UAVHE RW79

Rotary (Wankel type) Hybrid APU

Key Features

Engine Design

Designed for use as a power source for UAVs. Ultra-lightweight. Easy to configure and manage.Flexibility of Possible Installation. Consistent performance over a wide range of altitudes and temperatures.

Fuel System

Low fuel consumption. Operates on Heavy Fuel, including most common civil and military jet fuel grades such as Jet A, Jet A-1, JP-5, JP-8, and Sustainable Aviation Fuel (SAF).

Air Intake

Ducted Air Intake and Exhaust for Cooling System and Co-axial air flow of the Exhaust System

Electronic Control

Multiple RW79 units can work in parallel or in hot-swap mode. A power balance controller can integrate batteries, supercapacitors, and one or more generators into a common bus.

Construction

Ultra-lightweight. Easy to configure and manage.Flexibility of Possible Installation

Cooling System

Forced Cooling with Pre-filtered Air for All Heat-emitting Components. Ability to Operate in Any Position and with Accelerations up to +6G

Electrical Output

- Output power 11kW, up to 16kW Peak.
- Output voltage 28VDC, 270VDC (MIL-STD-704).
- Output voltage options: 48/96/144/192VDC

Technical specifications

Power	22hp @13500rpm
Electric power output	16kW
Electric output	14.4V, 28V, 48V, 270V
Engine Weight	4705 g
Controller Weight	3370 g
Dimensions	177(L) x 197 (H) x 162 (W) mm
Fuel type	Aviation Kerosine (Jet A-1, JP8, SAF)
Specific Fuel consumption	255 gr/kWh
Fuel consumption @max load	4.2 L/h
Cooling	Forced Air cooling
Intake	Electronic Fuel Injection, e-Supercharger
Ignition	CDI
Starter	Electric, Integrated
Lubrication	Automix oil lubrication system / or 1% Premix API TC Oil
Control	FADEC, CAN Bus 2.0, J1939
Control interface	CANBus (twisted pair), Ethernet RJ45
Operation altitude	Up to 6100 m (FL200, 20000 ft)
Operational temperature range (cold start)	-45C to +55C
Operational temperature (full load)	-45C to +55C
Relative humidity	0-95% (MIL-STD-810E, Method 507, Procedure III)
Weather conditions	Functional in various weather conditions including dust, rain, snow, fog, and exposure to saltwater spray
Temperature Shock	MIL-STD-810E, Method 503.3
Power deviations under adverse conditions	>5%
MTBO	1000H
Service intervals	200H

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More details

Engine Design

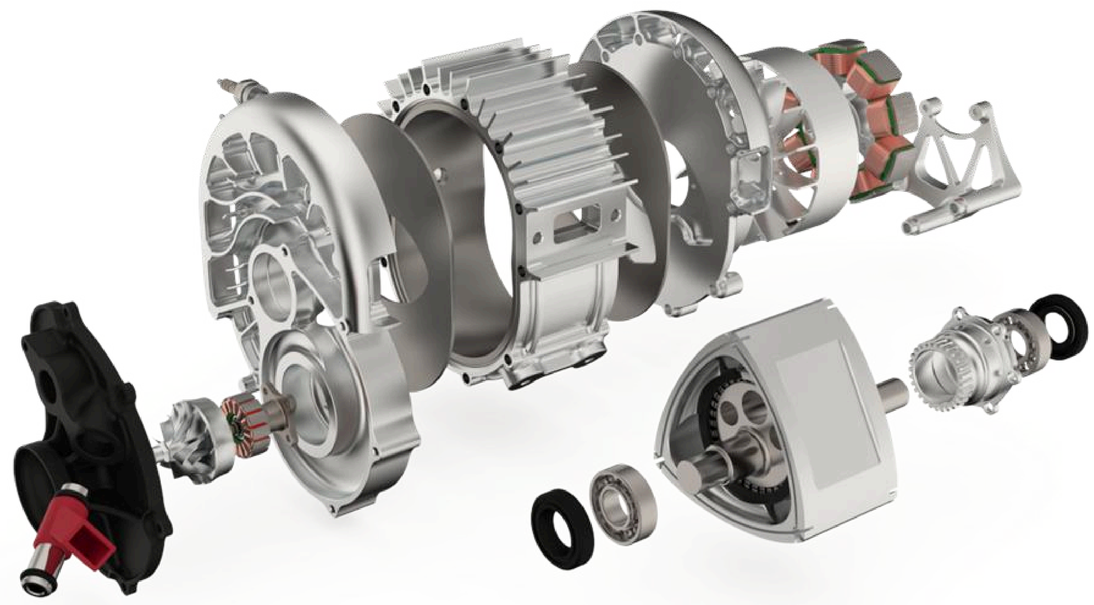
- Air-cooled rotary engine with direct drive generator on permanent magnets.
- Electronic fuel injection with forced electric supercharging.
- e-Supercharged fuel intake through the rotor with centrifugal acceleration of the pre-atomized mixture.

Materials

- The stator is aluminum, CNC-milled from a forging with a thin sleeve of whitened cast iron.
- Rotor: Aluminum with DLC coatings in the seal channels.
- Apex seals - polished, Tungsten Carbide.
- All external surfaces have hard anodizing and protective coatings to meet MIL-STD-810
- The stator is made of a precision CNC-milled cast iron sleeve in an aluminum shell.
- The laminated stator of the generator.
- Neodymium magnets in a Halbach array on an aluminum rotor.

Fuel and Ignition System

- A BLDC electric motor for precise maintenance of selected pressure in the intake tract drives a supercharger impeller.
- Submersible high-pressure fuel pump and pressure regulator.
- Electronically controlled piezo injector with ultrasonic control of counter-focus of the spray flame. Sub 5nm droplet size.
- Dual ignition with two spark plugs.
- Complies with MIL-STD-461/464. Insulated wires, connectors, and housings with EMI protection.



Cooling System:

Forced air. Air intake through the generator stator for cooling. Air is discharged coaxially around the exhaust port.

Electric output

- Meets and Exceeds MIL-STD-704F requirements
- 270 VDC @ 16.8 ADC - 16 kW
- 28 VDC @ 35 ADC x 16 Channels
- 48VDC @ 200ADC x 16 Channels split 16kW total

Flexibility

Multiple RW79 units can operate in parallel or hot-swap mode, seamlessly integrating with batteries, supercapacitors, and additional generators through a power balance controller.

Protection

Limits short circuit current between 460-490 Amps for 2s:

- 125% for 6 seconds
- 150% for 3 seconds
- Recovery from 95% Step Load in 40 ms to 704F

Transient performance exceeds MIL-STD-704F:

- Over/under voltage: Input and Output
- Overload
- Short circuit
- High temperature
- Internal system error

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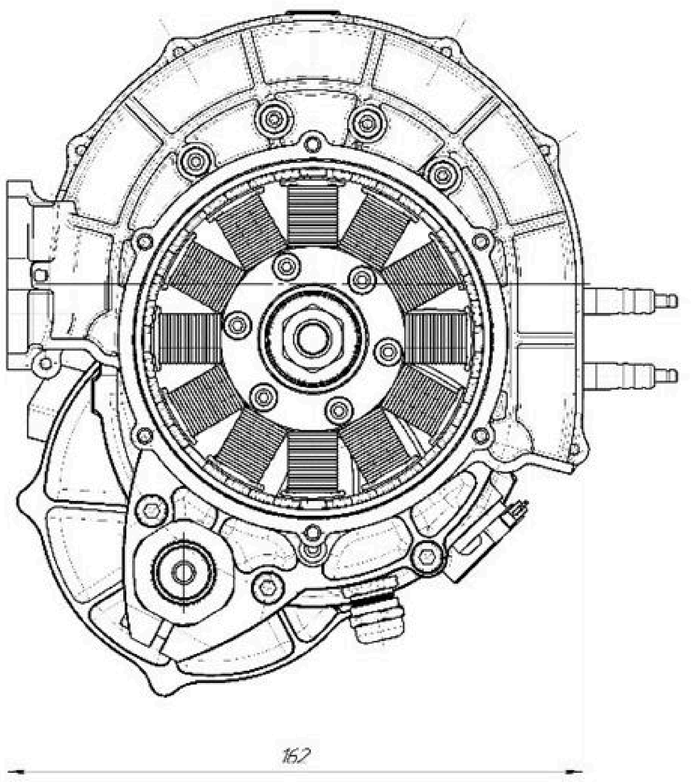
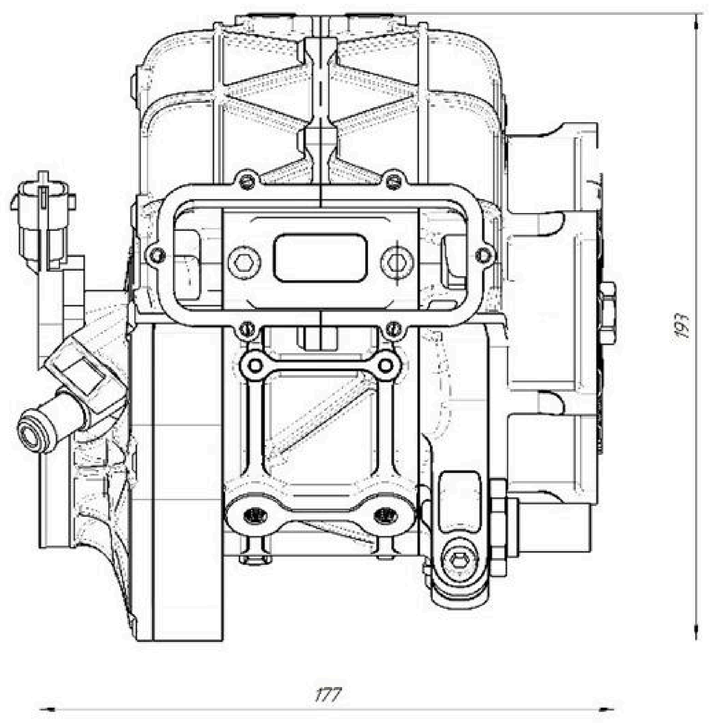
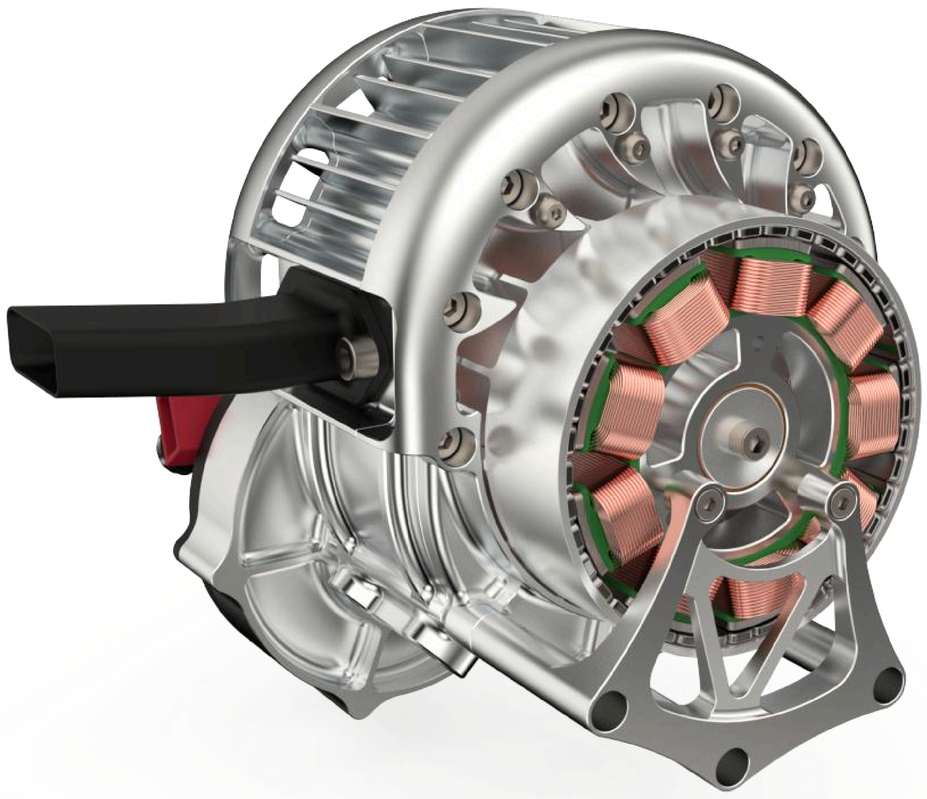
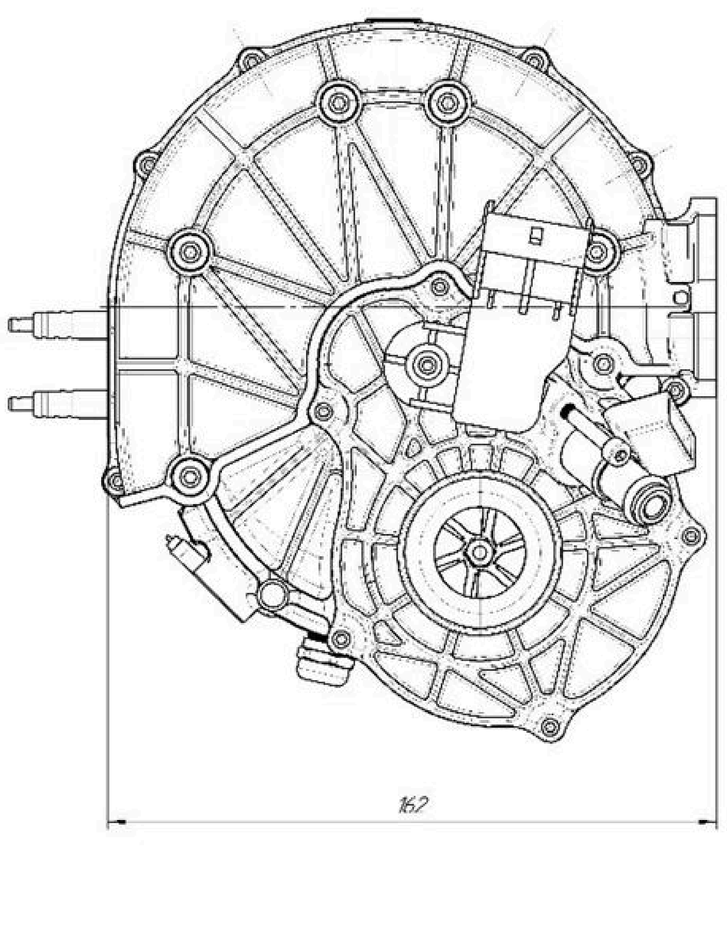
Dimensions









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ECU / Generator Rectifier / Power Distribution Unit

Key Features

- All engine electronic systems in one compact case.
- Capability to configure hot-swap of multiple controllers and combine/balance multiple generators.
- Ability to configure individual 48VDC channels into groups of 96VDC/144VDC/192VDC.
- Integrated starter battery. Automatically recharges from the generator. Electrically isolated from other onboard systems.
- Integrated supercapacitor battery for torque fluctuation compensation.
- Several independent channels for control and telemetry.
- Priority system for responding to generator overload, separate profiles for each group of consumers.
- Software configuration of protection/shutdown levels, resettable fuses.
- Connectors for engine wiring connection, control interface, and four groups of four channels (a total of 16) connectors for connecting electrical consumers and external batteries.

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Price

Price: 15,500 EUR (Ex-Works Barcelona)

We offer a 'Developers Kit' – an engine on a subframe suitable for mounting on a dyno, including a kit of radiators, pumps, a fuel system, an ECU, and a wiring kit, with software control documentation (API, necessary source codes)

More info:
https://uavhe.eu/products/rw1-79/

CAD (STEP) files: https://uavhe.eu/wp-content/uploads/2024/01/RW79.stp_.zip