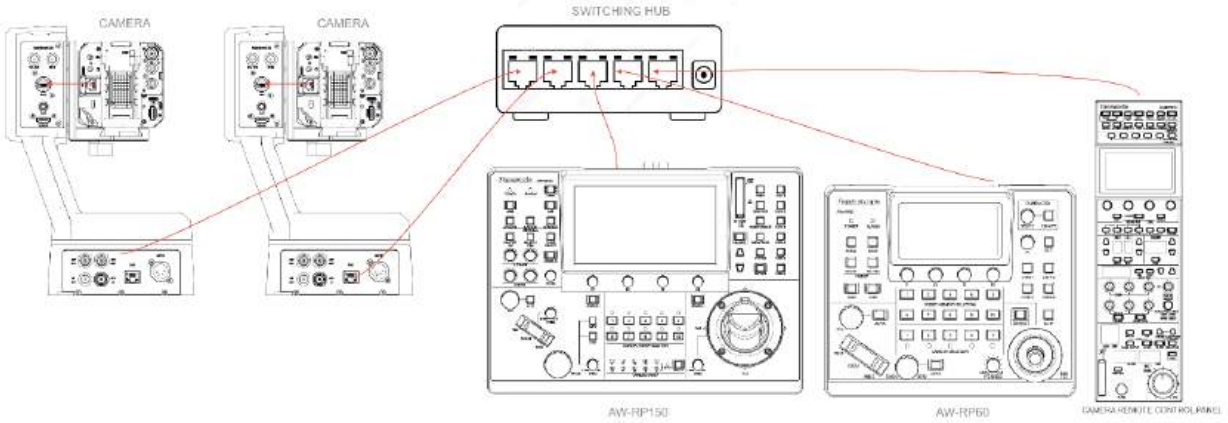


Fig. 3 Connecting Robyhead D2 and Panasonic AW-RP150 (AW-RP60) control panels over a local area network.

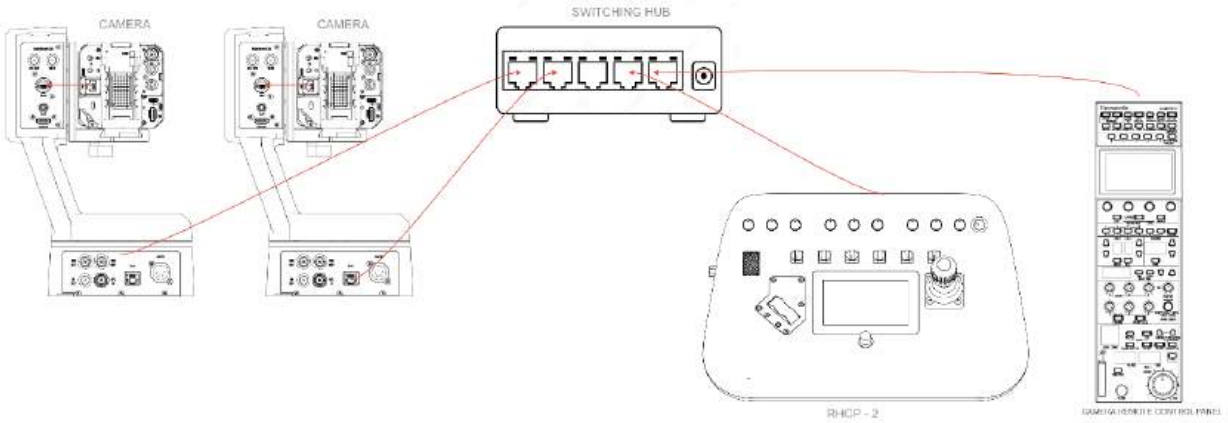


Fig. 4 Connecting Robyhead D2 and Movicom RHCP – 2 control panel.

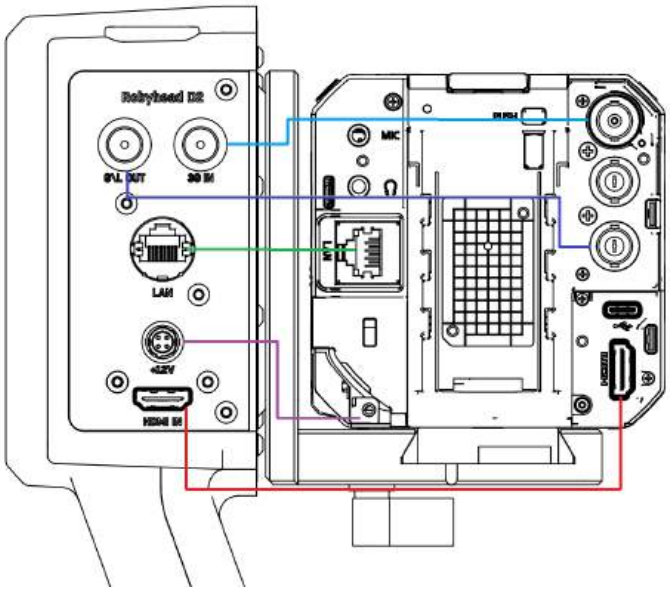


Fig. 5 Connecting Robyhead D2 to a camera (Shown with Panasonic UB10).

7. Installing the Pan-Tilt unit

Ensure the pan-tilt unit's mounting point can bear the weight of the pan-tilt unit (own weight 3.7 kg) and the installed camera (up to 4 kg) – total 8 kg (16.5 lbs). Screws for installing the device are not included with the D2 head, make sure to use proper size screws to bear the weight involved.

Install the camera only after completing the mounting of the pan-tilt unit.

The device can only be installed in a vertical position (including upside-down).

Work with the pan-tilt unit should only be performed by qualified personnel.

During installation, the power supply must be disconnected.

For ceiling mounting (or any upside-down mount), it is recommended to use the Panasonic AW-UE160 camera ceiling mount.

If mounting upside-down, make sure to use a safety cable to connect the D2's safety lug to a similar element on the AW-UE160 platform.

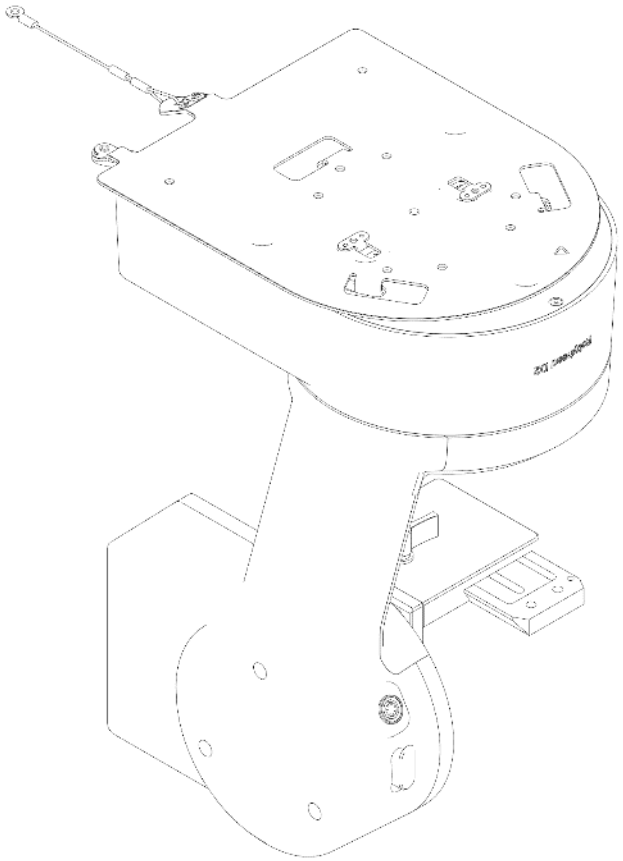


Fig. 6 Examples of ceiling mounting. Mounting brackets are not included with the D2.

Examples of ceiling mounting. Mounting brackets are not included in delivery.

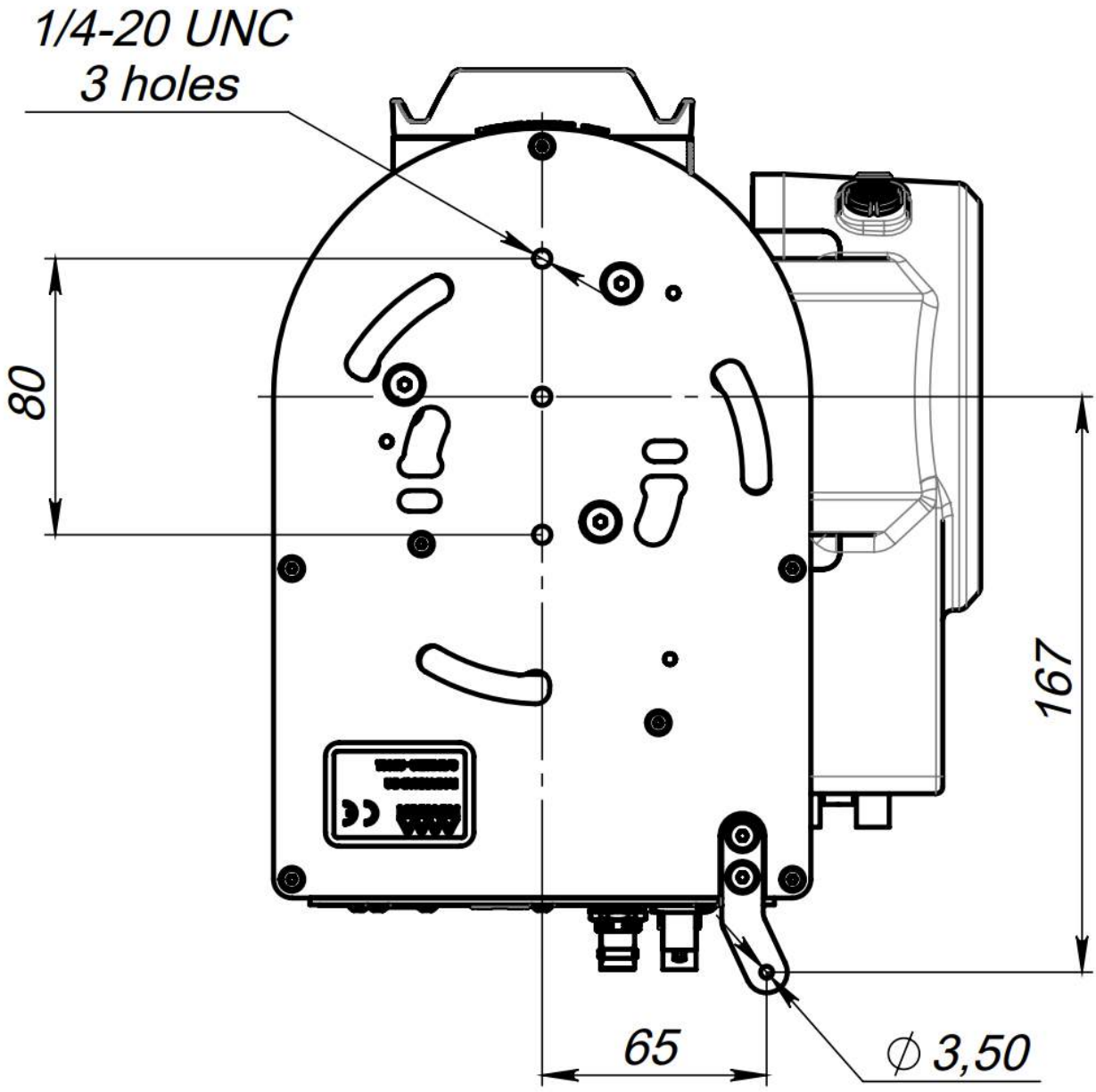


Fig. 7 Robyhead D2 bottom side dimensions

8. Installing a camera on Robyhead D2

The product is delivered assembled with the camera mount in the "standard" position.

Use the "standard" camera mount assembly only for desktop mounting the D2 ‘right-side up’ (Fig. 8 and Fig. 9).

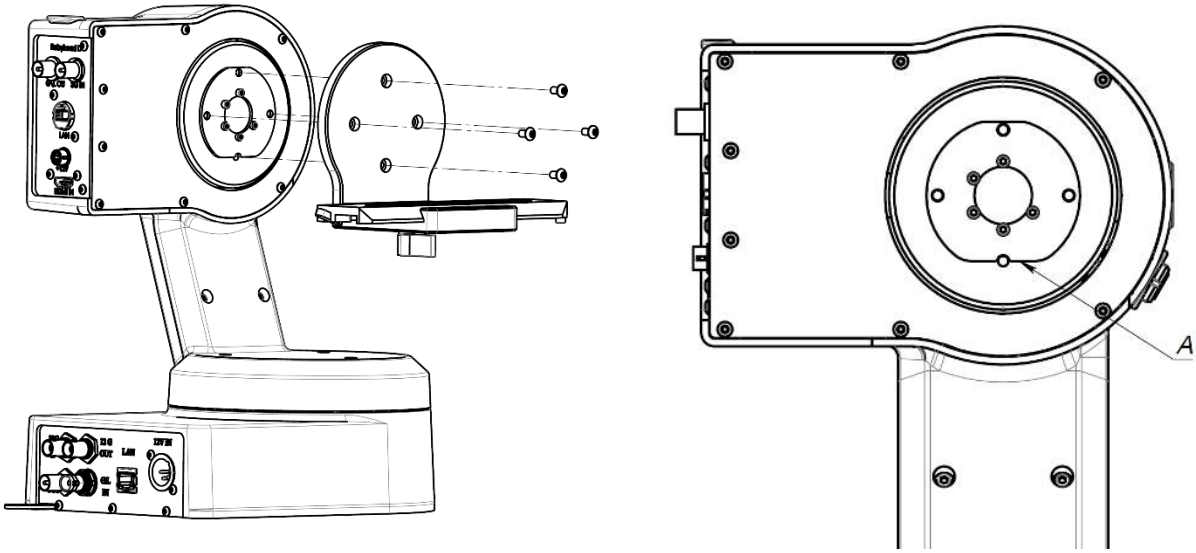


Fig. 8 «Standard» camera mount assembly

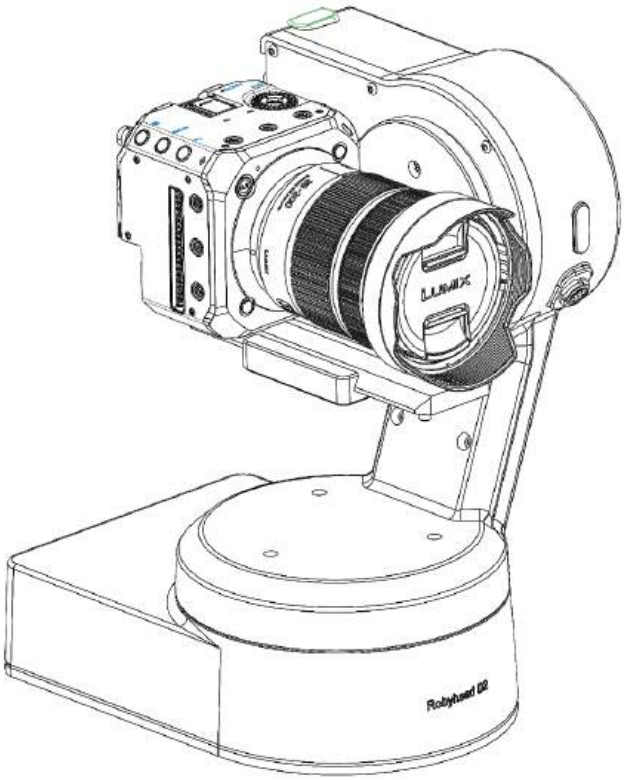


Fig. 9 Mounting a camera on the "standard" camera mount

For ceiling or ‘upside-down’, mounting, use the "reversed" assembly of the camera mounting plate (Fig. 10 and Fig. 11).

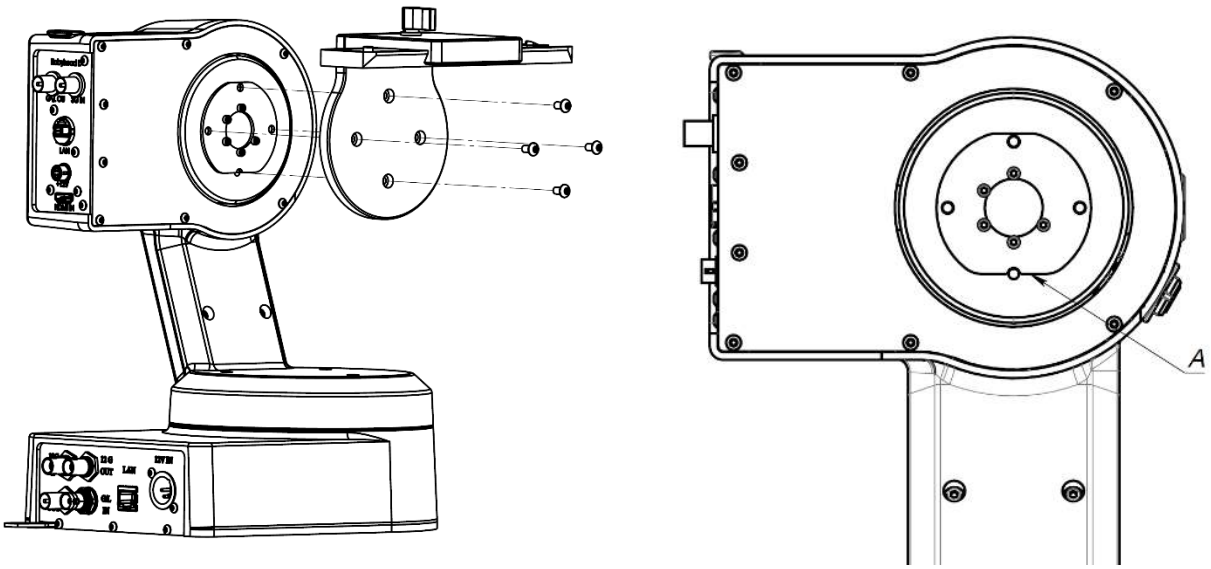


Fig. 10 "Reversed" mount assembly for suspended camera mounting

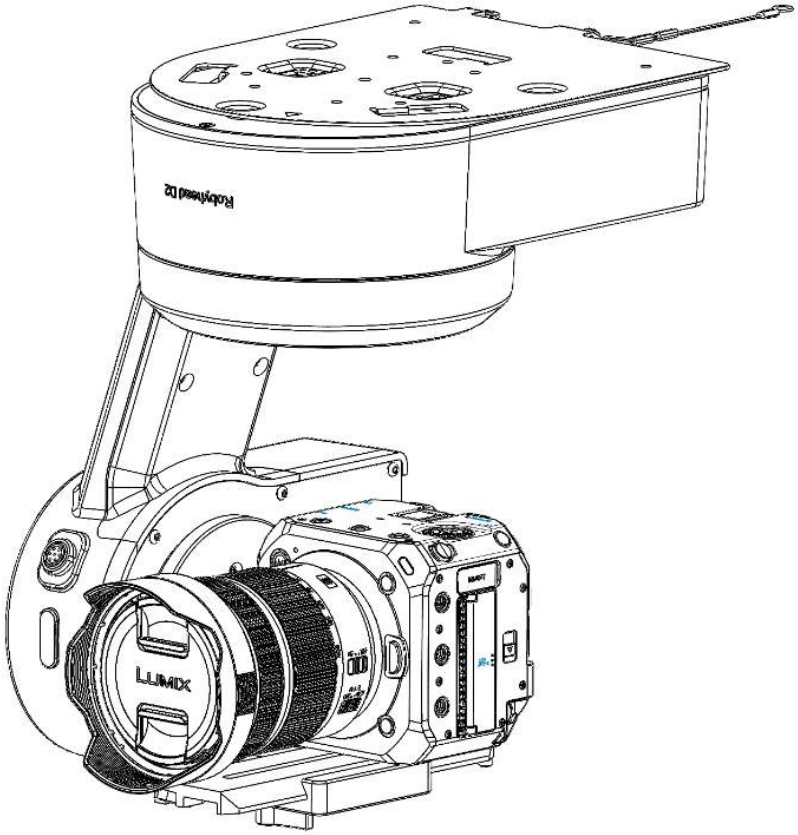


Fig. 11 "Reversed" mount assembly for suspended camera mounting

It is recommended to assemble the camera mounting plate for the inverted configuration before mounting the D2 to the ceiling (or upside-down).

For "reversed" assembly of the camera mounting plate for upside-down mounting, perform the following steps:

1. Unscrew the 4 screws securing the arm to the base as shown in Fig. 8.
2. Flip the arm and secure it using the 4 screws as shown in Fig. 10. It is important to pay attention to the position of edge A. When securing the arm in the "standard" or "reversed" configuration, edge A must always face towards the base of the pan-tilt unit (Fig. 8 and Fig. 10). Failure to comply with this requirement will affect the camera's rotation angles, which may lead to the camera or lens colliding with the device housing.

Attach the camera to the camera mounting plate using screws. For convenience when mounting the camera to the mounting plate, the plate can be removed by loosening the clamping screw underneath the arm and pressing the locking mechanism on the mounting plate ("dovetail").

Ensure the camera is balanced relative to the tilt axis (along the camera's optical axis). Camera balancing can be done by shifting the mounting plate relative to the arm along the optical axis, or by moving the camera relative to the mounting plate. For lightweight camera and lens setups, it is permissible to attach the camera in the center of the mounting plate slot. For heavy setups with long lenses, it will be necessary to change the camera's position on the plate by shifting the camera closer to the mounting plate's safety spring mechanism.

Mount the camera on the mounting plate using at least two 1/4"-20 UNC x15 screws (Fig. 12). The tightening torque of the mounting screws must be sufficient to ensure a secure connection – approximately 4-5 Nm.

The dimensions of the camera mounting plate are shown in Fig. 13.

After installing the head, you can configure the pan-tilt unit inversion in the web interface (see Chapter 10) to coordinate movement directions for multiple heads.

After installing the camera, it is necessary to check the camera's rotation range by manually rotating the camera from stop to stop. If the camera, plate, or lens makes contact with the Robyhead D2 device housing, then you must correctly set the camera's operational range in the Movements tab (see Chapter 10.1). Failure to comply with this point may result in damage to the camera, lens, or Robyhead D2 device.

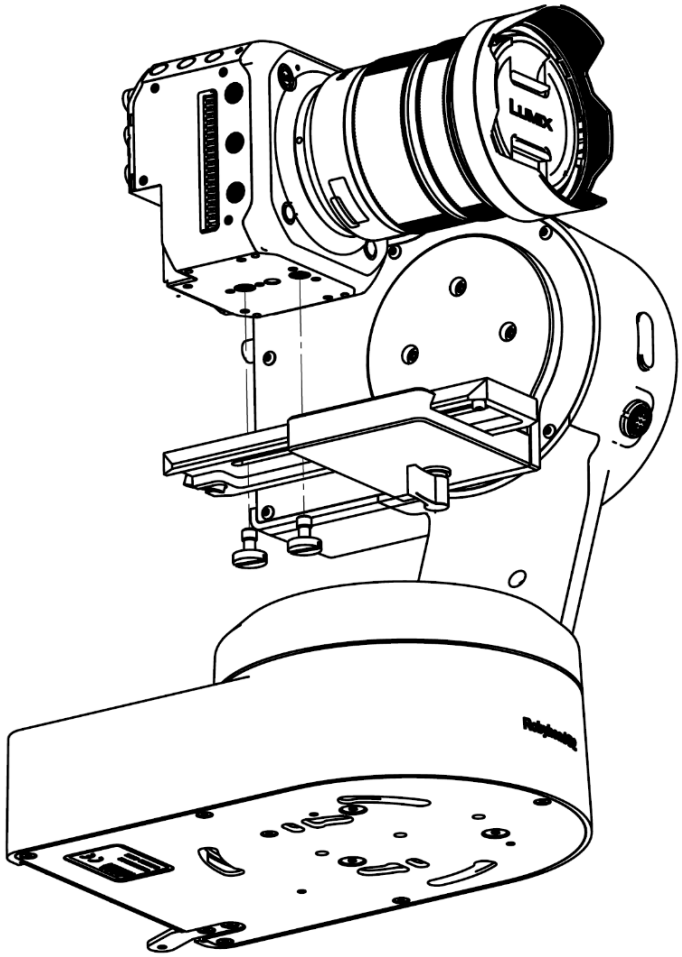


Fig. 12 The camera is attached to the mounting plate with at least two 1/4"-20 UNC x15 screws. The tightening torque of the mounting screws should be 4-5 Nm.

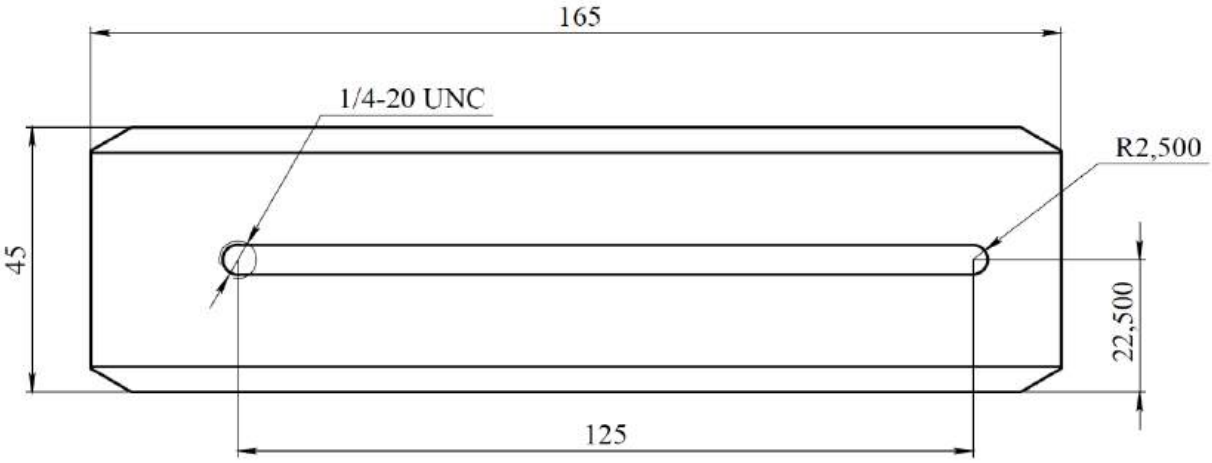
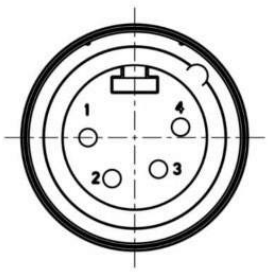


Fig. 13 Camera mounting plate dimensions

9. Connector pinouts

Pin location is given when viewing the connector from the mating side, with the unit rightside up.

9.1 Power input connector (XLR 4 male)



Pin #	Pin Function
1	GND
2	Not used
3	Not used
4	12 VDC

Fig. 14 Power input connector

9.2 12V DC power output connector

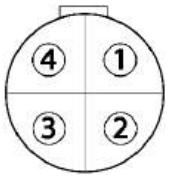


Fig. 15 12V DC Output

Pin #	Pin Function
1	GND
4	12 V DC

Maximum allowable current through this connector is 2A. Mating cable connector – Hirose HR10A-7P-4P.

9.3 Lens control connector

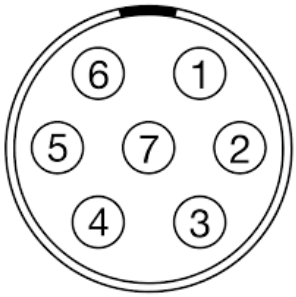


Fig. 16 "Lens" control connector

Pin #	Pin Function
1	TX485B_N
2	TX485B_P
3	RX485B_N
4	RX485B_P
5	+5V
6	+12V
7	GND

Maximum allowable current through this connector is 2A. Mating cable connector FGG.1B.307..

10. Web interface

Configuration of the pan-tilt unit is performed via the web interface. To access the configuration page, launch a web browser on your computer and enter the device's IP address in the address bar (e.g., http://192.168.0.16). Ensure your computer's network settings are configured appropriately beforehand – see below.

The default IP address of the pan-tilt unit is 192.168.0.16.

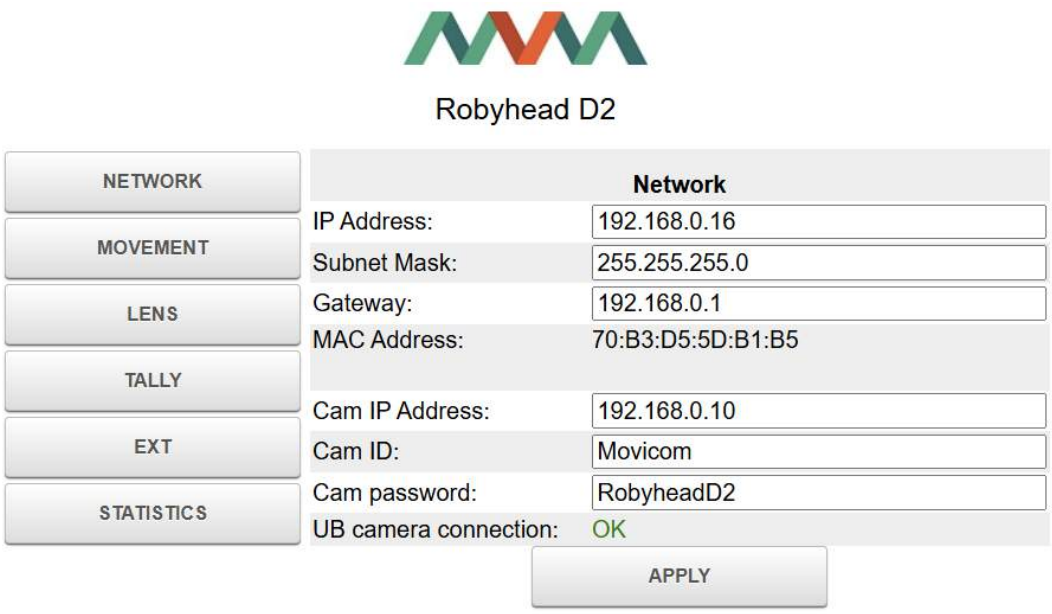


Fig. 17 Robyhead D2 web interface

New setting values are applied immediately after clicking the **"Submit"** button. Network settings are applied only after clicking **"Apply"** and subsequently rebooting the pan-tilt unit.

The following tabs are available in the web interface:

- **Network** – IP address, subnet mask, and gateway of the pan-tilt unit, network settings for the UB10/UB50 camera.
- **Movement** – configuration of movement parameters, setting of axis limit ranges.
- **Lens** – configuration of parameters for Robyhead D2 interaction with the lens.
- **Tally** – configuration of brightness for the dual-color Tally indication.
- **Ext** – tab for configuring work with external equipment, e.g., Tilta motors.
- **Statistics** – informational tab with device statistics and version.

10.1 Movement tab

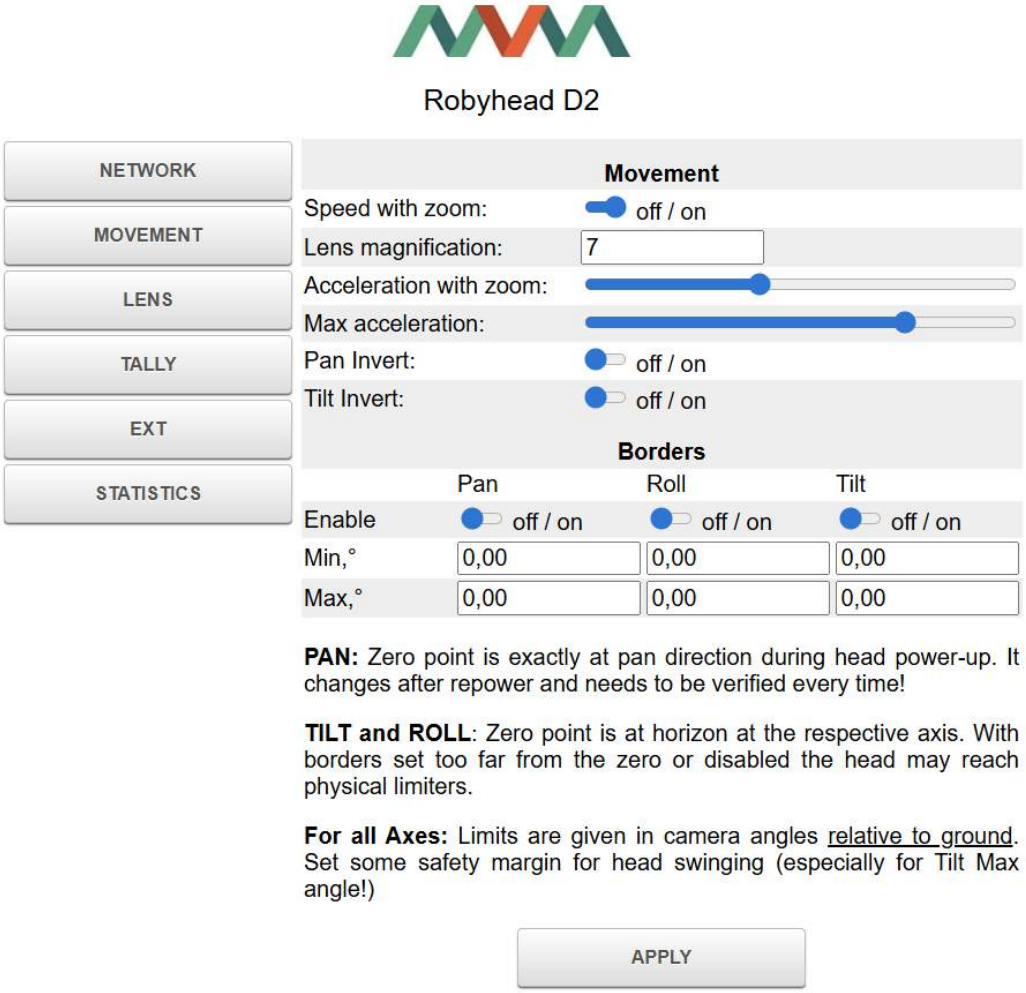


Fig. 18 Movement tab

- **Speed with zoom** – enables/disables the "Zoom Compensator" function. This function scales the maximum speed of the pan-tilt unit relative to the current zoom value. When enabled, the closer the shot (more zoomed in), the slower the pan-tilt unit moves for the same joystick deflection.
- **Lens magnification** – Sets the scaling coefficient for the "Speed with zoom" function. If the scaling coefficient matches the lens's zoom factor number, the frame speed remains constant for a constant joystick deflection regardless of zoom level. Values different from the lens's zoom factor number are allowed in this field. The higher the value, the stronger the slowdown at tight shots. The recommended average value is 7.
- **Acceleration with zoom** – this parameter allows changing the smoothness of acceleration and deceleration depending on the current zoom position. If Acceleration with zoom is different from 0, then acceleration and deceleration will be smoother when zoomed in. The

leftmost position of the slider disables this function. The further right the slider, the more noticeable the scaling effect will be.

- **Max Acceleration** – determines how smoothly the camera will start and stop moving. Lower values (slider to the left) will provide a smoother start and stop of camera movement.
- **Pan and Tilt invert** – inverts the movement directions of the axes. This function is used to coordinate joystick directions on a control panel when the panel controls multiple heads with different types of installation (right-side up or upside-down).
- **Borders** – rotation ranges for the axes. To apply values, the Enable slider must be activated.

10.2 Lens tab

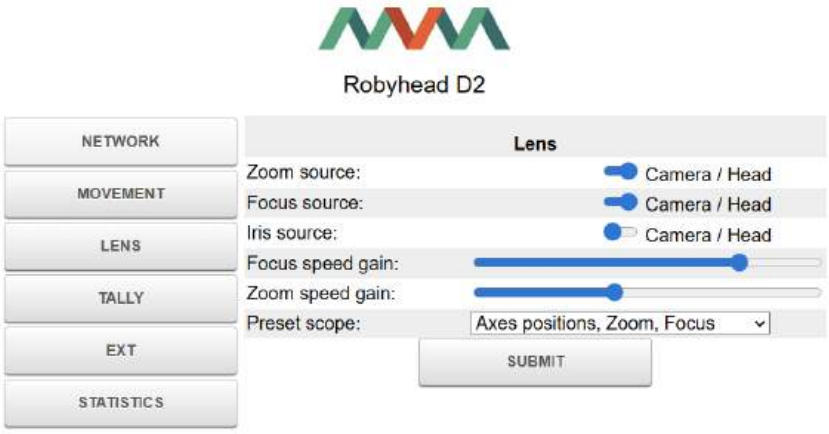


Fig. 19 Lens tab

- **Zoom/Focus/Iris source** – selects the source for zoom control. When "Camera" is selected, the head forwards commands received via the AW protocol directly to the lens. Used for motorized lenses. When "Head" is selected, the head independently processes AW commands related to the corresponding lens parameter and redirects them to the lens connector. This setting is used when using lenses with Serial control cable (Fujinon, Canon) or in the case of using a UB10/UB50 configuration with a partially motorized lens.
- **Focus speed gain** – scaling coefficient for focus change speed. Used only when the focus source is set to "Head".
- **Zoom speed gain** – scaling coefficient for zoom change speed. Used only when the zoom source is set to "Head".
- **Preset scope** – defines the set of parameters involved in and saved to a preset.

10.3 Tally tab

Fig. 20 Tally tab

Configuration of the intensity of the camera tally indication. Independent configuration or disabling of one of the indicators is possible.

10.4 Ext tab

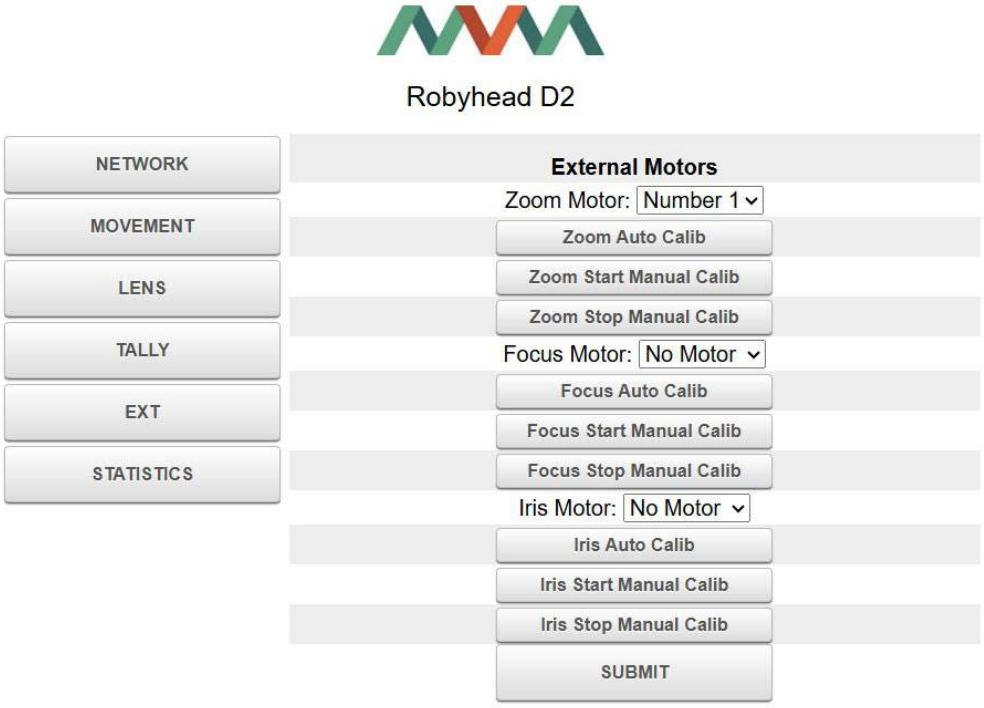


Fig. 21 Ext tab

- **Zoom Motor** – selects the Tilta motor number to which control should be forwarded.
- **Zoom Auto Calib** – starts automatic calibration of the Tilta motor based on the lens's mechanical stops.
- **Zoom Start Manual Calib** – starts manual calibration of the Tilta motor.
- **Zoom Stop Manual Calib** – ends manual calibration of the Tilta motor.

10.5 Statistics tab

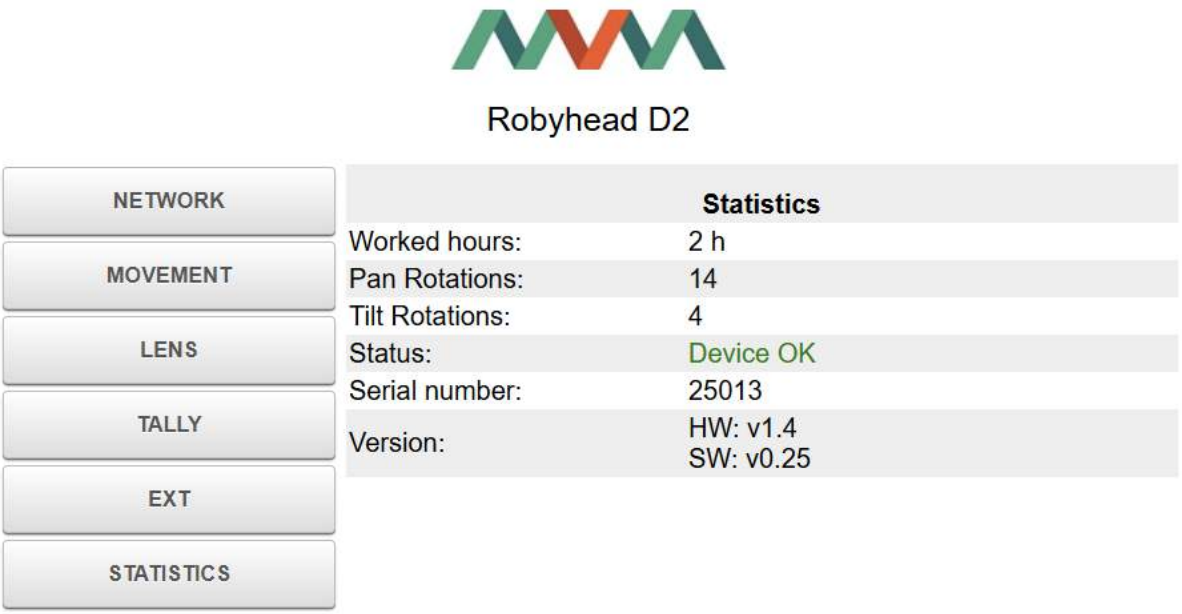


Fig. 22 Statistics tab

This tab shows device operation statistics, current operating hours, board version (HW), firmware version (SW), as well as the current device status including some of the detected errors and faults.

11. Working with external Tilta Nucleus M motors

The Robyhead D2 supports working with both motorized Panasonic, Canon, Fujinon lenses and external Tilta Nucleus M and M II control motors. The robotic head supports working with both generations of motors.

For correct operation of the lenses and motors, it is necessary to properly configure the parameters using the web interface.

First, on the Lens tab, correctly select the source for optics control. For motorized Panasonic lenses controlled via the UB10/UB50 camera, select the "Camera" parameter for the corresponding optics parameter.

To use an external motor, select "Head". Next, select the motor number on the EXT tab. Please note that for those lens axes where an external motor is not used, "No Motor" must be selected.

To connect the motor to Robyhead D2, a special connection cable "CAB5 Tilta" is used. To connect 2 or more motors in a chain, a standard 7-pin to 7-pin Lemo cable must be used.

For mounting the motor on the camera, it is recommended to use the SmallRig 3011 adapter, as well as a 15 mm diameter carbon guide tube.