JENBACHER TYPE 3F

The reference for robustness and reliability—now with higher efficiency

JENBACHER
INNIO

THE NEXT GENERATION JENBACHER TYPE 3F ENGINE

The reference for robustness and reliability—now with higher efficiency!

Based on our proven Type 3 platform established in 1988 and continuously developed ever since, the next generation Jenbacher Type 3F engine offers proven robustness and reliability while delivering more efficiency than ever. That's to be expected when you consider the many innovation milestones set by Jenbacher Type 3 engines over the years, including the introduction of the world's first V20 gas engine in 1993.

The Type 3 engine platform is:

Proven
Since 1988, ~11,000 engines delivered & ~9,000 MW installed[1]
450 million+ oph of experience[1]

Reliable
Outstanding reliability
Maintenance-friendly engine design
Excellent availability: up to 99%

Flexible
1,500 rpm (50 Hz) / 1,200 & 1,800 rpm (60 Hz)
Fuel flexible: pipeline gas, biogas and special gases
Application-specific design options: container, genset, or CHP
Dedicated versions for 10+ different applications

Building on its proven heritage, the new Type 3F 50 Hz engine now leads the way with next-generation technology innovation that delivers an up to 2 percentage point efficiency boost compared to earlier engine versions—up to 1,065 kWel—without sacrificing its proven reliability or robustness. In addition to delivering efficiency as high as 43.3% when operating on pipeline gas, the Type 3F engine is optimized for reduced total hydrocarbon (THC) emissions, future-proof fuel flexibility, and enhanced serviceability. Moreover, the latest 3F technology is retrofittable for most of the installed Type 3 fleet.[2]

[1] as of July 2022 [2] Recommended during minor or major overhaul

BENEFITS

at a glance

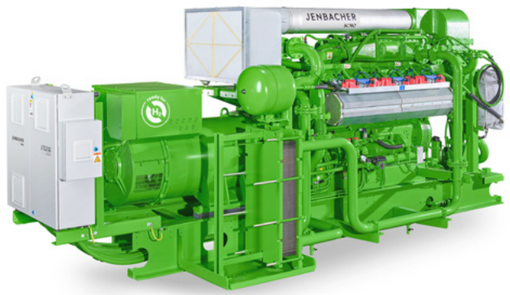
Greater efficiency
Up to 2 percentage points improved fuel usage means savings for you

Lower THC emissions
Lower THC emissions lead to a smaller environmental footprint

Reduced oil cost
Less consumption and longer lube oil lifetime lower your oil life-cycle costs

Convenient upgrade
For your installed engines, an upgrade for the latest technology can be applied anytime—ideally during your minor or major overhaul

Future-proof fuel flexibility
The "Ready for Hydrogen" option facilitates your move from conventional fuels today to H_2 operation tomorrow, once H_2 becomes more readily available

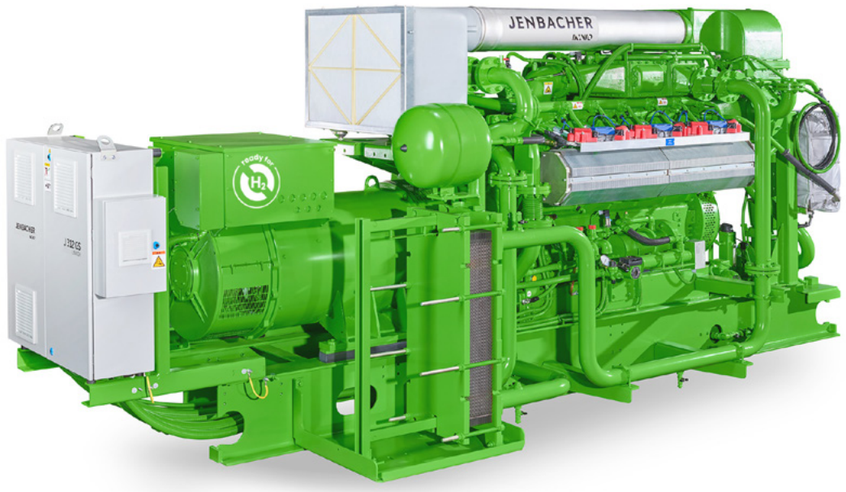


Watch the video of the new Jenbacher Type 3F unit!

"Ready for Hydrogen" = Optional scope on demand

INNOVATIVE DESIGN

The Type 3F engine delivers innovative technical features that enable greater efficiency, lower THC emissions, reduced oil costs, and future-proof fuel flexibility. And you can easily take advantage of these benefits with our convenient 3F upgrade.



"Ready for Hydrogen" = Optional scope on demand

INNOVATIVE DESIGN FEATURES

New cylinder head (4V)

Optimized for better gas exchange and improved cooling, the new cylinder head also delivers reduced THC emissions, improved combustion, and more robust valve and valve seat materials.

New power unit

Our new aluminum piston design helps minimize crevice volume for reduced THC emissions, improved combustion, and reduced oil consumption. Other key aspects of the design include a new piston bowl shape, liner, and scraper ring.

New knock control & ignition system

This enhanced system delivers better engine protection, more efficient combustion, and easier serviceability.

New valve train (4V)

A new valve train with a floating bridge makes service easier.

New camshaft

Our new camshaft gives you increased charge efficiency and enhanced Miller timing. Plus, your THC emissions are reduced, and you get better gas exchange.

INTEGRATED SOLUTIONS

for Jenbacher Type 3F engines

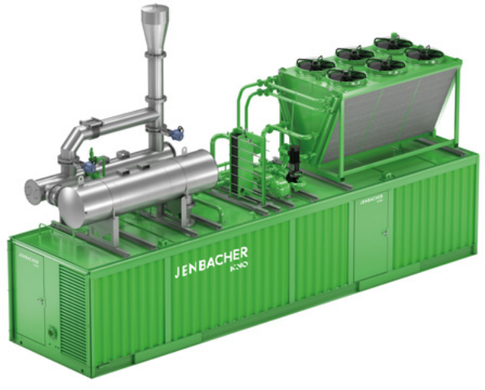
Containers for the Type 3F engine are available with a broad range of options to meet your specific project requirements.

Benefits

Pre-installed package completed with auxiliary systems ensures a quick and easy site installation

Compact footprint consumes minimum amount of space onsite

All components matched and tuned to the specific site requirements by Jenbacher engineering experts to help ensure optimal performance



Lubricating oils

The new 3F engine also can be operated with dedicated Jenbacher engine oils.

Our Jenbacher N Oil 40 and S Oil 40 are optimized for performance by our engineering experts and suppliers to deliver.

- Extended oil service life for better synchronization of oil changes and other planned maintenance measures
- Reduced overall oil consumption—due to fewer changes—that lets you conserve limited resources for greater sustainability
- Longer filter service life for material and maintenance cost savings
- Improved cleanliness and a better wear protection enable longer service life of valves and cylinder heads
- Increased plant availability for more energy production and higher overall yield

TECHNICAL DATA

Meeting customer needs

Our Type 3F technology can help meet diverse customer needs with new dedicated applications such as combined heat and power (CHP) and propane.

Pipeline gas — 1,500 1/min / 50 Hz

	Type	Pel (kW)[3]	ηel (%)[3]	Pth (kW)[4]	ηth (%)[4]	ηtot (%)
NOx < 500 mg/Nm³[5]	J312F	500	42.0	547	46.00	88.0
	J312F	635	43.1	664	45.00	88.1
	J316F	851	43.1	901	45.60	88.7
	J320F	1,067	43.3	1,125	45.6	88.9
	J312F-CHP	635	41.5	749	49.0	90.5
	J316F-CHP	851	41.3	1,021	49.5	90.8
	J320F-CHP	1,067	41.4	1,276	49.5	90.9
NOx < 250 mg/Nm³[5]	J312F	635	42.1	683	45.4	87.5
	J316F	851	42.2	930	46.1	88.3
	J320F	1,067	42.3	1,162	46.1	88.4
	J312F-CHP	635	40.7	770	49.4	90.1
	J316F-CHP	851	40.5	1,049	49.9	90.4
	J320F-CHP	1,067	40.6	1,311	49.9	90.5

CHP Version

CHP version enables an intercooler water temperature of 70° C, so the low temperature intercooler circuit maybe obsolete. This saves not only investments for Balance of Plant (BoP), avoids parasitic losses and potential sound emissions, it also results in a higher total efficiency.

Biogas — 1,500 1/min / 50 Hz

	Type	Pel (kW)[3]	ηel (%)[3]	Pth (kW)[4]	ηth (%)[4]	ηtot (%)
NOx < 500 mg/Nm³[5]	J312F	548	42.7%	530	41.3%	83.9%
	J312F	635	41.9%	649	42.8%	84.6%
	J316F	851	41.9%	883	43.5%	85.4%
	J320F	1,067	42.0%	1,104	43.5%	85.5%
NOx < 250 mg/Nm³[5]	J312F	548	41.7%	544	41.4%	83.0%
	J312F	635	40.9%	662	42.6%	83.5%
	J316F	851	40.9%	902	43.3%	84.2%
	J320F	1,067	41.0%	1,127	43.3%	84.3%

Propane (HD-5) — 1,500 1/min / 50 Hz

	Type	Pel (kW)[3]	ηel (%)[3]	Pth (kW)[4]	ηth (%)[4]	ηtot (%)
NOx < 250 mg/Nm³[5]	J312F	472	40.2	556	47.4	87.6
	J316F	630	39.8	758	47.9	87.7
	J320F	792	40.0	947	47.9	87.9

[3] Technical data according to ISO 3046
[4] Total heat output with tolerance at +/- 8% exhaust gas outlet temperature 180°C
All data according to full load and subject to technical development and modification.
Further engine versions available on request.
[5] @ 5%O_2 dry exhaust

WEIGHTS AND DIMENSIONS

Configuration	V 70°
Bore (mm)	135
Stroke (mm)	170
Displacement / cylinder (lit)	2.43
Speed (rpm)	1,500 (50 Hz)
Mean piston speed (m/s)	8.5 (1,500 1/min)
Scope of supply	Generator set, cogeneration system, generator set / cogeneration in container
Applicable gas types	Natural gas, flare gas, propane, biogas, landfill gas, sewage gas. special gases (e.g., coal mine gas, coke gas, wood gas, pyrolysis gas)

	J312	J316	J320
Engine type			
No. of cylinders	12	16	20
Total displacement (lit)	29.2	38.9	48.7

		Dimensions l x w x h (mm)
Generator set	J312	4,900 x 1,800 x 2,300
	J316	5,200 x 1,800 x 2,300
	J320	5,700 x 1,700 x 2,300
Cogeneration system	J312	4,900 x 2,300 x 2,300
	J316	5,300 x 2,300 x 2,300
	J320	5,700 x 1,900 x 2,300
Container	J312	12,200 x 2,500 x 2,600
	J316	12,200 x 2,500 x 2,600
	J320	12,200 x 2,500 x 2,600

		Weights empty (kg)
Generator set	J312	8,100
	J316	10,100
	J320	13,900
Cogeneration system	J312	9,500
	J316	11,200
	J320	14,400

ready for H_2

Want a greener future?

Visit innio.com/hydrogen to learn more about INNIO's hydrogen solutions.

Zero-carbon H_2 operation tomorrow

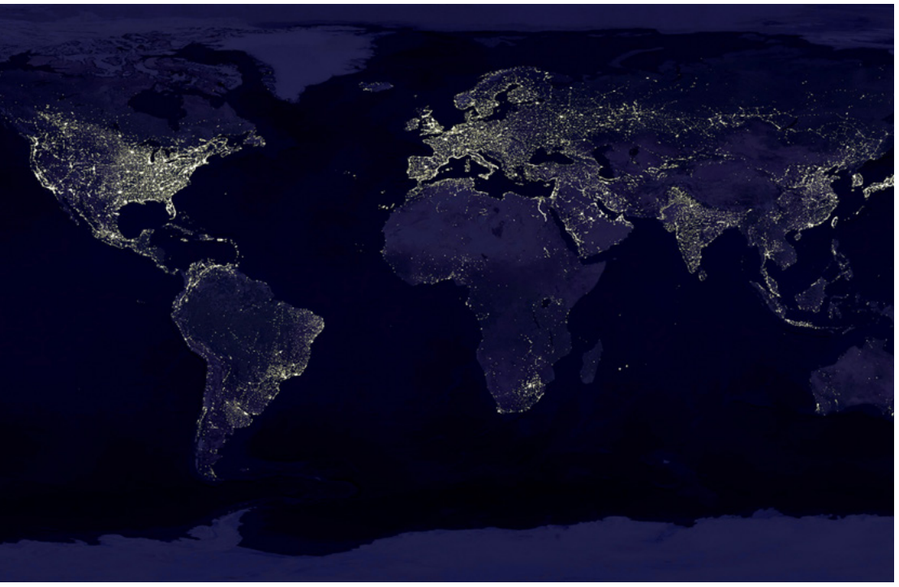
In addition, your INNIO equipment can be moved from conventional fuels today to H_2 operation tomorrow, once H_2 becomes more readily available.

OPERATIONAL EXPERIENCE

you can count on

Our next generation Type 3F technology delivers the established robustness and reliability you expect—with higher efficiency from your specific energy source.

Check out the following reference installations to learn more about the broad range of industrial, commercial, and municipal applications running efficiently on energy sources from pipeline gas to biogas to special gases such as sewage gas.



AIZ STRASS IM ZILLERTAL

Powering treatment plant with sewage gas

Strass im Zillertal
Austria

»After more than 80,000 operating hours with the existing Jenbacher Type 3 engine, we made the clear decision to again rely on Type 3 technology with the next generation 3F as the replacement. The exchange was simple and smooth.

Right from the start, the J312F delivered both power and heat with the same reliability as before, but with a clearly noticeable increase in efficiency. As a result, more power and heat can be made available for internal processes from the volume of gas produced. The new module thus plays an important role in reducing operating costs and the environmental footprint of our wastewater treatment plant.«

Christian Fimml, plant manager,
WWTP Achental-Inntal-Zillertal Strass

PLANT FACTS

Engines	1 x J312 F25
Energy source	Sewage gas
Electrical output	635 KW
Thermal output	709 KW

SOREMA

Less maintenance, better efficiency

»Our home textile company SOREMA, established in 1976, has reaffirmed our confidence in Jenbacher by replacing a J312 D05 container with this new generation J316 F02. We are continuing with the same type of maintenance contract coverage, but this time the main maintenance intervals were favorably extended to 40/80,000 operating hours.

We improved our electrical efficiency from 40.8% to 41.6% with this new 3F version, and at the same time the NO_x emissions were reduced by 50% to comply with the latest emissions requirements. The recoverable thermal power increased by 83 kW, improving our production of thermal energy, which is used in our dyeing process. The new version of the DIA.NE XT4 HMI remote control program is more developed, allowing better engine performance control.«

André Relvas, director,
SOREMA – Portugal

PLANT FACTS

Engines	1 x J316 F02
Energy source	Pipeline gas
Electrical output	780 KW
Thermal output	456 KW
Electrical efficiency	41.6%

BGA MINDEROFFINGEN I

Lower operating costs

»For decades we have been relying on the Jenbacher Type 3 engines. Pairing its robustness and reliability with a higher efficiency, means that we can supply heat and power at lower operating costs.«

Petra Huggenberger, CEO
Bioenergie Minderoffingen

PLANT FACTS

Engines	1 x J312 F225
Energy source	Biogas
Electrical output	550 KW
Thermal output	530 KW

BGA WECHINGEN I

Efficiency key to upgrade

PLANT FACTS

Engines	1 x J316 F225
Energy source	Biogas
Electrical output	703 KW
Thermal output (cooling)	442 KW

»Since 2005 we have relied on the Jenbacher Type 3 engine platform. The reliability and robustness are outstanding, so we have decided to go for the 3F upgrade for an efficiency boost.«

Nexhip Balkaj, biogas plant manager,
Energie TG Wechingen GmbH

DOMINIKUS-RINGEISEN-WERK (DRW)

Improving profitability while reducing environmental footprint

PLANT FACTS

Engines	3 x J312 F05
Energy source	Pipeline gas
Electrical output	3 x 551 KW
Thermal output	3 x 695 KW

Find out more about our solution from Thomas Roth in person

»We have been relying on Jenbacher Type 3 engines since 2000. Based on the positive experience with the upgrade of the first engine to the new 3F generation model in 2020, it was an easy decision for us to implement the upgrade with the second and the third engine because they always operate reliably.

Thanks to the improved fuel usage of the modern 3F generation engine, we have been able to do both – increase our profitability and reduce our environmental footprint.«

Thomas Roth, head of power and engineering
Dominikus-Ringeisen-Werk (church foundation under public law)

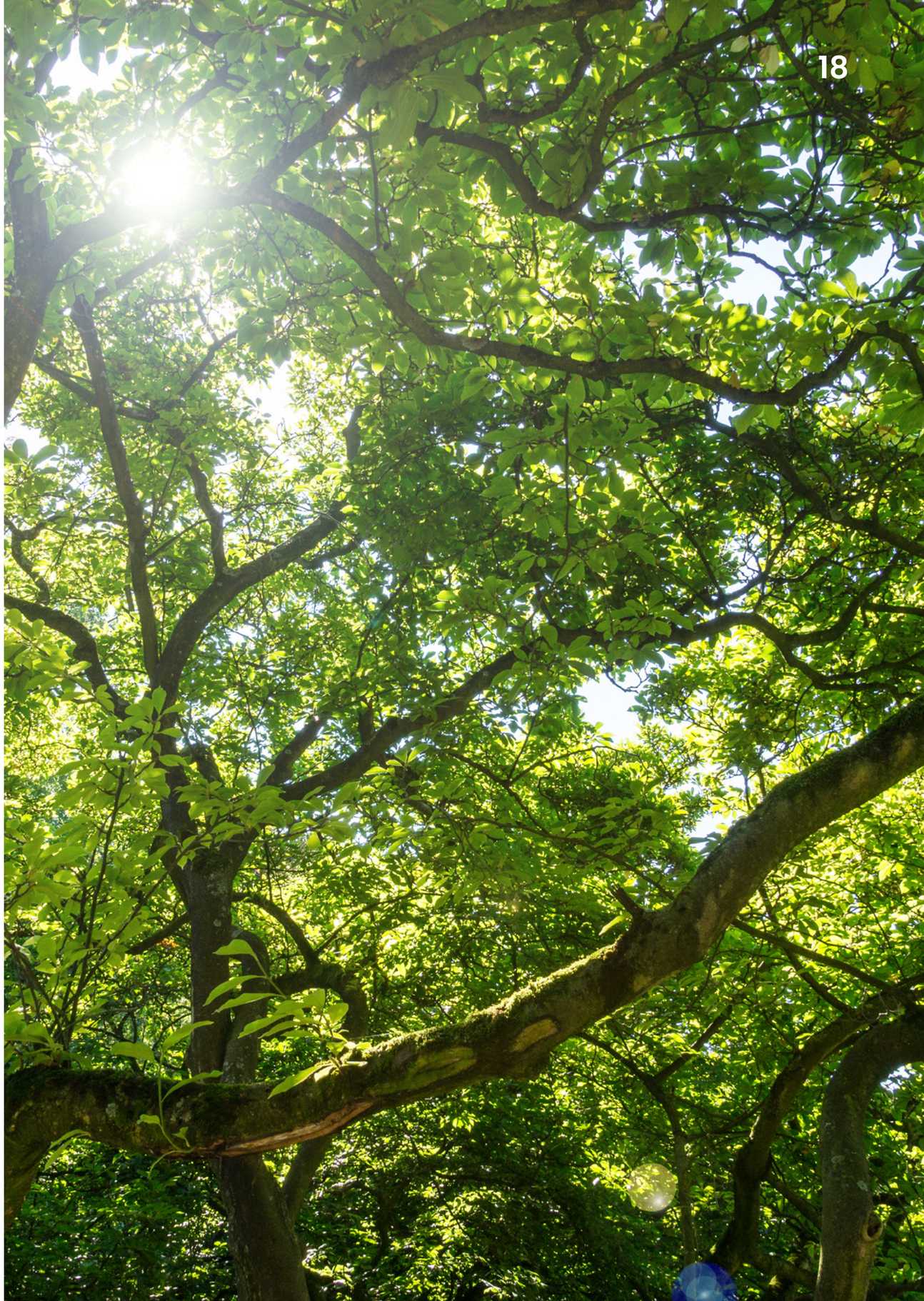
INTERESTED?

INNIO is ready to position you for a greener tomorrow.

Get your individual energy concept now.

Reach out today by completing the contact form online: innio.com/contact

Our Sales contact will follow up with you.



INNIO is a leading energy solution and service provider that empowers industries and communities to make sustainable energy work today. With our product brands Jenbacher and Waukesha and our digital platform myPlant, INNIO offers innovative solutions for the power generation and compression segments that help industries and communities generate and manage energy sustainably while navigating the fast-changing landscape of traditional and green energy sources. We are individual in scope, but global in scale. With our flexible, scalable, and resilient energy solutions and services, we are enabling our customers to manage the energy transition along the energy value chain wherever they are in their transition journey.

INNIO is headquartered in Jenbach (Austria), with other primary operations in Waukesha (Wisconsin, U.S.) and Welland (Ontario, Canada). A team of more than 3,500 experts provides life-cycle support to the more than 54,000 delivered engines globally through a service network in more than 80 countries.

INNIO's ESG Risk Rating places it number one of more than 500 worldwide companies in the machinery industry assessed by Sustainalytics.

For more information, visit INNIO's website at **www.innio.com**

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ENERGY SOLUTIONS.
EVERYWHERE, EVERY TIME.

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