UAV KF-1 helicopter

The provided helicopter is a self-stabilizing unmanned mini-helicopter that can be used as an aerial platform for several applications, such as aerial filming, photography, surveillance, inspection, remote sensing, etc.

CopterCam UAV KF-1 helicopter specification

Item	Specification
Length*	263 cm
Height*	71 cm
Weight*	16 kg
Maximum take-off weight*	35 kg
Maximum altitude	3000 m
Fuel tanks*	2X6L or 2X2.5L
Fuel consumption	4000cc/hour
Gear ratio	6.88/4.69
Engine	Two-stroke, two cylinder, gasoline
Generator*	150 W, 12V, battery backup
Starter	External electrical starter
Transmission	Sealed, oiled, geared
Tail rotor transmission	Shaft-driven
Flight control	Manual, semi-automatic, autonomous
Maximum climb rate at semi-automatic mode	2 m/sec
Maximum frontal speed at semi-automatic mode	71 km/h
Maximum lateral speed at semi-automatic mode	71 km/h
Endurance*	3 hours, max
Maximum payload*	14 kg
Flight control software	Semi-autonomous, autonomous
Flight modes	Manual, semi-automatic, autonomous
Altitude hold accuracy	± 1 m
Position hold accuracy	± 2 m
Due to constant development and improvement, may have minor variations	

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System technical information

Helicopter can be equipped with DJI XP3.1 GPS/INS Standard, AceOne or XP3.1 Waypoint autopilot with next features *(XP3.1 standard):*

XP3.1 Standard Autopilot

- Autonomously hovering with high precision.
- Flight velocity in one direction corresponds to given RC stick volume, so operator can control only one channel at time- if right stick is moved front, helicopter accelerates to corresponding (stick position) speed and will fly to this direction. If right stick is released, helicopter brakes, stops and will hover at one spot till next commands. The same way autopilot works to all directions (front, right, back, left).
- Changing helicopter altitude is done via left stick. When stick is centered, helicopter keeps height. When stick is pushed forward, helicopter starts to climb till stick is centered again and vice versa.
- Flight speed in all directions are proportional to controller stick positions and is smoothly alterable from 0 km/h to max speed.
- Helicopter heading is controlled by magnetometer, so system keeps the same heading, till operator gives rudder command.
- If helicopter remote control signal is lost, system turns automatically into hovering state and will keep position and height (*enters the Fail Safe mode*) or returns home.
- Autopilot is based on GPS with internal Kalman filter, 6-DOF inertial measuring units, magnetic-field meter and barometer.
- Autopilot is fully configurable with included software via standard PC and is also future upgradeable (if needed) to map mode system ("fly by waypoints").
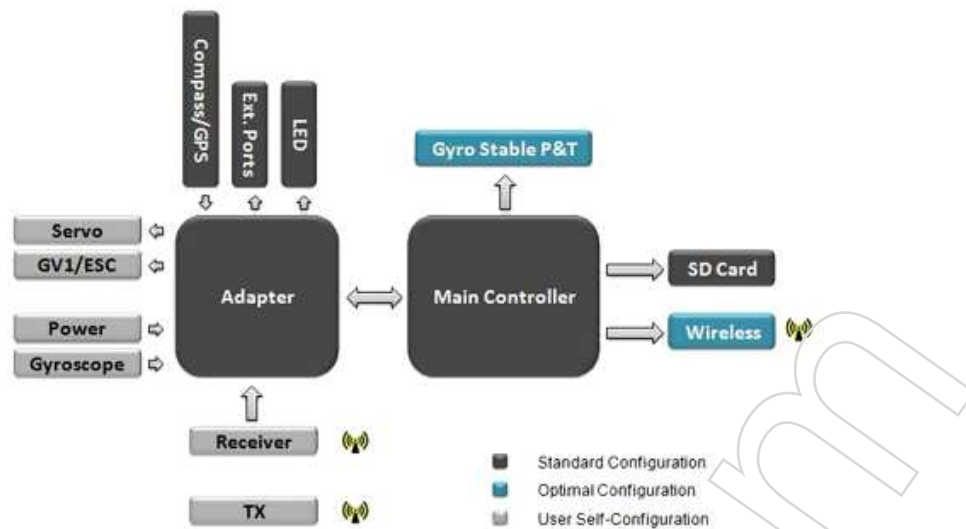- System is equipped with flight data-logger.

Autopilot hardware

Complete set of XP3.1 Standard autopilot.   *Main unit with installation frame*


XP3.1 autopilot framework

- Separate DSPs (digital signal processors), calculates altitude and control algorithms, improves real-time performance of the controller
- High performance 16-channel GPS receiver, provides superior position accuracy
- Highly-reliable tri-axial gyroscopes and accelerometers of MEMS are enclosed
- Building algorithm can facilitate users to do the hard and soft iron magnetic field compensation to eliminate magnetic interference
- Dedicated CPLD to decode and encode servo signal, achieve higher reliability and compatibility for most RC receivers

Autopilot control modes

- Autopilot Mode:
  Allows operator to fly the helicopter in an easier way, even learn to control the helicopter in few minutes for *first-time pilots*.
  Altitude can be locked; nose direction and the helicopter's velocity command can be issued by RC transmitter (Tx) separately and accurately.
  When TX sticks are centred, the system will auto-hover accordingly.
  Flight speed is in proportion to the volume of TX stick.

- Attitude Control Mode:
  The attitude stable mode is able to work even without a GPS signal. When users switch into this mode, helicopter will hold stable attitude and altitude, without position and velocity locking. Allow the helicopter to be easily controlled in a no GPS condition.

- Pure Manual Mode:
  Traditional manual mode. The helicopter is being controlled as an ordinary RC helicopter.

XP3.1 WayPoint Autopilot

DJI XP3.1 WayPoint is the DJI flight control system with Ground Station software that enables 3-D map way points editing, flight path planning and real-time flight attitude feedback. This product is specially designed for the purpose of advanced Unmanned-Helicopter operation, BVR (Beyond Visual Range) flying and applications such as surveillance, aerial photography, etc. Based on the existing XP3.1 Autopilot, XP3.1 WayPoint not only ensures stable performance and safety of the helicopter, easy operation for the pilot, but also allows the helicopter to fly automatically according to the flight path set before or modified during the flying process in the Ground Station software.
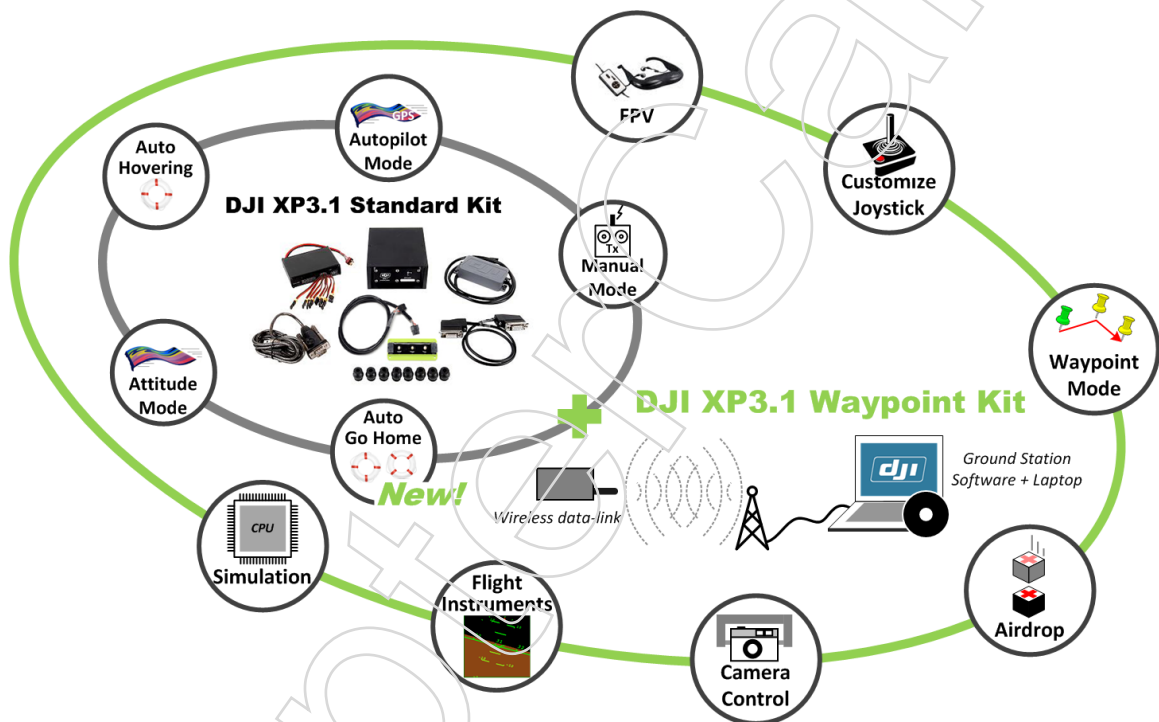
- Secured communication Protocol
- Path validity check
- Go-Home navigation
- Way points limit timer
- Precise flight data feedback
- Precise calibration of all sensors
- Rapid control switch between four control modes: pure manual, attitude control, autopilot and joystick control
- Flight & action control, way points hold timer enabled
- Real-time flight attitude monitoring
- FPV flying
- Coordinated turn enabled
- Customized action control channel that enables functions specialized by users: patrol airdrop of photoshooting
- Map from Google Earth 3-D, saving and loading from local http server enabled
- Flight mission saving and loading

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- Simple installation to enable user's helicopter become fully automated

System requirements			
Microsoft Windows XP Home/Professional Edition, Microsoft Windows Vista, Microsoft Windows 7 32bit			
Languages			
English, Traditional/Simplified Chinese			
Ground Station software functions			
Graphical flight assignments programming	Waypoint functions	Maximum waypoints:	50
		Properties:	Altitude. Latitude. Longitude. Flight Speed. Start waypoint.
		Assignments:	Camera shutter. Gimbal control. Airdrop control. General-purpose control.
	Mission modes	Patrol. One way from start point to end point.	
	Turning modes	Stop and turn. Coordinated Turn.	
Map browser	Google Earth 3-D GIS.		
Safety control	Hovering mode & automatic "Go Home" function. Most of the potential hazards are eliminated automatically.		
Flight instruments	GPS coordinates indicator. General speed indicator. Attitude indicator. Altitude indicator. RF signal strength indicator. Helicopter position tracker.		
Hardware			
Electronic/electromechanical equipment	IMU. GPS. Pressure sensor. Digital compass. Wireless data link. Airdrop platform. General-purpose controller.		
Communication	Hardware Interface:	RS-232	
	Radio Frequency:	900 MHz/ 2.4 GHz (Optional)	
	Data-Throughput:	Maximum 11,520 bps (Optional)	
Control Modes & Simulation			
Rotorcraft control modes	Manual mode under transmitter control.		
	Attitude control mode under transmitter aided control.		
	Autopilot mode.		
	Semi-auto mode under joystick aided control.		
	Waypoint mode.		
Pre-flight simulation	Virtual environment aid to help users get familiar with operations.		

Color monitoring camera (optional)

Two axes, stabilized camera. Stabilization is integrated with XP3.1 autopilot.

Item	Specification
Visual range and speed	Pitch angle (-45°-190°), 110°/sec Azimuth angle (0°-360°), 35°/sec
Focal distance	F3.8mm - 38.0mm(F2.8) 10xZoom
Resolution	795(H) X 596(V). 1/4" Super HAD CCD
Minimum illumination level	0.02 Lux@F2.8 B/W

Medium range video transmitter/receiver (optional)

Item	Specification
Frequency:	1.2 GHz-1.3 GHz
Channels:	4 channels, video/audio synchronization
Transmitting Power:	5000mW
Range	~5000m
Power	DC 12V
Dimensions	111x67x60mm
Weight	338g
Receiver	12 channels

Helicopter can be equipped with front mount.

Two axes, stabilized camera mount. Stabilization is integrated with XP3.1 autopilot.

Support, training

We provide full support for our customers:

- Phone support for quick technical questions
- E-mail support
- Spare parts supply

In addition we can provide training session for operator (if needed) with accommodation, or also at the client's location.

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