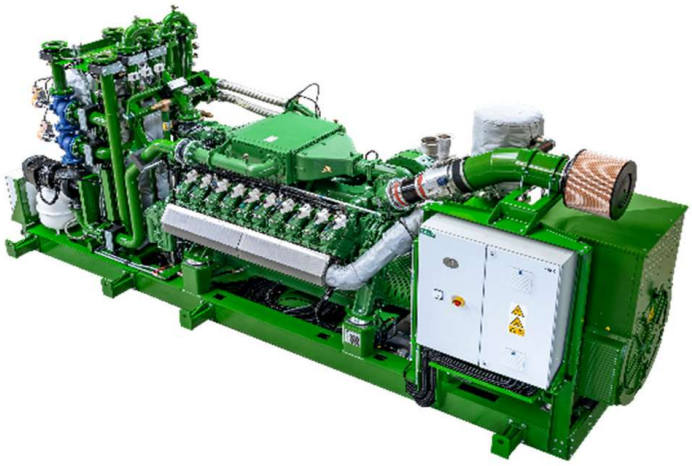
White Harvest
ENERGY

TECHNICAL SPECIFICATION

avus 1000plus NG

ctw70-B-0 | 1,100 kW Combined Heat and Power Module



Design example

AT A GLANCE

Application	**Combined heat and power**
Electrical output	**1,100 kW**
Useful thermal output	**4,363 MBTU/hr**
Electrical service	**480 V / 60 Hz**
Fuel	**Natural gas, Hi = 990.37 BTU/ft³**
Methane number	**MN 80 / min. 70**
NOx	**< 1 g/BHP-h**
Electrical efficiency	**41.0 %**
Total efficiency	**88.6 %**
Reference conditions	**DIN ISO 3046-1**

Manufacturer technical data

Prepared and issued by White Harvest Energy, an authorized 2G Energy sales distributor and service provider. Equipment data is 2G Energy manufacturer data and is subject to project-specific engineering and technical revision. Performance figures apply at the stated reference conditions and are subject to project-specific derating. Source document: 2G Doc.-ID 5305302, Rev. O (06.07.2026).

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CONTENTS

1 Basic data ... 3
1.1 Performance data ... 3
1.2 Exhaust gas * and sound emissions ... 3
1.3 Engine ... 3
1.4 Generator ... 4
2 Mixture composition ... 5
2.1 Combustion air ... 5
2.2 Fuel ... 5
3 Integrated heat extraction ... 5
3.1 Heating circuit ... 5
3.2 Engine circuit ... 5
3.3 Low temperature mixture cooling circuit (LT) ... 6
4 Exhaust system ... 6
5 Ventilation ... 7
6 Operating materials ... 7
7 Electronics and software ... 7
8 Interfaces ... 8
8.1 Dimensions and weights ... 8
8.2 Water and gas interfaces ... 8
8.3 Electrical connections and utility interface ... 9
8.4 Data interfaces ... 9
9 Technical framework ... 9
9.1 Standard reference conditions ... 9
9.2 Derating ... 9
9.3 Notes ... 10

1 Basic data

1.1 Performance data

Parameter	100 %	75 %	50 %	Unit
Electrical output ****	**1,100**	**825**	**550**	kW
Useful thermal output	**4,363**	**3,372**	**2,460**	MBTU/hr (2)
Energy input	**9,156**	**7,044**	**5,010**	MBTU/hr (1)
Electrical efficiency	**41.0**	**40.0**	**37.5**	%
Thermal efficiency	**47.7**	**47.9**	**49.1**	%
Total efficiency	**88.6**	**87.8**	**86.6**	%
Power-to-heat ratio	**0.86**	**0.83**	**0.76**	
Min. approved power el. abs. ****		**275**		kW

Notes

**** Part-load operation specifications: see 2G technical advisory TA-008.

1.2 Exhaust gas * and sound emissions

Emissions and noise	Value	Unit
NOx with catalytic converter	**< 1**	g/BHP-h
NOx without catalytic converter	**< 1**	g/BHP-h
NOx (energy-specific, without catalyst)	**< 1.3**	g/kWh
CO with catalytic converter	**< 0.4**	g/BHP-h
CO without catalytic converter	**< 1.9**	g/BHP-h
HCHO with catalytic converter	**< 14.9**	ppm (4), (6)
HCHO without catalytic converter	**n.a.**	ppm (4), (6)
Engine surface noise **	**113**	dB(A) (7)
Engine surface noise with soundproof encapsulation ***	**—**	dB(A) (7)
Exhaust outlet noise **	**126**	dB (7)

Notes

* With the appropriate catalyst configuration. When an SCR system is used, refer to the separate SCR data sheet.

** Total sound power level at engine operation at full load according to DIN EN ISO 3746.

*** Mean sound pressure level at a distance of 1 m (3.3 ft) under free-field conditions according to DIN 45635. Increased noise exposure is to be expected where combustion air is drawn from the installation room.

1.3 Engine

Engine	Value	Unit
Engine manufacturer	**2G**	
Engine type	**agenitor 420**	
Model / cylinders	**V / 20**	

Engine	Value	Unit
Mode of operation	**4-stroke**	
Combustion process	**λ > 1**	
Engine displacement	**2,722**	in³
Bore / stroke	**5.12 / 6.61**	in
Rated speed	**1,800**	1/min
ISO coefficient of performance (mech.)	**1,530**	hp
Compression ratio	**13.5 : 1**	
Mean effective pressure	**247.4**	psi
Mean piston speed	**33.1**	ft/s
Flywheel body	**SAE 0**	
Direction of flywheel rotation	**Left**	
Number of crown gear teeth	**60**	
Dry engine weight	**9,513**	lbs
Mixture cooling system	**122**	°F

1.4 Generator

Generator	Value	Unit
Manufacturer	**Leroy-Somer**	
Type	**LSA 50.2 L7 / 4P**	
Generator type	**Synchronous, directly coupled**	
Automatic voltage regulator (AVR)	**D550**	
Rated engine speed	**1,800**	1/min
Frequency	**60**	Hz
Mechanical input power	**1,141**	kW
Effective electrical output	**1,100**	kW (5)
Apparent electrical output (cos φ 1 / 0.8)	**1,100 / 1,375**	kVA
Rated generator current (cos φ 1 / 0.8)	**1,323 / 1,654**	A
Rated generator voltage (± 10 %)	**480**	V
Subtransient reactance X"ds saturated / X"d unsaturated	**12.6 / 14.8**	%
Short-circuit current Ik"3	**12.84**	kA
Power factor cos φ (inductive / capacitive)	**0.8 / 0.95**	
Generator protection relay circuit breaker	**—**	A
Efficiency (full load at cos φ 1)	**96.4**	%
Moment of inertia	**—**	lb · ft²
Max. ambient temperature	**104**	°F

Generator	Value	Unit
Stator coupling	**Star (wye)**	
Protection class	**IP23**	
Generator weight	**—**	lbs
Power factor correction	**Not available**	
Engine startup	**Not available**	

2 Mixture composition

2.1 Combustion air

Combustion air	Value	Unit
Combustion air mass flow rate	**13,034**	lbs/hr
Combustion air volume flow rate (77 °F / 14.69 psi)	**2,938**	SCFM

2.2 Fuel

Fuel requirements according to 2G technical advisory TA-004 Gas.

Fuel	Value	Unit
Reference methane number / minimum methane number	**80 / 70**	
Fuel mass flow rate	**463.2**	lbs/hr
Fuel volume flow rate	**154.1**	SCFM [6]
Min. gas flow pressure at rated load *	**0.29**	psig
Max. gas flow pressure at rated load *	**3.63**	psig
Gas train safety pressure	**7.25**	psig

Notes

* At gas train inlet.

3 Integrated heat extraction

3.1 Heating circuit

Heating water requirements according to 2G technical advisory TA-002 Heating circuit.

Heating circuit	Value	Unit
Heating water volume flow rate (delta T = 20 K / 36 °F)	**248.5**	gpm
Heating water return temperature (max.) *	**158**	°F
Heating water supply temperature (max.) **	**194**	°F [8]
Safety valve	**87**	psi
Min. operating pressure	**15**	psi
Internal pressure drop in heating circuit *	**4**	psig
Approx. pressure reserve *	**7**	psig

3.2 Engine circuit

Coolant requirements according to 2G technical advisory TA-001 Coolant.

Engine circuit	Value	Unit
Jacket water heat (engine)	**1,710**	MBTU/hr (2)
Engine cooling water inlet temperature (min.)	**176**	°F
Engine cooling water outlet temperature (max.)	**194**	°F
Max. inlet / outlet difference	**6 K (10.8 °F)**	
Recirculated engine cooling water volume (min.)	**373.5**	gpm
Total recirculated cooling water volume	**373.5**	gpm
Maximum pressure at engine outlet	**51**	psi
Minimal pressure at engine outlet	**15**	psi
Safety valve	**43.5**	psi
Approx. heat dump circuit pressure reserve (optional) *	**4**	psig
Safety temperature limiter	**230**	°F
Mixture heat from high temperature circuit (HT)	**747**	MBTU/hr (2)
Mixture coolant inlet temperature HT (max.)	**180**	°F
Recirculated coolant volume HT mixture (min.)	**373.5**	gpm

3.3 Low temperature mixture cooling circuit (LT)

Coolant requirements according to 2G technical advisory TA-001 Coolant.

LT mixture cooling circuit	Value	Unit
Mixture heat LT	**222.1**	MBTU/hr (2)
Mixture coolant inlet temperature LT	**100.4 / 127.4**	°F
Mixture coolant outlet temperature LT	**105.8 / 132.8**	°F
Recirculated coolant volume LT mixture (min.)	**89.7**	gpm
Safety valve	**43.5**	psi
Min. operating pressure	**14.5**	psi
Approx. pressure reserve *	**7**	psig

Notes

* From / to module interface.

** Dependent on the design of the heating circuit pump group; the stated value applies to a pump group designed by 2G. Heating water supply temperature in part-load operation is limited to 90 °C (194 °F).

Two LT mixture coolant temperature levels are published. The applicable pair is fixed by the project heat rejection design and must be confirmed before equipment selection.

4 Exhaust system

Exhaust system	Value	Unit
Exhaust gas temperature after turbine	**780**	°F

Exhaust system	Value	Unit
Exhaust gas temperature after exhaust gas heat exchanger	**248**	°F (3)
Exhaust gas heat	**1,906**	MBTU/hr (2)
Damp exhaust gas volume flow rate	**2,833**	SCFM (6)
Dry exhaust gas volume flow rate	**2,542**	SCFM (6)
Damp exhaust gas mass flow rate	**13,497**	lbs/hr
Dry exhaust gas mass flow rate	**12,564**	lbs/hr
Max. exhaust backpressure after turbocharger	**1**	psig
Approx. pressure reserve (with catalytic converter) *	**—**	psig

Notes

* From module interface. Exhaust gas heat exchanger and catalytic converter in standard version and in new condition.

5 Ventilation

Ventilation	Value	Unit
Radiant module heat (approx.)	**293.44**	MBTU/hr (2)
Min. supply air flow rate (delta t = 10 K / 18 °F)	**15,311**	SCFM

6 Operating materials

Lubricating oil approvals according to 2G technical advisory TA-003 Lubricating oil; coolant approvals according to TA-001 Coolant.

Operating materials	Value	Unit
Lubricating oil consumption (avg. / max.)	**0.05 / 0.2**	g/kWh
Engine oil capacity (max.)	**44.9**	gallons
Lubricating oil refill tank capacity (optional)	**51.5**	gallons
Lubricating oil system with auxiliary tank (optional)	**51.5**	gallons
Approx. engine circuit coolant capacity (module)	**—**	gallons
Approx. LT mixture cooling circuit coolant capacity (module)	**13.2**	gallons

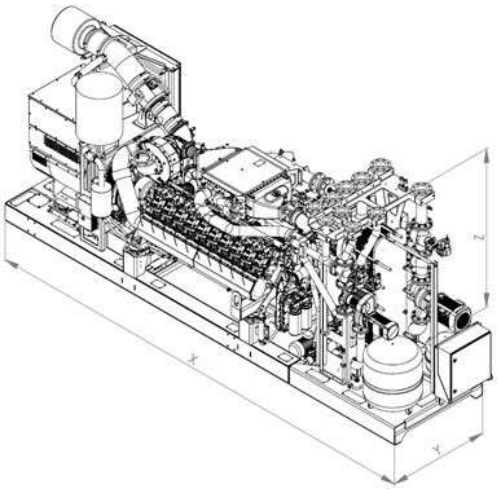
7 Electronics and software

Controls	Value	Unit
Power system protection device	**Bachmann GSP**	
Power system protection software status	**> 13466**	
Touch screen	**10**	in
Control cabinet protection class	**NEMA Type 12**	
Power distribution cabinet protection class	**NEMA Type 1**	
Ambient temperature of control cabinets	**32 – 95**	°F

Controls	Value	Unit
Relative humidity of control cabinets (max.)	**65**	%

8 Interfaces

8.1 Dimensions and weights



Design example — module envelope, dimensions X / Y / Z

Dimensions and weights	Value	Unit
Module length *	**X — 248**	in
Module width *	**Y — 66**	in
Module height *	**Z — 94**	in
Module weight (without operating materials)	**25,353**	lbs
Module weight with soundproof encapsulation (optional)	**—**	lbs
Powder-coated frame	**RAL 6002**	
Control cabinet width	**31**	in
Control cabinet depth	**24**	in
Control cabinet height	**79**	in
Control cabinet weight	**441**	lbs
Powder-coated control cabinet	**RAL 7035**	
Power distribution cabinet width	**24**	in
Power distribution cabinet depth	**20**	in
Power distribution cabinet height	**79**	in
Power distribution cabinet weight	**331**	lbs
Powder-coated power distribution cabinet	**RAL 7035**	

Notes

* Dimensions subject to change. Refer to the project interface drawing for exact values.

8.2 Water and gas interfaces

Water and gas interfaces	Value	Unit
Gas interface	**80 / 10**	DN / PN
Exhaust gas interface	**—**	DN
Heating circuit interface	**100 / 16**	DN / PN
Heat dump circuit interface	**100 / 16**	DN / PN
LT mixture cooling circuit interface	**80 / 16**	DN / PN

Notes

US equivalents: DN 80 ≈ NPS 3; DN 100 ≈ NPS 4. PN 10 ≈ 150 psi; PN 16 ≈ 232 psi. Flange drilling is metric unless adapters are specified.

8.3 Electrical connections and utility interface

Electrical interface	Value	Unit
Grid connection with pre-fuse (provided by customer)	**480 V / 60 Hz**	
Electricity network system	**Wye (Y)**	
Short-circuit current rating Icc (max.)	**50**	kA

8.4 Data interfaces

Data interfaces	Value
Remote maintenance access (optional) *	**DSL / UMTS (SIM)**
Interfaces / data interfaces (optional)	**Profibus DP · Profinet IO · Modbus RTU · Modbus TCP · Ethernet/IP · hardware signals**
Virtual power plant access (optional)	**Possible after technical clarification (bus systems or hardware signals)**

Notes

* Remote maintenance access must be provided by the customer.

9 Technical framework

Unless otherwise indicated, all data refer to engine operation at full load at the respective media temperatures and apply subject to technical innovations.

The electrical output is based on the generator output measured at the generator terminals. All output and efficiency specifications are therefore gross values.

The fuel gas quality must meet the requirements of 2G technical advisory TA-004 Gas. The equipment and peripheral systems must be configured according to the 2G technical manuals.

9.1 Standard reference conditions

Standard reference conditions according to DIN ISO 3046-1.

Reference conditions	Value	Unit
Air pressure	**14.5**	psi
Air temperature	**77**	°F
Relative humidity	**30**	%

9.2 Derating

Power reduction due to installation at an altitude above 300 m (984 ft) above sea level and/or a combustion air intake temperature above 40 °C (104 °F) shall be determined specifically for each project according to 2G technical information TI-049 Load reduction.

9.3 Notes

Ref.	Note
(1)	Reference conditions according to DIN ISO 3046-1. At nominal output, the specific fuel consumption tolerance amounts to + 5 %. Efficiency data is based on an engine in new condition. The decrease in efficiency throughout the service life is reduced by adhering to the maintenance guidelines.
(2)	At nominal output, the useful thermal output tolerance amounts to ± 8 %.
(3)	Specifications based on new condition. The exhaust gas temperature tolerance amounts to ± 8 %.
(4)	In reference to a residual oxygen content in the exhaust gas of 5 %.
(5)	Electrical output at the generator terminals at cos φ = 1.
(6)	Volume specifications in standard condition: pressure 14.69 psi, temperature 32 °F.
(7)	Reproducibility standard deviation of 4 dB according to DIN EN ISO 3746.
(8)	The heating water supply temperature tolerance amounts to ± 2 °C (± 3.6 °F).