AQUILA3F
USER MANUAL
V.4

ARGOSDYNE

Contents

01

Product Profile

This Section describes the features of the product, guide the preparation of the drone before flight, and lists the components of the drone and remote controller.

Product Profile

Introduction

AQUILA-3F is a small quad-rotor, high-precision aerial survey drone with 76-minute flight time and IP53 waterproofing. Upgrade your next mapping mission with the AQUILA-3F - the most compact and accurate low altitude mapping solution.

Based on the new H7 flight control system, it is compatible with PX4 and ArduPilot dual-system open source architecture.A new dual RTK module is integrated directly into the AQUILA-3F, providing real-time, centimeter-level positioning data for improved absolute accuracy on image metadata. As the same time, It has stronger anti-magnetic interference ability and precise positioning ability. In addition to optimized flight safety and precise data collection. Fit the AQUILA-3F to any workflow, with the ability to connect this positioning system to the NTRIP (Network Transport of RTCM via Internet Protocol) using a 4G dongle or WiFi hotspot.

Users can also create customized solutions through the newly added Phalanx G1 expansion board module and customized auxiliary equipment according to business characteristics, so that AQUILA-3F can be closely integrated with the operation scene.

This device complies with Part 15 of the FCC Rules.
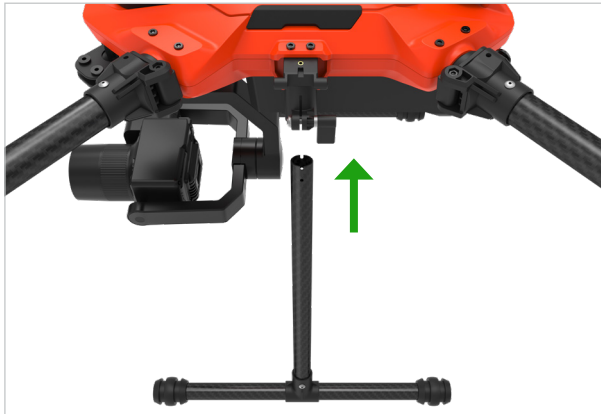Operation is subject to the following two conditions :
(1) This device must accept any interface received and
(2) this device must accept any interface received, including interference that may cause undesired operation

Preparing the Drone

1. Installing the Landing Gears
Install the landing gears,tighten the latch clockwise,and make sure it's tight.

2. Mounting the Gimbal and Camera

1. Align the white and red dots and insert the gimbal.
2. Rolate the gimbal lock to the locked position.

After installation, make sure that the gimbal lock is locked in place.
Make sure to press down the Gimbal Detachment button when rotating the gimbal lock to remove the gimbal and camera. The gimbal lock should be fully rolated when removing the gimbal for next installation.

* The camera is a separate option, and the price is addedaccording to the camera type

3. Battery Installation

Slide battery into the battery compartment according to the arrow's direction as shown below.

When the upper and lower buckles on the battery are in place, a click sound indicates the battery is securely installed. Failure to do so may affect the flight safely of your drone.

Make sure to use included batteries, Do not use any other type of batteries.

4. Turning on the Drone
Turn on/off :

Short press the power button on the drone once to turn on the battery; long press for 2seconds to turn off the battery. The indicator light is always on after turning on the power.

Drone Overview

1.Propellers
2.RTK Modules
3.Frame Arms
4.Gimbal Camera

5. Motors
6.Landing Gear
7.Power Button
8.Transmission

Expansion Port Overview

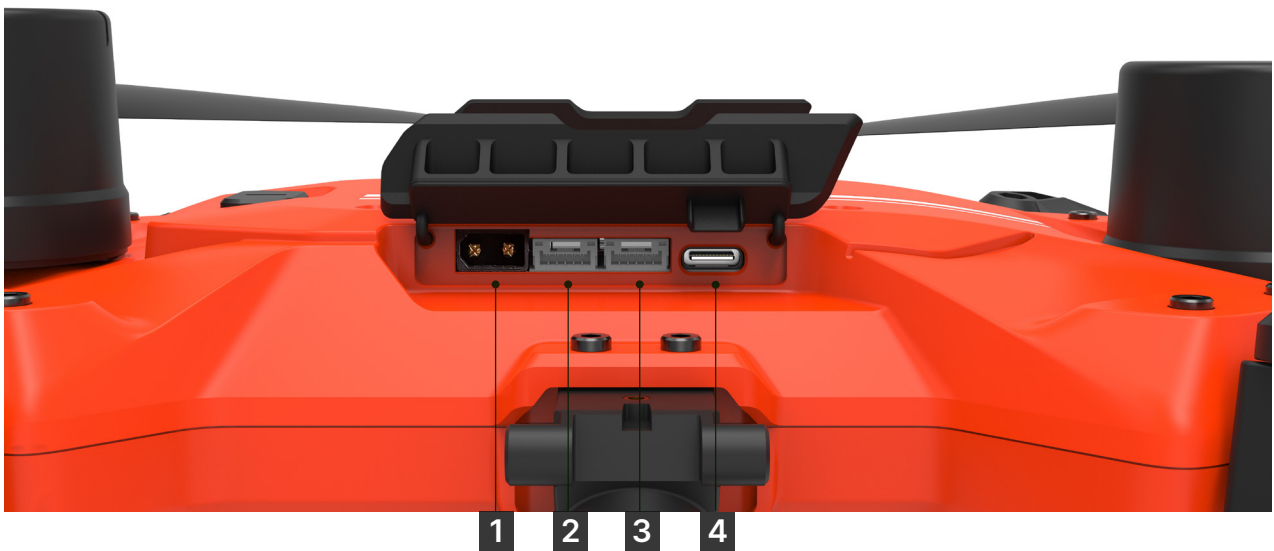**1.Expansion Board USB-C Port** (Debug Port)

2.Serial Interface D1 (Debug Port)

3.Serial Interface D2 (Debug Port)

4.Serial Interface D3 (Debug Port)

1.External Output Power Port (21V-26V)

2.Ethernet Port E1 (Debug Port)

3.Ethernet Port E2 (Debug Port)

4.FC USB-C Port (Debug Port)

02

Drone

This section introduces the drone components, features and functions.

Drone

Profile

The AQUILA includes a flight controller,a communication system,a positioning system and an Flight Battery. This section describes the functions of these components.

Flight Mode (1)

The AQUILA drone supports the following flight modes:

• Position Mode

The drone utilizes a GNSS-based positioning system to control its attitude. This system supports multiband, allowing for more precise location calculations and accurate attitude control. Additionally, it supports RTK, providing positional accuracy within a few centimeters when connected to an RTK base station.

• Altitude Mode

This mode is available for use in environments with poor GPS reception. To maintain the drone's altitude, it uses altitude values from the barometer instead of GPS signals for attitude control. Horizontal control is managed according to the pilot's inputs.

Precautions when using Altitude Mode

The default flight mode of the drone is Positioning Mode. If the GPS signal is weak or the compass is disturbed by other magnetic influences, the drone will switch to Altitude Mode. In Altitude Mode, the drone maintains altitude automatically using barometer values. Due to errors in barometer readings, the drone might not maintain an accurate altitude and could move up and down.

Additionally, without GPS information necessary for horizontal control, the drone might drift sideways or be significantly affected by external influences, particularly the wind. Therefore, manual adjustments by the pilot are required, making it challenging for inexperienced pilots to control the drone.

Hence, it is not safe to fly the drone in areas with weak GPS signals or compass disturbances. If such a situation occurs, it is recommended to land the drone as soon as possible.

Flight Mode (2)

Return To Launch：

In RTL mode, the drone automatically returns to the launch point and then lands.

Mission Mode：

In Mission mode, the drone automatically performs the mission.

Drone Status Indicators

The AQUILA has Front LEDs and Drone Status Indicators.

The positions of these LEDs are shown in the figure below:

The Front LEDs show the orientation of the drone. The Front LEDs glow solid white when the drone is turned on to indicate the front (or nose) of the drone. The Drone Status Indicators communicate the system status of the flight controller. Refer to the table below for more information about the Drone Status Indicators.

Drone Status Indicator Description

Normal:

Altitude Mode：Fast blue flashing

Position Mode：Alternate red and green flashing

RTL Mode：　　Fast yellow flashing

Mission Mode：Fast purple flashing

RTL Mode (1)

Retrun to Launch

RTL mode is a mode in which the drone automatically moves to the last recorded launch point (Home Point) and lands. There are three types of RTL mode: Smart RTL, Low Battery RTL, and Failsafe RTL.

- ## Smart RTL

To use Smart RTL mode, press and hold the RTL button on the remote controller for about 2 seconds. After this, when you boot up the drone, the status indicator will flash yellow. If you press the Smart RTL button again during the RTL process, Smart RTL mode will be canceled, and control of the drone will revert to the pilot.

- ## Low Battery RTL

If the drone's battery power becomes insufficient, it may not be able to return to the launch point with the remaining battery power. In this case, the pilot must land the drone on the ground as quickly as possible. To eliminate the risk associated with low battery power, the drone needs to determine the RTL conditions based on its current location information and battery status. If there is not enough battery power remaining, the drone will automatically initiate RTL according to the conditions outlined in the table below.

In this case, be aware that the drone may crash or be lost.

Battery Level	Explanation	Drone Indicator Light	Flight Status
23%	Low battery warning	It flashes rapidly in red.	It continues to fly while maintaining the current flight mode.
21%	If the distance from the current location to the launch point is 500 meters or less, there is sufficient power to return to the launch point.		The drone returns to the launch point and lands automatically during RTL. While RTL is in progress, the pilot can cancel it.
16%	If the distance from the current location to the launch point is 500 meters or less, there is enough power to return to the launch point.		The drone returns to the launch point and lands automatically during RTL. While RTL is in progress, the pilot can cancel it.
5%	The drone must be landed immediately.		The drone slowly descends to land at its current location before stopping the motor operation.

RTL Mode (2)

Failsafe RTL

Failsafe RTL is automatically activated if communication loss between the remote controller and the drone persists for more than 3 seconds. When Failsafe RTL is activated, the drone returns to the launch point in the shortest distance possible and lands.

RTL Sequence

1. The Home Point is automatically recorded.
2. RTL is initiated. This includes Smart RTL, Low Battery RTL, and Failsafe RTL.
3. Once the launch point is confirmed, the drone adjusts its direction.
4. If the distance between the drone and the launch point is within 30 meters, it returns while maintaining the current altitude. If the distance exceeds 30 meters or if the current altitude is lower than the set RTL altitude, the drone ascends to the set RTL altitude before returning. If the current altitude is higher than the set RTL altitude, the drone returns directly to the launch point.
5. Upon reaching the airspace above the launch point, the drone lands.

Precautions during RTL:

1. Set the RTL altitude value in the settings menu and ensure there are no hazardous buildings or objects within the flight area.

2. During RTL, the drone automatically lands upon return, but it's recommended for the pilot to reduce the drone's speed using the remote controller when approaching the landing point.

3. When the drone lands automatically, it may bounce back due to recoil. Therefore, reducing the landing speed provides greater stability and safety.

FLIGHT - LOG

Flight data is automatically recorded on the onboard storage device of the drone. After the flight, you can connect the drone to a computer using a USB cable via the FlyDynamics app to download the recorded flight data.

Propellers

Propellers Usage Guide

Only use Codev Dynamics approved propellers. Do not mix propeller types.

Ensure to check that the propellers and motors are installed firmly and correctly before each flight.

Ensure that all propellers are in good condition before each flight. Do not use aged, chipped, or broken propellers.

To avoid injury, stand clear of and do not touch propellers or motors when they are spinnning.

Replaceing the Propellers

In order to replace the propellers, use the H2.5 hex key with ball-end.

Propeller blades are sharp, please handle with care.

Drone Battery

The Drone battery is specially designed for AQUILA. It uses a brand-new high-performance battery. Please be sure to fully charge the battery before using it for the first time. Must use the special charger provided by Codev Dynamics for charging.

Capacity：	10000mAh
Voltage：	26.4V
Battery Type：	Lipo 6S
Energy：	231wh

Please read carefully and strictly abide by the requirements of Codev Dynamics in this manual, disclaimer, and battery surface before using the battery. The user shall bear the consequences caused by failure to use it as required.

Warnings:

1. The Drone Battery is asignificantyl reduced when flying in low temperature environments (temperatures below 5°C).
2. Ensure that the battery is fully charged and the cell voltage is at 4.4V before each flight.
3. Enter the flight as soon as FLyDynamics App displays the "Low Battery Level Warning" in low temperature environments.
4. You will still be able to control the drone's movement when this warning is triggered.
5. In extremely cold weather, the battery tempereture may not be high enough even after warming up. In this cases, insulate the battery as required.
6. In ensure optimal performance of the battery, keep the battery temperature above 16°C.
7. In low temperature environments, it will take a longger time for the batteries to warm up. It is recommended to keep the battery warm before use to reduce the warm-up time.

03

Flight

This section describes flight restrictions and safe flight practices.

Flight Enviroment Requirements

1. Do not ues the drone in bad weather such as where wind speeds exceed 15m/s.
2. When flying in open areas , tall and largr metal structures may affect the accuracy of the on board compsaa and GNSS system. Make sure to operate the drone by following the prompts in the app.
3. Avoid obstacles, crowds, high voltage power lines, trees, and bodies of water.
4. MInimize interference by avoiding arears with elevated levels of electromagnetism, including base stations and radio transmission towers.
5. Drone and battery performance are subject to rnvironmental factors such as air density and temperature. Be very careful when flying at high altitudes, as battery and drone performance may be affected.

Preflight Checklist

1. Remote controller, Flight Battery, and display device are fully charged.
2. Landing gears are mounted firmly ,and batteries are locked firmly.
3. All the devices' firmware is up-to-date.
4. Ensure that a microSD card has been inserted.
5. The Camera and Gimbal work normally after the power is turned on.
6. Motors can start and are functioning normally.
7. The FlyDynamics App is successfully connected to the drone.
8. Do not face the battery connector downwards to the ground to avoid getting dust or water into the battery connecter.
9. Make sure that the gimbal dampener is without obvious wear and tear, and the gimbal anti-drop has been fastened.

Pilot Compliance Guidelines

1. Pilots of ultralight flying devices (drones) must adhere to compliance guidelines set forth by the Ministry of Land, Infrastructure, and Transport to ensure that no harm is caused to life or property due to the operation of ultralight flying devices.

2. Prohibition of nighttime flying from sunset to sunrise.

3. Prohibition of flying in conditions such as fog, rain, or other reduced visibility situations where safe flight is compromised, and flying is not visually confirmed (instrument flight conditions).

4. Prohibition of flying within controlled zones (within a radius of 9.3km from an airfield).

5. Prohibition of flying in restricted zones such as ceasefire lines, areas surrounding nuclear power plants (within a radius of 18.6km), airports, or military airfields for national defense or security reasons.

6. Prohibition of flying in airspace where flight paths for drone are established (at altitudes of 150m or higher).

7. Prohibition of flying over densely populated areas or areas where there is a risk of casualties if the drone were to fall.

8. Prohibition of dropping objects or other materials during flight.

9. Prohibition of flying under the influence of alcohol.

Starting and stopping motors

Motor Starting

If you operate the remote controller's stick as shown below, the motor will start.
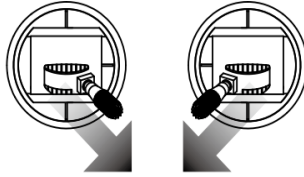
Motor Stop

When the drone lands, pull the left stick downward as shown in the picture below, and the motor will stop after about 3 seconds.

Emergency Motor Stop

If an emergency situation occurs during flight, click "Disarmed" to stop the motor.

Flight Test

Conduct basic flight tests before flight as follows.

1. Position the drone on a flat and open surface.
2. Power on the controller, then power on the drone
3. Launch the FlyDynamics app and connect to the drone, then enter the camera view.
4. Wait for the drone status LEDs (front: red, rear: green) to illuminate.
5. Use the controller to start the drone, then gently pull the left stick upwards to take off.
6. Gently pull the left stick downwards to land the drone After turning off the drone, turn off the controller.

7. During flight, if the drone enters failsafe mode, the drone status LED will rapidly flash yellow. If the battery voltage is low (Low Battery Level Warning), the front LED of the drone status LED will flash red, and the rear LED will flash green rapidly.

Battery use and storage precautions

Battery Safety Precautions

- The drone utilizes a LiPo-Hv, 10000mAh battery.
- The full charge voltage of the battery is 26.4V.
- When the battery is loaded with mission equipment up to the maximum allowable weight, flight time is based on 20 minutes per flight. After 100 charge/discharge cycles, the battery may not perform at its original capacity.

Battery Storage Precautions

- Prolonged exposure of the battery to liquid (rain, moisture) can lead to chemical breakdown, potentially causing the battery to catch fire or explode.
- Store the battery in a cool, dry place away from direct sunlight. If storing for more than 3 months, maintain a temperature between 22-28°C (71-82°F).
- Do not store the battery in environments with strong static electricity or electronic devices.
- Avoid placing heavy objects on top of the battery.
- For long-term storage, fully charge and discharge the battery once every 3 months.
- If storing the battery fully charged for more than a week, manage it in the storage mode of the battery charger to prevent issues such as swelling.

Battery Charger Safety Precautions

- When using a separately purchased battery charger, ensure it is set to the appropriate Profile and channel settings for the LiPo-Hv 6S 10000mAh battery specification. Depending on the charger model, it may also be capable of charging batteries used in the controller.
- Once you correctly match the cable connectors between the charger and the battery, you can proceed with the charging process.
- The usage instructions may vary depending on the charger product and model. Please refer to the separate manual provided with the purchased product for specific guidelines.

Firmware Update

Drone firmware upgrade

Please download the latest Drone firmware from CodevDynamics official website before upgrading.

1. Connect the drone to a PC with a Type-C USB cable.
2. Run the FlyDynamics. First select the Gear icon (Vehicle Setup) in the top toolbar and then Firmware in the sidebar.
3. Please unplug your Pixhark and/or Radio from USB. Then plug your device via USB to start firmware upgrade.
4. Tap to Advanced settings , choose Custom firmware file, Click the OK button to start the upgrate.
5. Restart the deviece after the firmware update is complete.

FlyDynamics APP firmware upgrade

Please download the latest FlyDynamics APP firmware from CodevDynamics official website before upgrading.

Please connect the latest App firmware to the remote control via a USB Flash Disk or SD card, select the installation file in the file manager, and overwrite the installation.

Extended Screw Holes Description

Be sure to use the specified type of screw to avoid damaging the screw hole thread and ensure that the accessories are installed firmly.

04

Appendix

Appendix

Specifications ────────────────────────

Drone	**AQUILA-3F**
Dimensions	583.58*582.42*286.92mm
Diagonal Wheelbase	780mm
Weight	Approx. 1.6 kg (without batteries)
	Approx. 2.8 kg (with one battery)
Max Payload	3kg
Operating Frequency	2.400 - 2.4835 GHz
Transmitter Power	2.4000 - 2.4835 GHz ;
	29.5 dBm（FCC）; 18.5dBm（CE）
	18.5 dBm（SRRC）; 18.5dBm（MIC）
Hovering Accuracy	Vertical：
	± 0.5 m (GPS enabled)
	± 0.1 m (RTK enabled)
	Horizontal：
	± 0.5 m (GPS enabled)
	± 0.1 m (RTK enabled)
RTK Positioning Accuracy	1cm + 1ppm（Horizontal）
	1.5cm + 1ppm（Vertical）
Max Angular Velocity	120˚
Max Pitch Angle	30˚
Max Takeoff/Land speed	6~10m/s (configurable)
Max Speed	12m/s
Service Ceiling Above Sea Level	5000m
Max Wind Resistance	15m/s
Max Flight Time	76min (no Payload)
GNSS	Dual GPS-GPS, GLONASS, Galileo, BeiDou
Operating Temperature	-10° C to 50° C
IP Rating	IP53

Drone Battery LPB610HV

Capacity	10000mAh
Voltage	26.4V
Battery Type	Lipo 6S
Energy	231wh
Weight	1.2kg
Operating Environment	0° C to 40° C (32° F to 104° F)

Customer Support Center

ARGOSDYNE Customer Support Center
☎ 070-5102-1388

For any inquiries regarding the construction of the AQUILA-3F drone and drone automatic operation system - Rondo Mobility System, please use the ARGOSDYNE Customer Support Center.
※ For customers who use communication networks such as LTE/wifi through the Rondo Mobility System, problems that arise related to the use of rate plans, etc. can be resolved by contacting the telecommunication company with which you have a contract.

Product maintenance
The free maintenance period for the AQUILA-3F drone is one year from the date of purchase. Except in cases where there is a defect in the product itself, free support is not provided for matters caused by the user's negligence or natural disasters.

Feedback about this document
If you would like to help us improve this document, please send suggestions, comments, or errors to info@argosdyne.com.

> ⚠️ If damage to the product occurs due to a change in the intended use of this product or a change in the settings, we will not be held liable due to the customer's negligence.

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