

CYCLOPS - TurboDrone

PILOT CHECKLIST

1 PRE-FLIGHT

Purpose: To ensure that the aircraft is in flight order

1.1 Step 1: Central Turbine Inspection

- All the blades are present
- Rotors spin freely
- No major impact in the Shroud

1.2 Step 2: Inspection of auxiliaries

- All propellers are in good condition
- The motors do not rotate around the carbon axis
- The fairings are fixed and in good condition

1.3 Step 3: General Inspection

- No bare cables
- No free cables that could change when entering
- Landing feet are attached and in good condition
- Ensure that your HEREFLOW sensor is cable-connected and screwed to the drone
- Ensure that your Lidar sensor is cable-connected and screwed

2 PAYLOAD MOUNTING

Objective: Prepare the drone for an inspection mission

BEWARE THE DRONE CYCLOPS SERIES MUST HAVE A PAYLOAD TO FLY OR DEAD-WEIGHT MASS

2.1 Step 1: Choose your flight configuration

- Setup 1: Insta360 Camera
- Config 2: Feyiu Gimbal + Thermal Camera
- Config training: Add the fake camera (equivalent to Config1) with weight inside (orange fake camera)

2.2 Step 2: Mount the payload

- Mount the inspection elements on the front plate (camera, etc.)
- Mount balancing weights if needed
- Check balance - that the weights are correct for the chosen Config. – handle the drone by the top handle either by hand or through a carbon rod to check if there is any major disbalance.

Important: Make sure everything is secure and nothing can come loose in flight

3 GETTING STARTED

Objective: Prepare the drone for start-up

3.1 Step 1: Prepare the batteries

- Check the state of charge of the batteries
- Position the 2 batteries on the battery supports
- Fasten the batteries with the straps – make sure to lock the cables in the strap
- Mount low battery alarms on balancing sockets
- Make sure that no cables are close to the auxiliary motors

3.2 Step 2: Preparation of pilot equipment

- Switch on the Radio Control
- Turn on telemetry items

3.3 Step 3: Getting Started

- Connect the 2 batteries
- Check the connection between the drone and the RC (green led on the receiver and crossfire)
- Check the telemetry connection
- Check that the Pixhawk has initialized correctly (sound signal)
- Check that your RC respond on all modes: Stabilize, AltHold, Loiter – check on the telemetry screen
- Arm check: when armed on stabilize or althold ONLY the auxiliaries motors will start.

4 BEFORE THE FIRST TAKE OFF OF THE DAY

AFTER major transportation (airplane, trucks, or mishandling, or boat shipping) or several month unattended: Ground-run-up is mandatory

- Drone attached / strapped on a support of more than 5 KG – strap through the lower in-turbine carbon tube.
- **Do not strap landing gears – strap on carbon tubes!**
- Getting started & verification of use
- Power up in 10% increments for 10 seconds
- At each level check the noise (no abnormal vibration)
- Go to the next level +10% and thus up to 100% power

In the event of abnormal vibration at a bearing, stop the turbine and carry out the usual checks or suspend the activity.

- Once process is ended, cut the throttle. Do a quick visual inspection
- Add 5% throttle for 20-30s to cool motors of the EDF (central turbine).

5 LIFT-OFF

5.1 Step 1: Arm the drone

- Arm the drone (radio control)

Select mode: Stabilise or AltHOLD for take-off

It is advised not to take-off on Loitter indoor due to the nature of the drone which may or may not be suitable for the Loitter sensor (Hereflow).

- Check that the 4 auxiliary motors are running well
- Very slightly increase throttle
- Check that the central turbine turns well
- In AltHold (and Loitter) take-off : the Central turbine ramps-up according to Pixhawk and it takes few seconds for Pixhawk to ramp up the turbine – be gentle and patient.

5.2 Step 2: Put the drone in the air

- Gradually increase the throttle until the drone starts to lift (throttle approx. 50%) – be patient as turbine ramps for take-off is managed by Pixhawk.
- Give a small pulse on the throttle to put the drone in the air
- Stabilize the drone at eye level then start the mission

On K-001 & K002 drone on Stabilize and AltHold the drone needs a bit of pitch-forward as it tends to shift back – it is a known issue to be corrected. – Pixhawk does correct as soon as you switch to loiter mode.

5.3 Loiter mode:

When on Stabilize or AltHold and the drone is at +1M and stable:

- You can switch to Loiter,
- wait 2 seconds and move your drone gently around
- check if there is no “HERFLOW / XY error” – as this would indicate that the ground is not compatible with the ToF Herflow Sensor and you need to revert back to AltHold. If there is no error, you are free to loiter to your will.
- Fly Safe and respect regulations

6 LANDING

- Landing Modes: Stabilise, AltHold, Loitter. All modes are fine for landing

The Landing gears can break on hard landing. Landing gears are wearables and are designed to break on hard landing to absorb the energy of a hard landing and keep the drone safe. You have spare landing gears and the landing gears can be changed easily with zip-tights.

- As soon as the pilot hears the battery alarm, he must IMMEDIATELY enter the landing phase
- You can set battery alarm on your RC or Telemetry (by default Alarm is set to Telemetry).
- Gradually reduce throttle to lose altitude
- A few centimetres from the ground (10-20cm), level off, then reduce the throttle again to land

Note: In this phase the drone is subject to ground effects corrected by Pixhawk on Loiter mode only. For Stabilize and AltHold pilot need to pay attention to landing phase.

- Once on the ground, cut the throttle. Do a quick visual inspection
- Add 5% throttle for 20-30s to cool motors for the central turbine. This is needed. Please avoid stopping the motor of the Cyclops abruptly. Abruptly stopping turbine motors creates a thermal discharge due to the high current within the motor and ESC.

Important: No battery failsafe is set - only the pilot is responsible for his battery level