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Inhalt

1 ARENS RVI 279-2Z Boxer Engine

The starting point in the development of the RVI boxer engine is the recognition that the efficiency potential of future two-stroke petrol engines can only be realized by means of a holistic approach to designing engines. When developing the engine design, tried-and-tested specifically two-stroke solutions were considered as well as entirely new design approaches were worked out. Development was consistently oriented towards expanding on the construction and cost advantages of piston-ported two-stroke engines and combining the advantages of high-pressure direct injection. The result of this is the world's smallest two-stroke combustion engine with integrated high-pressure direct injection. It is suitable for use in applications limited by space and weight, which are to be found in small watercrafts, landcrafts, aircrafts or mobile power units. RVI engines do not need oil changes, replacement oil filters or valve setting and are therefore very low-maintenance.

1.1 Working Principle // Two-Stroke

The ARENS RVI boxer engine has been built according to the principle of a piston-ported two-stroke engine. The fresh air inlet is controlled via a rotary slide system. It integrates both the cyclic control system of the fresh air inlet into the engine crankcase and the throttling of the supply flow. By means of a steering rotary slide on the housing, it is possible to achieve asymmetrical inlet control diagrams for optimal fresh air charge. Another choke rotary slide is located upstream from this enabling continuously variable throttling of the supply air. The patent-protected system has an extremely flat, simple and robust structure. The suction noise at the inlet controlled by the rotary slide is lower than that at inlets controlled by a piston or a diaphragm.

1.2 Fuel Supply // High-Pressure Direct Injection

The high-pressure injection system enables charge-layered operation. To enable an extremely compact structure for the fuel system, we developed a high-pressure fuel pump and a multifunctional fuel distributor block. This allows the direct injection system to be integrated into the engine system in a highly compact manner. Currently, the engine is operated at max. 150 bar injection pressure, while higher pressures are readily possible. The high-pressure injectors are housed in cylinder heads and inject fuel directly into the combustion chamber. Their position has been chosen so that the injection jet is directed opposite the incoming fresh air stream.

1.3 Lubrication // Multi-Point Targeted Oiling

Moving parts are lubricated via a multipoint lubricating system which applies the smallest amounts of lubricant directly onto the bearing points of the crankshaft. A part quantity of the lubricant is applied to the pivot bearings via holes in the crankshaft. Another part quantity is applied to areas of the liner and rotary slide system to be lubricated. Lubricants that are fully compatible with combustion are used to prevent them being released into the environment. The lubricant is metered out via engine management. The lubricant-fuel ratio is around 1:220 to 250 depending on the operating conditions.

1.4 Engine Management System // Programmable ECU

The electronic engine management system regulates the ignition, lubrication and injection parameters based on maps and appropriately adjusts them to the prevailing operating conditions. The sensor system also monitors temperatures, pressures, and fill levels necessary for smooth operation. Corresponding data interfaces for reading information relevant to operations are also available.

1.5 Construction Principle // Modular Boxer Arrangement

The arrangement of the cylinders enables a very small distance between the piston rod axis of the cylinders and thus minimising free moments I and II order. The free forces I and II order are both zero as a matter of principle. A very convenient mass balance occurs without any additional action.

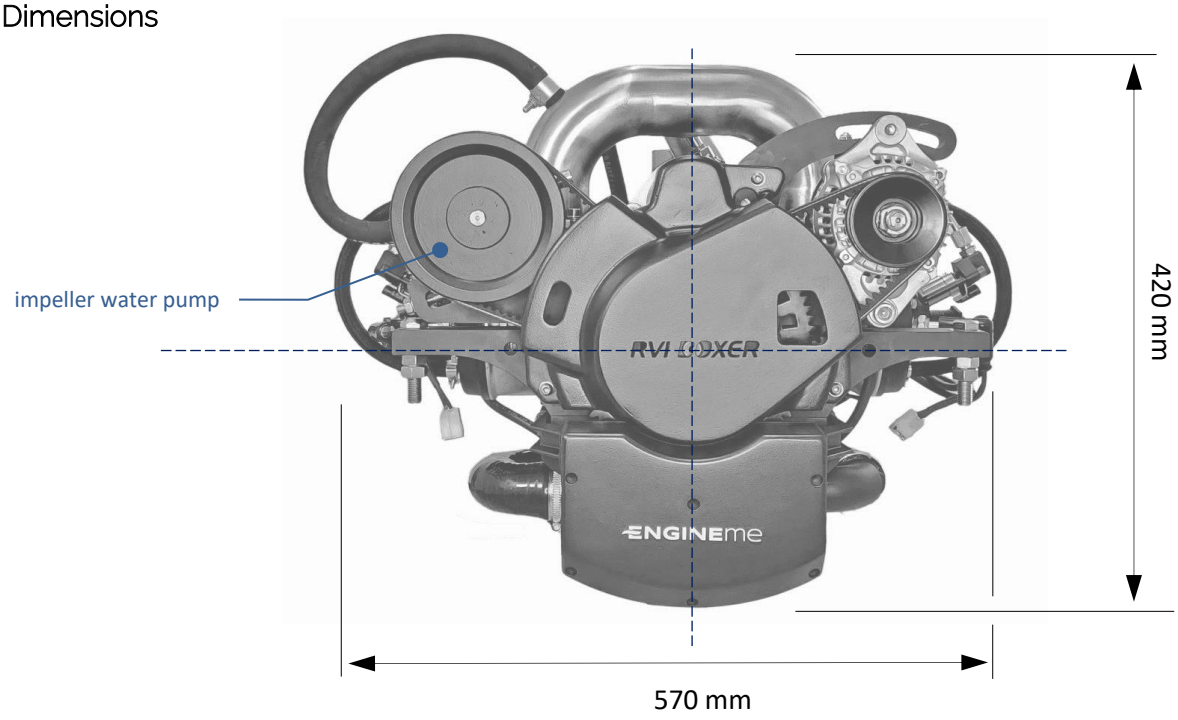
In Arens RVI boxer engines, two opposing cylinders form a “constructive module” that can be multiplied indefinitely. Based on this principle, several cylinder capacity and performance variants can be derived from the basic two-cylinder construction without having to make changes to the module-forming subassemblies. The modular construction also enables the multiple use of structurally identical components and assemblies. Even at low number of units, an effective economy of scale occurs which is not only accelerated by a performance variant’s production figures but also by the number of units of all variants to be produced. The decision regarding onto which performance variant the module-forming assemblies are mounted can be postponed until final assembly. This flexibility in the production of variants shortens reaction times when demand changes and reduces decision-making risk.

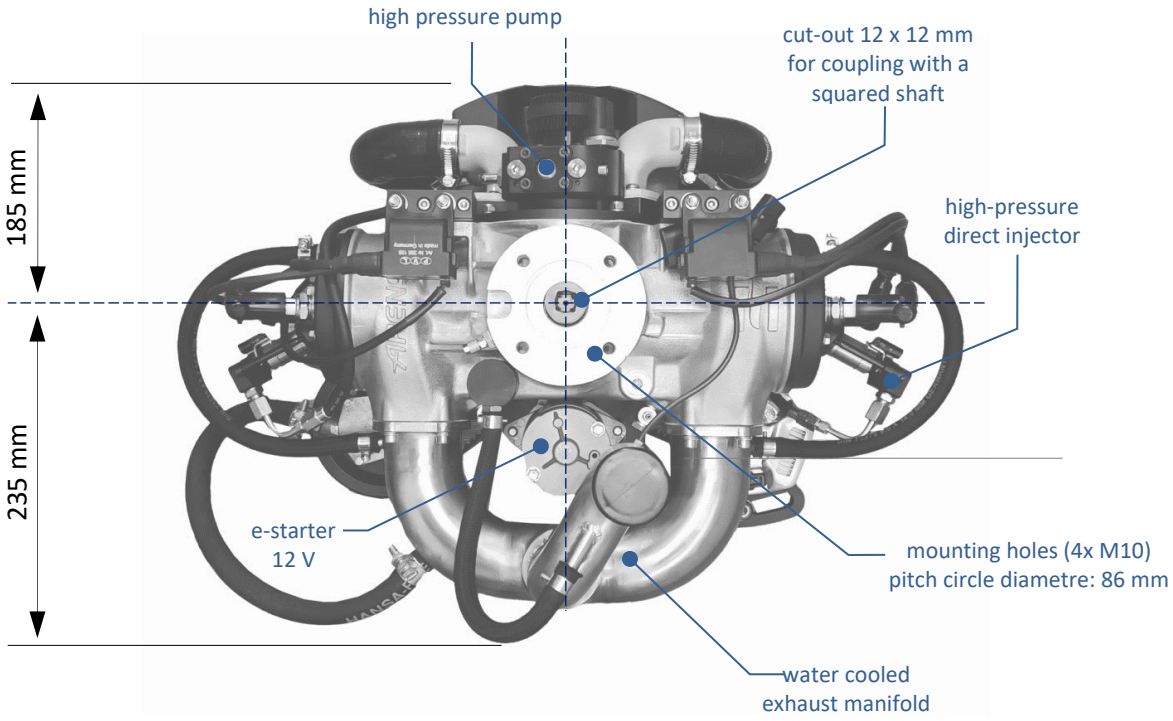
1.6 Cooling

The engine is equipped with a single-circuit seawater cooling system, which is operated by an impeller pump. Other cooling concepts and pump solutions can be applied.

2 Technical Information

2.1 Dimensions





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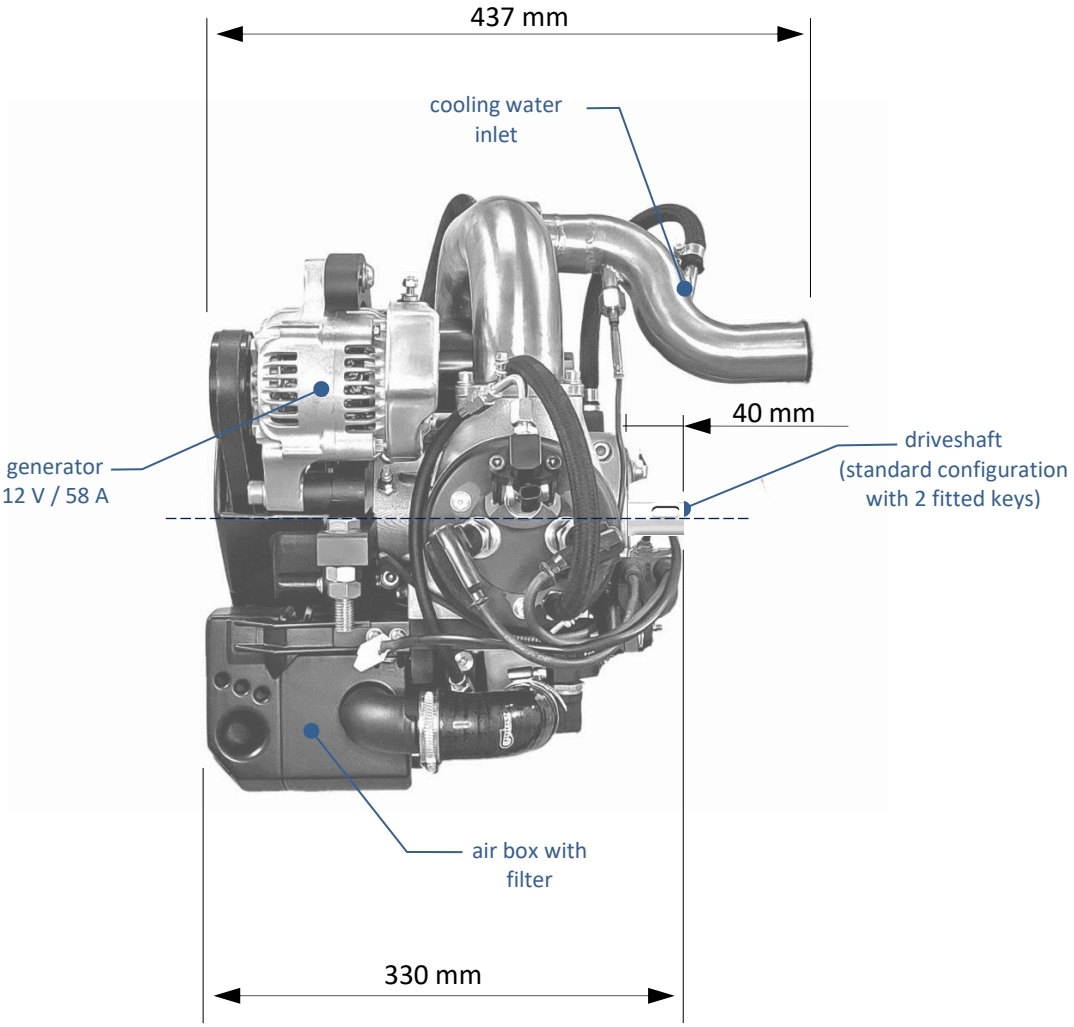
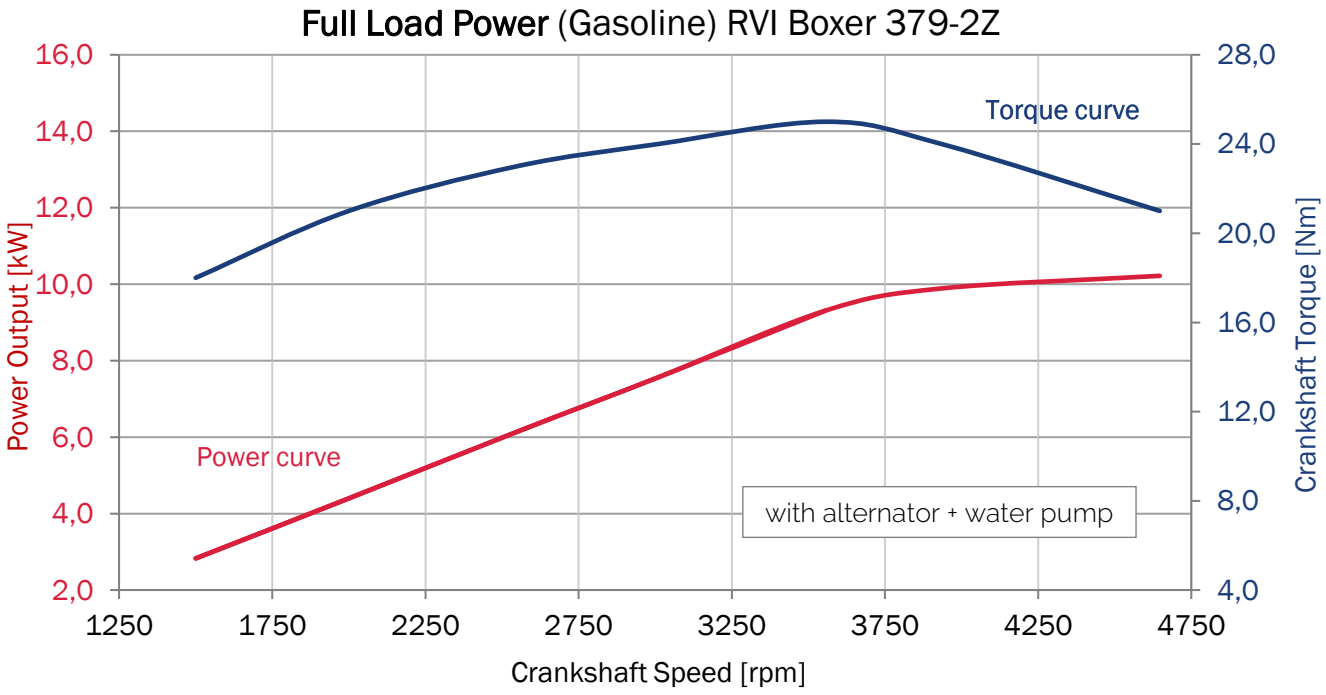
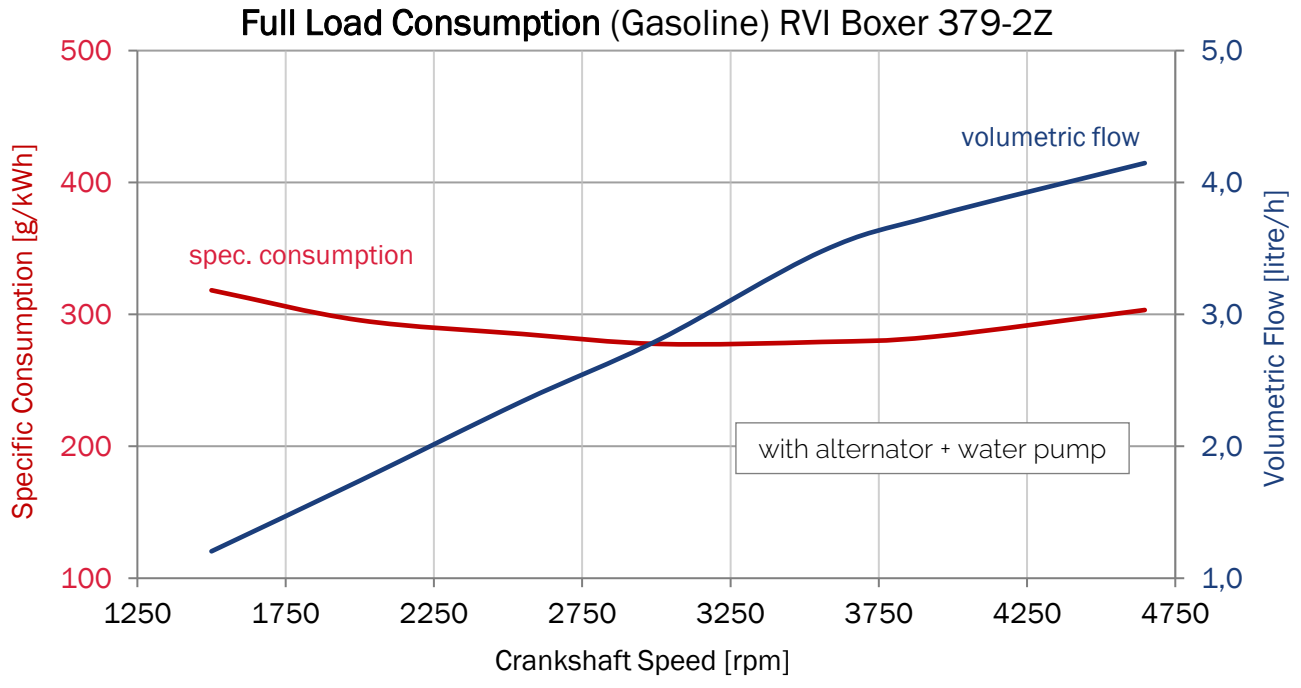


2.2 Power & Consumption





2.3 Technical Data

Please enquire in the instance of deployment outside the values specified.

Performance data	Maximum power		kW (hp)	11,04 (15)
	Rotational speed range		rpm	1,000 to 4,200 (capped)
	Maximum torque		Nm	25
	Spec. consumption		g/kWh	270
Primary dimensions	Cubic capacity		cc	379
	Cylinder stroke		mm	54.5
	Hole		mm	66.5
	Number of cylinders			2
	Cylinder configuration	USP		Boxer (excellent mass compensation)
	Dry weight	USP	kg	30
	Box size (H x W x D)		mm	420 x 570 x 330
Cooling system	Type	USP		Water cooling, with injection into exhaust
	Temperature control			Thermostat
	Temperature range		°C	50 to 60
Fresh air inlet	Type			Combined flat rotary valve system
	Control rotary valve			Inlet valve timing adjustable
	Air-fuel mixture	USP		Quantity-controlled (low throttling losses)
Control electronics	Type	USP		Engine Management System (EMS)
	Interfaces			RS232, CAN-BUS (customizable)
Ignition system	Type			Coil ignition
	Ignition timing			Electronic characteristics control
Fuel system	Type	USP		High-pressure direct injection
	Metering			Electronic characteristics control
	Fuel pressure		bar	60 to 150
	Fuel pre-feed		bar	2 to 4
	Fuels			Gasoline; alternative fuels possible
Lubrication system	Type	USP		Multi-point targeted loss lubrication
	Metering			Electronic characteristics control
	Lubricant			Oils consistent with NMMA TC-W3®
Generator	Max. Voltage output		V	14
	Max. Power output		A	58
	Charge controller			Integrated
Starter	Min. voltage		V	12
	Min. capacity		W	500
Peripherals	Fuel tank		l	12 (other on request)
	Electric fuel pump		bar	2 to 4
	Lubricant tank		l	1.5
	Min. battery storage		Ah	14 (recommended)