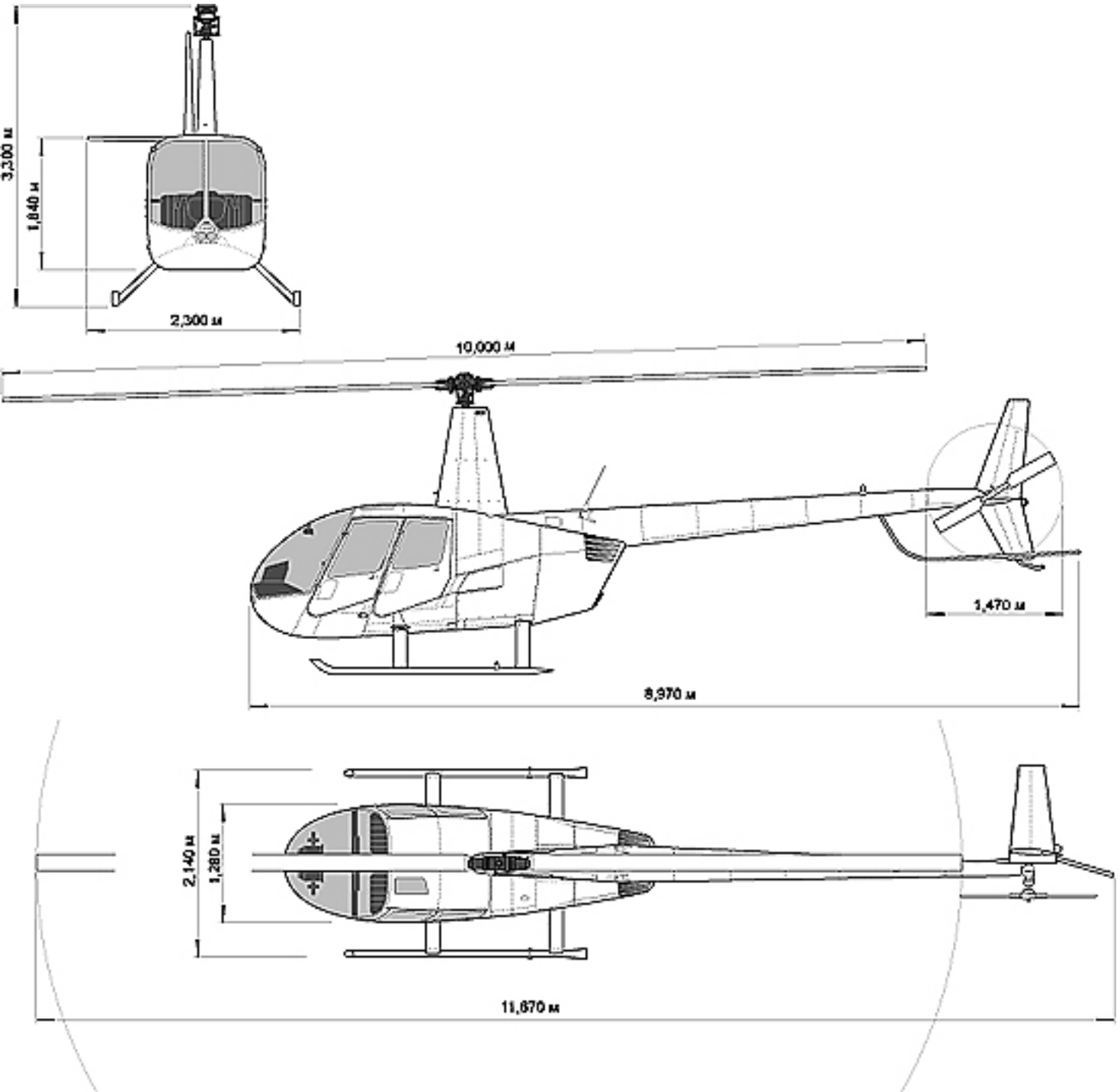
Robinson R44

Systems



The airframe is primarily a metal construction. The primary fuselage is welded steel tubing and riveted aluminium sheet.

The tailcone is an aluminium semi-monocoque structure where the skin carries most loads.

Induction air enters through a screened opening on the right side of the aircraft.

Raven I

Induction air is mixed with vaporised fuel as it passes through a venturi in the carburettor. The fuel/air mixture is then delivered to the cylinder intake.

Raven II

Fuel and air are metered at the fuel control unit but are not mixed. The fuel is injected directly into the intake port of the cylinder where it is mixed with the air just before entering the cylinder.

A teetering, semi-rigid, type rotor system is used with 2 aluminium or stainless steel blades . These are mounted to the aluminium-forged hub using coning hinges, while the hub is mounted to the shaft using a teetering hinge.

The original blades were constructed of 2 stainless steel skins with a honeycomb core and an aluminium forged root fitting. In 2010 all blades were manufactured using aluminium instead of stainless steel for better dent protection and corrosion resistance.

The tail rotor has two all-metal blades and a teetering hub with a fixed coning angle. The pitch change bearings have self-lubricated liners. The teeter hinge bearings are elastomeric. The tail rotor blades are constructed with aluminum skins and root fittings. Maintaining the paint finish will reduce corrosion and erosion.

The engine's power is transmitted to the rotor system through a vee-belt sheave using four double vee-belts.

After the engine has started a clutch actuator is used to tension the belts to allow power transmission. The clutch actuator switch in the cockpit has a cover to prevent accidental disengagement during flight.

The fuel tanks use flexible bladders in aluminium enclosures in order to reduce the risk of post-crash fires.
The fuel tanks are vented through air vents located inside the mast fairing.
The tanks are interconnected, so that the auxiliary fuel tank that is located higher feeds the main tank and will empty while there still remains fuel in the main tank.

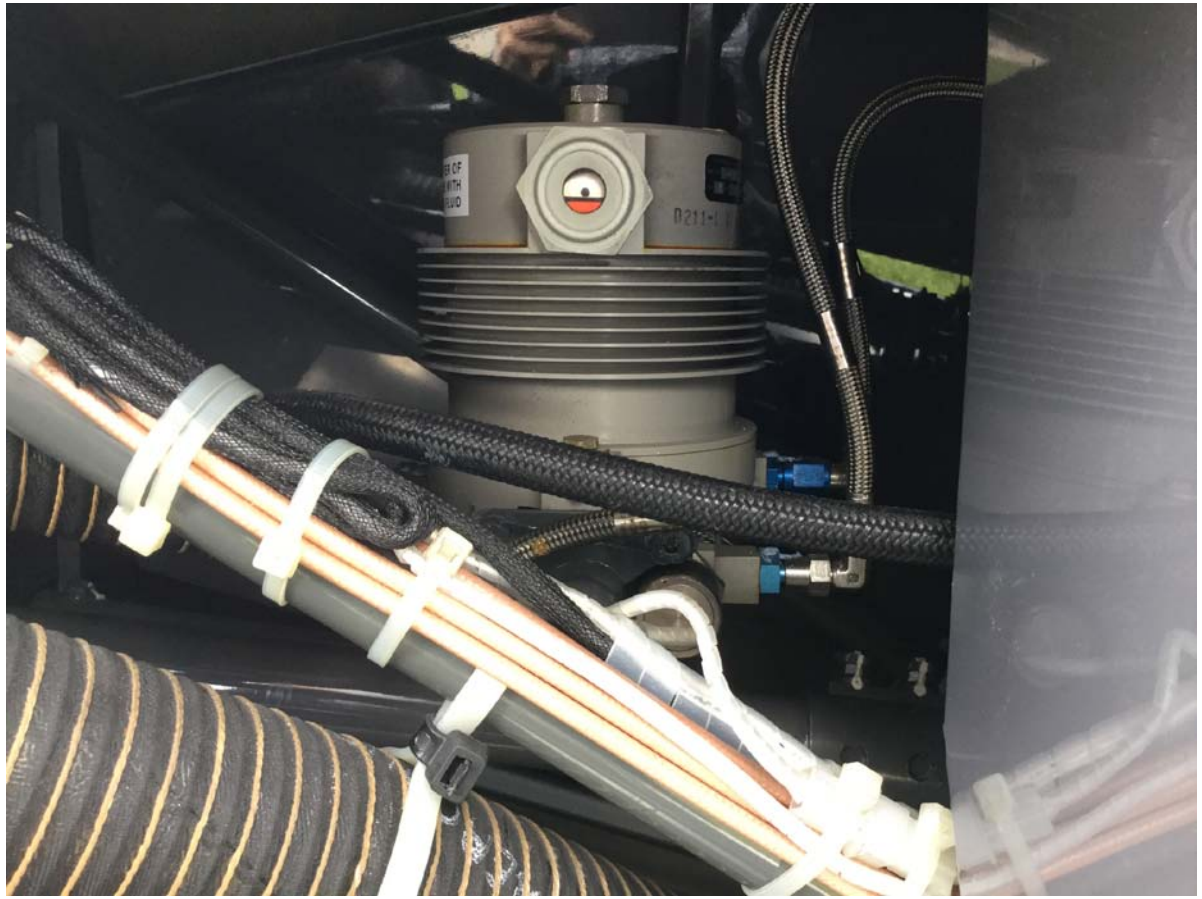
There are drain valves provided for each fuel tank sump, as well as for the gascolator. These should be sampled to check for contamination and to verify the correct grade has been used.

The Raven I fuel system is gravity fed, while the Raven II uses a fuel pump system.

Fuel travels from the gascolator to the electric fuel pump, then to the engine driven pump, then to the fuel control and from there to the flow divider atop the engine via flexible fire-sleeved hoses.

The gascolator fuel filter incorporates a pressure switch, which activates a fuel filter warning light.

The electric fuel pump is a 30gph positive displacement pump and is capable of supplying more fuel than engine demand under all conditions. If the pump pressure falls below 23psi a pressure switch activates the fuel pump warning light.



The hydraulic system eliminates feedback forces on the cyclic and collective, it consists of a pump (driven by the gearbox in case of engine failure), three servos, a reservoir, and interconnecting lines. Normal pressure is 450 to 500 psi.

One servo is connected to each of the three push-pull tubes which support the swash plate.

The R44 uses a double ignition system using 2 magnetos. A magneto is a small electrical AC generator driven by the crankshaft, creating a very high voltage that is led to the spark plugs via high-voltage cables.

Using 2 magnetos instead of one increases safety and reliability and also improves combustion. If one magneto fails, the other will continue to operate normally, although a slight decrease in power can be expected. The same is true if one of two spark plugs in a cylinder fails.

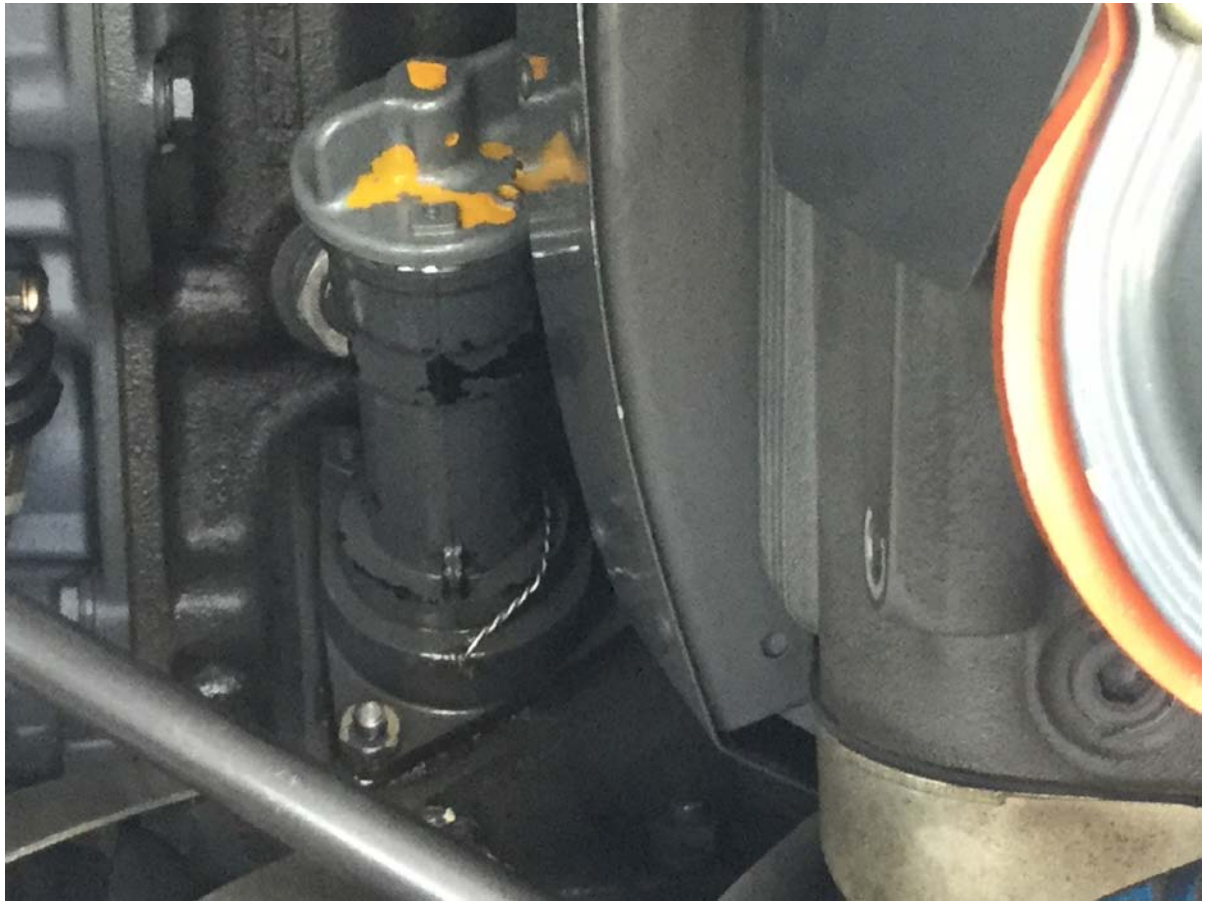
The operation of the magnetos is via the ignition switch in the cockpit.

The Raven I uses a 14 volt electrical system including a 14 volt alternator and 12 volt battery while the Raven II uses a 28 volt alternator and 24 volt battery.
In normal operation the engine-driven alternator provides electrical power to the electrical system and charges the battery. The alternator produces alternating current which is then converted to direct current using a rectifier and supplied to the busbar that distributes the current to the electrical components on the aircraft.

Push-to-reset type circuit breakers are located just in front of the front left seat and are marked to indicate their function and amperage. The Master Battery switch on the console controls the battery relay which disconnects the battery from the electrical system.

DUAL TACHOMETER

An electronic engine and rotor dual tachometer is standard. Engine tachometer signal is provided by magneto breaker points. Rotor tachometer signal is provided by two magnetic senders at the main gearbox drive yoke. Each tachometer is on a separate circuit with its own circuit breaker. With battery and alternator switches off, the tachometers continue to receive power from the battery through a bypass circuit as long as the clutch actuator switch is in the engage position.



The wet sump oil system installed in the R44 models uses an oil pump that draws oil from the oil sump (which is located inside the engine), routes it through a filter screen and, if the oil is hot, through the cooler. From there the oil passes an oil pressure relief valve and is routed into the oil gallery of the crankshaft. The oil flows down into the sump by gravity after it has passed through the engine. The function of the relief valve is to reroute excessive oil directly back to the sump in case of excessive pressure.

For pre-flight purposes the oil level can be checked using a dip-stick, it is scaled in US Quartz. Minimum level for takeoff is 7 while maximum is 9.