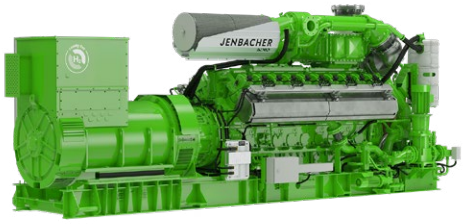
JENBACHER

JENBACHER TYPE 4 H2-ENGINE

Hydrogen technology available today, accelerating a cleaner tomorrow



Since the beginning of 2022, INNIO's entire 50 Hz natural gas engine product portfolio has been available with a "Ready for H_2" option. All Jenbacher engines can be equipped with a "Ready for H_2" package that enables operation with up to 25% (vol) of hydrogen in pipeline gas.

Fueled by either 100% hydrogen or a variable hydrogen/natural gas mixture with up to 100% hydrogen content, our proven Jenbacher Type 4 engines support the transition toward net-zero future. Existing engines can be converted to 100% H_2 operation.

Jenbacher Type 4 engines, in the 800 to 1,560 kW power range for standard gaseous fuels, are characterized by high power and strong efficiency. Backed by INNIO's cloud-based intelligent digital myplant platform, these engines enable simplified preventative maintenance and offer high reliability and availability.

Reference installations H2-Engines

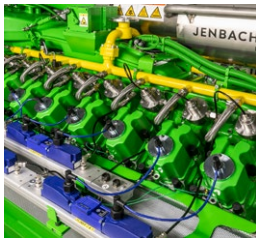
J412 – RAG Austria AG, Gampern, Austria



RAG Austria AG has launched the world's first natural hydrogen storage facility in Gampern, Austria, storing 4.2 GWh of solar power for winter use. At the site, a Jenbacher J412 engine produces electricity and heat operating on a variable mixture of hydrogen and natural gas. This pioneering combined heat and power (CHP) plant supports decarbonization and a sustainable energy supply, demonstrating the potential for green hydrogen in the future.

Engine	1 x J412
Electrical output	530 kW
Thermal output	550 kW
Energy source	100% H_2/natural gas
Commissioning	2024

J416 – HanseWerk Natur, Hamburg, Germany



HanseWerk Natur, an E.ON company, is showcasing a flagship CHP project in Hamburg. The 1 MW Jenbacher J416 is designed for natural gas operation and high total efficiency. In 2020, INNIO and HanseWerk Natur demonstrated the field conversion from natural gas to 100% hydrogen operation. The engine runs on a variable hydrogen mixture from 0% up to 100% (100% H_2 for a short-term demonstration). This project is powerful proof that our Jenbacher Type 4 engines can operate exclusively on hydrogen and that existing engines can be converted to 100% hydrogen operation.

Engine	1 x J416
Electrical output	100% H_2: > 600 kW/100% natural gas: 999 kW
Thermal output	100% natural gas: 1,292 kW
Energy source	100% H_2/natural gas
Commissioning	2020 (temporary H_2 demonstration plant)

J420 – Hyosung Heavy Industries, Ulsan, South Korea



Hyosung Heavy Industries, a South Korean energy leader, launched Asia Pacific's first 100% hydrogen engine power plant using a Jenbacher J420 engine. The project converts hydrogen, in this case the by-product from chemical processes, into cleaner power, demonstrating hydrogen's role in decarbonizing heavy industry.

Engine	1 x J420
Electrical output	up to 1,042 kW
Thermal output	1,136 kW[1]
Energy source	100% H_2
Commissioning	2024

[1] Achieved in CHP applications only.

JENBACHER

H2-Engine

Feature	Description	Advantages
Port injection	Includes individual cylinder H_2 fuel injection valves to support combustion optimization and balancing, along with enhanced safety during H_2 operation.	— Fast response time — Rapid adjustment of cylinder-specific air/gas ratio — Improved safety by reducing risk of pre-ignition, cylinder overloading, and backfire during irregular combustion events
Cylinder-selective combustion control	Supports cylinder-specific combustion optimization with high control accuracy, including fuel injection balancing per cylinder. Enables fast response during irregular combustion events.	— Fast response time — Improved safety through rapid response to irregular combustion events (e.g., pre-ignition) — Rapid adjustment of engine or cylinder-specific operating points
Optimized turbocharger with waste gate	Enables dual fuel operation and improved efficiency.	— Maintenance of turbocharger speed within limits — Optimization of engine and turbocharger operating points

Technical data

Configuration	V 70°		
Bore (mm)	145		
Stroke (mm)	185		
Displacement/cylinder (lit)	3.06		
Speed (rpm)	1,800 (60 Hz) 1,500 (50 Hz)		
Mean piston speed (m/s)	9.3 (1,500 1/min) 11.2 (1,800 1/min)		
Scope of supply	Generator set, cogeneration system, generator set/cogeneration in container		
Applicable gas types	Natural gas/hydrogen and mixtures of both		
Engine type	J412	J416	J420
No. of cylinders	12	16	20
Total displacement (lit)	36.7	48.9	61.1

		Dimensions l x w x h (mm)
Generator set	J412	5,400 x 1,800 x 2,200
	J416	6,200 x 1,800 x 2,200
	J420	7,100 x 1,900 x 2,200
Cogeneration system	J412	6,000 x 1,800 x 2,200
	J416	6,700 x 1,800 x 2,200
	J420	7,100 x 1,800 x 2,200
Container[2] 40-foot	J412	12,200 x 3,000 x 2,700 – 5,300
	J416	12,200 x 3,000 x 2,700 – 5,300
	J420	12,200 x 3,000 x 2,700 – 5,300
		Weights empty (kg)
Generator set	J412	11,200
	J416	13,500
	J420	17,200
Cogeneration system	J412	11,800
	J416	14,100
	J420	17,800

Subject to technical development and modification.

Outputs and efficiencies: 100% hydrogen

		Target values for demo plant | 50 Hz			Target values for demo plant | 60 Hz		
Engine version		**JMS 420 E900**	**JMS 416 E900**	**JMS 412 C900**	**JMS 420 E980**	**JMS 416 E980**	**JMS 412 C980**
Energy input	kW	2,500	2,000	1,500	2,744	2,179	1,631
Electrical output	kW	1,000	800	600	1,070	850	636
Thermal output	kW	1,150	920	690	1,289	1,024	766
Electrical efficiency		40%	40%	40%	39%	39%	39%
Thermal efficiency (70/90°C)		46%	46%	46%	47%	47%	47%
Total efficiency		86%	86%	86%	86%	86%	86%
H_2 gas amount	Nm³/h	833	667	500	915	726	544
H_2 gas amount	kg/h	76	61	45	83	66	49
NO_x@5%O_2 dry	mg/Nm³	<100	<100	<100	<100	<100	<100

[2] The dimensions refer to the standard base models with horizontal exhaust silencer.

In general, "Ready for H_2" Jenbacher units can be converted to operate on up to 100% hydrogen in the future. Details on the cost and timeline for a future conversion may vary and need to be clarified individually.

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