500kW-2MW Gas Engine

500kW-2MW Gas Engine

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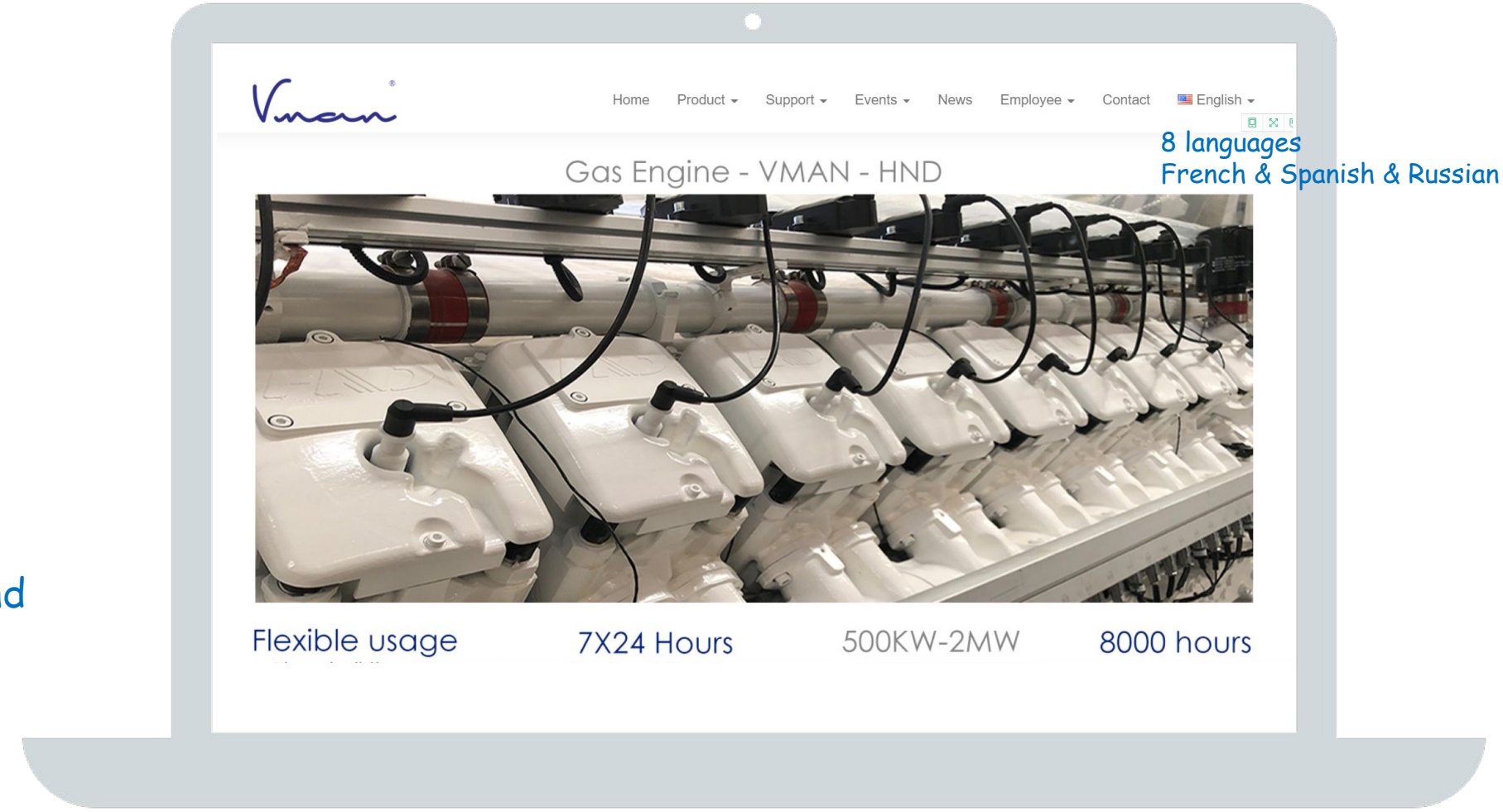
- Good support
- Growing sales and popularity



8 languages
French & Spanish & Russian

Gas Engine Business

2018

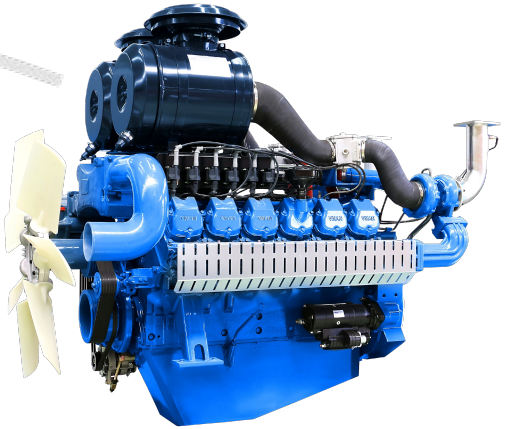
Starting cooperate with Poland factory develop gas engine lower than 500kW

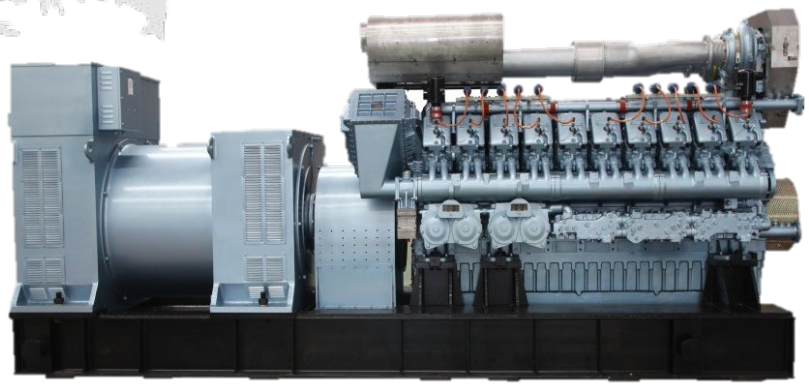
2019

As exclusive distributor of HND gas engine &gas generator set in global market

2020-2021

Fully push gas project in global market





Gas Products

Gas Engine

- HND Gas Engine — 500kW-2000kW
- VMAN Gas Engine — 175kW-500kW

8000 hours Warranty

First major overhaul : 64,000 hours

Product design life: 20 years

Lower Exhaust NOx

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He nan Luoyang	488,000 m2
Employees More than 1800	Fund 2600, 000, 000

CSSC – HND Gas Engine

- HND is Chinese government engines manufactory.
- HND is a member of China State Shipbuilding Corporation Limited (CSSC).
- HND is research and manufacturing base of big power diesel engines and gas engine & gas generator in China.
- HND is the supplier for Chinese military, before haven't export to global market.
- From the year of 2019, HND began to cooperate with VMAN engine for export business, that's means VMAN engine is exclusive distributor of HND gas power products in the global market.

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Dec.1958

The HND was founded in 1958

Dec.1985

licensed import
technology from DEUTZ-MWM Company (Germany)

started produced MWM 234 series engines,MWM 604 series engines and TBD620 series engines.

Dec.1998

Get the certification of ISO 9001 and GJB/Z9001 (Chinese Military Quality System Standard)

Dec.2001

Localization 60% parts of the TBD620V12

Dec.2006

Researched and developed gas engines with its own intellectual property
,which technology on the basis of the MWM TBD620 diesel engine.

2013

Finish all series gas engines

Products contain CHG620L6, CHG620V8, CHG620V12,CHG620V16 and CHG622V20, 5 series gas engines, its power range from 500kW to 2000kW.

Productive technology

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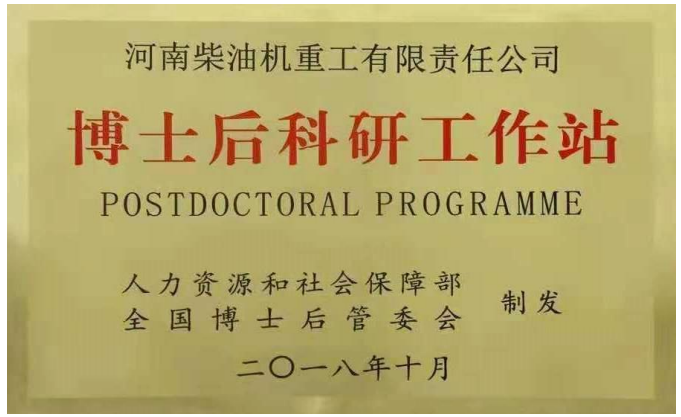
Manufacture

1. With AutoCAD, Pro/E, AVL BOOST combustion analysis Software during the R&D stage;
2. Also have combustion tester machine, detonation pressure tester machine, and Smokey analysis tester machine ,etc..



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National enterprise postdoctoral program

8 patents for invention & many appearance patents

Famous Marine Engine

HND company is the biggest and best manufactory for Chinese Navy Ships

High speed and power diesel engines occupy more than 90% market of Chinese Navy Ships

Exported Russian military market through government purchasing.

Now also very famous in Russian market.

HND Gas Engine

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HND Gas Engine on the basis of the licensed technology from MWM Company (Germany) , started produced MWM 234 series diesel engines which type V6, V8 and V12, MWM604BL6 series diesel engines and TBD620 series V8, V12 and V16 diesel engines. In 2007,HND obtained the license of manufacturing L16/24 and L21/31 engines from MAN B&W Co., and start mass production in 2008. At present, diesel engine power range from 110kW to 2336kW.

Engine Model	Engiine output power	Electrical power (natural gas)	Electrical power (marsh gas)	Cylinder number	Bore x stroke (mm)	Displace ment (L)	Electrical efficiency	Thermal efficiency	Max.oil consumption (g/kWh)
CHG620L6	540kW	500kW	450kW	L6	170x195	26.56	35.0%	42.0%	0.5
CHG620V8	740KW	700kW	630kW	V8	170x195	35.4	36.8%	42.0%	0.5
CHG620V12	1100kW	1000kW	900kW	V12	170x195	53.1	37.0%	43.0%	0.5
CHG622V16	1600kW	1500kW	1275kW	V16	170 x 215	78.08	37.0%	43.0%	0.5
CHG622V20	2200kW	2000kW	1700kW	V20	170x215	97.6	38.0%	43.0%	0.5

In 2005, HND company researched and developed gas engines with its own intellectual property which technology on the basis of the MWM TBD620 diesel engine. Now which products contain CHG620L6, CHG620V8, CHG620V12,CHG620V16 and CHG622V20, 5 series gas engines, gas engines power range from 550kW to 2000kW and gas generator power range from 500kW to 2000kW.

ITEM	UNIT	VALUE
Model		CHG622V16
Rated power	kW	1600
Heat loss	MJ/kWh	9.375
Quantity of cylinders	PCS	16
Cylinder bore	mm	170
Stroke	mm	215
Displacement	L	78.08
Speed	rpm	1500
Compression ratio		12:1
mean effective pressure	MPa	1.72
mean speed of piston	m/s	10.75
Oil quantity	m^3（kg）	280
Cooling water quantity	m^3（kg）	180
Dimension(L*W*H)	mm	3495×1535×2165
Dry weight	kg	7880
Weight with oil	kg	8200
Moment of inertia of an area(flywheel)	kgm^2	11.7
Direction of rotation		CCW(Look at the flywheel)
Fly wheel		SAE21
EMC		N（By VDE0857）
Starter	kW	2×13 @DC24V

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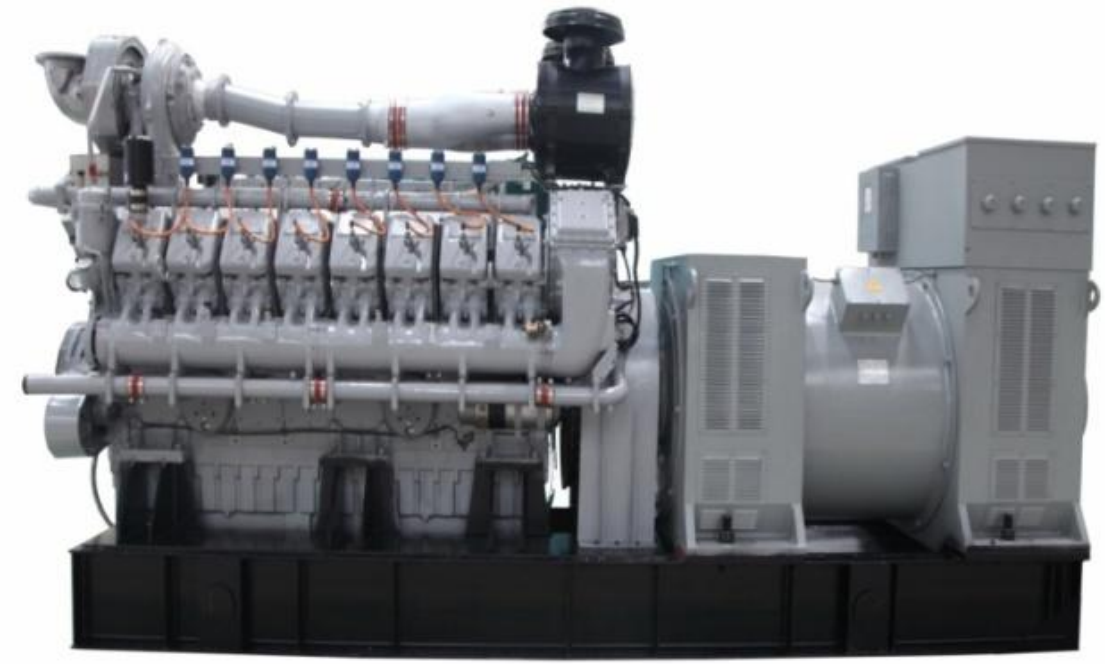
CHG622V16

Rated Power:1600kW



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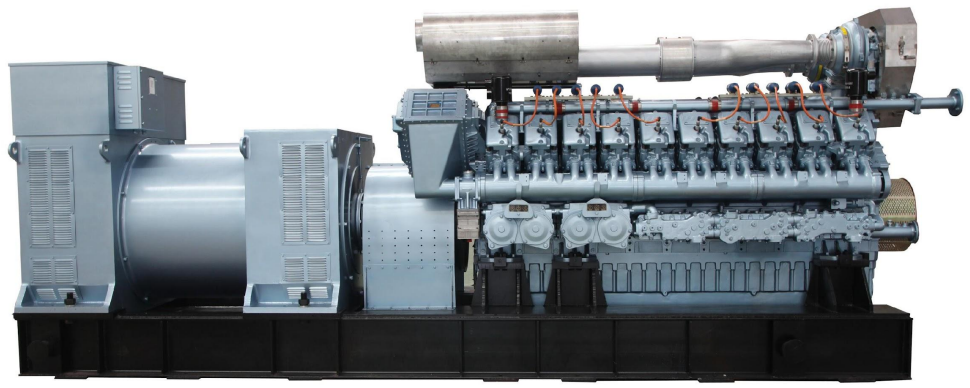

CHG622V20

Rated Power:2100kW

ITEM	UNIT	VALUE
Model		CHG622V20
Rated power	kW	2100
Heat loss	MJ/kWh	9.375
Quantity of cylinders	PCS	20
Cylinder bore	mm	170
Stroke	mm	215
Displacement	L	97.6
Speed	rpm	1500
Compression ratio		12:1
mean effective pressure	MPa	1.72
mean speed of piston	m/s	10.75
Oil quantity	m^3(kg)	330
Cooling water quantity	m^3(kg)	220
Dimension(L*W*H)	mm	3860×1600×2400
Dry weight	kg	8800
Weight with oil	kg	9200
Moment of inertia of an area(flywheel)	kgm^2	11.7
Direction of rotation		CCW(Look at the flywheel)
Fly wheel		SAE21
EMC		N（By VDE0857）
Starter	kW	2×13 @DC24V

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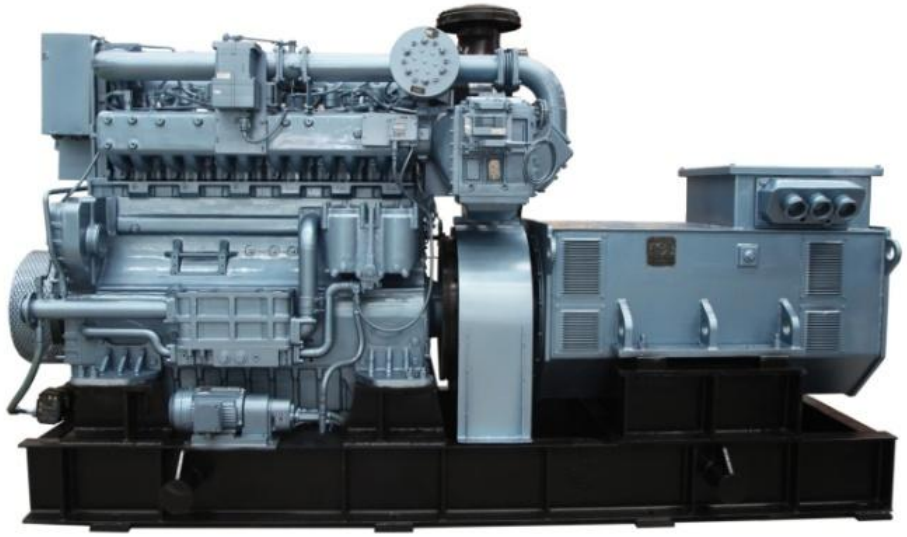

Gas generator set type	P500GF
Gas engine type	CHG620L6
Rated Power（kW）	500
Frequency(Hz)	50
Bore/stroke (mm)	170/195
Displacement(dm^3)	26.56
CNG consumption（kJ/kW·h)	9473
Therma power cooling system（kW）	254
Therma power of the exhaust（kW）	342
Dimension（L*W*H）	4055×1406×2400
Weight (kg)	5700

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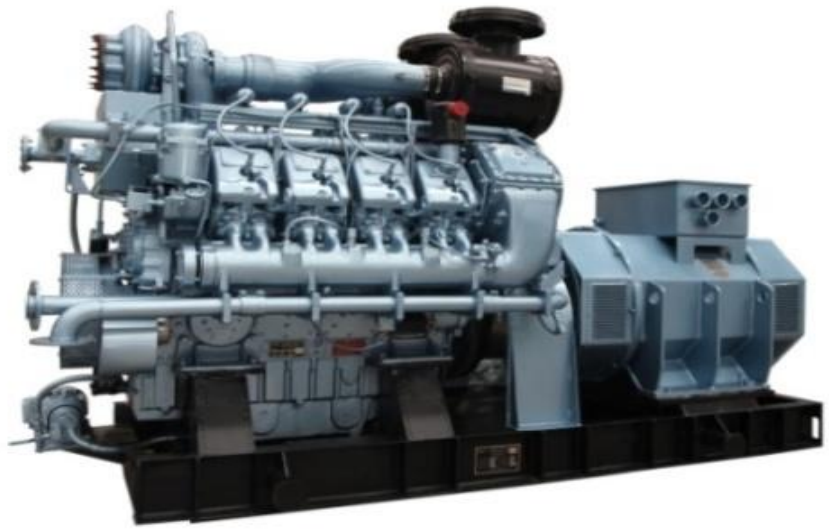

Gas generator set type	P700GF
Gas engine type	CHG620V8
Rated Power（kW）	700
Frequency(Hz)	50
Bore/stroke (mm)	170/195
Displacement(dm^3)	35.4
CNG consumption（kJ/kW·h)	9473
Therma power cooling system（kW）	317
Therma power of the exhaust（kW）	428
Dimension（L*W*H）	3800×1500×2400
Weight (kg)	8550

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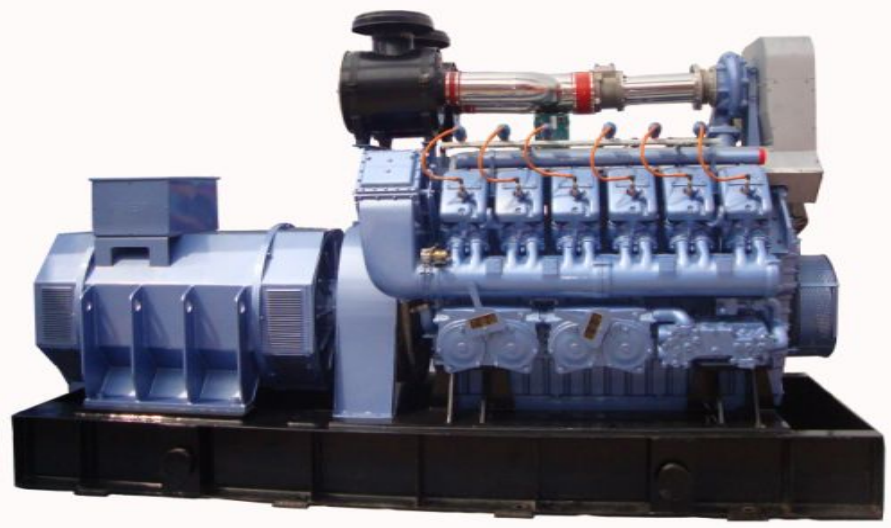

Gas generator set type	P1000GF
Gas engine type	CHG620V12
Rated Power（kW）	1000
Frequency(Hz)	50
Bore/stroke (mm)	170/195
Displacement(dm^3)	54.3
CNG consumption（kJ/kW·h)	9473
Therma power cooling system（kW）	509
Therma power of the exhaust（kW）	686
Dimension（L*W*H）	4500×1500×2400
Weight (kg)	10060

HND Gas Engine Block

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- Advanced turbocharged, intercooled, four-stroke V-type gas engine adopts the same technology as the most advanced international CAT, MWM and Jenbacher.
- V-type gas engine, cylinder arrangement with 90 ° angle easily for repairing and maintenance.

Fitted Parts

Engine body and cylinder head are made by nodular cast iron. Strong ability to bear mechanical load.

Globular gold has less cracking effect on the metal matrix, It can make cast iron strength reach 70 ~ 90% of the matrix structure strength, the tensile strength can reach 120kgf /㎡, and it has good toughness.

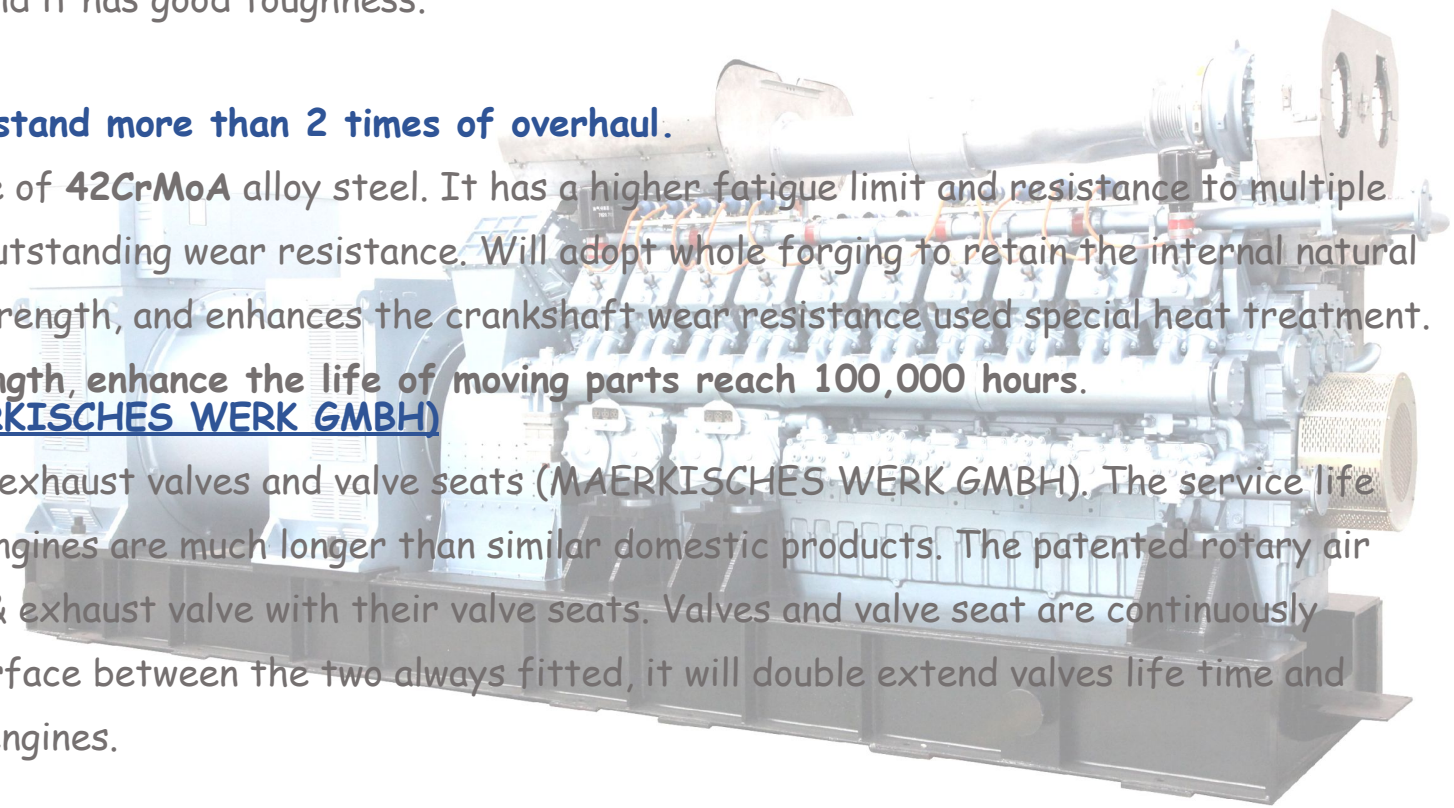
Moving Parts

Reach 100,000 life hours, all moving parts can withstand more than 2 times of overhaul.

Crankshaft, camshaft and other moving parts are made of **42CrMoA** alloy steel. It has a higher fatigue limit and resistance to multiple impacts after treatment, good impact toughness and outstanding wear resistance. Will adopt whole forging to retain the internal natural state of the metal, greatly improves the crankshaft strength, and enhances the crankshaft wear resistance used special heat treatment. This crankshaft will be increased more than **20% strength, enhance the life of moving parts reach 100,000 hours.**

Engine inlet & exhaust valves and valve seats (MAERKISCHES WERK GMBH)

HND gas Engine used original imported German inlet & exhaust valves and valve seats (MAERKISCHES WERK GMBH). The service life of inlet & exhaust valves and valve seats of HND gas engines are much longer than similar domestic products. The patented rotary air valve technology is used in fitting between the intake & exhaust valve with their valve seats. Valves and valve seat are continuously grinding during the operation of engines, let sealing surface between the two always fitted, it will double extend valves life time and rejecting "pre-ignition" and "post-ignition" of the gas engines.



Gas Transmission system

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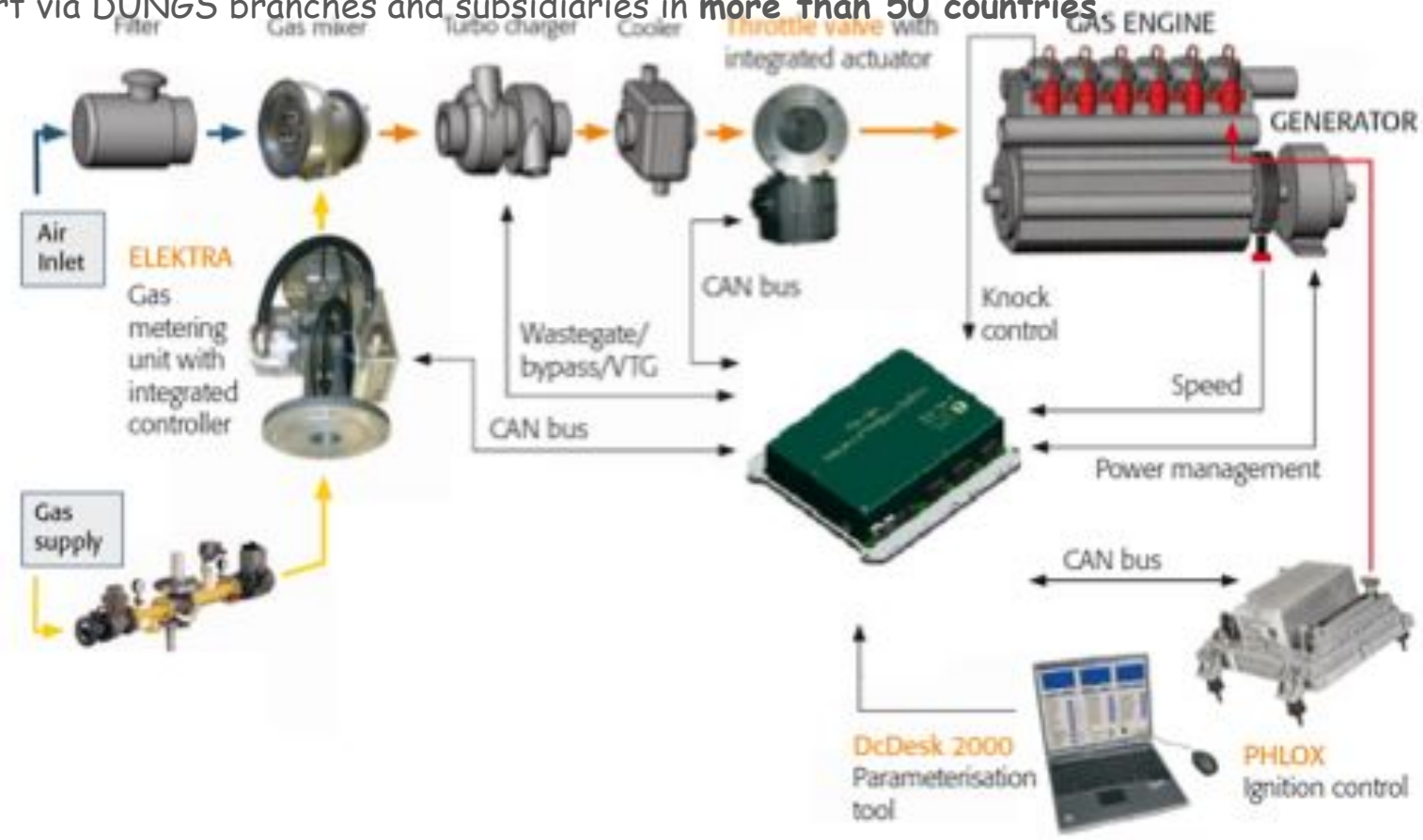
Gas transmission system

Gas system (NGL) includes pressure reducing valves, solenoid shut-off valves, manual shut-off valves, filters and other equipment, which are installed according to different project.

The main valves of the gas transmission system adopt **original German DUNGS** products, DUNGS has Vibration tested combination controls Multi block and Gas Bloc according **US Military Standard** MIL-STD-810G/31.

Worldwide support via DUNGS branches and subsidiaries in **more than 50 countries**.



HND Gas Engine Block

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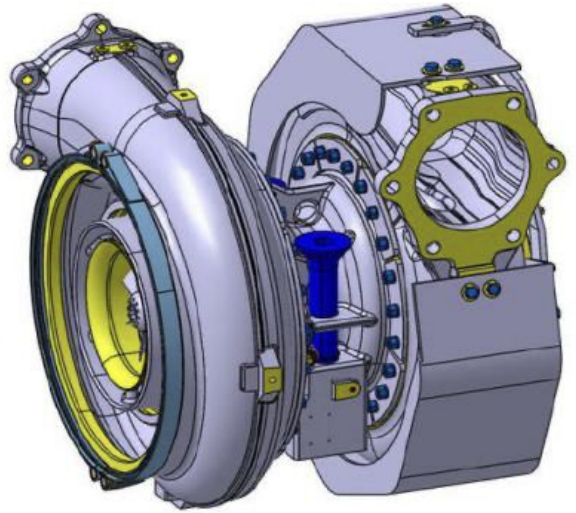
Turbo-charger

HND gas engine is equipped with two **original imported ABB** TPS series Turbo-chargers to provide strong power for the engine.

Monitoring system

Adopts international advanced pressure sensor imported from Switzerland, perfect combination of high precision and high reliability. Unique sensor disconnection alarm. High performance shunt oil filtration technology: in order to prolong the service life of lubricating oil, centrifugal oil filter is installed, which can efficiently separate carbon black particles and metal wear particles in lubricating oil; It has the characteristics of improving oil cleanliness, prolonging oil life, reducing wear of moving parts and prolonging maintenance period.



HND Gas Engine Control system

- **Imported ignition controller (HEINZMANN IC-20)**

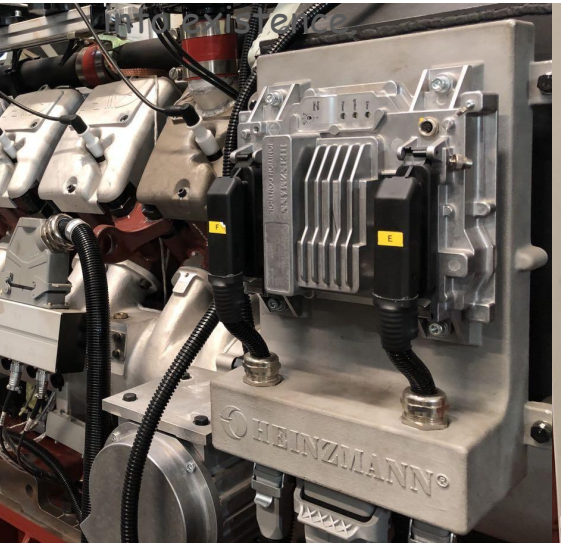
Ignition coil and specialized spark plug for gas engine are selected to ensure its accurate ignition timing and better ignition performance.

- **Air-fuel ratio control system (Lean Combustion):**

Adopt lean combustion technology and accurate electronic control parameters such as ignition timing and air-fuel ratio to adapt more widely type range of gas. Ensure to get more power with lower gas consumption.

- **Configure XIOS-UC2 air-fuel ratio control device for precise control.**

1. Digital microprocessor control technology should be able to automatically and accurately control engine power, air-fuel ratio, ignition timing, and reduce NOx emissions while maintaining appropriate gas consumption.
2. The air-fuel ratio control system can keep NOX emissions within a smaller fluctuation range under all environmental and operating conditions. The engine requires almost no need adjust when the ambient temperature and air humidity changed
3. Through automatically adjusting the ignition timing, ensuring gas engine running with the best performance, and restraining NOx bring



- **Knock control system:**

The anti-knock device (KC-01) will automatically sends a shutdown signal to protect the engine once monitoring knock occur inside in the engine cylinder

HND gas engines use the German "HEINZMANN" series products with the best combustion management in the world today. Mixture control, Mixer feed volume, ignition system, AKR…






Part2

EXPERIENCE



"Many huge and big project had used HND engines

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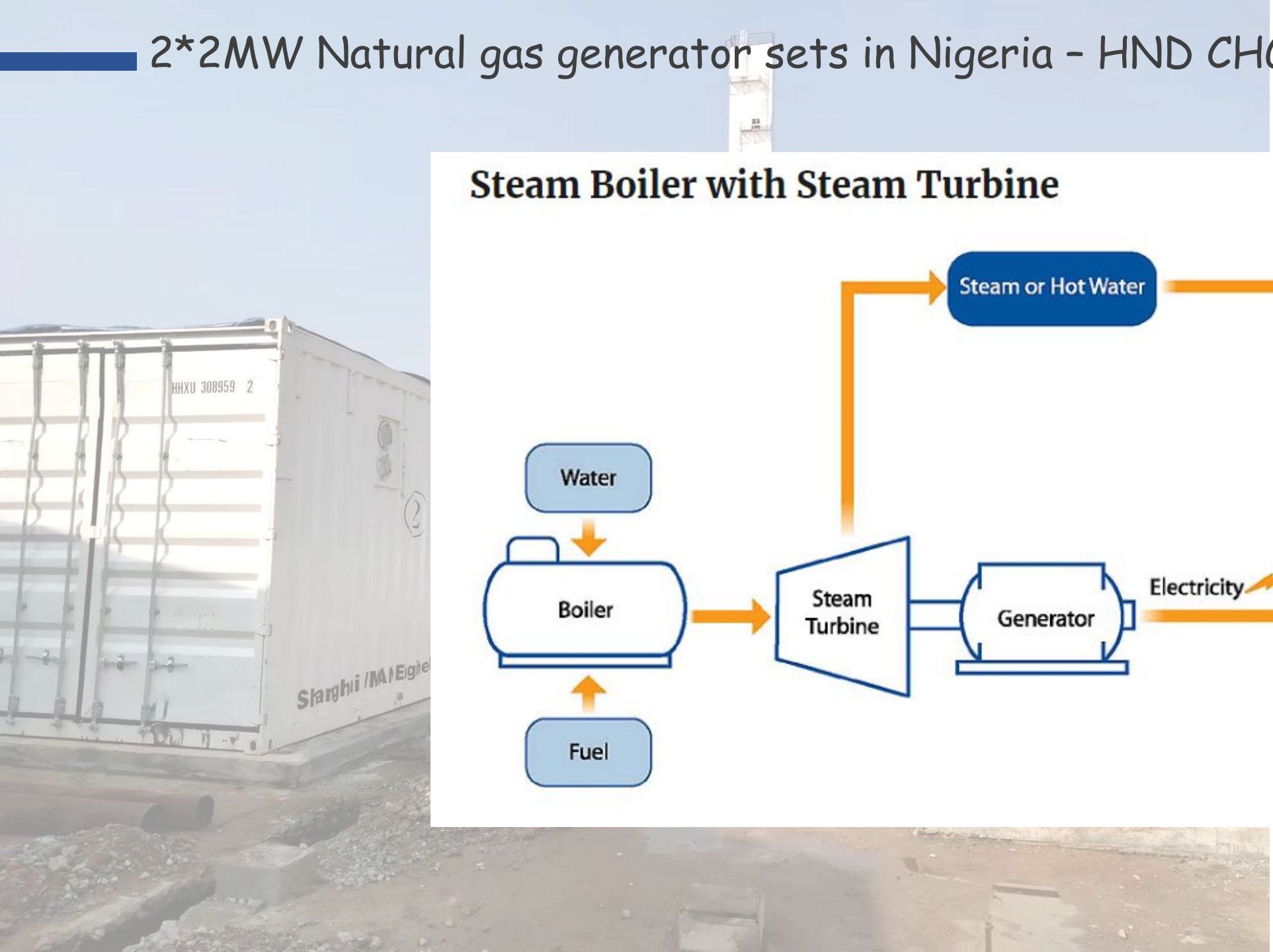
2*2MW Natural gas generator sets in Nigeria – HND CHG622V20

2*2MW Natural gas generator sets now working in Nigeria, this project with 3 main target function

- Power Supply for manufactory
- Waste heat used for hot water supply
- Exhaust gas (CO2) collecting system

2*2MW Natural gas generator sets in Nigeria - HND CHG622V20



2*1MW mash-gas generator sets in Indonesia – HND CHG620V20

2*1MW Mash-gas generator sets now working in Indonesia from 2019, this project with 2 main target function

- Power Supply for manufactory
- Waste heat used for hot water supply

5*1MW CH4-gas generator sets in Mongolia – HND620V16

5*1MW CH4 gas generator sets now working in Mongolia from 2020, this project with 3 main demand

- Power Supply for manufactory
- NOx content in the exhaust should less than or equal to 500 mg/Nm3.
- Rated noisy: ≤85dB(A) (1m)

15*1.5MW Mash-gas generator sets in North of China

15*1.5MW gas generator sets now working in Ni xia from 2020 for power supply

Operation Cost
USD 1.2 million / year

Benefit

- ✔ Power Supply Gross Yield USD 7.69 million / year
- ✔ Steam Yield USD 1.36 million / year

Power Plant per year benefit USD 7.78 million

Yield rate per year:46.13%

Recycling cycle:26 months

Gas Engine Customer List

- Russia - ENGINEERIN CENTER OPTIMA LLC ----- Trading Company
(500kW gas engine --- CKD type)

- Russia - NZGU CO.,LTD ----- VMAN Engine Distributor

- Albania - FMT SERVOMATIK SHPK ------ VMAN Engine Distributor
(300kW gas engine in parallel)

- Nigeria – Comet Star ------- Ending User
(2*2MW gas generator power plant)

- Poland – CH4 Moto ----- VMAN Engine Distributor in Eastern Europe
(1*2MW gas engine / 2 * 1 MW gas engine and other gas engine mix types)

- Turkey - CEFA MAKINA SAN.VE TIC.A.S -------- VMAN Engine Distributor
(4MW, 10MW gas generator power plant, other gas engine mix types)

And some project if do the Russian market not directly export by ourselves can’t get the customer information.


Thanks For
Watching