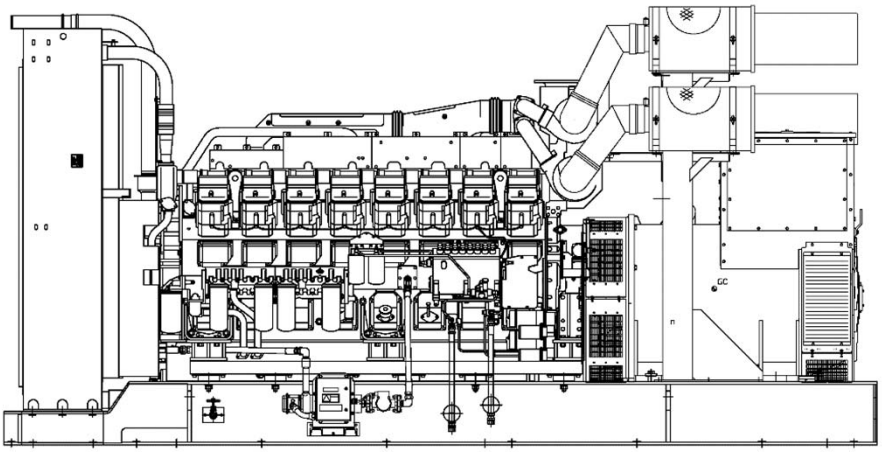
MITSUBISHI BASIC DIESEL GENERATOR SET
TECHNICAL SPECIFICATION



MGS
Mitsubishi
Generator Series

MGS2000R

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*image for illustration only

1. Generator Set Overview Specification

This specification covers the indoor use MITSUBISHI diesel engine generator set and attached equipment.

		50Hz				
MGS Model		MGS2000R				
Voltage[1]	**(V)**	380				
Duty		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Rated Output[2]	**(KVA)**	2000		1800		1540
	(kW)	1600		1440		1232
Engine model		S16R-PTAR				
Fuel Consumption[3] (liter/hr) (% load)	**25%**	131		122		126
	50%	220		202		178
	75%	312		284		248
	100%	407		369		319
Lub.Oil Consumption (100% Load)	**(liter/hr)**	1.64		1.48		1.28
Generator	**(MG-)**	S7G				
Cooling system	**(Type)**	Closed looped circuit by integral radiator				
Dimensions						
Length	**(mm)**	5210	5210	5210	5210	5430
Width	**(mm)**	2160	2160	2160	2160	2200
Height	**(mm)**	2585	2635	2585	2635	2765
Weight (Dry)	**(kg)**	12900	13100	12900	13100	13540
(Wet)	**(kg)**	13570	13770	13570	13770	14210

Note 1 For other voltage, please contact to Sales for confirmation
Note 2 Output at 40°C, 1000m ASL with fan
Note 3 Fuel consumption based on fuel density of 0.84 g/l.
Fuel oil consumption may differ subject to site condition and specification of fuel.
Not guaranteed value.

1.1 ENVIRONMENT ETC.

MITSUBISHI generator sets are designed to meet following operating conditions

a) Relative humidity : Max. 85%
b) Ambient Temperature : 5°C ~ 40°C
c) Altitude above sea level : 1000m

2. Rating Definition

Duty	Overload	Yearly Average Load Factor	Yearly Operating hours	Allowable Average Load Factor for 24 Hours
Standby (ESP)	Not available	Maximum 70%	Maximum 500 hours	1. Maximum 80% 2. 100% in emergency
Prime (PRP)	+10% Overload	Maximum 70%	Unlimited	1. Maximum 80% 2. Overload operation (≤110%) is limited to a maximum of 1 hour per 12 hours 3. Over 90% load operation limited to a maximum of 3 hours per 24 hours
Continuous (COP)	Not available	Maximum 100%	Unlimited	1. Maximum 100%
Critical Power (CP) [1]	Not available	Maximum 100%	Unlimited	1. Maximum 100%
Data Center Continuous Power (DCCP) [1, 2]	+10% Overload	Maximum 100%	Unlimited	1. Maximum 100% 2. Overload operation (≤110%) is limited to a maximum of 1 hour per 12 hours

Note 1 UPTIME compliant: This DCCP rating meets the requirement of Tier III and Tier IV data center site with no runtime limitation when the operation is loaded to 'N' demand for the engine generator set.

Note 2 DCCP rating does not have +10% overload defined in ISO8528-1:2018

3. DIESEL ENGINE

		50Hz				
		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Engine Model		S16R-PTAR 4 cycle, water cooled, turbocharged with after cooler				
Gross Engine Power (without fan basis)	(kWm)	1723		1553		1330
Fan loss	(kWm)	38		38		38
Speed	(RPM)	1500		1500		1500
Brake mean effective Pressure	(MPa)	2.1		1.9		1.6
Regenerative Absorption	(kW)	140				
No. of cylinder		16				
Bore / stroke	(mm)	170 / 180				
Total displacement	(liter)	65.37				
Compression ratio		14.0:1				
Piston Speed	(m/sec)	9.0				
Noise Level at 1m (Excluding: intake , exhaust & fan)	(dB(A))	111				
Governor	Type	Digital Electrical type				
Frequency regulation		G3 class				
Steady state Frequency band		±0.25%				
Heat rejection to coolant	(kW)	1062		951		815
Heat rejection to exhaust	(kW)	1334		1186		1016
Heat rejection to atmosphere from engine	(kW)	128		115		98

4. LUBRICATION SYSTEM

		50Hz				
		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Lubricating oil capacity	(liter)	230				
Lubrication system	Type	Forced lubricating by gear pump wet sump				
Lubrication Oil filter	Type	Paper element				
Lubrication Oil cooler	Type	Water cooled corrugated				

5. COOLING SYSTEM

		50Hz				
		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Coolant capacity without /with radiator	(liter)	170 / 383				
Coolant pump external resistance	(kgf/ cm^2)	0.35				
Coolant pump flow rate	(liter/ min)	1650				
Cooling fan airflow rate	(m^3/ min)	1950				
Cooling fan airflow restriction	(kPa)	0.1				
Ambient air temperature	(℃)	40				

6. INLET & EXHAUST SYSTEM

		50Hz				
		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Air cleaner	Type	Turbo filter	Paper element	Turbo filter	Paper element	Paper element
Combustion air inlet flow rate	(m^3/ min)	145		130		112
Exhaust flow rate	(m^3/ min)	385		345		295
Max. exhaust gas temperature	(℃)	550				
Exhaust flange size (Internal diameter)		350A				
Allowable exhaust back pressure	(mm H2O)	600				

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7. ELECTRICAL SYSTEM

		50Hz				
		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
System voltage	(V)	24				
Starting system		Electric starting				
Starter motor capacity		7.5kW x 2				
Maximum allowable resistance of cranking circuit	(mΩ)	1.5				
Recommended minimum battery capacity	(Ah) At 5℃ & above	400				
	(Ah) Below 5℃ to -5℃	600				

8. GENERATOR

		50Hz				
		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Generator	Type	Brushless, self-excited, self-ventilated and rotating field				
Configuration		3Phase 4 Wire				
Protection		IP23				
Power factor		0.8 lagging				
No of poles		4 poles				
Insulation class		Class H				
Temperature rise		Class H Peak		Class H		Class F
AVR	Type *1	DAVR				
Voltage regulation	Steady State *2	±0. 25%				
	0 - 100% load	Maximum 1.0%				
Wave form distortion		5% (Non-Distorting Balanced Linear Load)				
Unbalance loading		Maximum 25%				
Negative phase sequence		Maximum 8%				
Overspeed		Maximum 125% of nominal speed				

*1 AVR is a standard for MG-HC5 and MG-KT series
*2 ±0.5% for AVR

9. GENERATOR CONTROL PANEL

		50Hz				
		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
IP rating		IP 2X				
Power input		DC24V				
Sensing	Phase & Wire	3Phase 4 Wire				
	Frequency	50 / 60Hz				
LCD display parameters	Engine	Engine speed Engine Oil pressure Engine Coolant temperature Engine Oil temperature*1 Engine exhaust gas temperature*1 Engine crankcase internal pressure*1 Charging dynamo voltage Engine hour run DC battery voltage				
	Generator	Generator voltage (L-L, L-N AC) Generator frequency (Hz) Generator load (kW, kVA, kVAr) Generator accumulated load (kWh, kVAh, kVArh) Generator phase rotation Power factor Generator winding temperature (U,V,W)*1 Generator bearing temperature*1				
Protections	Engine	Engine underspeed warning and shutdown Engine overspeed warning and shutdown Engine coolant temperature high warning and shutdown Engine oil pressure low warning and shutdown Engine crankcase internal pressure high shutdown*1 DC battery voltage low and high warning Loss of magnetic pickup signal Mag. pickup open circuit Charge alternator failure warning Emergency stop Fail to start Fail to stop warning L.O filter clogged warning Oil pressure sender open circuit Oil temperature high warning and shutdown*1 Coolant level low warning*1 Exhaust temperature high warning*1				
	Generator	Generator undervoltage warning and shutdown Generator overvoltage warning and shutdown Generator underfrequency warning and shutdown Generator overfrequency warning and shutdown Generator overcurrent shutdown Negative phase sequence warning Winding temperature high warning(U,V,W)*1 Bearing temperature high warning*1 Electrical trip Generator power warning				
	Synchronising	Generator reverse power, shutdown*2 Breaker close failure, warning*2 Breaker open failure, warning *2 MSC Link Failure warning*2 Fail to synchronise warning*2				

	50Hz				
	Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Auxiliary input	Remote start/stop Electrical trip CB close status (Generator closed auxiliary)				
Auxiliary output	CB open command (pulse) CB close command (pulse) Common shutdown Common warning kW overload System in auto mode Low speed detection Audible alarm (only when audible alarm is installed) Common electrical trip*1 Energize to stop*1 Fail to start alarm*1 Common alarm*1 Fail to start alarm*1 Over speed shutdown*1 Emergency stop*1 Oil pressure low shutdown*1 Coolant temperature high shutdown*1				
Status indicators	Generator at rest Generator available On load Generator stopping Cooling down Generator stopped Generator lock out Generator run indicator Remote start present indicator Generator ready indicator L.O filter clogged indicator Electrical trip indicator				
Controls	Voltage adjuster Frequency adjuster Emergency stop push button Key switch (STOP/RESET | ACTIVE | PANEL LOCK) Manual start button Manual stop/reset button Transfer to generator button (manual mode only) Open generator button (manual mode only) Alarm mute/Lamp test button Manual mode button Auto mode button Menu navigation buttons				

*1 require expansion unit
*2 Applicable for synchronising controller only

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MITSUBISHI HEAVY INDUSTRIES

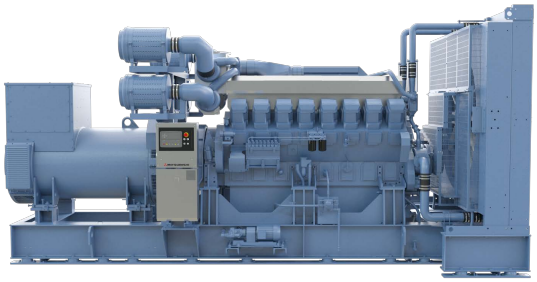

*image is for illustration purpose. It may not reflect actual product

MGS Mitsubishi Generator Series

MGS2000R

S16R-PTAR | 50 Hz

MITSUBISHI DIESEL GENERATOR

MGS Model		MGS2000R				
Frequency (Hz)		50				
Voltage (V)		380 - 415				
Duty		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Rated Output[1] (kVA)		2000		1800		1540
(kW)		1600		1440		1232
Engine Model		S16R-PTAR				
Fuel Consumption[2] (liter/hr) (% load)	25%	131		122		126
	50%	220		202		178
	75%	312		294		248
	100%	407		369		319
Generator	MG-	S7G				
Cooling System	Type	Closed looped circuit by integral radiator				
Length	(mm)	5210				5430
Width	(mm)	2160				2200
Height	(mm)	2585	2635	2585	2635	2765
Weight (Dry)	(kg)	12900	13100	12900	13100	13540
(Wet)	(kg)	13570	13770	13570	13770	14210

STANDARD & CERTIFICATIONS

- Certified to standards ISO 9001:2015
- Complies to G3 ISO8528-(1,3,5) sections, IEC60034-1 / BS EN60034-1, BS5000 Part 3, VDE0530, NEMA MG1-32, CSA22-2-100, AS1359 and UL1446
- Fully compliant with the NFPA110 Standard for Emergency and Standby Power
- Provides 100% load acceptance in one step to meet these demands

ENVIRONMENT PARAMETER

- Relative Humidity : 85%
- Altitude above sea level: 1000m
- Ambient Temperature: 5°C - 40°C (Please consult local MGS dealer for other requirements.)

ADVANCED CONTROL PANEL

- Rugged metal sheet with anti-vibrator isolator
- Operator-friendly interface and navigation
- Complete instrument and control accessories to meet a wide range of installation requirements
- Expansion module and custom programming are available for specific customer requirements

1: Output at 40°C, 1000m ASL with fan
2: Fuel consumption based on fuel density of 0.84 kg/L.
Fuel oil consumption may differ subject to site condition and specification of fuel. Not guaranteed value.

COMPLETE RANGE OF ACCESSORIES

- Power Panel
- Fuel System
- Exhaust System
- Starting/Charging System
- Mechanical Driven Radiator
- Engine Protection Synchronize Module

APPLICABLE CODES AND STANDARDS

MGS is designed in accordance with JIS, JEC, JEM, IEC, ISO (ISO15550, ISO 8528- (1,3,5) sections, ISO3046/1, JISB8002-1, DIN627, BS5514, BS5000, VDE00530, NEMA MG1-32, IEC60034, CSA (C22.2-100, AS1359) and manufacturer's standards unless otherwise specified.

Telephone Influence Factor (TIF) : Less than 50

Telephone Harmonic Factor (THF) : Less than 2%

Radio Interference : Suppression is in line with the provision of BS800 and VDE Class 0875G and 0895N

JIS : Japanese Industrial Standards

JEC : Japanese Electrotechnical Comittee

JEM : Standards of Japan Electrical Manufacturer's Association

IEC : International Electrotechnical Commission

ISO : International Standard Organization

**Codes may not be available in all model configurations. Please consult local MGS dealer for availability*

FUEL RATES

Based on ASTM D975, BS2869, and on fuel oil of 35°C API (16°C or 60°F) gravity having a LHV of 42,780kJ./kg (18,390 Btu/lb.) when used at 29°C (85°F) and weighing 838.9 g/liter (7.001lbs./U.S.gal.).

DIESEL ENGINE

		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Gross Engine Power (w/o fan basis)	(kWm)	1723		1553		1330
Engine Type		Four-cycled, water cooled, turbocharged with after cooler				
Speed	(RPM)	1500				
Brake mean effective pressure	(MPa)	2.1		1.9		1.6
Regenerative Absorption	(kW)	140				
No.of cylinder		16				
Broke / stroke	(mm)	170/180				
Total displacement	(liter)	65.37				
Compression ratio		14.0:1				
Piston Speed	(m/sec)	9.0				
Noise Level at 1m (Excluding: intake, exhaust & fan)	(dB(A))	111				
Governor	Type	Digital Electrical Type				
Frequency Regulation		G3 Class				
Steady State Frequency Band		±0.25%				
Heat Rejection to coolant	(kW)	1062		951		815
Heat Rejection to exhaust	(kW)	1334		1186		1016
Heat Rejection to atmosphere from engine	(kW)	128		115		98

LUBRICATION SYSTEM

Lubricating Oil Capacity	L	230
Lubricating System	Type	Forced lubricating by gear pump wet sump
Lubricating Oil Filter	Type	Paper element
Lubricating Oil Cooler	Type	Water cooled corrugated

COOLING SYSTEM

Coolant Capacity w/o Radiator /with Radiator	L	170 / 383
Coolant Pump External Resistance	kgf/cm^2	0.35
Coolant Pump Flow Rate	L/min	1650
Cooling Fan Airflow Rate	m^3/min	1950
Cooling Fan Airflow Restriction	kPa	0.1

ELECTRICAL SYSTEM

System Voltage	VDC	24
Starting System		Electric Starting
Starter Motor Capacity		7.5 kW x 2
Max. Allowable Resistance of Cranking Circuit	mΩ	1.5
Recommended Minimum Battery Capacity	Ah	400 (5℃ & above)
		600 (Below 5℃ to - 5℃)

GENERATOR

		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Generator	Type	Brushless, self-excited, self-ventilated and rotating field				
Configuration		3 Phase 4 Wire				
Protection		IP23				
Power Factor		0.8 Lagging				
No of Poles		4 Poles				
Insulation Class		Class H				
Temperature Rise		Class H Peak		Class H		Class F
AVR	Type	DAVR				
Voltage Regulation	Steady State	± 0.25%				
Wave Form Distortion		5% (Non-Distorting Balanced Linear Load)				
Unbalanced Loading		Maximum 25%				
Negative Phase Sequence		Maximum 8%				
Overspeed		Maximum 125% of nominal speed				

INLET AND EXHAUST SYSTEM

		Standby (ESP)	Critical Power (CP)	Prime (PRP)	Data Center Continuous Power (DCCP)	Continuous (COP)
Air Cleaner	Type	Turbo Filter	Paper Element	Turbo Filter	Paper Element	Paper Element
Combustion Air Inket Flow Rate	m^3/min	145		130		112
Exhaust Flow Rate	m^3/min	385		345		295
Max. Exhaust Gas Temperature	°C	550				
Exhaust Flange Size (Internal Diameter)		350A				
Allowable Exhaust Back Pressure	mm H20	600				

RATING DEFINITION IN ACCORDANCE WITH ISO8528-1

Duty	Overload	Load / Operating Hour		
		Avg. Load Factor/yr	Operating Hr/yr	Avg. Load Factor / 24hr
Standby (ESP)	Not Available	Maximum 70%	Maximum 500 hours	1. Maximum 80% 2. 100% in emergency
Prime (PRP)	+10% Overload	Maximum 70%	Unlimited	1. Maximum 80% 2. Overload operation (<110%) is limited to a maximum of 1hr per 12 hrs 3. Over 90% load operation limited to a maximum of 3 hrs/24hrs
Continuous (COP)	Not Available	Maximum 100%	Unlimited	Maximum 100%
Critical Power (CP)[3]	Not Available	Maximum 100%	Unlimited	Maximum 100%
Data Center Continuous Power (DCCP)[3,4]	+10% Overload	Maximum 100%	Unlimited	1. Maximum 100% 2. Overload operation (<110%) is limited to a maximum of 1hr per 12 hrs

3: UPTIME compliant: This DCCP rating meets the requirement of a Tier III and Tier IV data center site with no runtime limitation when the operation is loaded to 'N" demand for the engine generator set.
4: +10% overload is not recognized by Uptime for Tier Certification.

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