

# YS-X4-P Industrial Multirotor Autopilot

## General Introduction

YS-X4-P Industrial multirotor autopilot heavy-launched by Zero UAV is a complete flight system for all multi-rotor platforms for commercial and industrial AP applications, applied to brand-new design of integrating IMU into one unified box with MC, utilizes high quality components precisely calibrated with temperature compensation in all gyros and sensors, industry renowned flight algorithm in autopilot and UAV field, which makes the system be with precise flight location, enhanced maneuverability and easy operability. Powerful ground control station system and real-time flight data provides a powerful ground monitoring platform, which brings more stable, efficient and reliable functionality, applied to commercial, industry and military task etc. various areas.

### AUTOMATIC UAV APPLICATION

YS-X4-P system has stable and safe flying performance, combined with GCS and visible 3D map to check real-time flying parameters, complete various professional photography tasks with its functions of precisely waypoints flying, auto-takeoff/landing, target lock, fly to PP(pointed place) etc., totally realized auto-flying with no human intervention during the whole flight, which reduced the complexity of UAV professional application, and has been widely applied to professional aerial photography, remote sensing mapping, aerial prospecting, disaster monitoring, traffic patrol, security monitoring, forest fire prevention, electricity supervision and other fields.

### SUPPORT SHUTTER OF MULTIPLE CAMERAS

YS-X4-P has a new cool feature now, camera shutter by high low-level output format. It supports Canon series like camera 550D, 600D, 5D mark II etc. types. Meanwhile after completing the flight, the longitude, latitude, altitude, course and attitude etc. information of each photo can be saved to YShj file on your ground control station.

### MOBILE/TABLET/PC AS TERMINAL GCS

Simple operation of phone/Tablet/PC GCS, whole flight from takeoff to landing can be completed through simple and convenient portable devices. All operations can be completed via phone or tablet and no need to be limited before computer seat, which has fairly great mobility and portability. Meanwhile it supports Android phone/tablet, Iphone/Ipad (perfect jailbreak) etc as terminal GCS, and assist to realize real-time flying and parameter adjustment through portable devices or PC with simple installing assistant software, which makes gains adjustment easier and convenient during the flight, brings users brand-new flying experience.

### BLACKBOX FUNCTION

Friendly built-in blackbox function doesn't need any additional storage devices, it records flight data automatically and save one-minute data of time period before motors stop rotating. Its auto-recording and simple data exporting brings you reassuring flying experience.

### ONE MOTOR FAIL PROTECTION FOR OCTO

Generally, because of imbalanced mechanical structure and external environment, multi-rotor will crash and be damaged without any power output. The humanistic protection function from YS-X4-P autopilot, in Attitude or GPS Mode, keeps attitude under control even with any one power output failed and highly reduces crash risk. YS-X4-P can be compatible with ZERO-E1100 aircraft. E1100 is the professional Octo aircraft specially designed for commercial photography and model enthusiasts and it has enhanced safety, high stability, heavy load performance.

### AUTOMATIC PARACHUTE OPENING

Based on the precise and advanced algorithm of YS-X4-P Professional autopilot, the parachute will be opened automatically in emergency which is a safety shield for the aerial photography and all of the photography equipment.

### ROCKER-ARM FUNCTION IN THE AIR

YS-X4-P has a new feature now, that is Rocker-arm function in the air. Preset 3D waypoints and pushing sticks easily, precise and beautiful camera shot can be reached. This feature is particularly used in the field of photography and filming etc who have higher requirements and needs.

### PERFECT 360°SHOT WITHOUT ANY BLOCKING (AUTOMATIC AVOIDANCE OF LANDING GEAR)

To avoid blocking the view of the camera lens and freely get a perfect 360° view, the unique and user-friendly feature Gimbal Carefree is added based on the professional autopilot, that is to say gimbal pilot can control the craft and gimbal rotate synchronously making smooth shooting in all directions possible and the frame part will never be seen in your shot, meanwhile, the aircraft still moves forward and flies according to the preset flying route.

### SERVO GIMBAL STABILIZATION

YS-X4-P gimbal stabilization applies to almost all 2-axis stable gimbal structure(not available to Octo). Only need one-time parameters setup, system will correct and adjust gimbal according to the flying attitude of the whole aircraft to make the camera lens keep at a stable angle, which increases the stability of aerial photography. The scope of gimbal servo output frequency is 50HZ(analogue servo), 250HZ, 333HZ (digital servo).

### COMPATIBLE WITH ZERO BRUSHLESS GIMBAL

YS-X4-P Professional flight controller can support ZERO brushless gimbal series: Z2000 (5D), Z1400 (GH3), Z-T30 (30X Zoom) and so on. The autopilot can transmit attitude information to gimbal by general cable. Combining YS-X4-P autopilot and Zero brushless gimbals will bring you an awesome flying experience.

### REALTIME VOICE BROADCAST FROM GCS

It is quite convenient and easy to get real-time altitude and distance information during the whole flight with voice broadcast function, no need to distract your attention to check the GCS and quickly get real-time status information.

### TARGET LOCK & CLICK AND FLY TO POINTED PLACE

In auto-hover mode, you can select any interested point on the google map and take it as center point, touching the button of "Target Lock" on GCS can lock this interested point, meanwhile the aircraft could achieve a 360 degree circle flight around the point of interest. This function is easy to set up and convenient to operate, it is suitable for all-round shooting of a fixed scenic spot. Changing clock-wise and anti-clockwise direction by operating Aileron, changing radius to the point of interest by operating Elevator. This function is easy to set up and convenient to operate, it is suitable for all-round shooting of a fixed scenic spot.

Meanwhile, for those flying tasks which not allow preset waypoints or need to change flying target accordingly, click any target point on the google map, click "Click and Go" button, the aircraft shall fly to the target point automatically as command. Easy operating easy to go.

### AUTO-NAVIGATION & AUTO-GENERATING WAYPOINTS

Craft will finish the flying automatically according to the preset waypoints. After drawing new waypoints path or selecting from last waypoints records, the aircraft shall fly to the first waypoint and hover there, then fly all waypoints in sequential order to complete all waypoints flying. Meanwhile, according to different flying task, you can preset the waypoints location on google map and then one-button clicking "Auto-generating waypoints", system shall generate the waypoints path automatically and display its general length, it is easy to save your last waypoints records as option for next time flying.

### INTELLIGENT COURSE LOCK

During the flight, generally the flying forward direction is same as aircraft head direction; When enabling intelligent course lock, autopilot shall record now aircraft head direction, and then flying same aircraft head direction as recorded, at this moment the aircraft forward direction has nothing to do with flying direction.

### PHONE ATTITUDE CONTROL

Enable phone attitude control mode in phone remote control mode, to control the aircraft by tilting your phone to forward/back/left/right direction and its flying direction is same as phone tilt direction. For example, forward or back tilting phone, the aircraft shall move forward or back, left or right tilting phone, the aircraft shall move left or right etc. After quitting from phone attitude control mode, it will auto-switch back to phone remote control mode.

## FOLLOW ME

While using smartphone as GCS, in GPS hover mode and all transmitter sticks stay in the middle position, after enabling follow me, the aircraft shall lock its head direction and auto-flying by following up pilot via phone GPS location.

## LOW VOLTAGE VIBRATION ALERT (SMARTPHONE GCS)

YS-X4-P has built-in low voltage alert function, when voltage goes down to be a certain low value, phone shall remind users to pay attention to operation by vibration, when voltage goes down lower than the low value, phone shall keep a constant and high-frequency vibration to alert user must land the aircraft urgently.

## FAILSAFE (AUTO HOVER---GO HOME---LANDING)

Humanizing fail-safe is the feature to ensure that the multi-rotor will hover automatically when it loses signal. After loss of signal for a certain period of time, YS-X4-P will auto-switch to be hover status (Keep waypoint flying for 5 more seconds when during GPS waypoints flight), it shall keep auto-flying as waypoints route to make sure the normal flying task if signal recover within 5 seconds, if not recover after 5 seconds, you can enable auto-back/landing function.

## DEFINED WAYPOINTS (50 WAYPOINTS AVAILABLE)

Waypoints of YS-X4-P can be set to the number of destinations up to 50, users can carry out for each waypoint special settings, such as height, residence time, flight speed, longitude and latitude etc. to meet the complex requirement of the routes operating and flying task, intelligently adjust flying speed and altitude. You can setup shutter on each waypoint or change the waypoint route during the flight.

## PRECISE POSITION AND ALTITUDE HOLD

YS-X4-P uses high-precise air pressure sensor, measure precision 10cm, it calculates the attitude and vertical velocity by Kalman filtering method, controlling precision is 20cm. With YS-X4-P, the multirotors will have precise position and altitude lock in windy conditions, precise hovering in less than 1.5m horizontal and 0.3m vertical

## BUILT-IN DAMPER. ENHANCED DAMPING FUNCTIONALITY

IMU is built-in with a professional damper, no need additional damping devices, only need simple stick to aircraft body, which reduced the size and weight greatly and simplified the installation process. It greatly improved the reliability and damping functionality, bring users more stable and safe operation experience. YS-X4-P adopts new-generation professional accelerometer and vitally expand the acceleration measurement, enhanced damping functionality, suitable with bigger multirotor structure which may be with strong vibration.

### [MULTIPLE FLIGHT CONTROL MODE](#)

YS-X4-P supports multiple flight control mode, It can be intelligently switched among Manual mode, GPS attitude mode (Auto Hover /Auto Navigation /Auto Go Home/Landing), Phone attitude mode, Phone remote control mode, rocker-arm in the air mode to meet different flying missions, meanwhile, by using Zero brushless gimbal and parachute, the automatic avoidance of landing gear mode and automatic parachute opening mode can be available.

### [MULTIPLE TYPES OF MULTI-ROTORS AND A CUSTOMIZED MOTOR MIXER SUPPORTED](#)

Support traditional types for Quad/Hexa/Octo, it also supports customized motor mixer through defined parameters, to apply to "Special" multirotor platforms, and it is with simple configuration, easy installation and stable performance.

### [RTH SWITCH FROM TRANSMITTER](#)

In addition to the function of failsafe RTH, user also can control the multirotor RTH switch from transmitter and it is unnecessary to turn into failsafe mode.

### [CONVENIENT WIFI COMMUNICATION](#)

Each YS-X4-P comes with a professional WIFI module, private smartphone/tablet or PC can be used as ground station via WIFI communication. WIFI module is built-in two communication mode(Router mode and PP mode), user can setup the mode to be PP mode according to your favorite which can fly with no need router, greatly bring convenience to out-space flight.

### [MONITOR REAL TIME POWER AND VOLTAGE \(POWER CALCULATION MODULE OPTIONAL\)](#)

Check present current and power consumption on "Data" page on GCS. After connecting power management module, autopilot will automatically ZERO sensor and start monitoring current output (A) and power consumption (mAh) and displaying on GCS.

### [EXTENDED WITH DATALINK \(DATALINK MODULE OPTIONAL\)](#)

User can purchase digital data link to extend controlling distance, remove any range limitation from ground control station, greatly increased flying range.

### [HARDWARE RESERVED SPACE](#)

YS-X4-P reserved enough hardware space to extend more functions to satisfy highly requirement from customers. So users may freely extend extra functions according to your real need to meet different flying task requirements.

## TECH SPECIFICATION

Basic performance		Flight Performance	
Multi Rotor Types supported	Quad-Rotor: +4, x4; Hexa-Rotor: +6, x6, Y6, Rev Y6; Octo-Rotor: +8, x8, V8 (User Customized)	Hovering position accuracy (GPS mode)	Vertical: ± 0.5m Horizontal: ± 1.5m
Supported ESC output	Common PWM	Max Tilt Angle	35°
Transmitter	S-BUS Receiver Supported	Max Ascent/Descent Speed	±5m/s
Gimbal Supported	Servo Gimbal; ZERO Brushless Gimbal	Max Level Speed	10.2M/S
Receiver Supported	S-BUS General Cable	Acceleration/up/down	adjusted by GCS
Parachute Opening	Automatic Parachute Opening In Emergency; By Tx	Multiple control modes	Manual Stabilization; Auto takeoff/land; Attitude stabilization /GPS Attitude stabilization; <b>Rocker-arm in the air;</b> Automatic avoidance of landing gear
Operating Temperature	-5°C to +60°C		
Working Power	5.7V (there is special power supply module provided by manufacturer)		
Hardware		GCS	
Weight	MC&IMU: 119g	Language	Simplified Chinese、English
	GPS: 37g	Ground Control Software Requirement	Android / Windows XP sp3 / Windows 7
	WIFI: 39g	Map	Google 3-D GIS
Size	All-in-one Box:70.5mm×41mm×25mm	Safety Control	Auto-Hover & Auto Return Home & Auto Parachute Opening
	LED Indicator: 17mm x 17mm x 5.5mm		
	GPS : 55mm (diameter) x 11mm	Waypoints Attribute	Number, Height, Latitude, Longitude, Camera Setting, Hover Time, Target Speed
	Wifi: 65mm x 40mm x 14.4mm		