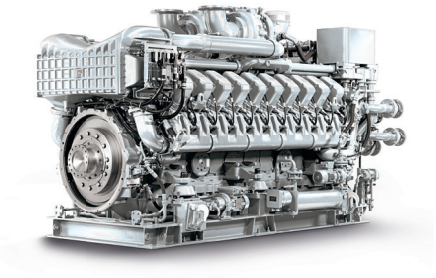
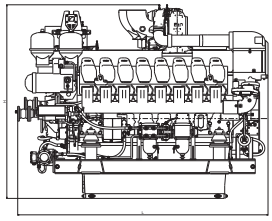
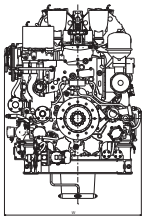
Offshore Oil & Gas

ENGINE PLUS SYSTEM

Diesel engines series 4000 P03







Optional equipment and finishing shown. Standard may vary.

Engine	Dimensions (LxWxH) mm (in)	Mass, dry kg (lbs)
12V	2750 x 1850 x 2140 (108 x 73 x 84)	8300 (18298)
16V	3250 x 1850 x 2140 (128 x 73 x 84)	10100 (22267)
20V	3650 x 1850 x 2140 (144 x 73 x 84)	11800 (26015)

All dimensions are approximate, for complete information refer to the installation drawing.

Engine		
Engine type		12V/16V/20V 4000 P63/83
Application type		3A/3B/3C
Bore/stroke	mm (in)	170/210
Cylinder configuration		90°V
Displacement/cylinder	l (cu in)	4.77 (290 cu. in.)
Displacement, total	l (cu in)	12V: 57.2; 16V: 76.3; 20V: 95.5
Fuel specification		acc. to MTU fluids & lubricants spec A001061
Emission compliance		IMO II, IMO III (with optional exhaust aftertreatment), EPA Tier 2 (60Hz versions), EPA Tier 3 (with optional exhaust aftertreatment)

Application	Power definition	
3A	Continuous Power	Continuous operation with load factor < 100% power, operating hours unrestricted, 10% overload capability (ICXN)
3B	Prime Power	Continuous operation, variable load with load factor < 75%, operating hours unrestricted, 10% overload capability (ICXN)
3C	Prime Power Limited	Standby operation, variable load with load factor < 75%, operating hours max. 1000 h/year, 10% overload capability (ICXN)

Power output within 5% tolerance at standard conditions. Power definition according to ISO 3046 (ratings also correspond to SAE J 1995 and SAE J 1349 standard conditions)
Consult your MTU distributor/dealer for the rating that will apply to your specific application.

A Rolls-Royce solution

		Continuous Power 3A		Prime Power 3B		Prime Power limited 3C	
Frequency	Hz	50/60		50/60		50/60	
Application		3A	3B/3C	3A	3B/3C	3A	3B/3C
Engine speed	rpm	1500/1800	1500/1800	1500/1800	1500/1800	1500/1800	1500/1800
Engine power	kW	1350/1455	1560/1680	1800/1940	2080/2240	2245/2425	2600/2800
Consumption at Load							
100%	g/kWh	204/203	202/207	198/205	197/204	207/209	211/215
75%	g/kWh	204/211	202/207	201/211	199/205	210/211	206/209
50%	g/kWh	213/223	209/217	209/223	205/216	220/222	215/218
Air Intake							
Intake air depression max.	mbar	50	50	50	50	50	50
Intake air flow at 100% load	m/s	1.6/2.1	1.8/2.5	2.0/2.9	2.3/3.2	2.9/4.0	3.5/4.4
Exhaust System							
Exhaust volume flow at 100% load	m/s	3.8/4.5	4.3/5.5	5.1/6.4	5.9/7.2	6.8/8.3	8.2/9.6
Exhaust gas temperature at 100% load	°C	500/395	493/395	480/395	480/395	495/375	470/410
Exhaust back pressure max.	mbar	85	85	85	85	85	85
Lube System							
Engine oil capacity, initial fill	ltr	245	245	300	300	335	335
Noise Level							
Surface airborne noise level at 1m	dB(A)	102/104	102/106	105/105	106/106	103/106	106/105
Exhaust noise level at 1 m (unsilenced)	dB(A)	105/105	106/106	TBA/111	109/109	112/114	114/115

Standard equipment	
Plus system	- Designed in accordance to oil & gas offshore industry standards - Modular concept with pre-defined options - All auxiliary equipment preinstalled on a small base frame including carbon steel tubing, hose lines and terminal points for customer connection - Flanged interfaces (ASME B16.5)
Starting System	- Electric starter motor 15 KW
Fuel system	- Common rail injection system, 1800 bar - Double walled high pressure injection pipes with leakage monitoring - Duplex fuel filters with changeover valve 2x 100% - Duplex fuel pre-filter 2x 100% with water separator and water level sensor
Lube oil system	- Automatic lube oil filter - Pre-lubrication unit with electric motor driven pump (non ATEX) - Lube oil centrifuge - Closed crankcase breather system - Dipstick for lube oil measurement - Hand pump for lube oil extraction
Combustion air system & exhaust system	- Air filters - Exhaust turbochargers and manifolds water cooled (reduced surface temp) - Vertical exhaust gas outlet - Exhaust gas bellows/compensators with counter flanges
Cooling system	- High temp engine jacket & low temp charge air coolant circuits with engine driven coolant pumps - Coolant thermostats in HT and LT circuits - HT pre-heating unit including pump and electric motor (non ATEX)
Mounting	- Engine mounting brackets for resilient mounting - Resilient engine mounts, height adjustable - Small base frame
Paint System	- Offshore paintwork solvent-based, 2K epoxy paint system - Colors to RAL- 5007, 7001, 7023, 3000, 3001, 3020, 9020 - Increased coat thickness for offshore applications – DFT min 140 µm
Power Transmission	- SAE 00 flywheel housing - Flywheel 21“ - Vibration damper - Resilient coupling

Standard equipment	
Control/Monitoring – ADEC Advanced Diesel Engine Controller	- Engine monitoring of operating parameters and alarms - Engine protection against critical operating parameters - CAN communication to SAM (customer interface module) - Hardware I/O (digital analog) - Engines speed control - Over speed detection - Island and parallel operation (droop) - Override possibility (Test-, EMG-, FWP- or essential operating mode) - Invertible digital inputs (NO or NC contacts) - Self-monitoring
SAM	- Display of fault codes - Hardware I/O - Communication protocol (SAEJ1939 or Siemens RK512) - Interface for diagnostics - Diagnostic lamp - Control keys for parameter setting - Monitoring and protection of generator temperatures
Documentation	- General arrangement drawing - P&ID - Wiring/schematic diagrams - Utility consumption list - Fabrication and quality control plan (ITP) - Equipment & instrument data sheet - Torsional critical speed analysis - Welding certificates and procedures - Testing FAT procedure & report - NDE, paint procedure & report - Fluids and lubricants schedule - Operation and maintenance manual - Installation, erection, commissioning and start-up manuals - Packing list - Declaration of incorporation

Optional Equipment	
Starting System	- Redundant starting systems - Air turbine starter - Hydraulic starter - Battery charging alternator 28 VDC - Connecting parts for air starting system including 1 1/2“ ANSI flange, electric starting valve and pressure reduction valve - Soft engagement valve for hydraulic starting system
Fuel system	- Fuel return cooler (non ATEX/ATEX) - Fuel pre-filter with water level sensor (non ATEX/ATEX), differential pressure switch and intermediate piping
Lube oil system	- Pre-lubrication unit with electric motor driven pump (ATEX) - Electric motor driven pump for lube oil extraction/filling (non ATEX/ATEX) - Deeper oil sump - for higher inclinations (25° in all directions) - Lube oil level monitoring & replenishment
Combustion air system & exhaust system	- Air shut off flaps - Horizontal exhaust gas outlet (16V, 20V only) - Exhaust gas bifurcation for single outlet - Exhaust gas silencer with spark arrestor
Cooling system	- Coolant connections: - LT pre-heating unit (for use in cold conditions) (non ATEX/ATEX) - Weld on flanges with rubber bellows - Connections for rubber hoses - HT pre-heating unit including pump and electric motor (ATEX) - Expansion tank incl. breather cap, level glass and threads for level monitoring sensors
Paint System	- Other RAL colors
Power Transmission	- Add. PTO´s for auxiliary equipment (hydro. pumps)
Control / Monitoring – ADEC Advanced Diesel Engine Contr.	- Engine monitoring unit (EMU) - NFPA 20 (2010) redundant governor

Optional Equipment	
LOP - Local Operator Panel	- Interface terminal box to customer control panel - Touchscreen HMI - Visible indication of main operating values e.g.: - Speed - Lube oil pressure - Coolant temperature - Material: stainless steel 316L - Dims L x H x W: 800 x 800 x 350 mm (typical) - Weight: 65 kg (typical) - Onskid installation - Emergency stop push button - Switch remote/local/off - Start/stop push button - Alarm horn - Generator winding and bearing temperature - Monitoring - Anti condensation heater - Starter control - Control and monitoring of onskid auxiliaries - Remote services/monitoring - Protocol: Profibus - Generator control - Load sharing
Certifications	- According to classification authorities (ABS, DNV, LRS, BV, GL, RS, CCS)
Documentation	- Other documents on request

Subject to change without notice. Customization possible.
Engines illustrated in this document may feature options not fitted as standard to standard engine.

Subject to change. | 3239971 | Edition 01/19 | ESM 2019-08.