

Imperial

Basic Technical Data

Nominal electrical output	800			kW
Load	50	75	100	%
Heat power	1,860,000	2,508,000	3,098,000	BTU/h
Fuel input	3,566,000	5,019,000	4,415,000	BTU/h
Heat rate	4,458	6,274	5,519	3TU/kW _e
Electrical efficiency	38.3	40.8	42.6	%
Heat efficiency	52.2	50.0	48.3	%
Total efficiency (fuel utilization)	90.5	90.8	90.9	%
Gas consumption	3920	5509	7027	CFH

The Basic Technical Data are applicable for the standard conditions pursuant to the "Technical instruction" document.

The minimum permanent electrical output must not drop below 50 % of the nominal output.

Gas consumption is expressed under the conditions (59°F, 14.648 psi, Low Heat Value 912.18 BTU/CF) Gas consumption tolerance, or fuel input tolerance, at 100% load is +5%. Tolerance of other parameters are mentioned in "Technical Instructions-Validity of Technical Data" document.

1) heat power is a sum of heat outputs of secondary circuit with exhaust gas cooled to 120°C

Emissions

emissions with 5% of O ₂ in exhaust gases	NO _x	CO	
Standard	500	650	mg/Nm ³
Reduced*	250	300	mg/Nm ³
emissions with 15% of O ₂ in exhaust gases	NO _x	CO	
Standard	0,31 (90)	0,41 (200)	g/bhp (ppm)
Reduced	0,16 (45)	0,19 (90)	g/bhp (ppm)

* Reduced NO_x emissions are achieved by the engine adjustment, causing lower electrical efficiency, Reduced CO emissions are achieved by additional oxycatalyst provided as an option. Lower emissions compliant with most stringent requirements can be achieved with SCR

Generator

Type	MJB 400 LC4		
Producer	MARELLI		
Cos φ	1,0		
Efficiency in the working point	97,1	%	
Voltage	480	V	
Frequency	60	Hz	

Metric

Basic Technical Data

Nominal electrical output	800			kW
Load	50	75	100	%
Heat power	545	735	908	kW
Fuel input	1045	1471	1880	kW
Electrical efficiency	38,3	40,8	42,6	%
Heat efficiency	52,2	50,0	48,3	%
Total efficiency (fuel utilization)	90,5	90,8	90,9	%
Gas consumption	111	156	199	m ³ /h

The Basic Technical Data are applicable for the standard conditions pursuant to the "Technical instructions" document.

The minimum permanent electrical output must not drop below 50 % of the nominal output.

Gas consumption is expressed under the invoicing conditions (15°C, 101.325 kPa). Gas consumption tolerance, or fuel input tolerance, at 100% load is +5%.

Tolerance of other parameters are mentioned in "Technical Instructions-Validity of Technical Data" document.

1) heat power is a sum of heat outputs of secondary circuit with exhaust gas cooled to 120°C

Engine

Type	TCG 3016 V16		
Producer	MWM		
Number of cylinders	16		
Arrangement of cylinders	V		
Bore × stroke	132/160	mm	
Displacement	35	dm ³	
Compression ratio	13,1 : 1		
Speed	1500	rpm	
Oil consumption, normal / max.	0,1	g/kWh	
Max. engine power	826	kW	

TCG3016V16 400V natural gas;25.10.2017



Thermal System

Secondary circuit

Heat carrier	water	
Total system heat recovery	2,921,000	BTU/h
Nominal water temperature, input / output	158/194	°F
Return water temperature, min / max	104/158	°F
Nominal flow rate	161.7	GPM
Max. working pressure	87	psi
Water volume in CHP unit circuit	203.4	gal
Pressure loss at the nominal flow rate	13	psi
min. pressure in system ¹⁾	14.5	psi
Nominal temperature drop ¹⁾	68	°F

1) total value (engine-generator in sound enclosure and exhaust gas module without connecting pipeline)

Utilization of exhaust gas output for other purposes

Heat output of exhaust gases (cooling to 248°F)	1,433,000	BTU/h
Exhaust gas temperature	820.4	°F

Primary circuit

heat carrier	water + ethylene glycol	
ethylene glycol's concentration	35	%
circuit's heat output	1,488,000	BTU/h
max. working pressure	43.5	psi
water volume in CHP unit circuit	37	gal

Aftercooler circuit

heat carrier	water + ethylene glycol	
ethylene glycol's concentration	35	%
circuit's heat output	177,400	BTU/h
coolant temperature (outlet from CHP unit – informative)	122	°F
coolant temperature (inlet into CHP unit) max	113	°F
nominal flow rate	42.8	GPM
Pressure reserve at the nominal flow rate ¹⁾	10	psi
highest allowed maximal hydrostatic height of system	3.8	ft
maximal connect-able volume of system outside the module of CHP unit ²⁾	21	gal
max. working pressure	43.5	psi
min. working pressure	7.3	psi
water volume in CHP unit circuit	10.6	gal

1) pressure reserve of internal part for covering pressure losses of external parts of circuit (interconnection pipeline and dry cooler)
 2) if connected volume overstep mentioned value, it is necessary to install into system additional expansion vessel

Thermal System

Secondary circuit

Heat carrier	water	
Total system heat recovery	856	kW
Nominal water temperature, input / output	70/90	°C
Return water temperature, min / max	40/70	°C
Nominal flow rate	10,2	kg/s
Max. working pressure	600	kPa
Water volume in CHP unit circuit	770	dm ³
Pressure loss at the nominal flow rate	90	kPa
min. pressure in system ¹⁾	100	kPa
Nominal temperature drop ¹⁾	20	°C

1) total value (engine-generator in sound enclosure and exhaust gas module without connecting pipeline)

Utilization of exhaust gas output for other purposes

Heat output of exhaust gases (cooling to 120°C)	420	kW
Exhaust gas temperature	438	°C

Primary circuit

heat carrier	water + ethylene glycol	
ethylene glycol's concentration	35	%
circuit's heat output	436	kW
max. working pressure	300	kPa
water volume in CHP unit circuit	140	dm ³

Aftercooler circuit

heat carrier	water + ethylene glycol	
ethylene glycol's concentration	35	%
circuit's heat output	52	kW
coolant temperature (outlet from CHP unit – informative)	50,0	°C
coolant temperature (inlet into CHP unit) max	45,0	°C
nominal flow rate	2,7	kg/s
pressure reserve at the nominal flow rate ¹⁾	70	kPa
highest allowed maximal hydrostatic height of system	10	m
maximal connect-able volume of system outside the module of CHP unit ³⁾	80	dm ³
max. working pressure	300	kPa
min. working pressure	50	kPa
water volume in CHP unit circuit	40	dm ³

1) pressure reserve of internal part for covering pressure losses of external parts of circuit (interconnection pipeline and dry cooler)
 2) if connected volume overstep mentioned value, it is necessary to install into system additional expansion vessel



Fuel, Gas Inlet

Low heat value	912.18	BTU/CF
Min. methane number	80	
Gas pressure	1.2 – 2.2	psi
Max. pressure change under varying consumption	10	%
Max. gas temperature	95	°F

Combustion and Ventilation Air

Unused heat removed by the ventilation air	180,800	BTU/h
air temperature at the ventilation inlet min / max	68/95	°F
air temperature at the ventilation recommended	77	°F
Amount of combustion air	1917.6	CFM
Max. amount of ventilation air at the outlet flange	11,425	CFM
Max. air temperature at the outlet flange	122	°F
max. counter-pressure on flanges of ventilation air ¹⁾	0.02	psi

1) total sum of pressure losses of connected ventilation pipeline without necessity of using additional fun

Exhaust Gas and Condensate Outlet

amount of exhaust gases	538.6	CFM
exhaust gas temperature between engine-generator set and exhaust exchanger nominal / max	557/1022	°F
exhaust gas temperature, nominal / max	248/500	°F
permissible pressure loss of the interconnecting exhaust piping	0.14	psi
speed of exhaust gases at the outlet (DN 150)	19.1	m/s

Lubricant Charges

amount of lubrication oil in the engine	35.7	gal
volume of engine additional oil tank	68.7	gal
replenishment oil tank volume	52.9	gal

Fuel, Gas Inlet

Low heat value	34	MJ/m ³
Min. methane number	80	
Gas pressure	8 ÷ 15	kPa
Max. pressure change under varying consumption	10	%
Max. gas temperature	35	°C

Combustion and Ventilation Air

Unused heat removed by the ventilation air	53	kW
air temperature at the ventilation inlet min / max	20/35	°C
air temperature at the ventilation recommended	25	°C
Amount of combustion air	3258	Nm ³ /h
Max. amount of ventilation air at the outlet flange	19411	m ³ /h
Max. air temperature at the outlet flange	50	°C
max. counter-pressure on flanges of ventilation air ¹⁾	120	Pa

1) total sum of pressure losses of connected ventilation pipeline without necessity of using additional fun

Exhaust Gas and Condensate Outlet

amount of exhaust gases	915	Nm ³ /h
exhaust gas temperature between engine-generator set and exhaust exchanger nominal / max	475/550	°C
exhaust gas temperature, nominal / max	120/150	°C
permissible pressure loss of the interconnecting exhaust piping	10	mbar
speed of exhaust gases at the outlet (DN 350)	19,1	m/s

Lubricant Charges

amount of lubrication oil in the engine	135	dm ³
volume of engine additional oil tank	260	dm ³
replenishment oil tank volume	200	dm ³



Unit Dimensions and Weights

	Engine generator set	Exhaust gas module	
length	284	193	in
width	98	39	in
height	130	102	in
service weight	29,611	6548	lb

Ventilation silencer			
length	42.5		in
width	72		in
height	98.5		in
service weight	2028		lb

Exhaust silencer			
length	169.3		in
diameter	∅ 31.5		in
installation position	horizontal		in
service weight	1874		lb

Switchboards	height [in]	width [in]	depth [in]
R1	82.7	31.5	23.6
R2	82.7	63	15.8
R3 ⁽¹⁾	82.7	23.6÷47.2	19.7
R4 ⁽²⁾	47.2	31.5	11.8
R5 ⁽³⁾	430÷1060	330÷855	7.9÷13.8
overall service weight		1544 lb	

- 1) Switchboard's width depends on size of frequency changers.
- 2) Switchboard's height depends on MWM. Standard is 47.3 in.
- 3) Switchboard's dimension depends on number of dry coolers' fans.

Unit Dimensions and Weights

	Engine generator set	Exhaust gas module	
length	7200	4900	mm
width	2500	1000	mm
height	3300	2600	mm
service weight	13430	2970	kg

Ventilation silencer			
length	1080		mm
width	1830		mm
height	2500		mm
service weight	920		kg

Exhaust silencer			
length	4300		mm
diameter	∅ 800		mm
installation position	horizontal		mm
service weight	850		kg

Switchboards	height [mm]	width [mm]	depth [mm]
R1	2100	800	600
R2	2100	1600	400
R3 ⁽¹⁾	2100	600÷1200	500
R4 ⁽²⁾	1200	800	300
R5 ⁽³⁾	430÷1060	330÷855	200÷350
overall service weight		700 lb	

- 1) Switchboard's width depends on size of frequency changers.
- 2) Switchboard's height depends on MWM. Standard is 1200 mm.
- 3) Switchboard's dimension depends on number of dry coolers' fans.



Noise Parameters

version	standard	option ¹⁾	
sound enclosure of CHP unit at 1m	80		dB(A)
ventilation inlet and outlet at 1m from the silencer	80	65	dB(A)
exhaust gas outlet at 1m from the silencer flange	80	60	dB(A)

1) noise parameters can be reduced by optimizing components to the required acoustic pressure level

Electrical Parameters

nominal voltage	277/480 V
nominal frequency	60 Hz
power factor ¹⁾	0,86
nominal current at cos φ=0.8	1120 A
generator circuit breaker	NS1600 H 3P
short-circuit resistance of switchboard R1	35 kA
short-circuit resistance of switchboards R2, R3, R4 and R5	10 kA
contribution of the actual source to the short-circuit current	< 15 kA
protection of power switchboard R1 closed/open	IP 31/00
protection of control switchboard R2 closed/open	IP 31/00
protection of frequency changers' switchboard R3 closed/open	IP 31/00
protection of engine switchboard R4 closed/open	IP 31/00
protection of cooling switchboard R5 closed/open	IP 66/00
recommended superior protection	1250 A
recommended connection cable ²⁾ (< 50m, at t<35°C)	3xNYY (3x240+120)

1) Power factor adjustable from 0,81C ÷ 1 ÷ 0,81L (range from 0.81C ÷ 1 must be verified according to the various types of generators).

L = inductive load - overexcited

C = capacitive load - underexcited

Operation of the generator with a power factor of less than 0.95 causes a power limitation sets the following table:

power factor [-]	1	0,95	0,81
output [% Pnom]	100	100	98

2) The stated cables are for information only. A check calculation for temperature rise and voltage drop must be made according to the actual length, placement and type of the cable (maximum allowed voltage drop is 10 V)

Colour Version

engine and generator	RAL 5010 (blue)
base frame	RAL 9017 (black)
sound enclosure	RAL 5013 (blue)

Caution

Manufacturer reserves the right to alter this document and the linked source materials.

