

User manual

Automatic photographing for TLS



Platform

The platform consists of a 2-axis gimbal where the rotation about the axes is driven by stepper motors. A touch screen that enables customized settings is connected to the gimbal.

Camera mounting

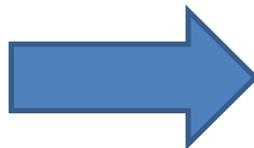
Note! When rotating the platform manually, do it gently. Otherwise, unwanted current can be induced in the stepsticks that drive the motors.

Before turning on the screen:

- Turn on the camera.
- Loosely mount the camera on the platform with the camera lens pointing in the opposite direction as the screen. For Sony NEX-3N, use the middle hole for the lens to be centered. Then find the center of mass by moving the camera forwards/backwards until it has no intention of rotating in each direction. Firmly secure the camera in that position.
- Check that the holder roughly is in its initial position in the azimuthal direction, which is when the motor labels are directed in somewhat the same direction.



- Check that the camera is in its initial position in the zenith direction, i.e. when the upper carbon fiber pipe in the platform is positioned directly above the lower one.



- Connect the white/red/black trigger cable to the camera.

Screen settings

Turn on the screen by pressing the black switch connected to it. As soon as the home screen is visible, you can press the buttons to set the values. Due to the small size of the screen, a pen or similar is recommended for usage when touching the screen. The values can be set in any order, but below a guide from the top to the bottom will follow. After each entered value, make sure you get a message that says that it is OK. Otherwise, try and press **Save** again.

The screenshot shows a settings menu with the following items:

- ROTATION AZIMUTH (DEG) with a value of 360
- OVERLAP AZIMUTH (%) with a value of 20
- ROTATION ZENITH (DEG) with 'Down:' and 'Up:' sub-values, both set to 80
- OVERLAP ZENITH (%) with a value of 10
- SENSOR SIZE ROUNDED (MM) with 'W:', 'H:', and 'F:' sub-values, all set to 25, 16, and 16 respectively

At the bottom is a green 'GO!' button. To the right, callout boxes identify: 'Description of setting' (pointing to the text), 'Current value' (pointing to the numbers), and 'Unit' (pointing to '(DEG)' or '(%)').

- **Rotation azimuth**

Enter the value on the keypad and press **Save**. Press **Home** to return to the home screen or **Next** to determine the overlap in the azimuthal direction. For no rotation, enter 0 as value. This will overwrite any overlap value.

Limits: maximum 360 degrees

The keypad shows a numeric grid from 0 to 9. The '0' key is highlighted in green. Above the keypad, the text 'Rotation az: 360 deg' is displayed. To the left is a green 'Home' button and to the right is a blue 'Next' button. A red 'X' button is located below the '0' key. To the right, callout boxes identify 'Description of setting' (pointing to the text) and 'Current value' (pointing to the numbers).

- **Overlap azimuth**

The overlap in the azimuthal direction is given in % of the angle of view (AOV) for the camera. Enter the value on the keypad and press **Save**. Press **Home** to return to the home screen or **Next** to determine the rotation in the zenith direction.

Limits: maximum 99 %

- **Rotation zenith**

The camera can be rotated both downwards and upwards 80 degrees respectively, with the reference point 0 degrees when the bottom of the camera is parallel to ground. First enter the value for the downwards rotation on the keypad and press **Save**. Then enter the upwards value, press **Save**. Press **Home** to return to home screen or **Next** determine the overlap in the zenith direction. For no rotation, enter 0 as value. This will overwrite any overlap value.

Limits: maximum 55 degrees down, 80 degrees up

- **Overlap zenith**

Enter the value on the keypad and press **Save**. Press **Home** to return to the home screen or **Next** to determine the rotation in the zenith direction.

Limits: maximum 99 %

- **Sensor size**

When entering the sensor size screen, the current values for the sensor width, sensor height and focal length are shown. Press **Home** to return to the home screen or **Clear all** to clear the current values and enter new ones. These numbers can be given with maximum 2 decimals.

Limits: sensor width and height maximum 99 mm, focal length maximum 500 mm

Note! The home screen shows rounded numbers for the sensor width, height and focal length. However, the values used are still as exact as given. The decimals are shown when entering the sensor size screen.

Camera	Sensor width	Sensor height	Focal length (no zoom)
Sony NEX-3N	23.5 mm	15.6 mm	16 mm
Sony NEX-5N	23.7 mm	15.6 mm	18 mm

Start the photographing

- **Check values**

Check that the values are as wanted. If not, it is possible to navigate back and forth and change the values.

- **Press GO!**



“Camera in action” is shown until the photographing is done.

Photographing finished

When the photographing is finished, a buzzer will give off a beeping sound. Press **OK** to return to the home screen or make sure the camera is in its initial position and press **Go again** to take photos again with the same parameters.

Note! The SD-card must not be removed or inserted when the screen is empowered. Since they share the same SPI-bus, this can lead to errors. If an SD-card is to be removed or inserted, turn of the screen.