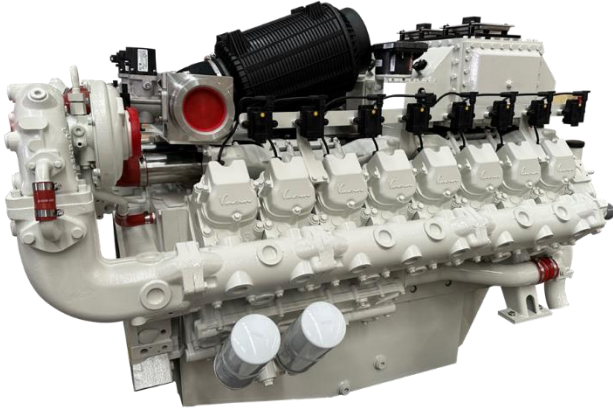




MIF NC 630 L Natural gas genset 500 kW Continues Power

MIF PLUS INTERNATIONAL
DANISMANLIK HIZMETLERI A.S.
KAVAKLI MAH. YEŞİLYURT CAD. NO:15/2,
IC KAPI NO: 11, BEYLİKDÜZÜ / ISTANBUL



Group		Continuous output
Power	kVA	630
Power	kW	500
Engine Speed	rpm	1500
Standard Voltage	V	231 / 400
Power Factor	Cos Q	0,8
Gas consumption at 100% power (Hu = 35.88MJ/m3)	Nm3/h	131

CONTINUOUS POWER RATING (COP): COP is the power that the engine can continue to use under the prescribed speed and the specified environment condition in the normal maintenance period stipulated in the manufacturing plant. Continuous Power is applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

1. GENERALLY

The main equipment of this project is a VMAN DT30 container gas generator set, the rated power of the single generator set is 500 kW, the continuous output power is 500 kW, and the output voltage is 231/400V. The power station can be operated in the grid-connected mode or the parallel island operation between the VMAN generator sets, and the cooling method is closed radiator.

2. STANDARD BENCHMARK CONDITIONS

When the environmental conditions do not meet the below items, the power should be corrected according to the manufactory standard.

Atmospheric pressure	100 kPa
Relative humidity	30% — 80%
Ambient air humidity	25°C



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3. GAS TECHNICAL CONDITIONS

Methane content	≥90%
Methane Number	≥80
Gas pressure	3~5 kPa
Gas temperature	≤35°C
Gas moisture	Unsaturated free water
Hydrogen sulfide(H ₂ S) content	≤20 mg/Nm ³
Total sulfur(S) content	≤200 mg/Nm ³
Carbon dioxide content	≤3% (V/V)
The solid particles in the gas should not be larger than 5µm, and the content should not be larger than 30 mg/m ³ . If it is not satisfied, a gas processing device should be added	
Interface pipe size of gas is DN80 PN16	
Note: If the gas conditions do not meet the above conditions, the power shall be corrected according to Party B's factory standard	

4. GENERATOR SET CONTAINER

The generator set container adopts the standard 20-foot container, the box adopts the integral frame structure, the box is installed inside the unit, the control cabinet, ventilation and lighting equipment, the unit noise reduction equipment, the unit starting system equipment, the gas branch pipeline equipment, the radiator, etc., the box is installed on the top of the silencer, exhaust explosion-proof valve, etc. The gas generator set container is transported as a whole, which is convenient for hoisting, positioning and installation after going to the site. The equipment installed on the top of the box and the connection pipes between the equipment and the installation bracket are placed in the transport container in the form of loose parts and shipped to the site for installation, and finally combined into a fully functional gas power station.

There are all main external interfaces in the two sides or top of each gas generator container:

- Engine gas inlet Flange DN80 PN16 (GB9119) 1 unit
- Low voltage cable entry 1 unit



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4.1 Gas generator sets

VMAN DT30 gas engine with Leroy-Somer LSA49.3 M6 alternator to form a unit.

GENERATOR BASIC PARAMETERS TABLE

Gas generator type	MIF NC 630 L
Gas engine type	DT30
Primary rated power (kW)	500
Current (A)	910
Voltage(V)	231/400
Rated speed (r/min)	1500
Power factor Cos ϕ	0.8
Rated frequency (Hz)	50
Voltage regulation method	Automatically adjust
Speed regulation method	Electronic governor
Excitation	Brush less excitation
Cooling system	Horizontal radiator
The ways of generator outgoing lines	Three-phase and four-wire system
The environment temperature	40°C
Operation mode	Isolated operation or parallel operation
Working hours for per year	7200 hours
Generator set technology type	Four-stroke, water-cooled, turbocharger inter-cooling, air-fuel ratio control, spark plug ignition, electronic control, air and CH4 are mixed externally
First major overhaul	36000 hours
Container generator L*W*H (mm)/=Weight (kg) (Silencers and radiators are not included)	Please refer to the drawing
Design life of generator set	≥20 years



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ENGINE HEAT PARAMETER

		50%	75%	100%
Power output	kW	250	375	500
Gas flow (Hu = 35.88MJ/m3)	Nm3/h	77.4	106.4	130.6
Total energy	kW	733	1008	1302
Air flow	Nm3/h	1183	1626	1871
Air flow	kg/h	1526	2098	2414
Flue gas flow	Nm3/h	1260	1733	2002
Flue gas flow	kg/h	1584	2178	2512
Exhaust energy at 120°C	kW	105	138	168
Jacket water energy	kW	239	318	401
Jacket water flow	m3/h	25	25	25

4.2 Engine Control System

The gas control system of VMAN gas engine uses the products of "American Woodward", which is the best combustion management in the world today. The air-fuel ratio control system, speed control system, ignition system and knock control system all use the PG+ system imported from the United States.

➤ 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.

- 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 into existence.

4.3 Alternator

The LSA49.3 M6 alternator of Nidec Leroy-Somer was used. Nidec Leroy-Somer is a world leader in electromechanical and electronic drive systems and the world leader in industrial alternators. Founded in 1919, Leroy-Somer is a French company employing 6200 people in 28 production units and 470 points of sale and service worldwide.



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ALTERNATOR PERFORMANCE

Item	Mes. Unit	Parameter
Rated Power	kVA	730
Power factor		0.8
Frequency	Hz	50
Voltage	kV	0.4
Rated Speed	rpm	1500
Permissible Overspeed	rpm	1800
Insulation grade		H
Level of insulation protection		IP23

4.4 GENSET control system

The unit control system is equipped with 1200A circuit breaker, and the ComAp unit controller is used to control the unit's start, stop, grid connection, power, etc. At the same time, it has the functions of controlling container ventilation, lighting, gas leakage protection and stop, and cooling system equipment operation.

4.5 Cooling system (Horizontal type fan cooling)

The unit adopts horizontal fan cooling mode, and the cooling device includes horizontal radiator and a set of cooling equipment. It mainly includes valves, high temperature water pumps, low temperature water pumps, electric three-way ball valves and related instruments, etc. The cooling fan is equipped with an automatic control controller, and the unit automatically opens or closes the number of fans according to the temperature.

4.6 Exhaust system

The exhaust system includes exhaust muffler, exhaust explosion-proof valve, Install it on the top of the container.

4.7 Gas transmission system

Gas system includes pressure reducing valves, solenoid shut-off valves, manual shut-off valves, filters and other equipment, which are installed inside into the container. The main valves of the gas transmission system adopt original German DUNGS products or at the same level product. 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.

4.8 Heat recovery system

DT30 container gas generator set is equipped with a set of hot water type recovery boilers that utilize the heat of the flared gas to heat softened water provided by the customer. The waste heat boiler is equipped with safety valve, pressure gauge, temperature gauge, etc. For detailed parameters, see the system diagram.



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5. MAIN PARTS MANUAL

No	Item	Qty	Description	Marks
A. MIF NC 630 L Container gas generator				
1.	MIF NC 630 L gas generator	1 unit	500 kW	1500 r/min
1.1	DT30 gas engine	1 unit	VMAN	
1.2	Alternator	1 unit	Nidec Leroy-Somer	
1.3	Common base	1 unit		
1.4	Engine control system	1 set	Woodward	
2.	Genset control system	1 set	ComAp control	
3.	Genset cooling system	1 set		
3.1	Horizontal type radiator	1 set		
3.2	Water pump	2 units		
3.3	Electric three-way valve	1 unit		
3.4	Plate heat exchanger	1 unit		
3.5	Piping and brackets	1 set		
4.	Exhaust System	1 set		
4.1	Muffler	1 unit		
4.2	Exhaust explosion-proof valve	1 unit		
5.	Unit gas branch pipeline equipment	1 set	German DUNGS	
5.1	Filter	1 unit	DN80-PN16	
5.2	Shut-off solenoid valve	1 unit	DN80-PN16	
5.3	Branch pipes device	1 unit	DN80-PN16	
5.4	Piping and brackets	1 set		
6.	Hot water type waste heat boiler	1 set		
7.	Container	1 set	20 ft base	
7.1	Ventilation system	1 set		
7.2	Lighting system	1 set		
7.3	Gas leak alarm system	1 set		
7.4	Noise reduction system	1 set		
8.	Oxygen senser and cable	1 set		
9.	Electric Water Preheater	1 set	Electric Heater	Option
10.	Battery charger	1 set	BP1024	Option
11.	Spring shock absorber	1 set		Option
12.	High temperature butterfly valve	3 unit		

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