Richen Power

H2 PLUS UAV Generator

Read This First

UAV-E

H2 PLUS

English

This manual can be downloaded from the following website:

https://www.richenpower.com/download

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Share information with Flight Controller

H2 can share running status and errors information with Flight Controller via #5 wire. The transmission protocol is TTL. Please require protocol from us. For Adrupilot APM autopilot, enable the display on Mission Planner. Docs:

https://ardupilot.org/copter/docs/common-richenpower-generator.html

Connect the Signal pin of #5 to one of the autopilot serial ports (e.g. Telem2).

Connect #6 to one of the autopilot's servo outputs and set a 2-pos or 3-pos switch on RC to start/stop the engine.
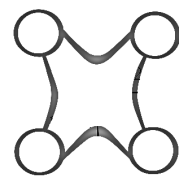
plug tip

Signal-Read
+3.3V
- 0
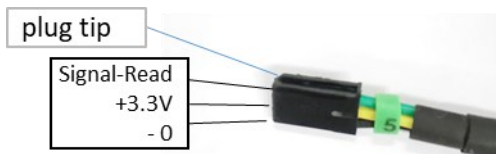
Read This First

Apply H2/H2PLUS Hybrid UAV Generator for extremely long endurance as following steps:

1	Getting Started
2	Operation
3	Maintenance
4	Trouble Shooting

Checking the bundled items

- H2PLUS（1）
- Power Hub（1）
- LiPo Battery 6S（2）
- Control Unit（1）
- Manual（this）

Complimentary Accessories
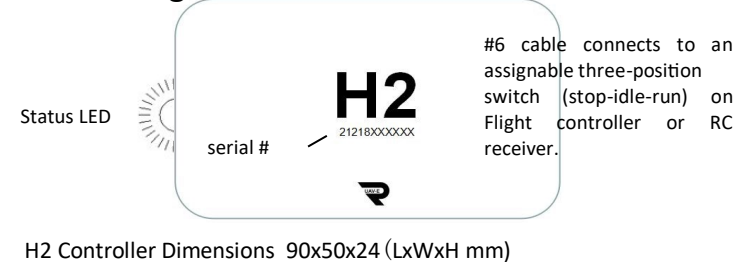
- Fuel Mixer（1）*
- Oil（1）*
- Starter & Battery 4S（1）*
- Fuel Tank（1）*
- Fuel Level Sensor（1）*

*Accessories are consumable items, available at https://www.richenpower.com/shop

Specification

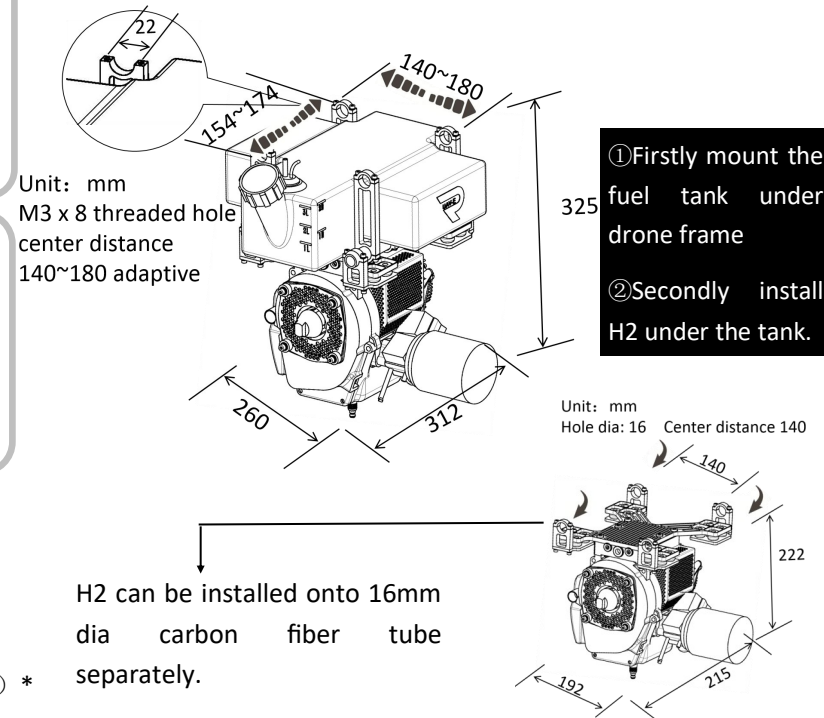|	**H2PLUS**
Weight	4.2kg(9.3lbs) w/o Accessories / 5.6kg(12.3lbs) Total
Power	2.4kW(3.3hp) Continuous
Dimension （L x W x H）	215 x 192 x 222 mm/8 x 7 x 8in
Applicable UAV Types	Multicopters & VTOL Fix-wings
Max. Take-off Weight	23kg (50lbs) or UAV suggested
Output Voltage	12 S (49V)
Fuel consumption	750 g/kw·h（hovering 2.5 Liter/h）
Service Temperature	-20 ~ 40 °C / −4 ~ 104 °F
Power as altitude	2.4kW/1000m；1.9kW/1500m;1.8kW/2000m
Rotating direction	Clock wise (view from starter)
Fuel	Automotive #95 or above + 2T oil

Connecting to H2 Controller

Status LED

H2
21218XXXXXX
serial #

#6 cable connects to an assignable three-position switch (stop-idle-run) on Flight controller or RC receiver.

H2 Controller Dimensions 90x50x24（LxWxH mm）

Getting Started

1 INSTALLING TO UAV

Installing H2 to UAV, default is suspended

Unit：mm
M3 x 8 threaded hole center distance 140~180 adaptive

22
140~180
154~174
325
260
312

①Firstly mount the fuel tank under drone frame
②Secondly install H2 under the tank.

Unit：mm   Hole dia: 16   Center distance 140

140
222
192
215

H2 can be installed onto 16mm dia carbon fiber tube separately.

NOTES: default mount is suspended. Other modes may lead to damper failure

Fuel supply

**Tank fuel filter must have 85μm or equivalent mesh

Distance to Compass should be ≥300mm to avoid EMI.

≥300

Primer pump
Fuel-out in yellow
Fuel-in in blue
Filter in fuel tank**

Cooling air comes out ! Don't block!

Clear for Starter

NOTE: Installation may differ from UAVs

Very hot 200℃/392F

NOTES： Removing muffler or gasket lead to derated power.
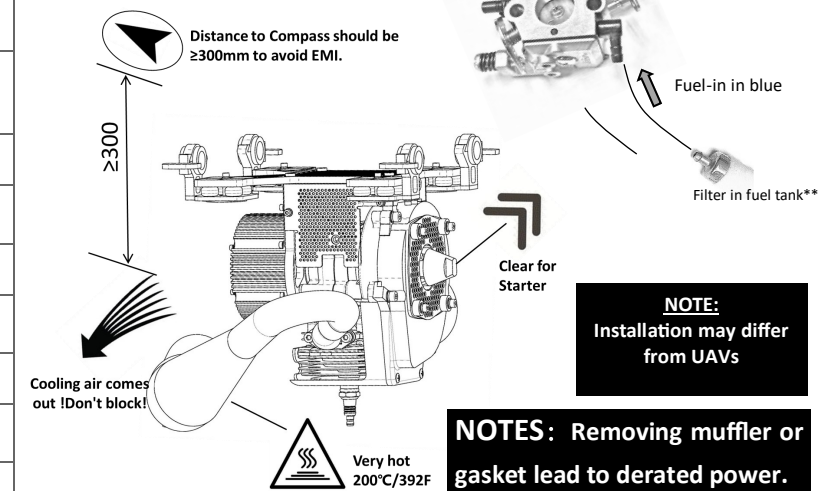
2 FUEL

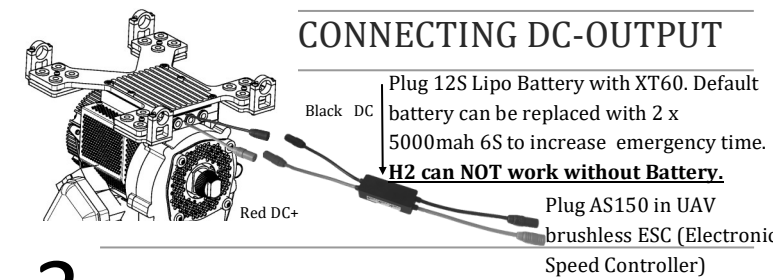Using Fuel Mixer to mix gasoline and oil

①Filling gasoline (octane over 95) until Mixer mark.

②Filling oil *** until Mixer mark

③up-side down to mix the fuel

gasoline/oil at 25：1

***Using recommended 2 cycle engine oil or JASO FC/FD ISO-L-EGD grade oil
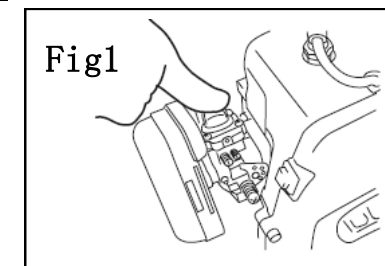
CONNECTING DC-OUTPUT

Black DC
Red DC+

Plug 12S Lipo Battery with XT60. Default battery can be replaced with 2 x 5000mah 6S to increase emergency time.
H2 can NOT work without Battery.

Plug AS150 in UAV brushless ESC (Electronic Speed Controller)

3 ENGINE RUNNING-IN

Running-in is completed. Plug-in and go.

Operation

1 STARTING

Fig1

Fig2
①
②
Filter
Push the cover and open
muffler bolt

Fig3
Open
Close
Choke Lever

Fig4
① ②
Rotating Direction
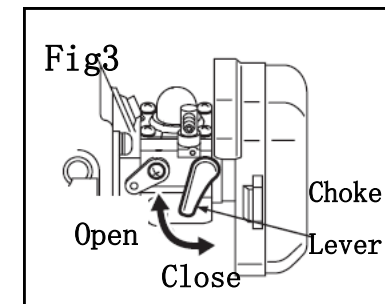
1. Before every start, push the primer pump several times until overflow fuel flows out from yellow pipe.（Fig.1) Check if the filter is clogged. Check muffler bolt.（Fig.2)
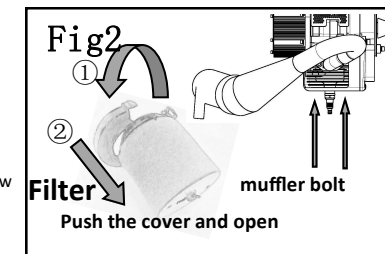
2. Power on and switch the three-position switch to "idle". Make sure the status lamp on H2 controller is "green". If not, please see Trouble Shooting chapter.

3. Close the Choke Lever （Fig.3）, ①Push hard the starter to H2, ②Push the start button for 2 seconds. Hear firing noise disconnect starter from H2.（In case of engine warm condition, choking may not be necessary)
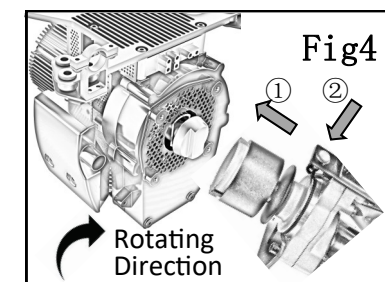
4. Open the Choke (Fig.3). Push start button for 2~3 seconds. Pull the starter until hearing firing noise （Fig.4)

！NOTES： Led on H2 controller is "solid green", H2 is able to start. If the led is "green & red flashing", maintenance is required. H2 is still able to start. Led is "red flashing" and controller Beeps, H2 is unable to start. See Trouble Shooting

⚠ **Important**

Over choking may cause starting difficulty due to wet spark plug. In this case change spark plug or dry it, and try to start again.

2 RUN

1. Before starting make sure the controller LED working as the Three position switch, referring to Trouble shooting.

2. **Switch the three-position switch to "run",** and monitoring the UAV input voltage.

3. Voltage should be at 49 ± 1V

4. Run H2 for 1 minute for warm up.

5. Take-off by moving throttle or running Auto-pilot program

6. Voltage may drop 2~3 V when encounters air turbulence or maneuver. If the voltage drop rapidly to under 45 V Please pay attention. Land and inspect when necessary.

⚠ Important
- H2 has LiPo Battery with capacity of 90-secend emergency landing. Contact us for bigger capacity.

3 STOP

1. **Be sure to have H2 cool down for 30 seconds at "idle" after flight.**

2. **Switch the three-position switch to "stop".** H2 will stop.

📖 NOTES
- Fuel ran out may completely damage H2. Monitor fuel level with given sensor and land before fuel ran out. DISPLAY is optional for fuel level sensor incompatible flight controllers like DjiA3

- H2 has "EMERGERNCY STOP" bottom.

"EMERGENCY STOP"
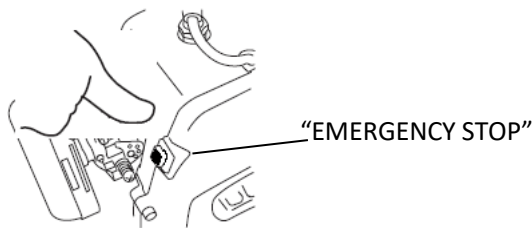
⚠ **Gasoline is flammable! At the end of the day or during long-distance transport, the fuel tank should be emptied. Fuel shall be properly stored .**

Maintenance

- Correct maintenance is necessary to keep H2 high performance

- H2 controller lamp blinks "green and red" for 4 hours. H2 is reaching the maintenance cycle (50 hours). H2 is still able to start . Please follow the MAINTENANCE in separate manual.

⚠ Important | Balance charge Li-batteries every 50 hrs

- If H2 is NOT maintained at every 50 hours cycle, it will lead to performance degradation.

- The controller lamp stops to blink "green and red" 2 hours after every 50 hours cycle.

Trouble Shooting

1）unable to start

	LED	Possible Cause	Solution
Three-Position Switch	Off	Switch is not on "idle"	Switch to "idle"
	Off	Power is off	Check power wiring and voltages.
	Green or green flashing	EMERGENCY STOP switch failure	Exchange
Filter overflow or clogged		Carburetor overflow	Repair carburetor or exchange
		Bad environmental air condition	Wash the filter with mixed gasoline
Wiring	Stop, idle & run position LED "red flashing" and alarms	#6 wire Three-position switch cable is not connected	Check wiring, change flight controller or RC receiver channel
Maintenance cycle exceeded	green and red flashing	Engine failure because of short of maintenance	Operate maintenance
Starter		Rotating direction wrong or voltage lower than 15V	Clock wise (view from starter) or charge the 4S battery

2）lack of power or unstable running

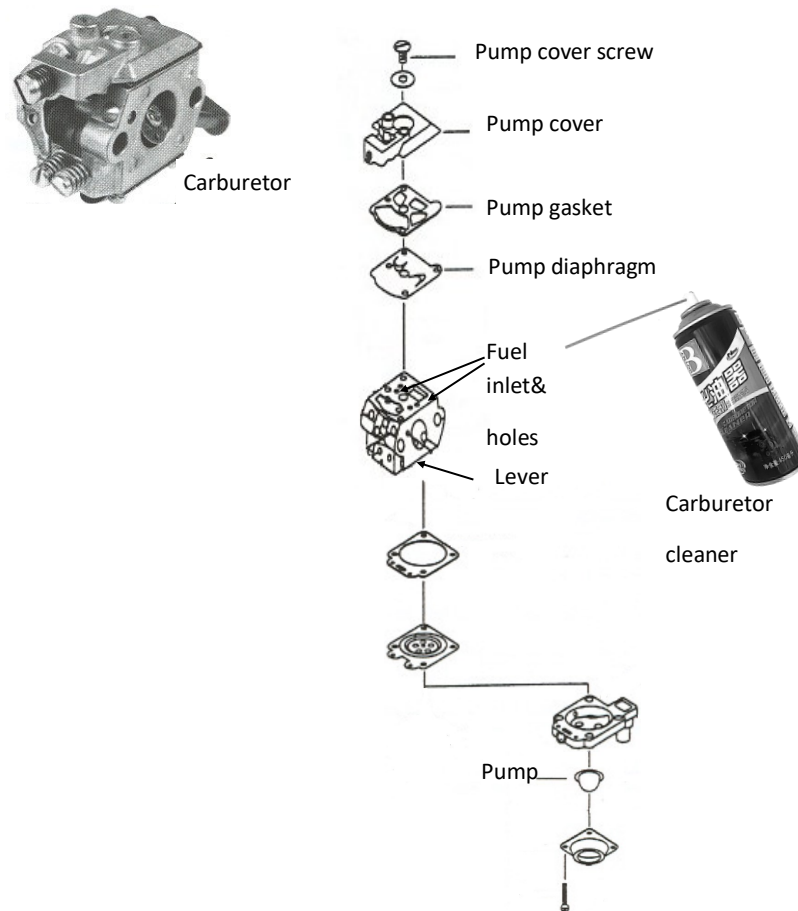|	LED	Possible Cause	Solution
Unstable running or unstable voltage	Solid green	Spark plug loose	Tight the spark plug
		Water in fuel, wrong, poor fuel quality or mixed longer than 2 months	Change with proper fuel
		Poor oil quality	FD/ISO-EGD 2T oil
		Air in blue fuel-in pipe or in tank wool fuel filter over 50 hours	Press primer pump. Make sure tank is connected to the air or change the fuel filter
	LED off	Controller or sensor failure	Contact us
Lack of power	"green & red flashing "	Maintenance required	Operate maintenance
		Filter clogged	Wash the filter with mixed gasoline
		Carburetor clogged	Clean (as below)
Spark plug		Remove spark plug and connect red plug cap, connect spark tip to cylinder and rotate the engine starter. If spark is yellow, discontinuous or weak, change the spark plug.	
Voltage drops rapidly	"red flashing" without alarm	Battery Voltage is too low	Run 1 minute until "solid green" before take-off

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Carburetor Cleaning

Dirty operating environment (dusty) or unfiltered fuel can lead to clogging of carburetor and lack of power. It can be solved by simple carburetor cleaning.

1. Remove fuel pump cover screw and pump cover. Clean diaphragm and fuel inlet using carburetor cleaner.

2. Remove pump. Press and Clean Lever using Carburetor cleaner.

3. Reassemble the pump cover and make sure gasket and diaphragm direction is correct.

📖 NOTES
Do NOT disassemble carburetor from H2. Only remove pump cover and clean diaphragm and fuel inlet.

- Carburetor
- Pump cover screw
- Pump cover
- Pump gasket
- Pump diaphragm
- Fuel inlet& holes
- Lever
- Pump
- Carburetor cleaner

Accessories

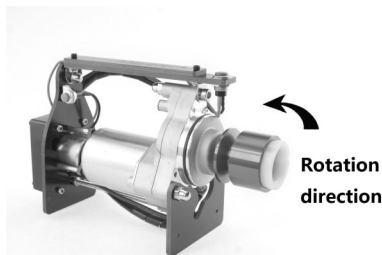| Number	Items
422014	Starter Rubber
421013	Starter Battery
522012	Starter
422011	Oil
422006	Spark Plug
422007	Spark Plug screwer
422008	3.5 Liter default fuel tank
422010	Fuel Filter
422009a	Fuel Pipe（Fuel in in blue）
422009b	Fuel Pipe（Fuel out in yellow）
422015	Fuel Mixer
421002	LiPo Battery 6S 1800mah 75C
421017	Fuel Level Sensor
421019	Air Filter
422018	4.3 Liter square fuel tank (optional)

Before starting make sure the controller LED working as the Three position switch. If LED doesn't work, please check your RC receiver channel configuration.

LED	Three position switch	Instruction
Off	Stop	
Solid green	Idle	
Off	Run (before engine started)	Flashing green & alarms if voltage lower than 46 V
Solid green	Run (after engine started)	Flashing red if voltage lower than 47V
Flashing red and alarms	Stop, Idle & Run	#6 wire not connected

Multirotor Propeller configuration

H2PLUS UAV Engine Hybrid Multirotor Power Configuration					
Motor	Propeller	Prop. Number	Voltage V	Max. Takeoff Weight KG	Norm Takeoff Weight KG
Dji E2000Pro 6010kv130	21x7 Plastic	6	48	16	14
TmotorU8kv135	Tmotor22x6.6Pro CF	6		16	14
TmotorU10kv100	JXF/Tmotor24x9 CF	6		18	16
TmotorU8IIkv100 or U8IIkv85	Tmotor28x9.2 CF	6		25	23
HobbywingX8kv120 or TmotorP80kv120	Tmotor30x9.0 CF or Plastic	4		24	22.5
Dji E5000 M10kv120	Dji 28x8	4		22	20

Rotation direction

Rotating direction: Clock wise (view from starter)