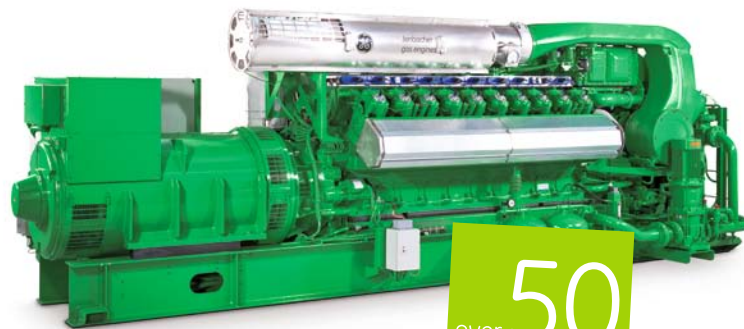


# Jenbacher type 4

The new 4B version



over **50**  
years of power  
Jenbacher gas engines

## an efficiency milestone

Based on the proven design concepts of types 3 and 6, the modern type 4 engines in the 800 to 1,500 kW power range are characterized by a high power density and outstanding efficiency. The optimized control and monitoring provides easy preventive maintenance and maximum reliability and availability.

## reference installations

### model, plant

### key technical data

**J416 GS**  
**Richard van Schie,**  
**Greenhouses Facility;**  
**Monster, The**  
**Netherlands**

Fuel..... Natural gas  
Engine type..... 2 x JMS 416 GS-N  
Electrical output..... 2,260 kW  
Thermal output..... 2,806 kW  
Commissioning ... September 2004 (1<sup>st</sup> engine),  
July 2007 (2<sup>nd</sup> engine)

### description

At this greenhouse facility, the Jenbacher cogeneration system provides power for artificial lighting, heating and CO<sub>2</sub> to increase the chrysanthemum production capabilities. The CO<sub>2</sub> produced from the engine's exhaust gas is used for the fertilization of the greenhouses, whereas the operator gains additional economic benefit due to the supply of the generated electricity to the local grid.



**J420 GS**  
**Landfill site**  
**Bootham Lane;**  
**Doncaster, UK**

Fuel..... Landfill gas  
Engine type..... 2 x JGC 420 GS-L.L  
Electrical output..... 2,666 kW  
Commissioning ..... May 2001 (1<sup>st</sup> engine),  
December 2002 (2<sup>nd</sup> engine)

At this site, the methane content of the landfill gas can drop as low as 35%. The fluctuations in the methane content can be handled easily by the Jenbacher engines due to the patented LEANOX® lean mixture combustion system. Thus these variations do not cause any reduction in the high output level of our power systems. The installation is operated by United Utilities Green Energy Limited.



**J420 GS**  
**Hospital;**  
**Padua, Italy**

Fuel..... Natural gas  
Engine type..... 2 x JMS 420 GS-N.LC  
Electrical output..... 2,832 kW  
Thermal output..... 2,576 kW  
Commissioning..... February 2002 (1<sup>st</sup> engine),  
October 2003 (2<sup>nd</sup> engine)

Two Jenbacher cogeneration systems help the Padua hospital to control its energy costs by providing power and heat at high efficiency levels. The electrical efficiency of each engine is 42.3%.



**J420 GS**  
**Containerized**  
**solution**  
**Biogas plant SBR;**  
**Kogel, Germany**

Fuel..... Biogas  
Engine type..... 1 x JMC 420 GS-B.L  
Electrical output..... 1,413 kW  
Thermal output..... 751 kW  
Steam production..... 1,037 kg/h at 3 bar  
or 698 kW output  
Commissioning..... October 2003

This biogas plant utilizes leftover food from hospitals, hotels and canteens as well as organic residual waste from the food industry for producing biogas that fuels our gas engine. The electricity generated is entirely fed into the public grid, and the exhaust gas from the engine is used for steam production. The steam serves for the pasteurization of the waste, which can then be used as sterilized fertilizer.



# technical features

feature	description	advantages
<b>Heat recovery</b>	Flexible arrangement of heat exchanger, two stage oil plate heat exchanger on demand	- Maximum thermal efficiency, even at high and fluctuating return temperatures
<b>TecJet™ gas dosing valve</b>	Electronically controlled gas dosing valve with high degree of control accuracy	- Very quick response time - Rapid adjustment of air/gas ratio - Large adjustable calorific value range
<b>Four-valve cylinder head</b>	Optimized swirl and channel geometry using advanced calculation and simulation methods (CFD)	- Minimized charge-exchange losses - Central spark-plug position resulting in optimal cooling and combustion conditions
<b>Crack connecting rod</b>	Applying a technology – tried and tested in the automotive industry – in our powerful stationary engines	- High dimensional stability and accuracy - Reduced connecting rod bearing wear - Easy to maintain

## technical data

Configuration	V 70°			<b>Dimensions l x w x h (mm)</b>			
Bore (mm)	145			Generator set	J412 GS	5,400 x 1,800 x 2,200	
Stroke (mm)	185				J416 GS	6,200 x 1,800 x 2,200	
Displacement/cylinder (lit)	3.06				J420 GS	7,100 x 1,900 x 2,200	
Speed (rpm)	1,800 / 1,200 (60 Hz) 1,500 (50 Hz)			Cogeneration system	J412 GS	6,000 x 1,800 x 2,200	
Mean piston speed (m/s)	7.4 (1,200 rpm) 9.3 (1,500 rpm)				J416 GS	6,700 x 1,800 x 2,200	
Scope of supply	Generator set, cogeneration system, generator set/cogeneration in container				J420 GS	7,100 x 1,800 x 2,200	
Applicable gas types	Natural gas, flare gas, biogas, landfill gas, sewage gas. Special gases (e.g., coal mine gas, coke gas, wood gas, pyrolysis gas)			Container	J412 GS	12,200 x 3,000 x 2,600	
Engine type	J412 GS	J416 GS	J420 GS		J416 GS	12,200 x 3,000 x 2,600	
No. of cylinders	12	16	20		J420 GS	12,200 x 3,000 x 2,600	
Total displacement (lit)	36.7	48.9	61.1	<b>Weights empty (kg)</b>			
				Generator set	J412 GS	J416 GS	J420 GS
				Cogeneration system	10,900	12,500	14,400
				Container (generator set)	11,500	13,100	15,000
				Container (generator set)	28,200	30,300	35,600
				Container (cogeneration)	28,800	30,900	35,000

## outputs and efficiencies

Natural gas		1,500 rpm   50 Hz					1,800 rpm   60 Hz					1,200 rpm   60 Hz				
NOx <	Type	Pel (kW) <sup>2</sup>	ηel (%)	Pth (kW)	ηth (%)	ηtot (%)	Pel (kW) <sup>2</sup>	ηel (%)	Pth (kW)	ηth (%)	ηtot (%)	Pel (kW) <sup>2</sup>	ηel (%)	Pth (kW)	ηth (%)	ηtot (%)
500 mg/m <sup>3</sup> <sub>N</sub>	412	889	42.8	901	43.4	86.2	852	41.2	949	45.9	87.2	634	41.8	657	43.3	85.1
	416	1,189	43.0	1,201	43.4	86.3	1,132	41.1	1,265	45.9	87.0	850	42.0	876	43.3	85.4
	420	1,487	43.0	1,502	43.4	86.4	1,421	41.3	1,582	45.9	87.2	1,063	42.0	1,094	43.3	85.3
250 mg/m <sup>3</sup> <sub>N</sub>	412	889	42.1	934	44.2	86.2	852	40.1	985	46.3	86.4					
	416	1,189	42.1	1,247	44.2	86.4	1,132	39.9	1,312	46.3	86.2					
	420	1,487	42.2	1,558	44.2	86.4	1,421	40.1	1,641	46.3	86.4					
350 mg/m <sup>3</sup> <sub>N</sub>	412	889	41.5	963	45.0	86.5						599	41.1	639	43.9	85.0
	416	1,189	41.6	1,283	44.9	86.6						799	41.1	851	43.8	85.0
	420	1,487	41.7	1,604	44.9	86.6						1,004	41.4	1,065	43.9	85.2

Biogas		1,500 rpm   50 Hz					1,800 rpm   60 Hz				
NOx <	Type	Pel (kW) <sup>2</sup>	ηel (%)	Pth (kW)	ηth (%)	ηtot (%)	Pel (kW) <sup>2</sup>	ηel (%)	Pth (kW)	ηth (%)	ηtot (%)
500 mg/m <sup>3</sup> <sub>N</sub>	412	889	42.0	883	41.7	83.8	852	40.1	918	43.2	83.4
	416	999	42.0	1,007	42.3	84.3					
	416	1,189	42.1	1,177	41.7	83.9	1,132	40.0	1,224	43.3	83.3
	420	1,487	42.2	1,472	41.7	83.9	1,426	40.3	1,530	43.3	83.6
250 mg/m <sup>3</sup> <sub>N</sub>	412	889	41.6	895	41.9	83.5	853	39.3	949	43.7	82.9
	416	1,189	41.7	1,194	41.9	83.7	1,132	39.1	1,266	43.7	82.8
	420	1,487	41.8	1,493	41.9	83.7	1,421	40.2	1,530	43.2	83.4

2) Total heat output with a tolerance of +/- 8%, exhaust gas outlet temperature 120°C, for biogas exhaust gas outlet temperature 180°C  
All data according to full load and subject to technical development and modification.