



C&I, Agriculture, Mining

SOLUTION GUIDE

Edition 1/19, valid from 10/2019



A Rolls-Royce
solution

CONTENTS

Contents	02	Automation	38
Pioneering the Power that matters	04	Engine data	44
Engine designation	06	Cylinder data, dimensions and masses	
General specifications	07	Parts & Service	60
Selection guideline	08	MTU ValueCare	
Applications		Exhaust emissions	70
5A - Diesel engines for heavy duty operation;		Emission Flex Package	72
75 kW - 1865 kW	10	Conversion table	75
5B - Diesel engines for medium duty operation;			
110 kW - 3000 kW	20		
5C - Diesel engines for short-time operation;			
290 kW - 496 kW	32		
Diesel engines for underground mining;			
75 kW - 429 kW	34		



PIONEERING THE POWER THAT MATTERS

Rolls-Royce provides world-class power solutions and complete life-cycle support under our product and solution brand MTU. Through digitalization and electrification, we strive to develop drive and power generation solutions that are even cleaner and smarter and thus provide answers to the challenges posed by the rapidly growing societal demands for energy and mobility. We deliver and service comprehensive, powerful and reliable systems, based on both gas and diesel engines, as well as electrified hybrid systems. These clean and technologically-advanced solutions serve our customers in the marine and infrastructure sectors worldwide.

A solution provider

MTU systems power the largest yachts, the strongest tugboats and the biggest land vehicles and provide energy for the world's most important mission-critical applications. Through advanced solutions such as microgrids, we integrate renewable energies and manage the power needs of our customers.

Our customized service offerings help you maximize uptime and performance and are supported by our digital solutions, which enable remote monitoring, predictive maintenance and a range of other benefits that keep your systems running at their best.

For over 110 years, we have provided innovative power solutions for our customers – meeting even the most demanding drive requirements. Our products and services span a wide range of applications and power needs, with both standard and customized options.

An expert in technology

As part of Rolls-Royce, we have long been known for cutting-edge innovation and technological leadership in product development. That same spirit of innovation inspires our sustainability efforts. Our focus is on developing and implementing system solutions that both maximize efficiency and reduce emissions -- which in turn work to reduce our impact on the environment.

A passionate and reliable partner

We at Rolls-Royce spend every day working together with our customers, to deliver engines, systems and complete life-cycle solutions that best fit your needs. We understand that each application is different and has its own specific demands. Our engineers embrace the challenge of finding the perfect solution for your unique power requirements. Every step of the way – from project planning, through design, delivery and commissioning; to the lifetime care of your equipment – we are dedicated to helping you get the most from your MTU investment.

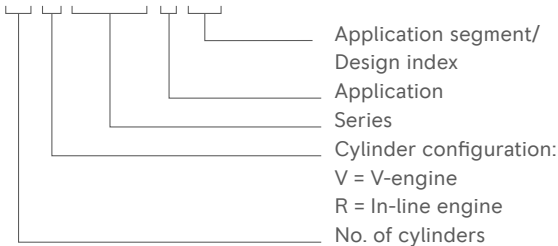


EXPLANATION OF THE ENGINE DESIGNATION

Series 900, 460, 1000, 1100, 1300, 1500, 2000, 4000 –

Example

16 V 4000 C 23



On-Highway engine
from Mercedes-Benz:

OM 934
OM 936
OM 470
OM 471
OM 473

Our Off-Highway
engine:

MTU 4R 1000
MTU 6R 1000
MTU 6R 1100
MTU 6R 1300
MTU 6R 1500

GENERAL SPECIFICATIONS

Diesel engines for mobile industrial, agricultural and mining applications

- Four-stroke, direct-injection
- Liquid-cooling and air-cooling
- V or In-line configuration

Power definition

Rated power of diesel engines in this sales program corresponds to ISO 3046

ICFN = ISO standard (continuous) fuel stop power

IFN = ISO standard fuel stop power

(ratings also apply to SAE J1995 and J1349 standard conditions)

Standard conditions for diesel engines

Barometric pressure: 1000 mbar

Site altitude above sea level: 100 m

Cooling variants	
Separate circuit charge air cooling	2000/4000
Air-to-air charge-air cooling	460/900/S60/ 1000/1100/1300/1500

We apply a policy of continual products and systems improvements. Please note, specifications are subject to change without notice. All dimensions are approximate. Details are subject to options selected. Please contact your distributor for current information and binding data.

For further information on our C&I, Agriculture and Mining products please contact your distributor or visit:
www.mtu-solutions.com

Selection Guideline

TYPICAL APPLICATIONS

5A - Diesel engines for heavy duty operation
Rating definition: Continuous operation with up to 100% load
Operating hours: unrestricted
5B - Diesel engines for medium duty operation
Rating definition: Continuous operation with variable load
Operating hours: unrestricted
5C - Diesel engines for short-time operation
Rating definition: Intermittent operation with variable load
Operating hours: max. 1000 hours per year
Diesel engines for underground mining
Automation
CaPoS smart edition
Engine management system - typical configuration
Series 460 and 900
motivline – the management technology for
mining applications with Series 4000-03
Engines data
Cylinder data, dimensions and masses, weight/power ratio
Parts & Service
MTU ValueCare
A portfolio of valuable products and services
Exhaust emissions, emission flex package and conversion table

For information on specific on-highway certificates please contact your distributor.

75 – 1865 kW	Page
Load factor > 60%	
Fuel stop power (ICFN)	10 - 19
110 – 3000 kW	Page
Load factor < 60%	
Fuel stop power (ICFN)	20 - 31
290 – 496 kW	Page
Load factor > 60%	
Fuel stop power (ICFN)	32 - 33
75 – 429 kW	Page
	34 - 37
	Page
	38 - 43
	Page
	44 - 59
	Page
	60 - 69
	Page
	70 - 75

Diesel engines for C&I, Agriculture and Mining applications

75 – 295 KW
(101 – 396 BHP)

> Intake air temperature: 25°C

5A – Heavy duty operation

Series 900

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Air-to-air charge-air cooling		
4R 904 C21	75	101	2200
4R 904 C31	90	121	2200
4R 924 C22	95	127	2200
6R 906 C21	130	174	2200
6R 906 C31	150	201	2200
6R 926 C22	175	235	2200
6R 926 C32	195	261	2200

Series 460

6R 460 C11R	220	295	1800
6R 460 C11	242	325	1800
6R 460 C21	260	349	1800
6R 460 C31	295	396	1800
6R 460 C22	265	355	1800
6R 460 C32	295	396	1800

Optimization:	20	EPA Nonroad T3 Comp (40CFR89)
	23	EU Nonroad St IIIA Comp (97/68/EC)
	29	China Onroad Stage V (GB17691-2005)
	31	China NRMM Stage III (GB20981-2014)
	38	EPA Nonroad T4i Comp (40CFR1039)
	39	EU Nonroad St IIIB Comp (97/68/EC)

All 5A-ratings can be used for 5B applications!

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Peak torque			Optimization
Nm	lb-ft	rpm	
400	295	1200-1600	20, 23, 31
470	347	1200-1600	20, 23, 31
550	406	1200-1600	38, 39
700	516	1200-1600	20, 23, 31
750	553	1200-1600	20, 23, 31
850	627	1200-1600	38, 39
1020	752	1200-1600	38, 39
1400	1033	1300	20, 23, 31
1600	1180	1300	20, 23, 31
1750	1291	1300	20, 23, 31
1900	1401	1300	20, 23, 31
1850	1290	1300	29, 38, 39
2000	1475	1300	29, 38, 39

Diesel engines for C&I and Mining applications

224 – 336 kW (300 – 450 BHP)

> Intake air temperature: 25°C

5A – Heavy duty operation

Series 60 (12.7 l)

Engine model	Reference no.	Rated power ICFN		
		kW	bhp	rpm
		Air-to-air charge-air cooling		
S60 (12.7 l)	6063MK33	224	300	2100
	6063MK33	242	325	2100
	6063MK33	261	350	2100
	6063MK33	280	375	2100
	6063MK33	298	400	2100
	6063MK33	298	400	2200

Series 60 (14 l)

S60 (14 l)	6063HK33	336	450	2100
	6063HV33	242	325	2100
	6063HV33	280	375	2100
	6063HV33	298	400	2100
	6063HV33	317	425	2100
	6063HV33	336	450	2100

Optimization:	5	EU Nonroad St II Comp (97/68/EC)
	19	EPA Nonroad T2 Comp (40CFR89)
	20	EPA Nonroad T3 Comp (40CFR89)
	23	EU Nonroad St IIIA Comp (97/68/EC)
	31	China NRMM Stage III (GB20981-2014)

All 5A-ratings can be used for 5B applications!

Peak torque			Optimization
Nm	lb-ft	rpm	
1424	1050	1350	5, 19
1559	1150	1350	5, 19
1831	1350	1350	5, 19
1831	1350	1350	5, 19
1898	1400	1350	5, 19
1830	1350	1350	5, 19
2237	1650	1350	5, 19
1559	1150	1350	20, 23, 31
1830	1350	1350	20, 23, 31
1898	1400	1350	20, 23, 31
2000	1475	1350	20, 23, 31
2102	1550	1350	20, 23, 31

Diesel engines for C&I, Agriculture and Mining applications

100 – 400 kW
(134 – 536 BHP)

> Intake air temperature: 25°C

5A – Heavy duty operation

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Air-to-air charge-air cooling		
4R 1000 C10	100	134	2200
4R 1000 C20	115	154	2200
4R 1000 C30	129	173	2200
6R 1000 C20	180	241	2200
6R 1000 C30	210	282	2200
6R 1100 C30	280	375	1700
6R 1300 C20	320	429	1700
6R 1300 C30	340	456	1700
6R 1500 C30	400	536	1700

Optimization: 21 EPA Nonroad T4 (40CFR1039)
27 EU Nonroad St IV (97/68/EC) Compliant
40 UN ECE R96 Emission Flex Package (EFP)

All 5A-ratings can be used for 5B applications!

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Peak torque			Optimization
Nm	lb-ft	rpm	
600	443	1200-1500	21, 27, 40
675	498	1200-1500	21, 27, 40
750	553	1200-1600	21, 27, 40
1000	738	1200-1600	21, 27, 40
1150	848	1200-1600	21, 27, 40
1900	1401	1300	21, 27, 40
2100	1549	1300	21, 27, 40
2200	1623	1300	21, 27, 40
2600	1918	1300	21, 27, 40

Series 1500 // 1300 // 1100 // 1000

Diesel engines for C&I, Agriculture and Mining applications

115 – 400 KW
(154 – 536 BHP)

> Intake air temperature: 25°C

5A – Heavy duty operation

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Air-to-air charge-air cooling		
4R 1000 C21	115	154	2200
4R 1000 C31	129	173	2200
6R 1000 C11	180	241	2200
6R 1000 C21	195	261	2200
6R 1000 C31	210	282	2200
6R 1100 C11	240	322	1600
6R 1100 C21	260	349	1600
6R 1100 C31	280	375	1600
6R 1300 C21	320	429	1600
6R 1300 C31	340	456	1600
6R 1500 C21	380	510	1600
6R 1500 C31	400	536	1600

Optimization: 45 EU Nonroad St V (2016/1628)
47 EU Nonroad St V (2016/1628) + EPA Nonroad T4

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Peak torque			Optimization
Nm	lb-ft	rpm	
675	498	1200-1500	45, 47
750	553	1200-1600	45, 47
1000	738	1200-1600	45, 47
1100	811	1200-1600	45, 47
1200	885	1200-1600	45, 47
1700	1254	1300	45, 47
1800	1328	1300	45, 47
1900	1401	1300	45, 47
2200	1623	1300	45, 47
2300	1696	1300	45, 47
2600	1918	1300	45, 47
2700	1991	1300	45, 47

Series 1500 // 1300 // 1100 // 1000

Diesel engines for C&I and Mining applications

1150 – 1865 KW
(1542 – 2500 BHP)

- > Intake air temperature: 25°C
- > Charge-air coolant temperature: 45°C

5A – Heavy duty operation

Series 4000

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Separate circuit charge-air cooling (SCCC)		
12V 4000 C15	1150	1542	1800
12V 4000 C33R	1150	1542	1800
12V 4000 C11R	1193	1600	1900
12V 4000 C13R	1193	1600	1800
12V 4000 C25	1250	1676	1800
12V 4000 C11	1286	1725	1900
12V 4000 C13L	1425	1910	1800
12V 4000 C33	1450	1945	1800
16V 4000 C13R	1492	2000	1800
12V 4000 C35	1500	2012	1800
16V 4000 C11R	1600	2146	1800
16V 4000 C11	1715	2300	1900
16V 4000 C13	1750	2345	1800
16V 4000 C13	1750	2345	1900
16V 4000 C13L	1865	2500	1800/1900

- Optimization:
- X

2

19

21

31
- Fuel consumption optimized

EPA Nonroad T1 Comp (40CFR89)

EPA Nonroad T2 Comp (40CFR89)

EPA Nonroad T4 (40CFR1039)

China NRMM Stage III (GB20981-2014)

All 5A-ratings can be used for 5B applications!

Peak torque			Optimization
Nm	lb-ft	rpm	
7351	5422	1494	21
on request			X
7612/7595	5614/5602	1500	X, 2
7595	5600	1500	X, 19, 31
7990	5893	1494	21
6985	5151	1500	X, 2
9070	6690	1500	X, 19, 31
on request			X
9520	7022	1350	X, 19, 31
9588	7072	1494	21
10188	7515	1500	2
9313	6896	1500	X, 2
11141	8216	1500	X, 19, 31
11141	8216	1500	X
11870	8754	1500	X, 19, 31

Diesel engines for C&I, Agriculture and Mining applications

110 – 375 KW
(148 – 503 BHP)

> Intake air temperature: 25°C

5B – Medium duty operation

Series 900

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Air-to-air charge-air cooling		
4R 904 C61	110	148	2200
4R 904 C71	129	173	2200
4R 924 C71	145	194	2200
4R 924 C52	115	154	2200
4R 924 C62	129	173	2200
4R 924 C72	150	201	2200
6R 906 C51	170	228	2200
6R 906 C61	190	255	2200
6R 906 C71	205	275	2200
6R 926 C61	220	295	2200
6R 926 C71	240	322	2200
6R 926 C52	210	282	2200
6R 926 C62	225	302	2200
6R 926 C72	240	322	2200

Series 460

6R 460 C41	315	422	1800
6R 460 C51	335	449	1800
6R 460 C61	360	483	1800
6R 460 C71	375	503	1800
6R 460 C42	315	422	1800
6R 460 C52	335	449	1800
6R 460 C62	360	483	1800
6R 460 C72	375	503	1800

Optimization: 20 EPA Nonroad T3 Comp (40CFR89)
23 EU Nonroad St IIIA Comp (97/68/EC)
29 China Onroad Stage V (GB17691-2005)
31 China NRMM Stage III (GB20981-2014)
38 EPA Nonroad T4i Comp (40CFR1039)
39 EU Nonroad St IIIB Comp (97/68/EC)

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Peak torque			Optimization
Nm	lb-ft	rpm	
580	428	1200-1600	20, 23, 31
675	498	1200-1600	20, 23, 31
705	520	1200-1600	20, 23, 31
610	450	1200-1600	38, 39
675	498	1200-1600	38, 39
800	590	1200-1600	38, 39
810	595	1200-1600	20, 23, 31
1000	735	1200-1600	20, 23, 31
1100	810	1200-1600	20, 23, 31
1200	885	1200-1600	20, 23, 31
1300	960	1200-1600	20, 23, 31
1120	826	1200-1600	38, 39
1200	885	1200-1600	38, 39
1300	959	1200-1600	38, 39
2000	1475	1300	20, 23, 31
2000	1475	1300	20, 23, 31
2200	1623	1300	20, 23, 31
2200	1586	1300	20, 23, 31
2000	1475	1300	29, 38, 39
2000	1475	1300	29, 38, 39
2200	1620	1300	29, 38, 39
2200	1620	1300	38, 39

Diesel engines for C&I and Mining applications

317 – 429 KW
(425 – 575 BHP)

5B – Medium duty operation

Series 60 (12.7 l)

Engine model	Reference no.	Rated power ICFN		
		kW	bhp	rpm
	Air-to-air charge-air cooling			
S60 (12.7 l)	6063MK33	317	425	2100
	6063MK33	332	445	2200
	6063MK33	336	450	2100
	6063MK33	354	475	2100

Series 60 (14 l)

S60 (14.0 l)	6063HV33	354	475	2100
	6063HV33	373	500	2100
	6063HV33	391	525	2100
	6063HV33	397	533	2000
	6063HV33	410	550	2100
	6063HK33	391	525	2100
	6063HK33	397	533	2000
	6063HK33	410	550	2100
	6063HK33	410	550	2300
	6063HK33	429	575	2100

- Optimization: 5 EU Nonroad St II Comp (97/68/EC)
19 EPA Nonroad T2 Comp (40CFR89)
20 EPA Nonroad T3 Comp (40CFR89)
23 EU Nonroad St IIIA Comp (97/68/EC)
31 China NRMM Stage III (GB20981-2014)

Peak torque			Optimization
Nm	lb-ft	rpm	
2000	1475	1350	5, 19
2000	1475	1350	5, 19
2102	1550	1350	5, 19
2102	1550	1350	5, 19
2102	1550	1350	20, 23, 31
2102	1550	1350	20, 23, 31
2373	1750	1350	20, 23, 31
2373	1750	1350	20, 23, 31
2373	1750	1350	20, 23, 31
2373	1750	1350	5, 19
2373	1750	1350	5, 19
2373	1750	1350	5, 19
2373	1750	1350	5, 19
2373	1750	1350	5, 19

Diesel engines for C&I, Agriculture and Mining applications

150 – 460 KW
(201 – 617 BHP)

> Intake air temperature: 25°C

5B – Medium duty operation

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Air-to-air charge-air cooling		
4R 1000 C40	150	201	2200
4R 1000 C50	170	228	2200
6R 1000 C40	230	308	2200
6R 1000 C50	260	349	2200
6R 1100 C40	300	402	1700
6R 1100 C50	320	429	1700
6R 1300 C40	360	483	1700
6R 1300 C50	380	510	1700
6R 1300 C60	390	523	1700
6R 1500 C50	430	577	1700
6R 1500 C60	460	617	1700

Optimization: 21 EPA Nonroad T4 (40CFR1039)
27 EU Nonroad St IV (97/68/EC) compliant
40 UN ECE R96 Emission Flex Package (EFP)

manufactured by



customized by



Peak torque			Optimization
Nm	lb-ft	rpm	
800	590	1200-1600	21, 27, 40
900	664	1200-1600	21, 27, 40
1250	922	1200-1600	21, 27, 40
1400	1033	1200-1600	21, 27, 40
2000	1475	1300	21, 27, 40
2100	1549	1300	21, 27, 40
2300	1696	1300	21, 27, 40
2380	1755	1300	21, 27, 40
2460	1814	1300	21, 27, 40
2750	2028	1300	21, 27, 40
2900	2139	1300	21, 27, 40

Series 1500 // 1300 // 1100 // 1000

Diesel engines for C&I, Agriculture and Mining applications

150 – 480 KW
(201 – 644 BHP)

> Intake air temperature: 25°C

5B – Medium duty operation

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Air-to-air charge-air cooling		
4R 1000 C41	150	201	2200
4R 1000 C51	170	228	2200
6R 1000 C41	230	308	2200
6R 1000 C51	260	349	2200
6R 1000 C61	280	375	2200
6R 1100 C41	300	402	1600
6R 1100 C51	320	429	1600
6R 1100 C61	340	456	1600
6R 1300 C41	360	483	1600
6R 1300 C61	390	523	1600
6R 1500 C51	430	577	1600
6R 1500 C61	460	617	1600
6R 1500 C71	480	644	1600

Optimization: 45 EU Nonroad St V (2016/1628)
47 EU Nonroad St V (2016/1628) + EPA Nonroad T4

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customized by



Peak torque			Optimization
Nm	lb-ft	rpm	
850	627	1200-1600	45, 47
950	701	1200-1600	45, 47
1300	959	1200-1600	45, 47
1450	1069	1200-1600	45, 47
1550	1143	1200-1600	45, 47
2000	1475	1300	45, 47
2100	1549	1300	45, 47
2200	1623	1300	45, 47
2400	1770	1300	45, 47
2600	1918	1300	45, 47
2850	2102	1300	45, 47
3000	2213	1300	45, 47
3100	2286	1300	45, 47

Series 1500 // 1300 // 1100 // 1000

Diesel engines for C&I and Mining applications

783 – 2013 KW (1050 – 2699 BHP)

- > Intake air temperature: 25°C
- > Charge-air coolant temperature: 45°C

5B – Medium duty operation

Series 2000

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Separate circuit charge-air cooling (SCCC)		
12V 2000 C66R*	783	1050	1800
12V 2000 C66	783	1050	2100
16V 2000 C66	970	1301	2100

Series 4000

12V 4000 C21R	1398	1875	1900
16V 4000 C21R	1492	2000	1900
12V 4000 C21	1510	2025	1900
12V 4000 C23R	1510	2025	1800
12V 4000 C23R	1510	2025	1900
12V 4000 C23	1680	2253	1800/1900
12V 4000 C55	1750	2347	1900
12V 4000 C65	1864	2500	1800
12V 4000 C65	1864	2500	1900
16V 4000 C21	1864	2500	1900
16V 4000 C45	2000	2682	1800
16V 4000 C21L	2013	2699	1900

- Optimization:
- X

2

19

21

31

38

*
- Fuel consumption optimized
EPA Nonroad T1 Comp (40CFR89)
EPA Nonroad T2 Comp (40CFR89)
EPA Nonroad T4 (40CFR1039)
China NRMM Stage III (GB20981-2014)
EPA Nonroad T4i Comp (40CFR1039)
also available for 2A application

Peak torque			Optimization
Nm	lb-ft	rpm	
4636	3419	1100	31, 38
4636	3419	1100	31, 38
5286	3899	1400	31, 38
7610	5613	1500	X, 2
9494	7003	1500	2
8199	6047	1500	X, 2
8482	6255	1700	X, 19, 31
on request			X, 19
9435	6959	1700	X, 19, 31
9258	6828	1805	21
10409	7677	1710	21
9861	7273	1805	21
10146	7483	1500	X, 2
11169	8238	1710	21
10933	8064	1500	X, 2

Diesel engines for C&I and Mining applications

2013 – 3000 KW (2699 – 4023 BHP)

- > Intake air temperature: 25°C
- > Charge-air coolant temperature: 45°C

5B – Medium duty operation

Engine model	Rated power ICFN		
	kW	bhp	rpm
	Separate circuit charge-air cooling (SCCC)		
16V 4000 C23R	2013	2699	1800
16V 4000 C23R	2013	2699	1900
16V 4000 C31	2125	2850	1900
16V 4000 C23	2240	3000	1800
16V 4000 C55	2240	3004	1800
16V 4000 C65	2400	3218	1800
20V 4000 C22	2720	3650	1800
20V 4000 C23	2800	3755	1800
20V 4000 C23L	3000	4023	1800

- Optimization:
- X

2

19

21

31
- Fuel consumption optimized

EPA Nonroad T1 Comp (40CFR89)

EPA Nonroad T2 Comp (40CFR89)

EPA Nonroad T4 (40CFR1039)

China NRMM Stage III (GB20981-2014)

Peak torque			Optimization
Nm	lb-ft	rpm	
11310	8342	1700	X, 19, 31
on request			X, 19
11142	8228	1800	X
12566	9268	1700	X, 19, 31
12509	9226	1710	21
13403	9886	1710	21
15159	11181	1500	2
15728	11600	1700	X, 19, 31
16852	12429	1700	X, 19, 31

Series 4000

5B – Medium duty operation

Diesel engines for C&I and Mining applications

290 – 496 KW (389 – 665 BHP)

- > Intake air temperature: 25°C
- > Charge-air coolant temperature: 45°C (S2000)

5C – Short-time duty operation

Series 1000

Series 60 (14 l) // (12.7l)

Engine model	Reference no.	Rated power ICFN		
		kW	bhp	rpm
		Air-to-air charge-air cooling		
6R 1000 C70	-	290	389	2000
S60 (12.7 l)	6063MK33	373	500	2100
	6063MK33	373	500	2300
S60 (14 l)	6063HV33	447	600	2100
	6063HV45	447	600	2300
	6063HV33	470	630	2100
	6063HV33	496	665	2300
	6063HV45	496	665	2300
	6063HK45	447	600	2300
	6063HK33	447	600	2100
	6063HK33	470	630	2100
	6063HK33	496	665	2300
	6063HK45	496	665	2300

Optimization:	5	EU Nonroad St II Comp (97/68 EC)
	19	EPA Nonroad T2 Comp (40CFR89)
	20	EPA Nonroad T3 Comp (40CFR89)
	21	EPA Nonroad T4 (40CFR1039)
	23	EU Nonroad St IIIA Comp (97/68/EC)
	27	EU Nonroad St IV (97/68/EC) Compliant
	40	UN ECE R96 Emission Flex Package (EFP)

All 5A/5B-ratings can be used for 5C applications!

Peak torque			Optimization
Nm	lb-ft	rpm	
1400	1033	1200-1600	21, 27, 40
2102	1550	1350	5, 19
2237	1650	1350	5, 19
2576	1900	1350	20, 23
2576	1900	1350	20, 23
2576	1900	1350	20, 23
2576	1900	1350	20, 23
2576	1900	1350	20, 23
2576	1900	1350	5, 19
2576	1900	1350	5, 19
2576	1900	1350	5, 19
2576	1900	1350	5, 19
2576	1900	1350	5, 19

Diesel engines for Underground Mining applications

75 – 390 KW
(101 – 523 BHP)

> Intake air temperature: 25°C

Underground Mining

Series 904

Engine model	Reference no.	Rated power ICFN		
		kW	bhp	rpm
	Air-to-air charge-air cooling			
4R 904 C	4R 904 C21	75	101	2200
	4R 904 C31	90	121	2200
	4R 904 C	100	134	2200
	4R 904 C61	110	147	2200
	4R 904 C71	130	174	2200

Series 906

6R 906 C	6R 906 C31	150	201	2200
	6R 906 C51	170	228	2200
	6R 906 C	180	241	2200
	6R 906 C61	190	255	2200
	6R 906 C71	205	275	2200

Series 1300 // 1100 // 1000

4R 1000 C31	–	129	173	2200
4R 1000 C51	–	170	228	2200
6R 1000 C31	–	210	282	2200
6R 1000 C61	–	280	375	2200

6R 1100 C31	–	280	375	1600
6R 1100 C51	–	320	429	1600

6R 1300 C41	–	360	483	1600
6R 1300 C61	–	390	523	1600

Optimization: MSHA (US regulation 30 CFR part 7)
48 MSHA / CANMET certified
49 CANMET certified

manufactured by



customized by



Peak torque			Optimization
Nm	lb-ft	rpm	
400	295	1400	MSHA
470	345	1400	MSHA
520	385	1400	MSHA
580	430	1400	MSHA
675	500	1400	MSHA
750	553	1400	MSHA
810	597	1400	MSHA
900	665	1400	MSHA
1000	738	1400	MSHA
1100	811	1400	MSHA
750	553	1200-1600	48
950	701	1200-1600	48
1200	885	1200-1600	48
1550	1143	1200-1600	48
1900	1401	1300	49
2100	1549	1300	49
2400	1770	1300	49
2600	1918	1300	49

Diesel engines for Underground Mining applications

224 – 429 KW
(300 – 575 BHP)

> Intake air temperature: 25°C

Underground Mining

Series 60 (12.7 l)

Engine model	Reference no.	Rated power ICFN		
		kW	bhp	rpm
		Air-to-air charge-air cooling		
S 60 (12.7 l)	6063MK32	224	300	2100
	6063MK32	242	325	2100
	6063MK32	261	350	2100
	6063MK32	280	375	2100
	6063MK32	298	400	2100
	6063MK32	317	425	2100
	6063MK32	336	450	2100
	6063MK32	354	475	2100

Series 60 (14 l)

S 60 (14 l)	6063HK32	392	525	2100
	6063HK32	410	550	2100
	6063HK32	429	575	2100

Optimization: MSHA (US regulation 30 CFR part 7)

Peak torque			Optimization
Nm	lb-ft	rpm	
1424	1050	1350	MSHA
1600	1150	1350	MSHA
1830	1350	1350	MSHA
1830	1350	1350	MSHA
1830	1350	1350	MSHA
2000	1475	1350	MSHA
2102	1550	1350	MSHA
2102	1550	1350	MSHA
2373	1750	1350	MSHA
2373	1750	1350	MSHA
2373	1750	1350	MSHA

Automation

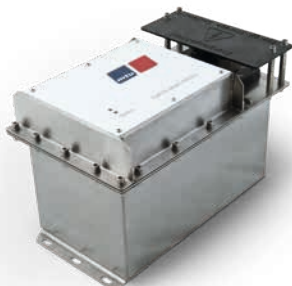
CAPOS SMART EDITION –
CAPACITOR POWER SYSTEM FOR
SERIES 2000 AND 4000**Reliable power right from the start.**

CaPoS smart edition was especially developed for heavy and duty applications and provides the high energy required by the 24V DC starters during the starting sequence.

CaPoS uses capacitor technology to optimize startup behavior. The number of modules to be used depends on the type of engine involved and its breakaway torque. CaPoS smart edition may be used autonomously or in conjunction with the motivline automation system.

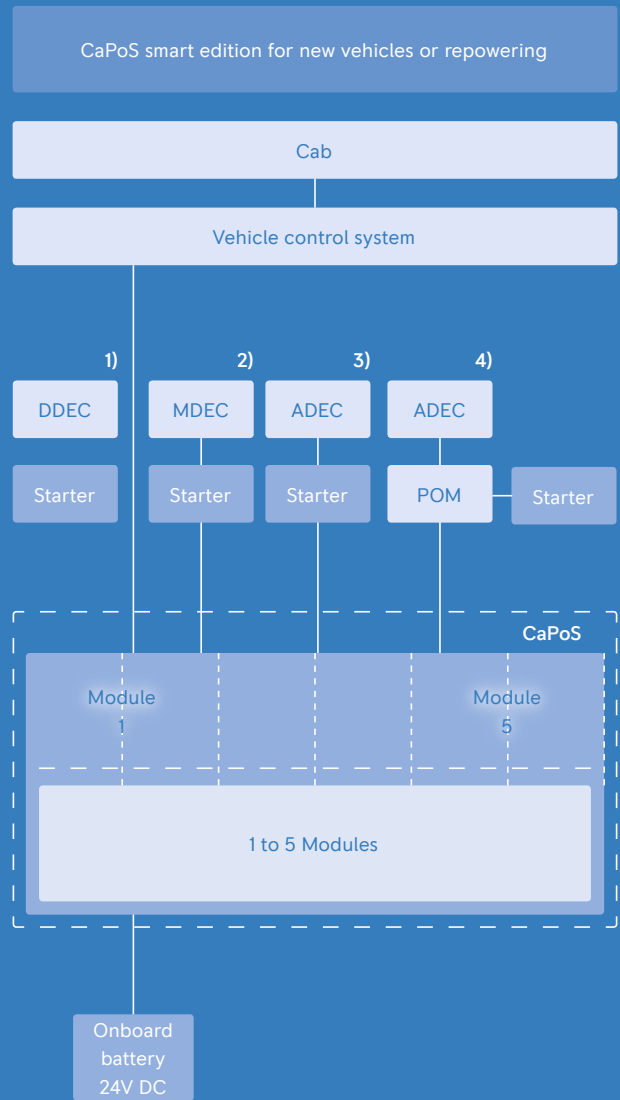
The most important features at a glance:

- Autonomous and modular construction
- Maintenance-free system
- Significant reductions in weight and volume compared with conventional starter batteries
- Optimized cold-starting capabilities
- Low life-cycle costs
- No voltage interruption during start-up
- On-board voltage of 24V DC
- Integrated self-monitoring system with interface to vehicle control system
- Integrated DC-/DC converter for automatical recharging
- IP66 protection



CaPoS smart edition

CAPOS SMART EDITION

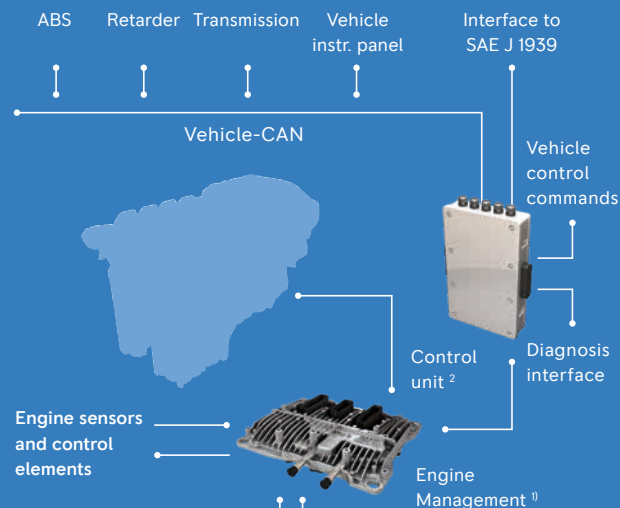


- 1) Series 4000 01
- 2) Series 4000 02
- 3) Series 4000 03/05, Series 2000 06
- 4) Optional for Series 4000 03, Series 2000 06

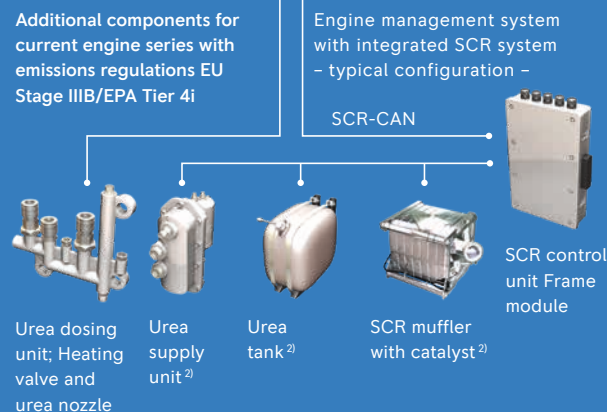
Engine management system

TYPICAL CONFIGURATION
SERIES 460 AND 900

Scope of supply for current engine series with emissions regulations EU Stage IIIA/EPA Tier 3



Additional components for current engine series with emissions regulations EU Stage IIIB/EPA Tier 4i



- 1) Engine mounted
2) Vehicle mounted

Automation

WE MANAGE EVERYTHING
FOR YOU.

All our engines are equipped with electronic engine controls. Intelligent electronics ensure that performance and efficient operation are achieved under all operating conditions. Innovative, high-end technology takes over the control, regulation and monitoring of the drive system. The systems are modular in order to be able to adapt the diesel engine to the complex optimal operating conditions of the equipment. In addition, operating conditions that could lead to damage are detected in time.

Your benefits:

- Protection of the engine and therefore safety by:
 - Reporting critical operating conditions
 - Temporary reduction in power
 - Automatic shutdown
 - Start inhibitor
 - Over speed regulation
 - Self-diagnosis and regulation for the system
- Standard interfaces for external system connections, such as CAN data bus and SAE J 1939
 - Easy integration with the vehicle
 - Flexible adjustment to the vehicle or vehicle components and project specific needs
 - Interface for engine diagnosis
- High availability and fail-safe operation
- High power efficiency
- Low fuel consumption
- Minimal exhaust emissions that fully meet all legal requirements

For engines equipped with SCR systems, we are your expert technology partner. The latest electronics integrate the necessary SCR components for the reduction of emissions intelligently into the overall system. This ensures optimal tuning of all engine and emission control functions.

Automation

MOTIVLINE – THE MANAGEMENT TECHNOLOGY FOR MINING APPLICATIONS WITH SERIES 4000-03

The motivline automation system is an innovative highend technology developed for mining vehicles. motivline performs the control and monitoring functions for the entire engine plant. The modular system guarantees optimum adaptation of the diesel engine to the diversity of operating conditions in mining.

motivline supports:

- Flexible adaptation to the vehicle and/or its components and project-specific requirements
- Automatic power output adjustment or optional engine shutdown by the integrated safety system and all other necessary monitoring and safety functions
- Interface - MTU telemetric device for GSM* - for MTU ValueCare Product Remote Services (optional with user agreement), which provides direct access to the data of your MTU engine
- Easy adaptation by means of MTU interface module SAM

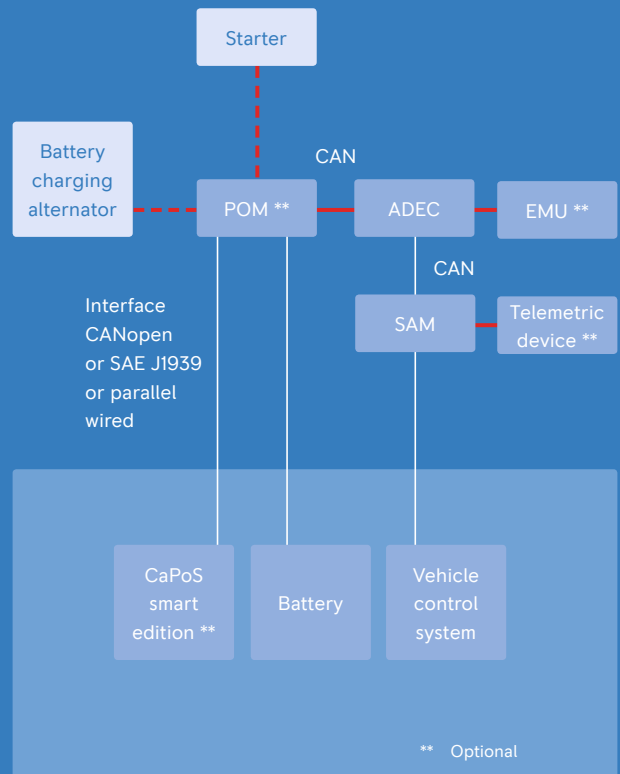
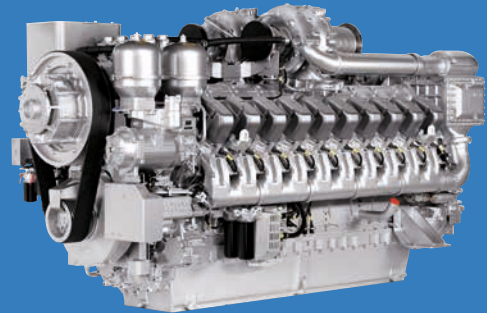
motivline harmonizes the engine integration into the vehicle.
Because of that optimized conditions generates:

- High power- efficiency
- Low fuel consumption
- Minimal exhaust emissions that are substantially below the legal limits

For the Series 4000 engines, a new engine management system ADEC has been developed, whilst there is also an extensive range of standardized solutions available - with options for flexible interfaces. The Engine Monitoring Unit EMU provides further enhanced availability by means of additional monitoring and diagnostic options for the engine. Complementing the SAM interface module, POM optimizes the start process and simplifies cabling to the starter and alternator. The complete Plug & Play system makes installation of the engine in the vehicle considerably simpler and faster.

* Global System for Mobile Communications

- ADEC = Advanced Diesel Engine Control
- EMU** = Engine Monitoring Unit
- POM** = Power Output Module
- SAM = Service and Application Module
- CaPoS = Capacitor Power System



ENGINES DATA

Diesel engines for C&I, Agriculture and Mining applications

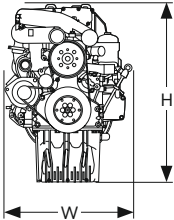
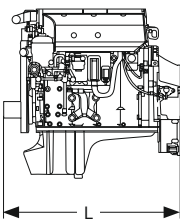
SERIES 900



manufactured by



customized by



Diesel engines for C&I, Agriculture and Mining applications

Engine	Cylinder data		
	Bore/Stroke mm (in)	Cyl. displac. l (cu in)	Tot. displac. l (cu in)
4R 904 Cx1 4 cyl./In-Line	102/130 (4.0/5.1)	1.06 (65)	4.2 (256)
4R 924 Cx1 4 cyl./In-Line	106/136 (4.2/5.4)	1.20 (73)	4.8 (293)
4R 924 Cx2 4 cyl./In-Line	106/136 (4.2/5.4)	1.20 (73)	4.8 (293)
6R 906 Cx1 4 cyl./In-Line	102/130 (4.0/5.1)	1.06 (65)	6.4 (391)
6R 926 Cx1 4 cyl./In-Line	106/136 (4.2/5.4)	1.20 (73)	7.2 (439)
6R 926 Cx2 4 cyl./In-Line	106/136 (4.2/5.4)	1.20 (73)	7.2 (439)

Dimensions	Mass
L x W x H mm (in)	(dry) kg (lbs.)
830 x 672 x 945 (33 x 26 x 37)	395 (870)
830 x 645 x 925 (33 x 25 x 36)	405 (893)
830 x 645 x 925 (33 x 25 x 36)	415 (915)
1087 x 688 x 956 (43 x 27 x 38)	530 (1168)
1087 x 681 x 956 (43 x 27 x 38)	530 (1168)
1087 x 681 x 956 (43 x 27 x 38)	545 (1202)

Please note, specifications are subject to change without notice. All dimensions are approximate. Details are subject to options selected. Please contact your distributor for current information and binding data.

Diesel engines for C&I, Agriculture and Mining applications

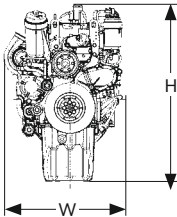
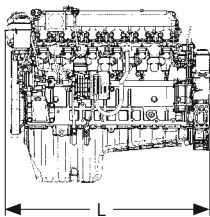
SERIES 460



manufactured by



customized by



Diesel engines for C&I, Agriculture and Mining applications

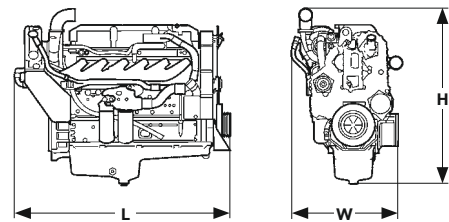
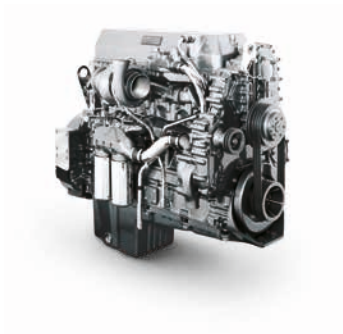
Engine	Cylinder data		
	Bore/Stroke mm (in)	Cyl. displac. l (cu in)	Tot. displac. l (cu in)
6R 460 C11R-C21 6 cyl./In-Line	128/166 (5.0/6.5)	2.13 (129)	12.8 (781)
6R 460 C31-C71 6 cyl./In-Line	128/166 (5.0/6.5)	2.13 (129)	12.8 (781)
6R 460 Cx2 6 cyl./In-Line	128/166 (5.0/6.5)	2.13 (129)	12.8 (781)

Dimensions	Mass
L x W x H mm (in)	(dry) kg (lbs.)
1315 x 785 x 114 (52 x 31 x 45)	920 (2028)
1320 x 750 x 1115 (52 x 30 x 44)	920 (2028)
1320 x 750 x 1115 (52 x 30 x 44)	930 (2072)

Please note, specifications are subject to change without notice. All dimensions are approximate. Details are subject to options selected. Please contact your distributor for current information and binding data.

Diesel engines for C&I and Mining applications

SERIES 60



Diesel engines for C&I and Mining applications

Engine	Cylinder data		
	Bore/Stroke mm (in)	Cyl. displac. l (cu in)	Tot. displac. l (cu in)
S60 6 cyl./In-Line	130/160 (5.1/6.3)	2.12 (129)	12.7 (775)
S60 6 cyl./In-Line	133/168 (5.2/6.6)	2.33 (142)	14.0 (854)

Dimensions	Mass	Weight/Power ratio
L x W x H mm (in)	(dry) kg (lbs.)	kg/kW (lbs./bhp)
1455 x 925 x 1380 (57 x 36 x 54)	1290 (2844)	3.5 - 5.8 (5.7 - 9.5)
1455 x 925 x 1380 (57 x 36 x 54)	1215 (2680)	2.4 - 5.4 (4.0 - 8.9)

Please note, specifications are subject to change without notice. All dimensions are approximate. Details are subject to options selected. Please contact your distributor for current information and binding data.

Diesel engines for C&I, Agriculture and Mining applications

SERIES 1000/
OM 934/936

SERIES 1100/
OM 470

manufactured by



customized by



SERIES 1300/
OM 471

SERIES 1500/
OM 473



Diesel engines for C&I, Agriculture and Mining applications

Engine	Cylinder data		
	Bore/Stroke mm (in)	Cyl. displac. l (cu in)	Tot. displac. l (cu in)
4R 1000 CxO 4 cyl./In-Line	110/135 (4.3/5.3)	1.28 (78)	5.1 (311)
6R 1000 CxO 6 cyl./In-Line	110/135 (4.3/5.3)	1.28 (78)	7.7 (470)
6R 1100 CxO 6 cyl./In-Line	125/145 (4.9/5.7)	1.77 (108)	10.7 (652)
6R 1300 CxO 6 cyl./In-Line	132/156 (5.2/6.1)	2.13 (130)	12.8 (781)
6R 1500 CxO 6 cyl./In-Line	139/171 (5.5/6.7)	2.60 (159)	15.6 (952)

Dimensions	Mass	Weight/Power ratio
L x W x H mm (in)	(dry) kg (lbs.)	kg/kW (lbs./bhp)
818 x 755 x 1033 (32.2 x 29.7 x 40.7)	510 (1124)	3.0 - 5.0 (4.9 - 8.2)
1059 x 821 x 1033 (41.7 x 32.3 x 40.7)	669 (1475)	2.6 - 3.6 (4.2 - 6.0)
1325 x 955 x 1230 (52.7 x 37.6 x 48.4)	590 (2094)	3.0 - 3.4 (4.9 - 5.6)
1375 x 980 x 1260 (54.1 x 38.6 x 49.6)	1083 (2388)	2.8 - 3.4 (4.6 - 5.5)
1425 x 1005 x 1290 (56.1 x 39.6 x 50.8)	1235 (2723)	2.7 - 3.1 (4.4 - 5.1)

Please note, specifications are subject to change without notice. All dimensions are approximate. Details are subject to options selected. Please contact your distributor for current information and binding data.

Diesel engines for C&I, Agriculture and Mining applications

SERIES 1000/
OM 934/936

SERIES 1100/
OM 470

manufactured by



customized by



SERIES 1300/
OM 471

SERIES 1500/
OM 473



Diesel engines for C&I, Agriculture and Mining applications

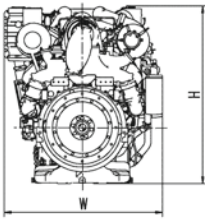
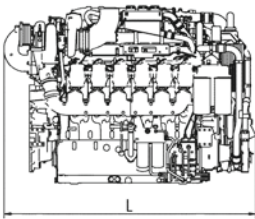
Engine	Cylinder data		
	Bore/Stroke mm (in)	Cyl. displac. l (cu in)	Tot. displac. l (cu in)
4R 1000 Cx1 4 cyl./In-Line	110/135 (4.3/5.3)	1.28 (78)	5.1 (311)
6R 1000 Cx1 6 cyl./In-Line	110/135 (4.3/5.3)	1.28 (78)	7.7 (470)
6R 1100 Cx1 6 cyl./In-Line	125/145 (4.9/5.7)	1.77 (108)	10.7 (652)
6R 1300 Cx1 6 cyl./In-Line	132/156 (5.2/6.1)	2.13 (130)	12.8 (781)
6R 1500 Cx1 6 cyl./In-Line	139/171 (5.5/6.7)	2.60 (159)	15.6 (952)

Dimensions	Mass	Weight/Power ratio
L x W x H mm (in)	(dry) kg (lbs.)	kg/kW (lbs./bhp)
948 x 860 x 1033 (37 x 34 x 41)	510 (1124)	3.0 - 4.3 (4.9 - 7.2)
1067 x 929 x 1031 (42 x 37 x 41)	672 (1482)	2.4 - 3.8 (3.9 - 6.2)
1295 x 1029 x 1183 (51 x 41 x 47)	938 (2068)	2.8 - 3.9 (4.5 - 6.4)
1393 x 1043 x 1215 (55 x 41 x 48)	1071 (2361)	2.8 - 3.4 (4.5 - 5.5)
1442 x 1099 x 1237 (57 x 43 x 49)	1230 (2712)	2.6 - 3.2 (4.2 - 5.3)

Please note, specifications are subject to change without notice. All dimensions are approximate. Details are subject to options selected. Please contact your distributor for current information and binding data.

Diesel engines for C&I and Mining applications

SERIES 2000



Diesel engines for C&I and Mining applications

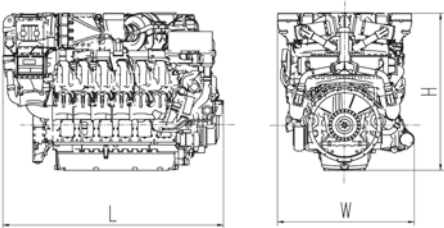
Engine	Cylinder data		
	Bore/Stroke mm (in)	Cyl. displac. l (cu in)	Tot. displac. l (cu in)
12V 2000 Cx6 12 cyl./90°V	135/156 (5.3/6.15)	2.23 (136)	26.8 (1633)
16V 2000 Cx6 16 cyl./90°V	135/156 (5.3/6.15)	2.23 (136)	35.7 (2177)

Dimensions	Mass	Weight/Power ratio
L x W x H mm (in)	(dry) kg (lbs.)	kg/kW (lbs./bhp)
2028 x 1278 x 1461 (79.8 x 50.3 x 57.5)	2950 (6503)	3.8 (6.2)
2378 x 1288 x 1488 (93.6 x 50.7 x 58.6)	3350 (7385)	3.5 (5.7)

Please note, specifications are subject to change without notice. All dimensions are approximate. Details are subject to options selected. Please contact your distributor for current information and binding data.

Diesel engines for C&I and Mining applications

SERIES 4000



Diesel engines for C&I and Mining applications

Engine	Cylinder data		
	Bore/Stroke mm (in)	Cyl. displac. l (cu in)	Tot. displac. l (cu in)
12V 4000 Cx1 12 cyl./90°V	165/190 (6.5/7.5)	4.06 (248)	48.8 (2978)
16V 4000 Cx1 16 cyl./90°V	165/190 (6.5/7.5)	4.06 (248)	65.0 (3967)
20V 4000 Cx2 20 cyl./90°V	165/210 (6.5/8.3)	4.49 (274)	89.8 (5480)
12V 4000 Cx3 12 cyl./90°V	170/210 (6.7/8.3)	4.77 (291)	57.3 (3493)
16V 4000 Cx3 16 cyl./90°V	170/210 (6.7/8.3)	4.77 (291)	76.3 (4656)
20V 4000 Cx3 20 cyl./90°V	170/210 (6.7/8.3)	4.77 (291)	95.4 (5822)
12V 4000 Cx5 12 cyl./90°V	170/210 (6.7/8.3)	4.77 (291)	57.2 (3491)
16V 4000 Cx5 16 cyl./90°V	170/210 (6.7/8.3)	4.77 (291)	76.3 (4656)

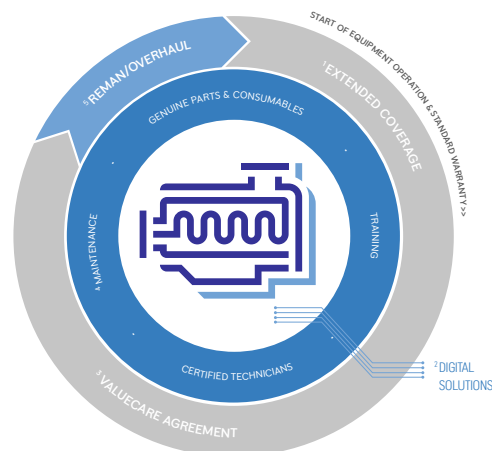
Dimensions	Mass	Weight/Power ratio
L x W x H mm (in)	(dry) kg (lbs.)	kg/kW (lbs./bhp)
2409 x 1588 x 1736 (94.8 x 62.5 x 68.3)	6045 13325	4.0 - 5.1 (6.6 - 8.3)
2879 x 1588 x 1736 (113.4 x 62.5 x 68.3)	7030 (15615)	3.5 - 4.4 (5.8 - 7.3)
3647 x 1609 x 2065 (143.6 x 63.3 x 81.3)	9865 (21750)	3.6 (6.0)
2497 x 1629 x 2065 (98.3 x 64.1 x 81.3)	7000 (15430)	4.2 - 5.9 (6.8 - 9.7)
3020 x 1629 x 2065 (118.9 x 64.1 x 81.3)	8100 (17860)	3.6 - 5.4 (6.0 - 8.9)
3647 x 1609 x 2065 (143.6 x 63.3 x 81.3)	10700 (23590)	3.6 - 4.5 (6.0 - 7.4)
2633 x 1631 x 1997 (103.7 x 64.2 x 78.6)	7960 (17549)	4.3 - 6.9 (7.0 - 11.4)
3201 x 1631 x 1997 (126.0 x 64.2 x 78.6)	9350 (20613)	4.1 - 4.9 (6.7 - 8.0)

Please note, specifications are subject to change without notice. All dimensions are approximate. Details are subject to options selected. Please contact your distributor for current information and binding data.

Complete lifecycle solutions.

ENSURE A LONG, RELIABLE LIFE.

As your equipment ages, its needs—and yours—change. Our full portfolio of service solutions wrap around your investment, providing 360 degrees of customized support, for optimal value at every stage of life.



- 1 Avoid the unexpected with added protection beyond the standard warranty.
- 2 Make better decisions faster with data-enhanced tools.
- 3 Maximize availability and optimize lifecycle costs with a ValueCare Agreement.
- 4 Improve system performance and extend equipment life with on-demand support.
- 5 Keep a good thing going with factory reman/rebuild solutions.

Complete lifecycle solutions.

RELY ON OUR EXPERTISE.

To give your equipment a long and productive life, choose a partner you can trust. Only factory-certified technicians know how to get the job done right using proven service methods, factory-specified maintenance schedules and genuine OEM parts.

From preventive maintenance to complete overhaul, we are your true lifecycle partner. Whatever level of support you need, our global network of factory-trained professionals knows all about your equipment and is ready to help you maximize performance and minimize lifecycle costs.

Never compromise

MTU engines and systems are built to last with legendary high standards. When it's time for service, don't settle for anything less. Protect the life of your equipment with professional certified service technicians and genuine OEM parts and consumables—the only options that live up to our standards for craftsmanship, quality and performance. To get the most from your equipment, there are no shortcuts. For maximum reliability, performance and uptime, choose a name you can trust.

If you need us a little:

On-Demand Support—including professional inspections and preventive maintenance recommendations from us—we help you to identify and address problems early, save on repairs or unexpected downtime, and optimize your equipment's performance and longevity. Inspections include visual assessment, test run and leak check, on-site oil and coolant analysis, diagnostic evaluation and reporting.

If you need us a lot:

ValueCare Agreements make it easy to keep your business running smoothly and reduce total cost of ownership by maximizing uptime, optimizing lifecycle costs and helping you avoid equipment-related business disruptions through preventive maintenance.



ValueCare Agreements

FOCUS ON YOUR OPERATIONS.
LEAVE THE REST TO US.

Service solutions designed around your priorities

ValueCare Agreements make it easy to optimize lifecycle costs, maximize uptime and devote more time and resources to your core business, with tailored solutions to move your business forward.



Gold

Maximize operational uptime

- Operational uptime commitment to meet or exceed your availability targets
- Regular supervision by local service partner (e.g. monitoring of parts stock,
- 24/7 emergency assistance with on-site support
- Monthly reports, including availability and average repair times
- Asset health monitoring
- Annual performance meetings and trend analysis with us to address technical updates, engine fleet data, operational optimization and more

Gold also includes all
benefits of Silver & Bronze levels



Silver

Eliminate unexpected maintenance costs

- Proactive maintenance planning, troubleshooting and remote engine health monitoring
- Fixed pricing per operating hour for maintenance and repairs
- Key corrective maintenance components always in-stock at our main warehouses
- 24/7 standby service with remote technical support
- Quarterly reports, including reliability analysis (mean time between failure)

Silver also includes all
benefits of Bronze level








Bronze

Ensure parts availability and price stability

- Digital connectivity (Go! Connect) and platform access (Go! Manage)
- Automated delivery of parts (preventive) at a predefined rate based on operating hours
- Preventive maintenance labor options to fit your business needs
- Dedicated support for technical issues
- Quarterly reporting of completed and upcoming maintenance and costs
- Annual on-site engine health check by our technician

ValueCare Agreements help you:

-  Increase operational uptime
-  Guarantee parts availability and service quality
-  Predict equipment-related costs
-  Optimize maintenance planning
-  Connect to us, 24/7

Digital Solutions

THE FUTURE IS DIGITAL.

Fueled by your system's data—and supplemented with our exclusive expertise, smart analytics and extensive database—digital solutions magnify the power of your investment.

From proactive failure prevention and intelligent troubleshooting to instant failure support and smart maintenance planning, digital solutions unlock the full potential of your MTU system.

**Service in your pocket**

Designed to support on-site operators, Go! Act:

- Receives push notification of failure codes from connected assets
- Provides crew members with vital information about failure codes
- Supports event reporting with convenient photo capture functionality
- Enables direct communication with fleet managers or our Customer Assistance Center

**Monitor your fleet**

Built for fleet managers, Go! Manage:

- Provides a live overview of fleet, asset and engine conditions
- Displays active and closed alarms
- Enables interaction and communication with on-site staff via Go! Act
- Shows maintenance schedule, with completed tasks clearly marked
- Supports remote troubleshooting via multigraph

Remanufactured Products

EXCHANGE AND SAVE.

Factory remanufactured products deliver the same high standards of performance, service life and quality as new products, along with identical warranty coverage—at a fraction of the cost. And with design and model-related updates, they also feature similar technological advancements. Developed by R&D engineers, the remanufacturing process saves you time and money, while benefiting the environment through the reuse of materials. To help you work efficiently, a wide range of remanufactured parts, engines and systems are available worldwide.

Reduce lifecycle costs.

As you evaluate your long-term power needs, you must consider a variety of factors. Factory remanufactured products are a smart solution, helping you reduce the total lifecycle cost of your equipment.

Save time.

Factory remanufactured products put your equipment back to work faster than an overhaul, which reduces downtime, service time and indirect costs such as storage.

Maintain standards.

All products are remanufactured to our strict standards by our certified technicians at our regional reman centers. Only we can remanufacture our parts, engines or systems to original factory specifications.

Protect the environment.

Since remanufacturing is an efficient use of resources and energy, factory remanufactured products benefit the environment as well.

Service Network

LOCAL SUPPORT. WORLDWIDE.

The most important part of your power system isn't a part at all—it's your local service team. With more than 1,200 service locations worldwide—backed by regional Parts Logistics Centers in Europe, Asia and America—you can count on responsive support by expert technicians, wherever work takes you. To find your local service partner, visit www.mtu-solutions.com.

Always on call, 24/7

Whether it's connecting you with a local service partner or assigning an urgent problem to a dedicated team of our experts, we're ready to assist you—wherever you are, whatever you need.

Europe, Middle East, Africa +49 7541 90-77777

Asia/Pacific +65 6860 9669

North and Latin America +1 248 560 8888

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Exhaust emissions

C&I, AGRICULTURE AND MINING
APPLICATIONS

Many countries have implemented environmental legislation to protect people from consequences of polluted air. For this reason an increasing number of countries regulate emissions from specific mobile and stationary sources.

Emission standards may apply internationally, nationally and/or for specific areas. The enforcement of an emission legislation may depend for example on the area where the equipment is used and the way it is operated.

The emission legislations may be categorized by power range and/or cylinder capacity. Emission legislations generally require a certificate which states compliance. Stationary applications may require on-site approvals (on-site emission test) depending on the particular emission legislation.

Please find as follows examples of emission standards which apply to the C&I, Agriculture and Mining Industry applications. For details please consult the applicable legislation and/or permitting authority.

Emission legislation for C&I, Agriculture and Mining applications may differentiate between mobile and stationary applications/ machinery.

Nonroad mobile machinery emission legislation may differentiate between constant and variable speed applications. Nonroad mobile machinery emission legislation may differentiate between ratings and cylinder volume.

Emission legislation for mobile applications are e.g. US EPA, EU NRMM, China NRMM, MoEF India/CPCB.

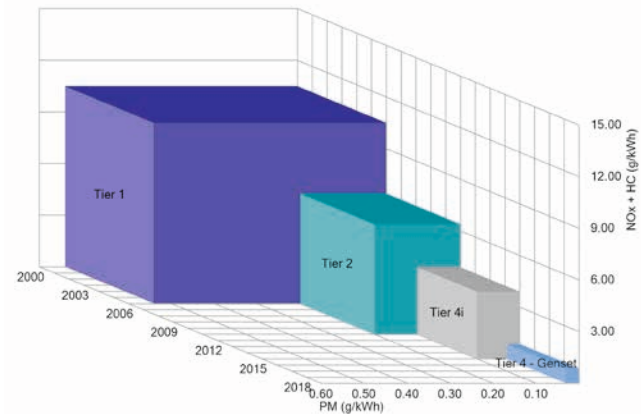
Stationary emission legislation differentiates between emergency standby and non-emergency applications. Usually non-emergency applications have more stringent emission limits. Engines for emergency standby applications are often limited by operating hours per year. The operating hour limitation may be defined differently from country to country. Especially stationary applications may be subject to more

stringent regional or municipal emission limits (e.g. Non-Attainment Areas).

Emission legislation for stationary applications is highly fragmented, e.g. US EPA, EU NRMM, TA-Luft, NEA Singapore, MoEF India/CPCB, China NRMM.

Sample for emission stages in C&I, Agriculture and Mining industry: EPA

EPA NRMM > 560 kW



Examples for emission level description:

- US EPA Nonroad Tier 4 (40CFR1039)
 - certified
- US EPA Nonroad Tier 2 Comp (40CFR89)
 - compliant with emission legislation - not certified
- US EPA Nonroad Tier 2 Comp
 - compliant and corresponding to emission limit values - not certified

Please note

That the engines and systems (only) comply with the country or region specific emission requirements and have appropriate emission certification(s) which are explicitly stated in respective defined technical specifications. Any export/import/operation of the engine in countries or regions with different applicable emission law requirements is at the customers responsibility.

Exhaust emissions

EMISSION FLEX PACKAGE

No matter where in the world your machines operate, you need a drive package that performs. With our Emission Flex Package, you increase the flexibility in highly regulated markets as well as in countries with no or lower emissions standards. With two engine generations from 100-460 kW, we are well prepared to offer the solution that meets your individual requirements best.

Emission Flex Package for Series 460, 500 and 900**EU Stage IIIB/EPA Tier 4i engines**

To be operated in non-regulated countries, your used EU Stage IIIB/EPA Tier 4i engines can be adjusted accordingly. For this modification, no hardware changes are necessary; our certified, authorized service dealers only update the software and decertify the engine*. The aftertreatment system may remain in the vehicle, saving time and removal costs. However, if the SCR components are removed, even higher sulphur tolerances may be achieved. This is completely up to you. We help you decide which option is best for you.

Emission Flex Package for Series 1000-1500**EU Stage IV Compliant/EPA Tier 4f**

If you plan to operate your EU Stage IV Compliant/EPA Tier 4f engines in countries with no or less stringent emissions regulations, we offer two options:

- Order new engines with the Emission Flex Package. This allows you to export your machines to anywhere from highly regulated countries to less or non-regulated countries with just one engine installation
- Adjust your engines in operation to more lenient emissions regulations. The modification is done by software update and recertifying* to UN ECE R96 Emission Flex Package (EFP) emission standard, no hardware changes are necessary. Removal of the SCR components is optionally. The new emissions conformity is documented in the system data.

* Due to emission compliance regulations you need to remove labels and certification numbers in advance so that de-/recertification can be conducted.

Benefits:

- Quick and easy modification through electronic update only
- Cost-efficient solution for customers selling and purchasing used EU Stage IIIB/EPA Tier 4i products in non-regulated countries
- Higher sulphur tolerance so that engines can be operated anywhere
- Economical use of resources by enabling second life for engines outside of emission regulated markets
- Higher technological standard than older, non-regulated engines which directly translates into fuel savings and lower life-cycle costs

Benefits compared to classic EU Stage IIIA/EPA Tier 3 engines:

- Common engine platform and dimensions
- Less integration effort due to identical interfaces and same dimensions
- Better fuel efficiency
- Better power curves for more efficient operation
- Future-proof engines that are continually enhanced

[illegible]

- Marine
- Rail
- PowerGen
- Oil & Gas

1 kW	= 1.360 PS	g	= 9.80665 m/s ²
1 kW	= 1.341 bhp	л	= 3.14159
1 bhp	= 1.014 PS	e	= 2.71828
1 oz	= 28.35 g	e	= 2.71828
1 lb	= 453.59 g	1 lb	= 16 oz
1 short ton	= 907.18 kg	1 short ton	= 2000 lbs
1 lb/bhp	= 447.3 g/PS _h	1 ft lb	= 1.356 Nm
1 lb/bhp	= 608.3 g/kWh	1 ft/min	= 0.00508 m/s
1 gal/bhp (US)	= 4264 g/kWh	pDiesel	= 0.83 kg/l
1 kWh	= 860 kcal	1 lb/sqin	= 0.069 bar (1 psi)
1 cal	= 4.187 J	1 mm Hg	= 1.333 mbar (133.3 Pa)
1 BTU	= 1.055 kJ	1 mm H ₂ O	= 0.0981 mbar (9.81 Pa)
1 inch	= 2.540 cm	T (K)	= t (°C) + 273.15
1 sq. inch	= 6.542 cm ²	t (°C)	= 5/9 x (t (°F) -32)
1 cu. inch	= 16.387 cm ³	t (°C)	= 5/4 x t (°R)
1 foot	= 3.048 dm	1 foot	= 12 inches
1 sq. foot	= 9.290 dm ²	1 yard	= 3 feet
1 mile	= 1.609 km	1 mile	= 5280 feet
1 naut. mile	= 1.853 km	1 naut. mile	= 6080 feet
1 UK Gallon	= 4.546 l	1 US Barrel	= 0.159 m ³
1 US Gallon	= 3.785 l		= 42 US Gallons
Energy:	1 J = 1 Ws = 1 VAs = 1 Nm		
Power:	1 W = 1 VA = 1 Nm/s		
Force:	1 N = 1 kgm/s ²		
Pressure:	1 Pa = 1 N/m ² (1 bar = 10 ⁵ Pa)		
MEP (bar)	$= \frac{P_{cyl}(kW)}{n(l/min) \times V_{cyl}(l)}$		
Torque (Nm)	$= \frac{P_{ges}(kW) \times 30000}{n(l/min) \times \pi}$		

