

FABA MOTOR

INDUSTRIAL ENGINE TECHNOLOGY

525 -1030 kW Electric Power

Cogeneration / Combined Heat and Power (CHP)

Natural Gas / Continuous

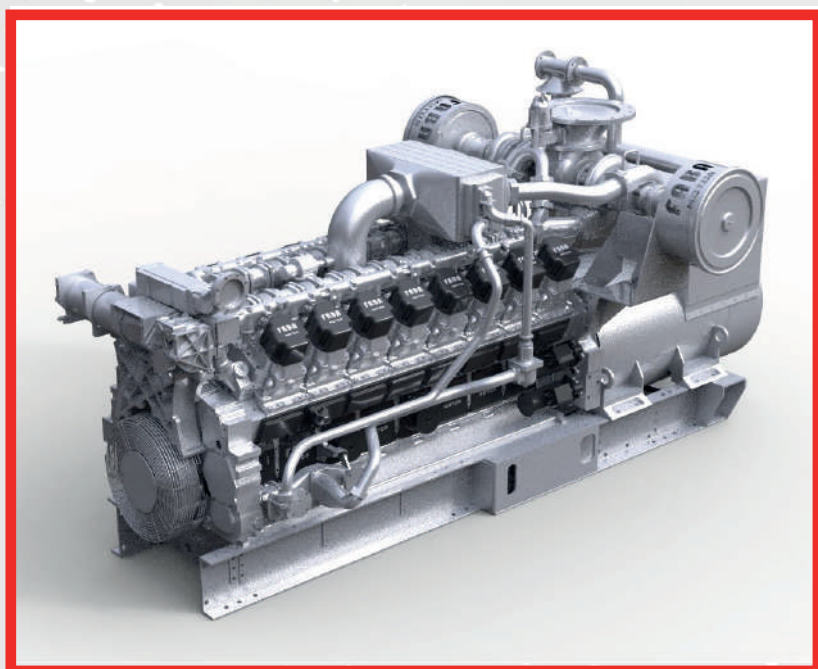
50 Hz / 1500 RPM / 400 Volts

Gas Engine Generator

V16/4G-C



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Empowering Human Life

Advantages

ENGINE DESIGN

- Robust to possible deviations in gas composition
- Designed with the purpose of strength, durability, and low cost of ownership
- Proper performance at lower air densities (high altitude / hot ambient temperature)
- Easy diagnostics and troubleshooting

EMISSIONS

Emission From the combustion chamber is reduced to lowest possible level considering improved combustion efficiency.

ADVANCED ENGINE CONTROL SYSTEM

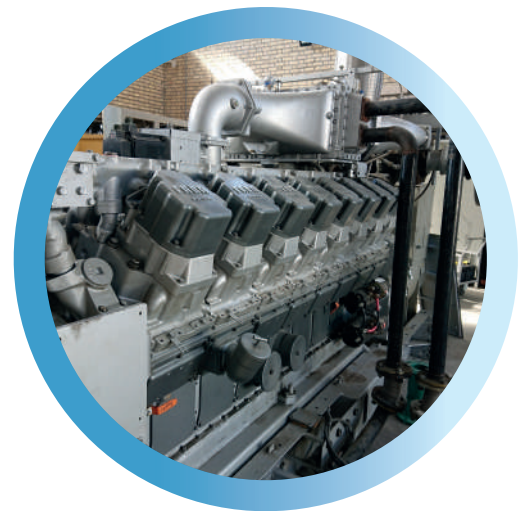
The engine management system (EMS) monitors and controls the performance functionalities such as engine speed, ignition timing, etc. It also provides diagnostic and troubleshooting capabilities which are valuable for engine maintenance.

MINIMUM INSTALLATION TIME

Many of the engine attachments are installed in the factory to lower the installation time on site.

FEATURES

CR	Stroke	Bore	Fuel System	Cooling	Aspiration
11.7	190 mm	170 mm	Carburetor fuel Supply, low pressure	Includes jacket water and oil cooler along with 2-stages aftercooler	Turbocharger assisted (TA)



TESTING AND QUALITY CONTROL

The conformity tests for the engines are carried out in the factory at different operating conditions to ensure their performance and reliability.

WARRANTY AND AFTER-SALE SERVICE

8000 running hours since installation would officially be guaranteed by FABA Motor.

GENERATOR

- Maximum over speed: 2250 RPM
- Normal speed: 1500 RPM
- Insulation: Class H
- Number of leads: 6
- Number of poles: 4
- Control system: Separately excited by P.M.G

Equipment and Accessories

COOLING SYSTEM

- Two air cooling circuits
- First, High Temperature (HT): jacket water + oil cooler +1st stage aftercooler
- Second, Low Temperature (LT): 2nd stage aftercooler

EXHAUST SYSTEM

- Exhaust manifolds, turbocharger housings, silencer

FUEL SYSTEM

- Gas meter
- Gas pressure regulator
- Zero pressure regulator
- Shutoff valve

LUBE SYSTEM

- Oil cooler
- Oil filter and oil sampling valve
- Drain valve
- Turbo oil accumulator

PROTECTION SYSTEM

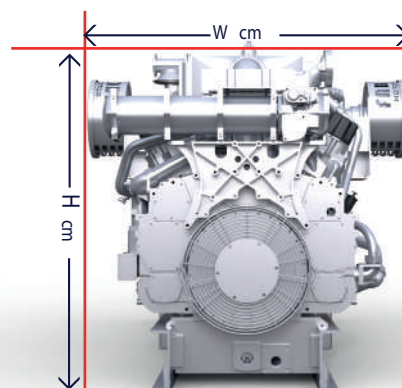
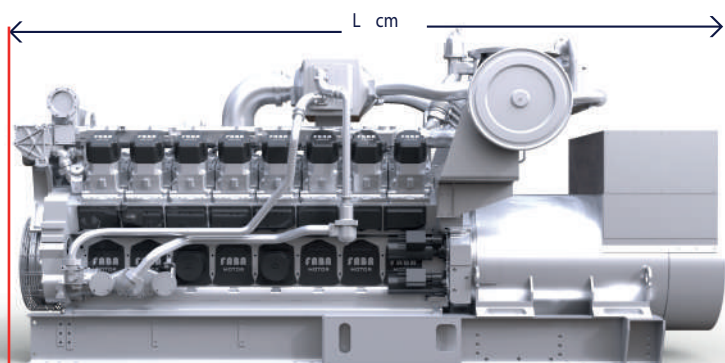
If any problem occurs in the system, one of the following faults is shown in a display and alerts:

- Low oil pressure
- Manifold air temperature
- Oil filter differential pressure
- Coolant JW inlet/outlet pressure
- High fuel or oil temperature
- Turbo inlet temperature
- Engine oil to engine coolant differential temperature
- High coolant temperature
- Engine speed
- Over hour time
- Engine load
- Voltage and frequency
- Oxygen level
- Detonation and knock

GAS ENGINE TECHNICAL DATA V16/4G-C				
ENGINE SPEED (rpm)	1500	APPLICATION		GENSET
COMPRESSION RATIO	11.7:1	RATING LEVEL		CONTINUOUS
AFTERCOOLER TYPE	SCAC	FUEL		NAT GAS
AFTERCOOLER - STAGE 2 INLET (°C)	32	FUEL SYSTEM		CARBURETOR
AFTERCOOLER - STAGE 1 INLET (°C)	92	FUEL PRESSURE RANGE (kPag)		10-35
JACKET WATER OUTLET (°C)	99	FUEL METHANE NUMBER		80
ASPIRATION	TA	FUEL LHV (MJ/Nm ³)		33.9
COOLING SYSTEM	JW+OC+1AC,2AC	ALTITUDE CAPABILITY AT 25°C		1000
EXHAUST MANIFOLD	DRY	POWER FACTOR		0.8
RATING	LOAD	100%	75%	50%
GENSET POWER	ekW	1030	776	517
GENSET POWER	kVA	1287	970	646
GENSET POWER	bkW	1078	808	535
GENERATOR EFFICIENCY	%	95.6	96.1	96.7
GENSET EFFICIENCY (@ 1.0 POWER FACTOR)	%	42.4	40.6	38
THERMAL EFFICIENCY	%	43.2	44.1	46.5
TOTAL EFFICIENCY (@ 1.0 POWER FACTOR)	%	85.6	84.7	84.5
ENGINE DATA				
AIR FLOW	Nm ³ /min	83	64	45
FUEL FLOW (0°C, 101, 3kPa)	Nm ³ /hr	258	203	145
COMPRESSOR OUT PRESSURE	kPa(abs)	275	225	174
COMPRESSOR OUT TEMPERATURE	°C	157	128	92
AFTERCOOLER AIR OUT TEMPERATURE	°C	40	38	36
INTAKE MAN. PRESSURE	kPa(abs)	245	204	155
INTAKE MAN. TEMPERATURE	°C	51	48	46
TIMING	°BTDC	22	20	18
EXHAUST TEMPERATURE-ENGINE OUTLET	°C	482	491	509
EXHAUST GAS FLOW RATE	Nm ³ /min	90	69	49
MAX INLET RESTRICTION	kPa	2.5	1.8	1.1
MAX EXHAUST RESTRICTION	kPa	5	3.8	1.5
EMISSIONS DATA-ENGINE OUT				
NO _x (AS NO ₂)	mg/Nm ³ DRY	According to Tier I		
CO	mg/Nm ³ DRY			
THC (mol. Wt. of 15.84)	mg/Nm ³ DRY			
NMHC (mol. Wt. of 15.84)	mg/Nm ³ DRY			
NMNEHC (VOCs) (mol. Wt. of 15.84)	mg/Nm ³ DRY			
HCHO (Formaldehydle)	mg/Nm ³ DRY			
CO ₂	g/Nm ³ DRY			
EXHAUST OXYGEN	%DRY	9.7	9.7	9.8
ENERGY BALANCE DATA				
LHV INPUT	kW	2430	1911	1360
HEAT REJECTION TO JACKET WATER (JW)	kW	344	244	181
HEAT REJECTION TO ATMOSPHERE	kW	87	74	65
HEAT REJECTION TO LUBE OIL (OC)	kW	81	76	55
HEAT REJECTION TO EXHAUST (LHV TO 25°C)	kW	658	584	421
HEAT REJECTION TO EXHAUST (LHV TO 120°C)	kW	574	495	342
HEAT REJECTION TO A/C - STAGE 1 (1AC)	kW	125	87	67
HEAT REJECTION TO A/C - STAGE 2 (2AC)	kW	105	70	54

Conditions: Ratings are based on natural gas having Lower Heating Value (LHV) of 33.9 MJ/m³ ambient temperature of 25 degree Celsius, 100 kPa pressure and % 30 relative humidity.

⊙ Dimensions

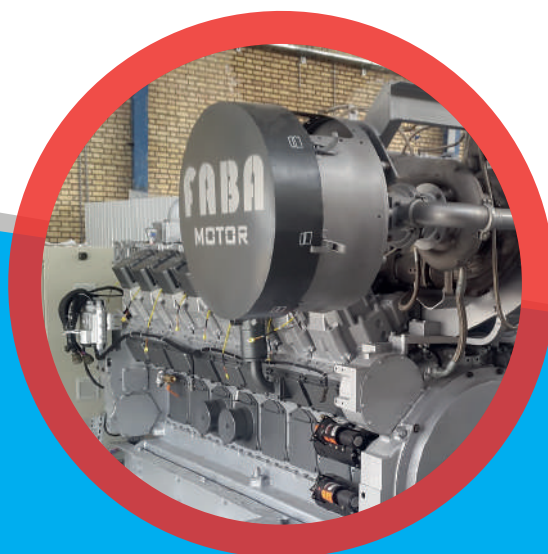


Dimensions	Unit	V8/4G-C	V12/4G-C	V16/4G-C
Length (L)	cm	365	441	495
Width (W)	cm	220	220	220
Height (H)	cm	210	210	210
Weight (Approximately)	kg	7,650	9,150	11,800

Combined Heat and Power

Engines can be configured specifically for heat recovery applications. The engine drives generator to produce electricity, while jacket water and/or exhaust cooling circuits transfer the waste heat of the engine to a customer's hot water/steam/hot oil circuit by heat exchangers.

The hot water/steam/ hot oil can be used for a facility's process or heating purposes like green houses, fruit driers, etc. This system considerably reduces overall fuel consumption, improve energy efficiency up to 85 percent, and reduces energy costs and emissions versus separate heat and electrical generation systems.



Items	Power (kW)		
	V8/4G-C	V12/4G-C	V16/4G-C
High temperature circuit (jacket water)	267	407	550
Exhaust cooling circuit	286	426	574
Total	553	833	1124

