Power Generation Rating Definitions

Symbol	Name of rating (ISO 8528-1:2018 description)	Overload operation (Rack set)	Definition	Required conditions for warranty(*1)					Application
				Load/operating hour(*2)			Overhaul interval after delivery <Maximum>(*3)		
				Ave. load factor /24Hr	Ave. load factor /yr	Operating Hr/yr(*4)	Top	Major	
E	Critical Power Operation (no ISO equivalent)	n.a. (E)(*5)	Stand-by usage with the maximum 300hr continuous operation. Typically example : For Data center.	---	Maximum 100%	Unlimited	4yr (Only the case exceed 500Hr by 4yr)	600Hr or 8yr whichever comes earlier	Emergency, stand-by
E	Emergency standby power (ESP)	n.a (E)	Rated power of an emergency generator as Stand- by that supplies power in case of a failure of main power source or commercial power.	Maximum 80% (100% in emergency)	Maximum 70% (*7)	Maximum 500Hr (*7)	1000Hr or 4yr whichever comes earlier	2000Hr or 8yr whichever comes earlier	
					Maximum 60%		4yr	3000Hr or 8yr whichever comes earlier	
P	Limited-time running power (LTP)	10% (E)	Regular power source of which the operating hour is limited to the short period as specified in the required conditions for warranty in this document. This rating shall be used for applications that require overload operation with Stand-by.	Overload operation (≦ 110%) is limited to a max. of 1Hr per 12Hr.	Maximum 100% (*7)	Maximum 500Hr (*7)	4yr	1000Hr or 8yr whichever comes earlier	Seasonal peak cut
	Prime power (PRP)		For generators with variable load and unlimited operating hour.	Maximum 80% Overload operation (≦ 110%) is limited to a max. of 1Hr per 12Hr. Over 90% load operation is limited to a max. of 3Hr per 24Hr.	Maximum 70% (*7)	Unlimited (*7)	3500Hr or 4yr whichever comes earlier	7000Hr or 8yr whichever comes earlier	Daily peak cut, portable generator
					Maximum 60%		4000Hr or 4yr whichever comes earlier	8000Hr or 8yr whichever comes earlier	
DCP (*6)	Data centre power (DCP)	10% (E)	For generator in Data center application (where reliable grid is available)	100% load is allowed in case of grid failure. Overload operation (≦ 110%) is limited to a max. of 1Hr per 12Hr.	Maximum 100% (*7)	Unlimited (*7)	500Hr or 4yr whichever comes earlier	1000Hr or 8yr whichever comes earlier	Data center
C	Continuous power (COP)	n.a (C)	Rating that can continuously generate power without limitation for operating hour per year under the required conditions for warranty in this document.	Maximum 100%	Maximum 100% (*7)	Unlimited (*7)	6000Hr or 4yr whichever comes earlier (Recommended :4000Hr)	12000Hr or 8yr whichever comes earlier (Recommended :8000Hr)	Base load, cogeneration system
				Maximum 90%	Maximum 90%	Unlimited	8000Hr or 4yr whichever comes earlier (Recommended :6000Hr)	16000Hr or 8yr whichever comes earlier (Recommended :12000Hr)	
D		n.a. (D)	In addition to the for symbol C above, this rating shall be used 90% or higher average load factor or longer maintenance interval are required.	Maximum 100%	Maximum 100% (*7)	Unlimited (*7)	8000Hr or 4yr whichever comes earlier (Recommended :6000Hr)	16000Hr or 8yr whichever comes earlier (Recommended :12000Hr)	

(*1)This condition constitutes a part of required conditions for warranty that Mitsubishi Heavy Industries Engine & Turbocharger,Ltd.(hereinafter "MHIET") agrees with the other party under Diesel Engine Sales Contract with the party(hereinafter "Individual Contract"), however details of the warranty descriptions and the conditions shall be referred to the Individual Contract. Atmospheric condition as per ISO 15550:2002(JIS B 8003:2005) (Barometric pressure :100kPa, ambient temperature :298K, relative humidity :30%).

(*2)Average load factor(per day or year) shall be calculated as per the formula in ISO 8528-1:2018 'average power output(Ppp)'. (*3)Refer to Operation Manual for more information regarding inspection and maintenance including items and descriptions. (*4)Warranty coverage shall be expired after Major Overhaul.

(*5)For backup or emergency purpose engine, it is needed to have output margin of 5% or more for the customer demand output to avoid engine stall by output tolerance (ISO 15550) and frequency variation etc.

(*6)The rating is consistent with the requirement of a Tier **III** and Tier **IV** under the Uptime Institute.

(*7)Conditions are consistent with the requirements under ISO 8528-1:2018. (*8)Please follow T0102-0009E for S16R2-PTAW-E & S16R2-PTAW2-E.

★THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT PRIOR NOTIFICATION.

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MITSUBISHI DIESEL ENGINES

S6R/S12A2/S12H/S12R/S16R

Eco-friendly Engines, High in Quality and Easy to Maintain

MITSUBISHI ENGINE

MITSUBISHI DIESEL ENGINES

Environment friendly
Mitsubishi Diesel Engines comply with regulations on emissions control of the U.S. Enviromental Protection Agency (EPA).

Easy maintenance
Accessories requiring daily maintenance are conveniently located on the left side of the engine.

High-reliability design
Engine reliability is enhaced through the adoption of a simple design for optimal functional performance.

Full lineup meeting market needs
the series includes engines from 6 to 16 cylinders, with a wide range of optional equipment to meet diverse market requirements.

SH Series

The adoption of the best-matching in-house-developed ECUI, high-efficiency turbochargers and 2-way coolig system has enabled clean, eco-friendly engines.*

The adoption of an electronic control system makes for optimized variable injection timing, for improved low-temperature sustainability.

The adoption of a large-sized intercooler enables combustion under high loads.

SR, SA Series

In-house developed high performance turbochargers provide outstanding engine performance under all loads.

High reliability is achieved through the adoption of high-quality parts while retaining the superior features of earlier models.

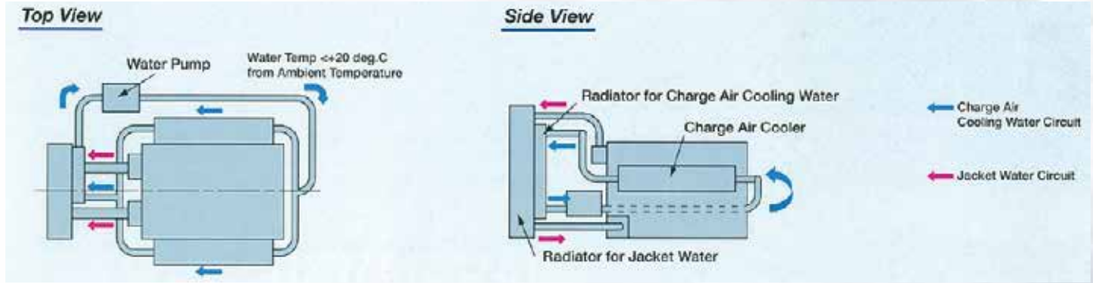
The adoption of a large-sized intercooler enables stable combustion under high loads.

For easier maintenance, SR engines adopt cartridge-type fuel and oil filters and standalone cylinder heads. A large inspection window is also provided. The result is superlative maintainability in addition to high quality.

PTAW (2-way cooling system)*

PTAW models feature a 2-way cooling system. By separating the cooling system from the intercooler for the jacket water, Mitsubishi succeeded in achieving cooler intake-air temperature than with earlier models. This has enabled lower exhaust gas emissions and improved combustion.

*Only for EPA Tier 2 Certified engines



SPECIFICATIONS

Tier 1

Model		S6R-Y1PTA-4	S12A2-Y1PTA-1	S12H-Y1PTA-3	S12R-Y1PTA-2	S16R-Y1PTA2	S16R-Y1PTAA2-1 (Dimensions include radiator)
Type		4 cycle, watercooled, turbocharged diesel engine					
Cylinder Arrangement piston bore x stroke		6-170 x 180 (0.2 x 6.7 x 7.1)	12-150 x 160 (0.47 x 5.9 x 6.3)	12-150 x 175 (0.47 x 5.9 x 6.9)	12-170 x 180 (0.47 x 6.7 x 7.1)	16-170 x 180 (0.62 x 6.7 x 7.1)	16- 170x180 (0.62 x 6.7 x 7.1)
Total Displacement		24.51	33.93	37.11	49.03	65.37	65.37
Combustion System		Direct Injection					
Dimensions	Length: mm (inches)	1945.5 (76.6)	2014.5 (79.3)	2250.2 (88.6)	2568. (101.1)	3223. (126.9)	3975. (156.5)
	Width: (mm) (inches)	1085.5 (42.7)	1449.7 (57.1)	1499.9 (59.1)	1454.5 (57.3)	1454.5 (57.3)	2392. 94.17
	Height: mm (inches)	1498.0 (59.0)	1541.5 (60.7)	1693.5 (66.7)	1592 (62.7)	1810.0 (71.3)	3276. 128.98
Dry Weight kg (lbs)		2300 (5072)	3250 (7166)	4300 (9482)	4800 (10584)	6200 (13671)	6443 (14207)
Starting System		Electric Starting with Cell Motor					
Fuel Oil		Diesel Fuel Oil (ISO8217 DMX, ASTM No. 2-D)					
Standby power	HF 60Hz~1800rpm (kW)	898 (670)	1207 (900)	1528 (1140)	1881 (1403)	2346 (1750)	2882 (2150)
Prime power	HF 60Hz~1800rpm (kW)	816 (609)	1099 (820)	1389 (1036)	1709 (1275)	2133 (1591)	2620 (1955)

Tier 2

Model		S6R-Y2PTAW-1	S12A2-Y2PTAW-2	S12H-Y2PTAW-1	S12R-Y2PTAW-1	S16R-Y2PTAW-1	S16R-Y2PTAW2-1
Type		4 cycle, watercooled, turbocharged diesel engine					
Cylinder Arrangement piston bore x stroke		6-170 x 180 (0.2 x 6.7 x 7.1)	12-150 x 160 (0.47 x 5.9 x 6.3)	12-150 x 175 (0.47 x 5.9 x 6.9)	12-170 x 180 (0.47 x 6.7 x 7.1)	16-170 x 180 (0.62 x 6.7 x 7.1)	16- 170x180 (0.62 x 6.7 x 7.1)
Total Displacement		24.51	33.93	37.11	49.03	65.37	65.37
Combustion System		Direct Injection					
Dimensions	Length: mm (inches)	1872.0 (73.7)	2098.5 (82.6)	2173.2 (85.56)	2490.5 (98.05)	3045.5 (119.9)	3045.5 (119.9)
	Width: (mm) (inches)	1085.5 (42.7)	1555.5 (61.2)	1673.6 (65.9)	1457.0 (57.4)	1457.0 (57.4)	1457.0 (57.4)
	Height: mm (inches)	1498.0 (59.0)	1542.0 (60.7)	1693.5 (66.7)	1646.5 (64.8)	1810.0 (71.3)	1810.0 (71.3)
Dry Weight kg (lbs)		2705 (5964)	3380 (7452)	4300 (9480)	5270 (11618)	6530 (14396)	6680 (14727)
Starting System		Electric Starting with Cell Motor					
Fuel Oil		Diesel Fuel Oil (ISO8217 DMX, ASTM No. 2-D)					
Standby power	HF 60Hz~1800rpm (kW)	918 (685)	1207 (900)	1528 (1140)	1881 (1403)	2346 (1750)	2923 (2180)
Prime power	HF 60Hz~1800rpm (kW)	835 (623)	1099 (820)	1389 (1036)	1709 (1275)	2133 (1591)	2657 (1982)

NOTES: 1) Specifications are based on North American standards, variable according to conditions.
2) HP value is deirved from the formula: HP= kWm/0.746
3) Ratings are based on SAE J1349 standard conditions of 100kPa (29.61 inHg) barometric pressure and 25° C(77° F) intake air temperature. These ratings also apply at ISO 3046/1, DIN 6271 and BS 5514 standard conditions of 100kPa (29.61 inHg), 27° C (81° F) and 60% relative humidity.
4) The above output ratings apply when no fan is used.
5) Output ratio on engine nameplate refers to standby power.