JENBACHER

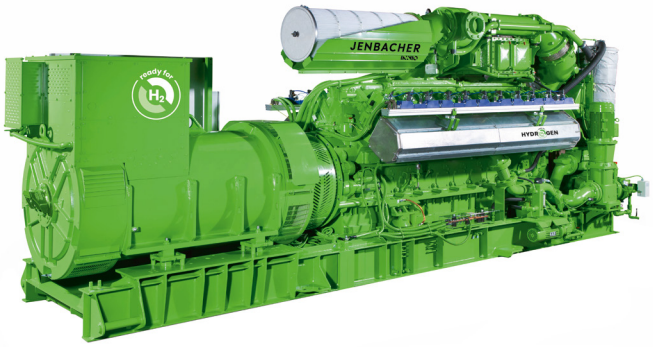
JENBACHER TYPE 4 H2-ENGINE

Our hydrogen technology is available today and accelerating a cleaner tomorrow.

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

Fueled by either 100% hydrogen or a variable hydrogen / pipeline gas mixture of up to 100% hydrogen content, our proven Jenbacher Type 4 engines are setting a benchmark on the path towards a net-zero future. Even existing engines can be converted to 100% H_2 operation.

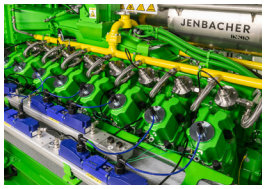
The innovative Jenbacher Type 4 engines in the 800 to 1,560 kW power range for standard gaseous fuels are characterized by high-power density and outstanding efficiency. Backed by INNIO's cloud-based intelligent digital platform myPlant, these engines provide easy preventive maintenance, high reliability, and excellent availability.



Jenbacher H2-Engine reference

J416 HanseWerk Natur in Hamburg, Germany

Energy source	Engine type	Electrical output	Total efficiency	Commissioning
Pipeline gas / 100% H_2	1 x J416	100% pipeline gas: 999 kW / 100% H_2: > 600 kW	93.5%	2020



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

H2-Engine

Feature	Description	Advantages
Port injection	Includes individual cylinder H_2 fuel injection valves for combustion optimization and balancing. Also an increased safety feature during H_2 operation	- Very quick response time - Rapid adjustment of cylinder individual air / gas ratio - Increased safety to avoid pre-ignition, overloading of individual cylinders, reduction of back-fire risk during irregular combustion events
Cylinder selective combustion control	Enables cylinder individual combustion optimization with high control accuracy, e.g., fuel injection balancing per cylinder. Fast response during irregular combustion events	- Very quick response time - Increased safety feature with fast response during irregular combustion events, e.g., pre-ignition, etc. - Rapid adjustment of engine or cylinder individual operation point
Optimized turbocharger with waste gate	Enables dual fuel operation and efficiency optimization	- Maintains turbocharger speed limits - Optimization of engine and turbocharger operation point

* 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.

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	Pipeline gas / hydrogen and mixtures of both

	J412	J416	J420
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 40-foot	J412	12,200 x 3,000 x 2,900
	J416	12,200 x 3,000 x 2,900
	J420	12,200 x 3,000 x 2,900

		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	Nm^3/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/Nm^3	<100	<100	<100	<100	<100	<100

I JB-1 23 004-EN-H2

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.

Jenbacher is part of the INNIO Group

Contact us:
jenbacher.com/en/contact

jenbacher.com/en

JENBACHER