



Engines for exhaust emission step 2

These are the characteristics of the 1013:

Modern water-cooled 4- and 6-cylinder in-line engines.

Three separate mounting options for gear-driven hydraulic pumps.

Easily accessible service points on one engine side.

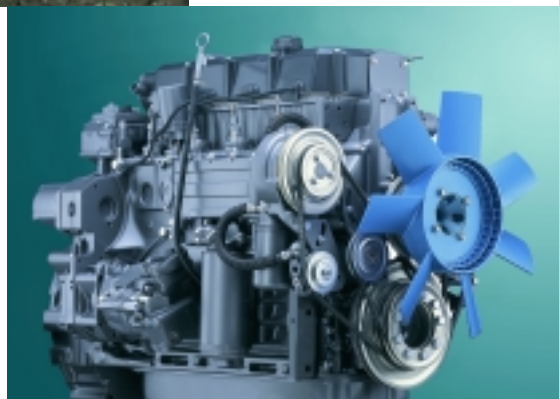
Exchangeable cylinder liners in cooling water flow.

Displacement 1.2 liters per cylinder. Compact design, high power-to-volume-ratio.

Turbocharging with charge air cooling, integrated engine cooling package optional.

Integrated high-pressure fuel injection system with single injection pumps.

Electronic engine governor with diagnostic facilities with CAN-Bus optional.



Your benefits:

- ▶ Modular series platform for wide range of applications.
- ▶ Low cost for noise insulation measures. High comfort in driver's cabin.
- ▶ Low fuel consumption and maintenance costs, long service life.
- ▶ Meets exhaust regulation EU-RL 97/68 (step 2) and US-EPA Nonroad (Tier 2).
- ▶ High reliability even under extreme working conditions.
- ▶ Compact installation of engines with integrated cooling system without customizing of engine cooling package.

► Engine description

Type of cooling:	Liquid cooling, thermostatically controlled, charge-air-cooled engines with air-to-air charge air cooler
Crankcase:	High grey cast iron crankcase, for monobloc construction
Crankcase breather:	Closed-circuit crankcase breather
Cylinder head:	Grey cast iron block-type cylinder head
Valve arrangement/ timing:	One inlet and one exhaust valve per cylinder, actuated via tappets, push rods and rocker arms, camshaft driven by geartrain
Piston:	Three-ring piston, two compression rings and one oil scraper ring
Piston cooling:	Oil cooled with spray nozzles (channel-cooled piston)
Connecting rod:	Forged steel rod
Crankshaft bearings:	Tri-metal plain bearings
Crankshaft:	With integral counterweights
Camshaft:	Forged steel shaft
Lubrication system:	Forced-feed circulation lubrication with gear pump
Lube oil cooler:	Oil cooler integrated in coolant circuit
Lube oil filter:	Paper-type microfilter as replaceable-cartridge full flow filter
Injection pump/ governor:	Single injection pumps for each cylinder integrated in crankcase Mechanical centrifugal governor (standard); electronic governor (EMR) optional
Fuel lift pump:	Integrated in belt drive
Injection nozzle:	Six-hole nozzle
Fuel filter:	Replaceable cartridge
Alternator:	Three-phase alternator 12 V or 24 V
Starter motor:	12 V or 24 V
Heating system:	Optional connection for cab heating to engine cooling circuit

► Technical data

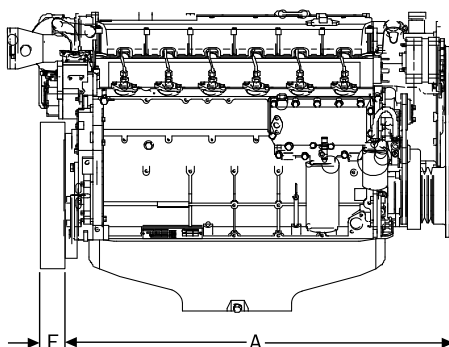
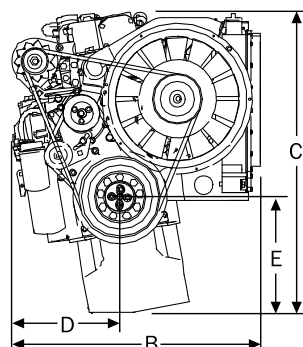
Engine type		BF4M1013C	BF4M1013EC	BF4M1013FC
Number of cylinders		4	4	4
Bore/stroke	mm inch	108/130 4.2/5.1	108/130 4.2/5.1	108/130 4.2/5.1
Displacement	l cu inch	4.76 290	4.76 290	4.76 290
Compression ratio		17.5	17.5	17.5
Max. rated speed	min ⁻¹ rpm	2300	2300	2300
Mean piston speed	m/s ft/sec	9.97 32.71	9.97 32.71	9.97 32.71

Power ratings for construction equipment engines¹⁾

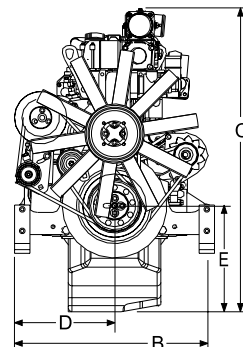
Power ratings for industrial engines, group I ²⁾	kW hp	115 154	118 158	129 173
at speed	min ⁻¹ rpm	2300	2300	2300
Mean effective pressure	bar psi	12.59 182.59	12.93 187.52	13.70 198.68
Industrial engines, group 4 ³⁾	kW hp	104 140	102 137	112 150
at speed	min ⁻¹ rpm	2300	2300	2300
Mean effective pressure	bar psi	11.39 165.18	11.72 169.99	12.28 178.10
Max. torque group 1	Nm lb-ft	572 422	577 426	700 516.25
at speed	min ⁻¹ rpm	1400	1400	1400
Mean effective pressure	bar psi	14.97 217.15	15.23 220.92	16.63 241.23
Minimum idle speed	min ⁻¹ rpm	800	800	650
Weight to DIN 70020, Part 7A (incl. cooling system) ⁴⁾	kg lb	(550) 432 (1212) 952	430 948	432 952

► Dimensions

Integrated cooling system

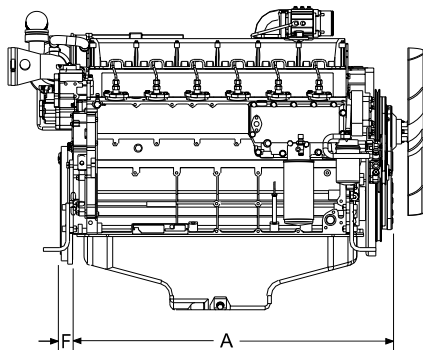


External cooling system



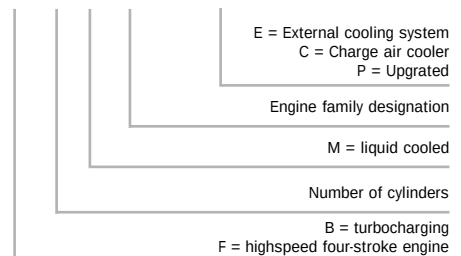
Engine		A	B	C	D	E	F
BF4M1013C	mm inch	898 35.7	760 29.9	790 31.1	338 13.3	295 11.6	122 4.8
BF4M1013EC	mm inch	740 29.1	616 24.3	935 36.8	292 11.5	302 11.9	122 4.8
BF4M1013FC	mm inch	740 29.1	616 24.3	935 36.8	292 11.5	302 11.9	122 4.8
BF6M1013C	mm inch	1158 45.6	760 29.9	845 33.3	338 13.3	345 13.6	122 4.8
BF6M1013EC	mm inch	1024 40.3	622 24.5	943 37.1	292 11.5	310 12.2	122 4.8
BF6M1013CP	mm inch	1158 45.6	760 29.9	845 33.3	338 13.3	345 13.6	122 4.8
BF6M1013ECP	mm inch	1024 40.3	622 24.5	943 37.1	292 11.5	310 12.2	122 4.8
BF6M1013FC	mm inch	1024 40.3	622 24.5	943 37.1	292 11.5	310 12.2	122 4.8

BF6M1013C	BF6M1013EC	BF6M1013CP	BF6M1013ECP	BF6M1013FC
6	6	6	6	6
108/130 4.2/5.1	108/130 4.2/5.1	108/130 4.2/5.1	108/130 4.2/5.1	108/130 4.2/5.1
7.14 435	7.15 435	7.14 435	7.15 435	7.15 435
17.5	17.5	17.5	17.5	17.5
2300	2300	2300	2300	2300
9.97 32.71	9.97 32.71	9.97 32.71	9.97 32.71	9.97 32.71
170 228	174 234	190 255	195 262	233 313
2300	2300	2300	2300	2300
12.41 179.98	12.71 184.32	13.87 201.15	14.59 211.59	16.88 244.80
153 205	148 199	171 229	166 223	191 256
2300	2300	2300	2300	2300
11.17 161.99	11.46 166.20	12.48 180.99	13.13 190.42	13.18 191.14
847 624.66	854 629.83	946 697.68	954 703.56	1050
1400	1400	1400	1400	1700
14.78 214.39	15.01 217.73	16.51 239.49	18.45 267.63	18.45 267.62
600	800	800	800	650
(702) 572 (1547) 1261	572 1260	(702) 572 (1547) 1261	572 1261	572 1261



► Model designation

BF 6 M 1013 ECP



- 1) Power ratings at flywheel without deduction fan power requirement.
- 2) To ISO 1585, EG-RL80/1269/EWG and EG-RL88/195/EWG.
- 3) To ISO 3046/1 (IFN), DIN 6271 fuel stop power.
- 4) Specific fuel consumption based on diesel fuel with a specific gravity of 0.835 kg/dm³ at 15°C.

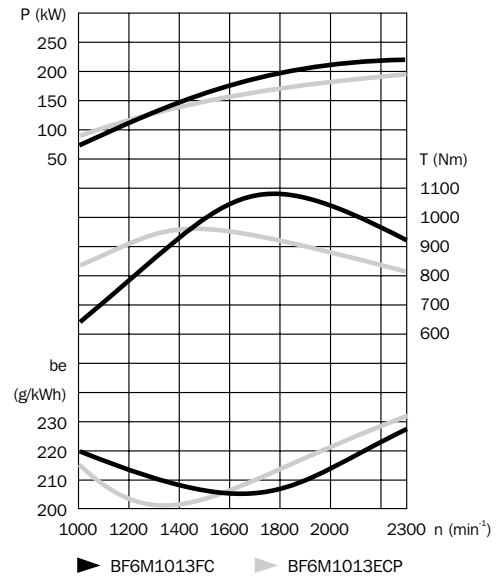
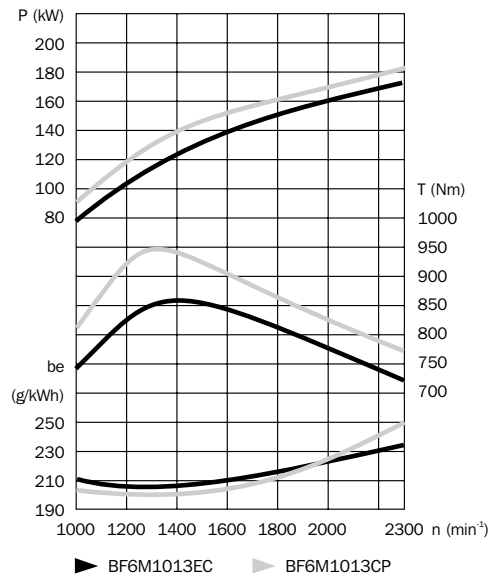
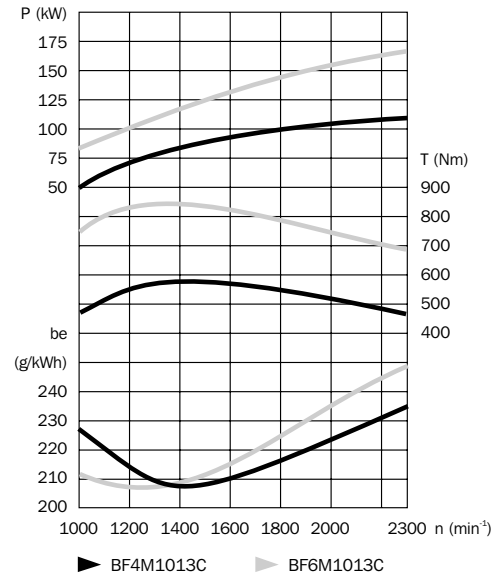
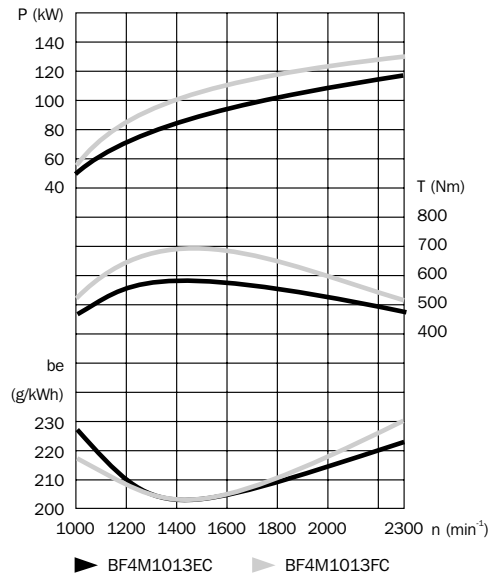
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The information given in the offer is decisive.

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► Standard engines





The engine company.

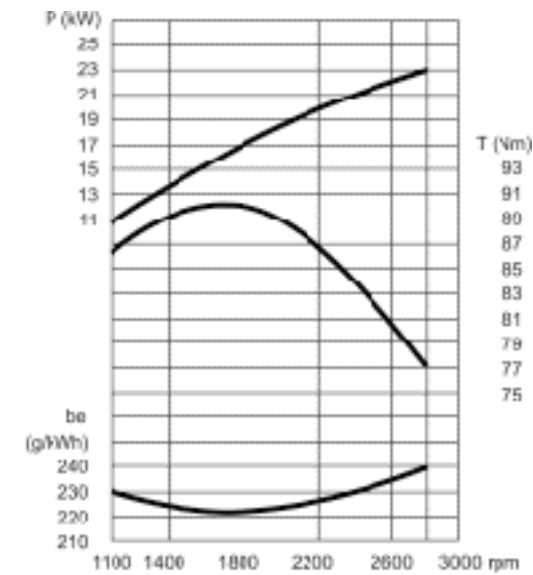
SSSI International Ltd.
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Ontario ; Canada
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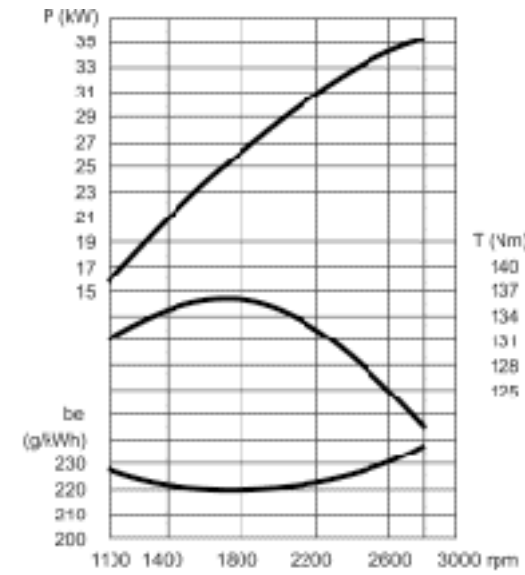


www.sssi-ltd.com

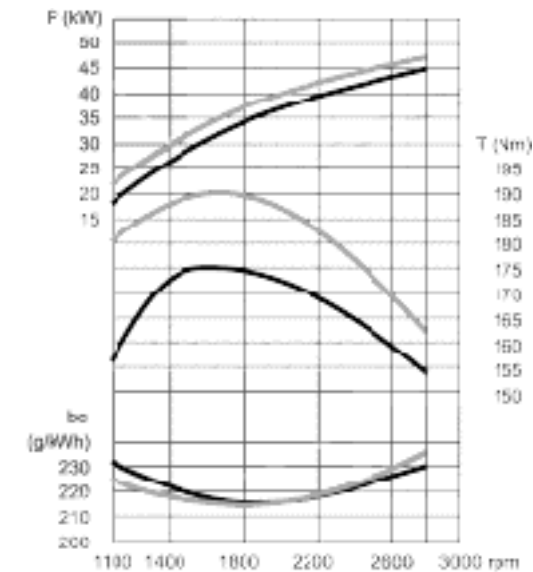
► Standard engines



► F2.2011

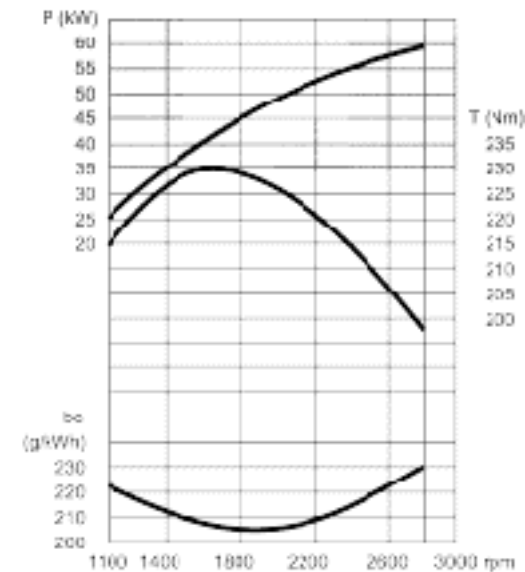


► F3.2011



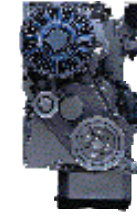
► BF3L2011

► F4L2011



► BF4L2011

SSSI International Ltd.



2011. The engine for construction.

12 - 58.1 kW at 1500 - 2800 rpm



Engines with integrated cooling system.

These are the characteristics of the 2011:

- 2-, 3- and 4-cylinder naturally aspirated in-line engines.
- 3- and 4-cylinder engines also turbocharged.
- Integrated cooling system (engine is supplied complete with heat exchanger).
- Cooling and lubrication with oil.
- 14% more power output in comparison to the successor 1011F.
- 100% extended belt change interval.
- PTO for hydraulic pump drive is increased by 55%.
- All service points on one engine side.
- Compact engine design.

Your benefit:

- Designed specifically for construction equipment the dimensions of the engines are extremely compact. Thus reducing installation costs.
- The new engines, which display an exceptional power /weight ratio, perform brilliantly while at the same time complying with the stricter regulations on environmental protection.
- Cooling and lubrication with oil avoid corrosion and cavitation. High reliability combined with long maintenance intervals and less wear parts.
- Low noise emission, no expensive insulation measures for noise reduction.



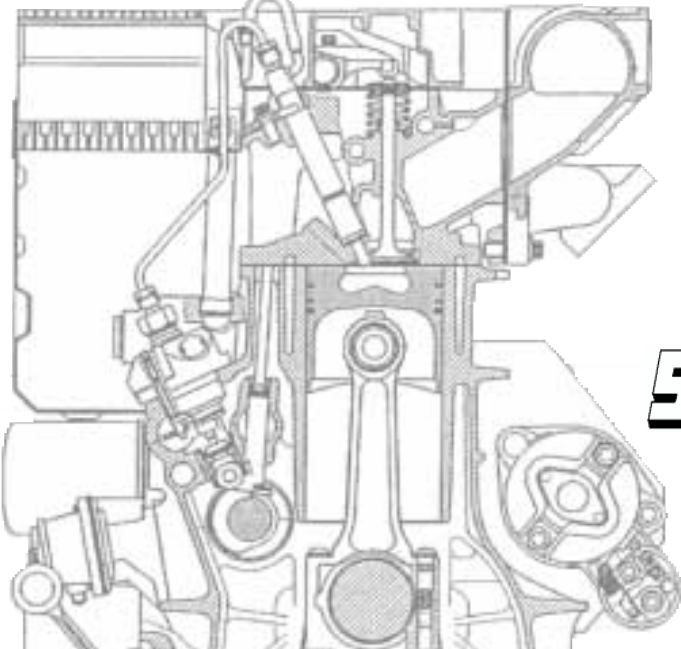
Knowing it's DEUTZ.



Best-Nr. 00311963 / 04 / 00 / MM-V

► Engine Description

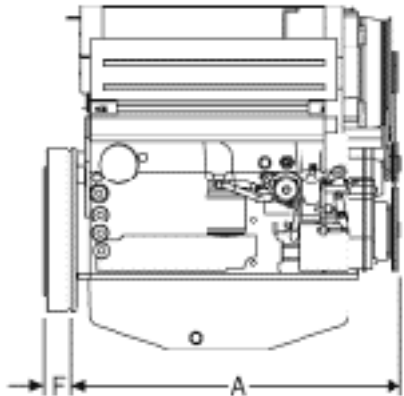
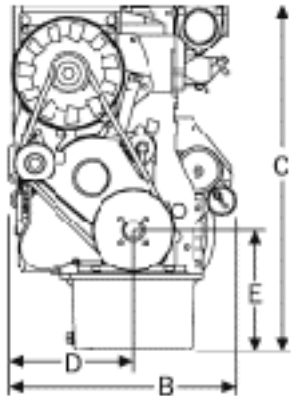
Type of cooling:	Integrated oil cooling
Crankcase:	Grey cast iron
Crankcase breather:	Closed-circuit breather
Cylinder head:	Block-type cast iron cylinder head
Valve arrangement/ Timing:	Overhead valves in cylinder head, one inlet and one exhaust valve per cylinder, actuated via tappets, push rods and rocker arms, driven by toothed belt and camshaft, automatic tensioner.
Piston:	Three-ring piston, two compressions rings and one oil scraper ring
Piston cooling:	Oil-cooled with spray nozzles
Connecting rod:	Drop-forged steel rod
Crankshaft and big-end bearings:	Ready-to-install plain bearings
Crankshaft:	Modular cast iron
Camshaft:	Steel shaft in bi-metal bearings
Lubrication system:	Forged-feed circulation lubrication with rotary pump which feeds both lubrication and cooling systems (and cab heating if fitted)
Lube oil cooler:	Integrated, of light metal
Lube oil filter:	Paper-type micro-filter as replaceable cartridge full flow filter
injection pump/ Governor:	Single injection pumps with mechanical centrifugal governor
Fuel lift pump:	Serviceable, with integrated strainer
injection nozzle:	Five-hole nozzle
Fuel filter:	Replaceable cartridge
Alternator:	Three-phase alternator, 14 V; 6o A (Standard)
Starter motor:	2,3 kW; 12 V
Heating system:	Optional connection for cab heating
Options:	Intake manifold connections, exhaust manifolds connections, hydraulic pumps, engine mounts rigid and flexible, oil pans, dipsticks, SAE 3/4/5/6 flywheel housings, alternators 12 and 24 V, oil filter positions horizontal and vertical, oil filler neck on side of crankcase or cylinder head cover



► Technical Data

Engine type		F2L2011	F3L2011	BF3L2011	F4L2011	BF4L2011
Nuner of cylinder		2	3	3	4	4
Bore/stroke	mm	94/112	94/112	94/112	94/112	94/112
Displacement	l	1.55	2.33	2.33	3.11	3.11
Compression ratio		18.5	18.5	17.5	18.5	17.5
Max. rated speed	rpm	2800	2800	2800	2800	2800
Mean piston speed	m/s	10.45	10.45	10.45	10.45	10.45
Power ratings for construction equipment engines ¹⁾						
Power ratings for automotive- and industrial engines ²⁾	kW	23.0	35.8	44.9	47.8	58.1
at speed	rpm	2800	2800	2800	2800	2800
Mean effective pressure	bar	6.36	6.58	8.26	6.59	8.01
Power ratings for cont. operation ³⁾	kW	21.8	34.0	42.6	45.4	55.1
at speed	rpm	2800	2800	2800	2800	2800
Mean effective pressure	bar	6.03	6.25	7.83	6.26	7.60
Max. torque	Nm	90	137	176	190	230
at speed	rpm	1700	1700	1600	1700	1600
Minimum idle speed	rpm	900	900	900	900	900
Specific fuel consumption ⁴⁾	g/kWh	220	218	212	214	205
Weight to DIN 70020, Part 7A ⁵⁾	kg	175	216	221	254	255

► Dimensions



Engine type		A	B	C*	D	E	F
F2L2011	mm	407	451	683	243	225	80
F3L2011	mm	519	451	678	243	220	80
BF3L2011	mm	519	495	678	343	220	93
F4L2011	mm	630	451	703	243	245	80
BF4L2011	mm	630	495	703	243	245	80

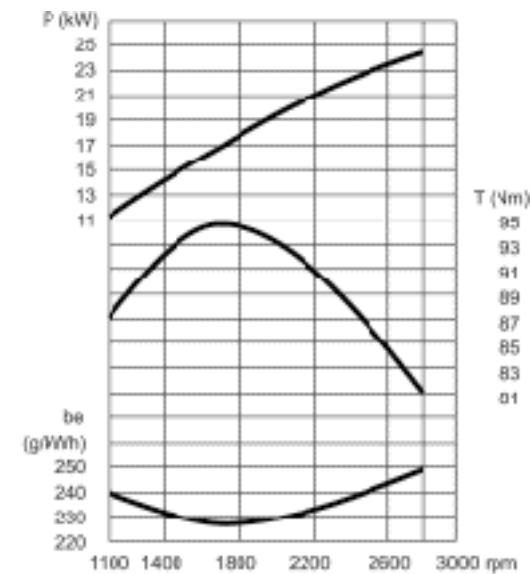
► Model designation

BF 4 L 2011	
Engine family designation	
L = Air-cooled	
Number of cylinder	
B = Turbocharging	
F = High-speed four-stroke engine	

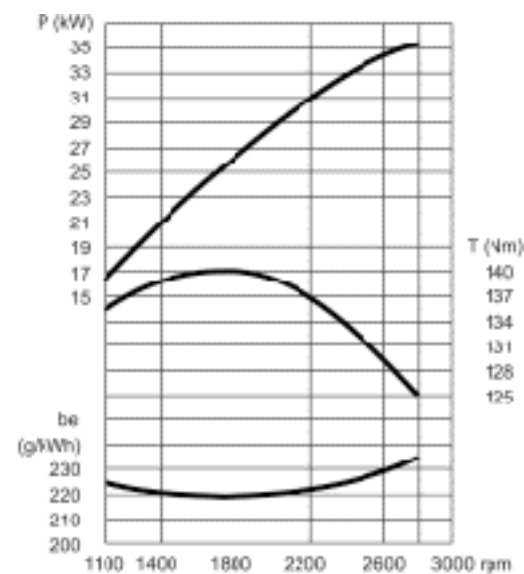
- 1) Power ratings at flywheel net, incl. integrated cooling system.
- 2) For intermittent operation to ISO 3046-1/ISO 1585.
- 3) Fuel stop power acc. to 3046/1 (ICFN).
- 4) At optimal operating point. Specific fuel consumption based on diesel fuel with a specific gravity of 0.835 kg/dm ³ at 15°C.
- 5) Including integrated cooling system, dry weight.
- * With standard oil pan.

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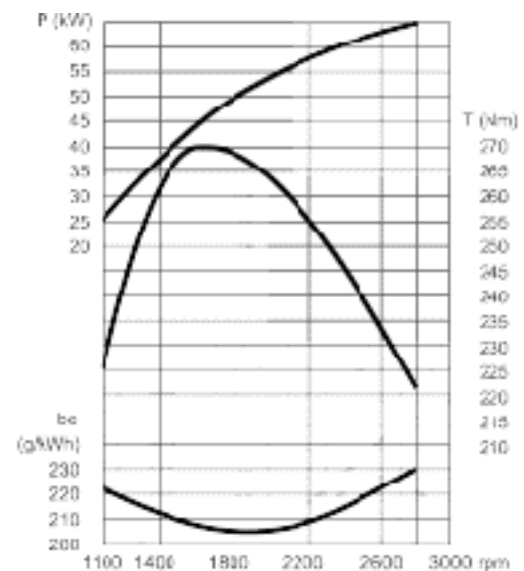
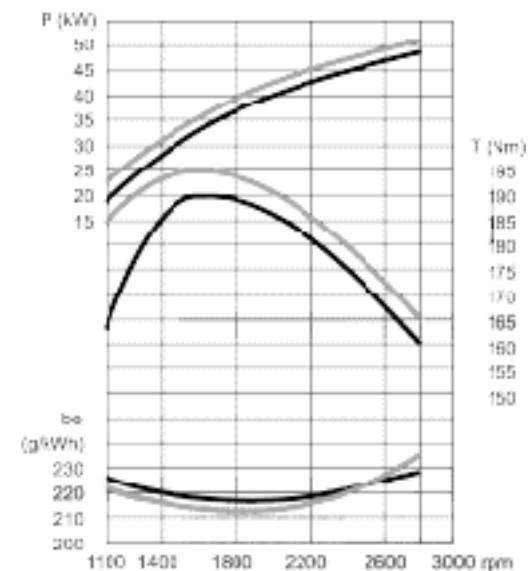
► Standard engines



► F2M2011



► F3M2011



Best.-Nr. 0031 1949 / 04 / 00 / MM-V



SSSI International Ltd.

2011. The engine for construction equipment.

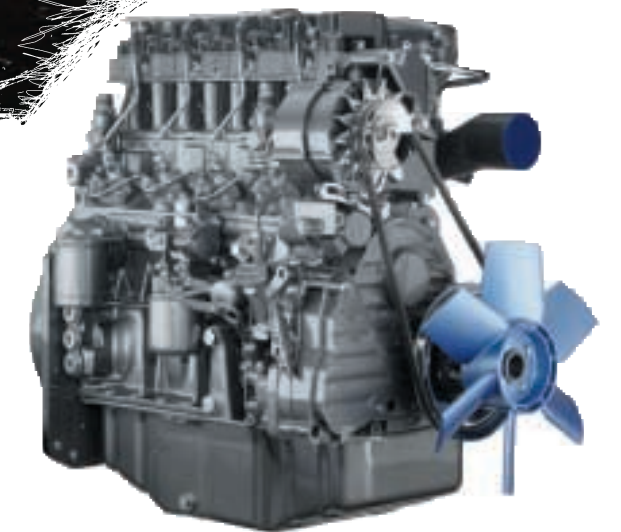
12.5 - 65 kW at 1500 - 2800 rpm



Engines with conventional cooling system.

These are the characteristics of the 2011:

- 2-, 3- and 4-cylinder naturally aspirated in-line engines.
- 3- and 4-cylinder engines also turbocharged.
- Oil-cooled (with conventional cooling system).
- 13% more power in comparison to the successor 1011F.
- 100% extended belt change interval.
- PTO for hydraulic pump drive is increased by 55%.
- All service points on one engine side.
- Compact engine design.



Your benefit:

- Designed specifically for construction equipment the dimensions of the engines are extremely compact. Thus reducing installation costs.
- The new engines, which display an exceptional power /weight ratio, perform brilliantly while at the same time complying with the stricter regulations on environmental protection.
- Cooling and lubrication with oil avoid corrosion and cavitation. High reliability combined with long maintenance intervals and less wear parts.
- Low noise emission, no expensive insulation measures for noise reduction.

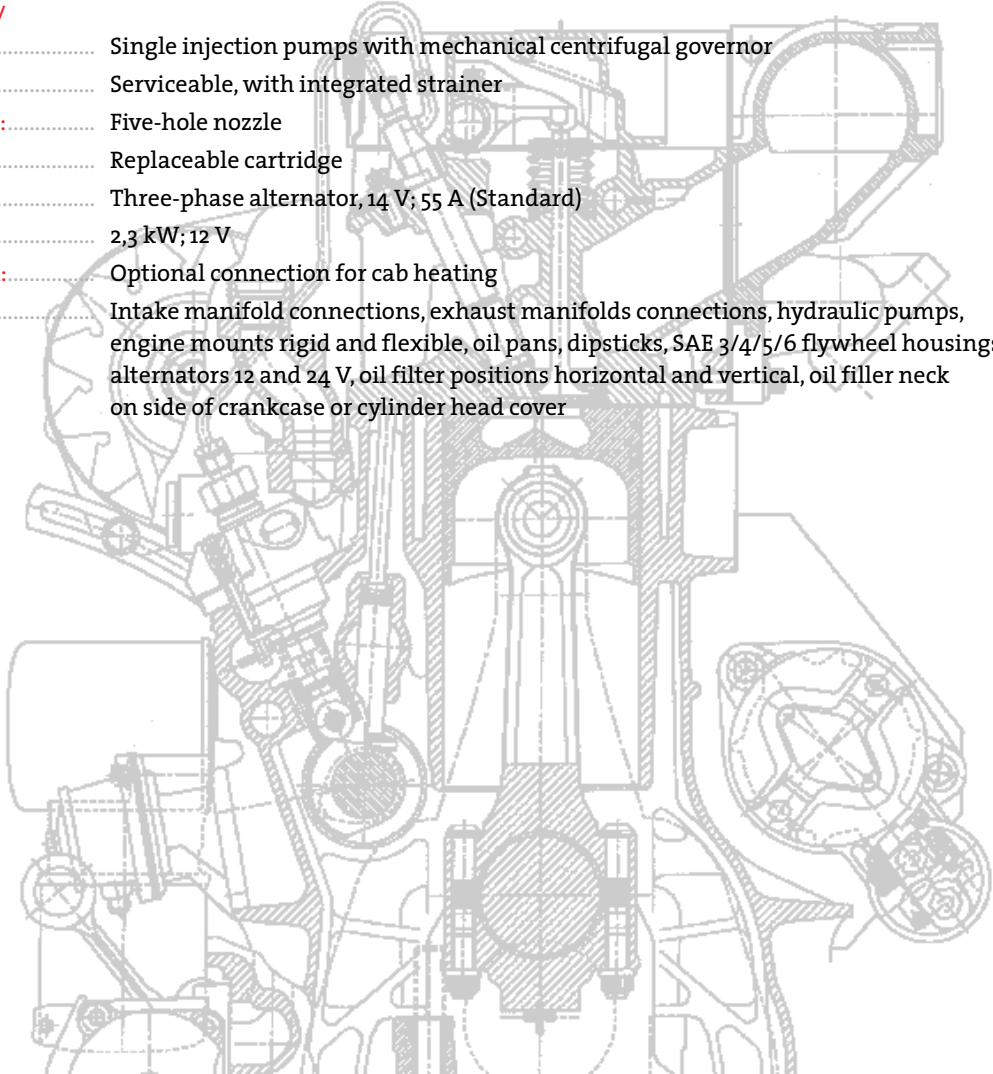


Knowing it's DEUTZ.



► Engine Description

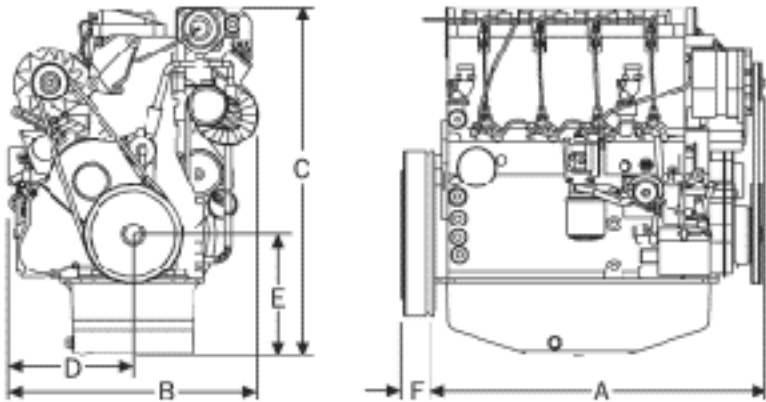
Type of cooling:	Oil-cooled (with conventional cooling system)
Crankcase:	Grey cast iron
Crankcase breather:	Closed-circuit breather
Cylinder head:	Block-type cast iron cylinder head
Valve arrangement/ Timing:	Overhead valves in cylinder head, one inlet and one exhaust valve per cylinder, actuated via tappets, push rods and rocker arms, driven by toothed belt and camshaft, automatic tensioner.
Piston:	Three-ring piston, two compressions rings and one oil scraper ring
Piston cooling:	Oil-cooled with spray nozzles
Connecting rod:	Drop-forged steel rod
Crankshaft and big-end bearings:	Ready-to-install plain bearings
Crankshaft:	Modular cast iron
Camshaft:	Steel shaft in bi-metal bearings
Lubrication system:	Forged-feed circulation lubrication with rotary pump which feeds both lubrication and cooling systems (and cab heating if fitted)
Lube oil cooler:	Externally arranged (conventional)
Lube oil filter:	Paper-type micro-filter as replaceable cartridge full flow filter
injection pump/ Governor:	Single injection pumps with mechanical centrifugal governor
Fuel lift pump:	Serviceable, with integrated strainer
injection nozzle:	Five-hole nozzle
Fuel filter:	Replaceable cartridge
Alternator:	Three-phase alternator, 14 V; 55 A (Standard)
Starter motor:	2,3 kW; 12 V
Heating system:	Optional connection for cab heating
Options:	Intake manifold connections, exhaust manifolds connections, hydraulic pumps, engine mounts rigid and flexible, oil pans, dipsticks, SAE 3/4/5/6 flywheel housings, alternators 12 and 24 V, oil filter positions horizontal and vertical, oil filler neck on side of crankcase or cylinder head cover



► Technical Data

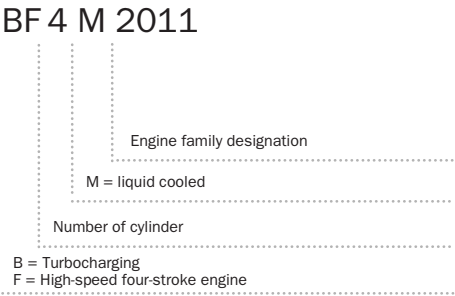
Engine type		F2M2011	F3M2011	BF3M2011	F4M2011	BF4M2011
Nuner of cylinder		2	3	3	4	4
Bore/stroke	mm	94/112	94/112	94/112	94/112	94/112
Displacement	l	1.55	2.33	2.33	3.11	3.11
Compression ratio		18.5	18.5	17.5	18.5	17.5
Max. rated speed	rpm	2800	2800	2800	2800	2800
Mean piston speed	m/s	10.45	10.45	10.45	10.45	10.45
Power ratings for construction equipment engines ⁴⁾						
Power ratings for automotive- and industrial engines ²⁾	kW	24.2	36.5	48.5	48.5	65.0
at speed	rpm	2800	2800	2800	2800	2800
Mean effective pressure	bar	6.69	6.71	8.92	6.69	8.96
Power ratings for cont. operation ³⁾	kW	23.0	34.7	46.0	46.1	62.0
at speed	rpm	2800	2800	2800	2800	2800
Mean effective pressure	bar	6.36	6.38	8.46	6.36	8.55
Max. torque	Nm	93	140	190	195	270
at speed	rpm	1700	1700	1600	1700	1600
Minimum idle speed	rpm	900	900	900	900	900
Specific fuel consumption ⁴⁾	g/kWh	224	219	210	213	205
Weight to DIN 70020, Part 7A ⁵⁾	kg	168	208	213	245	247

► Dimensions



Engine type		A	B	C*	D	E	F
F2M2011	mm	328	451	683	243	225	80
F3M2011	mm	519	451	678	243	220	80
BF3M2011	mm	519	495	678	243	220	93
F4M2011	mm	630	451	703	243	245	80
BF4M2011	mm	630	495	703	243	245	80

► Model designation



1) Power ratings at flywheel net, without cooling system.
2) For intermittent operation to ISO 3046-1/ISO 1585.
3) Fuel stop power acc. to 3046/1 (ICFN).
4) At optimal operating point. Specific fuel consumption based on diesel fuel with a specific gravity of 0.835 kg/dm ³ at 15°C.
5) Without cooling system, dry weight.
* With standard oil pan.

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413FW. The underground mining engine.

93-322 hp at 2300 rpm



These are the characteristics of the 413FW:

Air-cooled four stroke 6-, 8-, 10- and 12-cylinder in v-configuration.

12-cylinder also with turbocharging.

DEUTZ-two-stage combustion.

Extremely compact design.

High torque at low speed.

Robust and especially suited for use under extreme conditions.

Customized component system with many different peripheral parts.

Your benefits:

- ▶ Fast response to load changes.
- ▶ Low operating costs thanks to lower fuel consumption, low specific ventilation requirements and long maintenance intervals with reduced maintenance requirements.
- ▶ Operation advantages due to compact design and low power-to-weight ratio.
- ▶ Robust engine design ensures high operating safety.

► Technical data

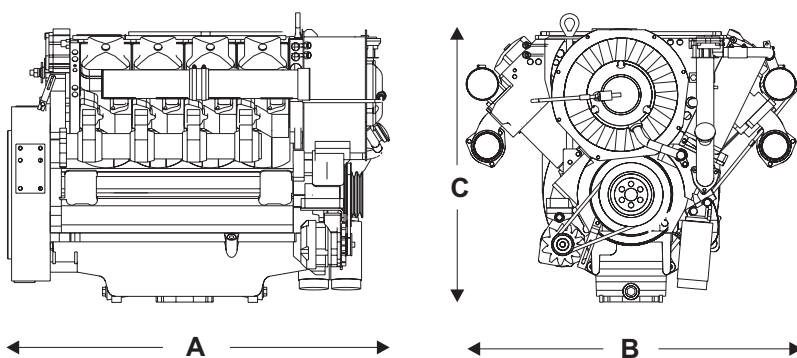
Engine type		F6L413FW	F8L413FW	F10L413FW	F12L413FW	BF12L413FW
Number of cylinder		6	8	10	12	12
Bore/stroke	mm	125/130	125/130	125/130	125/130	125/130
Displacement	l	9.572	12.763	15.953	19.144	19.144
Compression ratio		19.5	19.5	19.5	19.5	19.5
Max. rated speed	rpm	2300	2300	2300	2300	2300
Mean piston speed	m/s	9.96	9.96	9.96	9.96	996

Power ratings for underground mining engines

Power ratings ¹⁾	hp	137	182	228	274	322
at speed ²⁾	rpm	2300	2300	2300	2300	2300
Mean effective pressure	bar	5,56	5,56	5,56	5,56	6,54
Max. torque	Nm	500	665	830	995	1250
at speed	rpm	1500	1500	1500	1500	1500
Minimum idle speed	rpm	600	600	600	600	600
Spec. fuel consumption ³⁾	g/kWh	276	276	276	276	276
Weight ⁴⁾	kg	660	830	990	1120	1300

- 1) Power ratings without deduction fan power requirements, incl. cooling system. Ratings as per ISO 3046.
2) Power ratings for non-mentioned speeds upon request.
3) At optimal operating point. Specific fuel consumption based on diesel fuel with a specific gravity of 0,835 kg/dm³ at 15°C.
4) Acc. to DIN 70020, Part 7A. Without starter motor/alternator, radiator and liquids, however with flywheel and flywheel housing.

► Dimensions



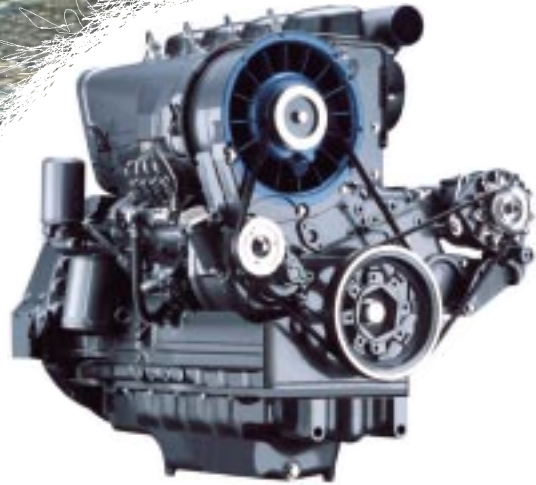
Engine		Length	Width	Hight
F6L413FW	mm	915	1038	860
F8L413FW	mm	1080	1038	860
F10L413FW	mm	1283	1038	999
F12L413FW	mm	1448	1038	1007
BF12L413FW	mm	1380	1192	1112





912. The engine for construction equipment.

24 - 82 kW at 1500 - 2500 min⁻¹



These are the characteristics of the 912:

Air-cooled 3-, 4-, 5-, 6-cylinder naturally aspirated in-line-engines.
Direct injection.
Advanced injection and combustion system.
PTOs via gear, V-belt and crankshaft.
Extremely compact design.
High torque at low speeds.
Modular system with single cylinder arrangement and high degree of parts commonality.
Customized component system with many different peripheral parts.
Cold-starting ability even under extreme climatic conditions.

These are the benefits for you:

- ▶ Fast response to load changes.
- ▶ Low noise emission, high cost savings thanks to less noise insulation requirement.
- ▶ Low operating costs thanks to lower fuel consumption and long maintenance intervals with reduced maintenance requirement.
- ▶ Excellent smooth-running characteristics thanks to low engine vibrations.
- ▶ Minimal environmental impact. Meets exhaust regulation EU-RL 97/68.
- ▶ Extremely reliable and durable.
- ▶ Easy-to-install unit (engine with integrated cooling system).

Engine description

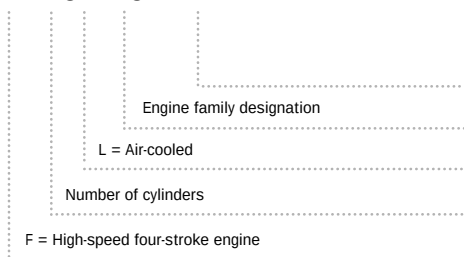
Cooling system:	Air-cooled with integrated axial-flow blower
Crankcase:	Grey cast iron
Cylinder head:	Aluminium single cylinder heads
Valve arrangement/ timing:	Overhead valves in the cylinder head, one inlet and one exhaust valve per cylinder, actuated from gear-driven camshaft via tappets, push-rods and rocker arms
Piston:	Three-ring piston: two compression rings and one oil scraper ring
Piston cooling:	Oil spray via nozzle
Crankshaft:	Drop-forged steel crankshaft with bolted counterweights
Connecting rod:	Drop-forged steel rod, diagonally split
Main and big end bearings:	Ready-to-install tri-metal plain bearings
Camshaft:	Steel, seated in bi-metal bearing on the blower side
Lubrication system:	Forced-feed circulation lubrication with rotary pump which feeds both lubricating and heating systems (if heating is fitted)
Engine oil cooler:	Integrated aluminium cooler
Oil cooler thermostat:	Oil cooler flow thermostatically controlled on engines with heating system
Lube oil filter:	Paper-type micro-filter as replaceable-cartridge full flow filter
Injection pump/ governor:	In-line injection pump with mechanical centrifugal governor
Injection nozzle:	Five-hole-nozzle
Fuel filter:	Replaceable cartridge
Starter motor:	12V; 2,7 kW (Standard)
Alternator:	Three-phase alternator, 14 V; 55A (Standard)
Heating system:	Optional connection for cab heating
Options:	Intake manifold connections, exhaust manifold connections, compressors, hydraulic pumps, engine mounts rigid and flexible, oil pans, SAE 1/2/3/4 flywheel housings, three-phase alternators 12 and 24 Volt, integrated hydraulic oil cooler, cooling fans controlled by exhaust thermostat

► Technical data

Engine type		F3L912	F4L912	F5L912	F6L912
Number of cylinders		3	4	5	6
Bore/stroke	mm	100/120	100/120	100/120	100/120
Displacement	l	2.83	3.77	4.71	5.66
Compression ratio		18	18	18	18
Max. rated speed	min ⁻¹	2500	2500	2500	2500
Mean piston speed	m/s	10	10	10	10
Power ratings for construction equipment engines¹⁾					
Power ratings for automotive engines ²⁾	kW	40	54	68	82
at speed ³⁾	min ⁻¹	2500	2500	2500	2500
Mean effective pressure	bar	6.79	6.88	6.93	6.96
Power ratings for industrial engines⁴⁾					
highly intermittent operation	kW	40	54	68	82
at speed	min ⁻¹	2500	2500	2500	2500
Mean effective pressure	bar	6.79	6.88	6.93	6.96
intermittent operation ⁴⁾	kW	38	51	65	78
at speed	min ⁻¹	2500	2500	2500	2500
Mean effective pressure	bar	6.45	6.50	6.62	6.62
Max. torque	Nm	185	247	308	370
at speed	min ⁻¹	1450	1450	1450	1450
Minimum idle speed	min ⁻¹	650	650	650	650
Specific fuel consumption ⁵⁾	g/kWh	225	225	225	225
Weight to DIN 70020, Part 7A ⁶⁾	kg	270	300	380	410

► Model designation

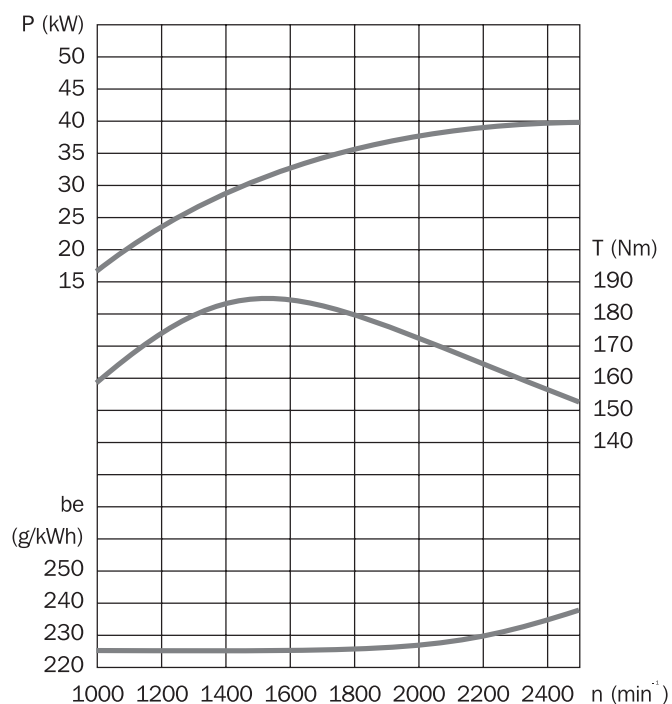
F 6 L 912



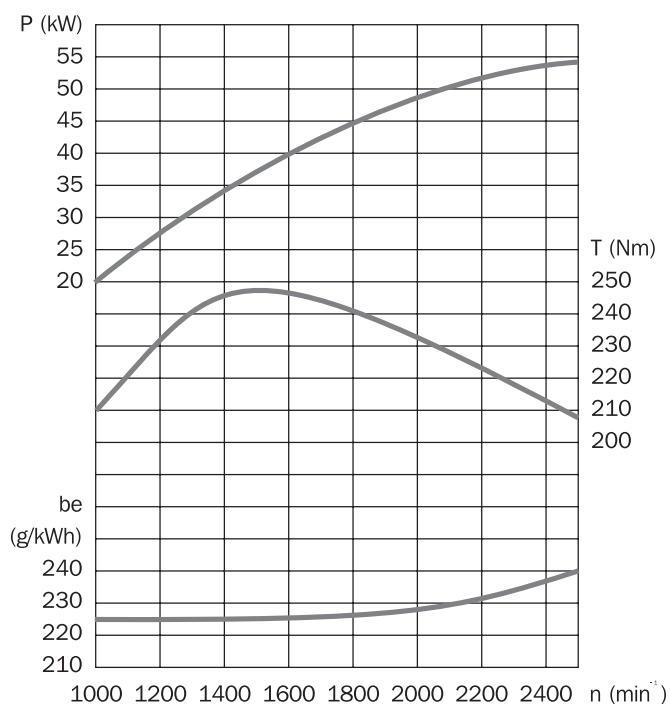
- 1) Power ratings without deduction fan power requirement, incl. cooling system, meeting exhaust emission limits of EU-RL 97/68.
- 2) Power ratings to DIN ISO 1585, EG-RL80/1269/EWG ECE-R 24
- 3) Power ratings for non-mentioned speeds upon request.
- 4) Power to DIN ISO 3046/1 (IFN). The fuel stop IFN power is an ISO net power at flywheel under reference conditions with all essential auxiliaries driven by the engine.
- 5) At optimal operating point. Specific fuel consumption based on diesel fuel with a specific gravity of 0,835 kg/dm³ at 15°C.
- 6) Without starter motor/alternator, radiator and liquids, however with flywheel and flywheel housing and complete integrated cooling system.

The values given in this data sheet are for information purposes only and not binding.
The information given in the offer is decisive.

► Standard engines

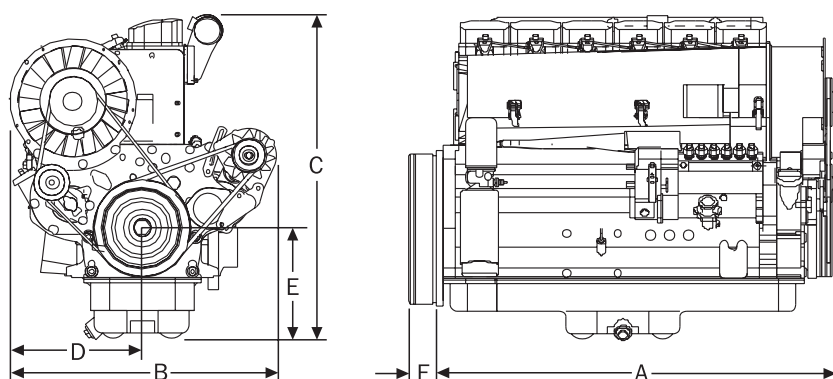


► F3L912



► F4L912

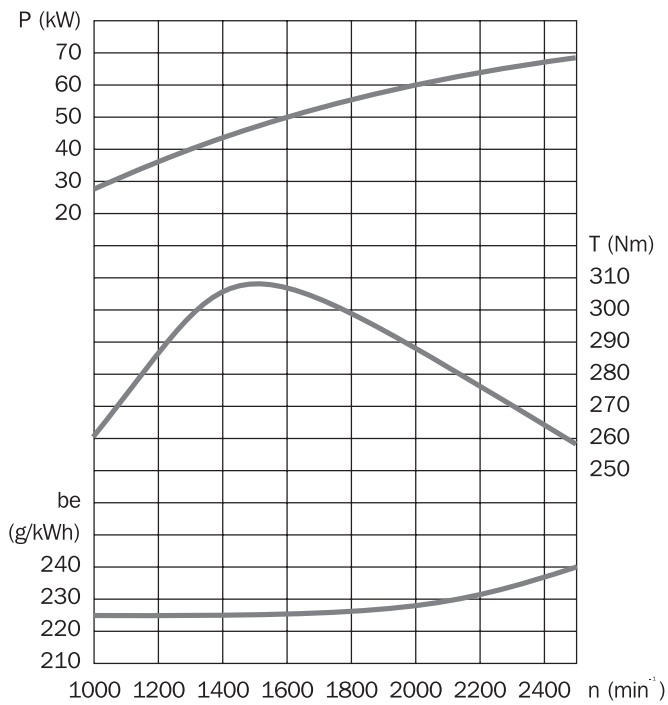
► Dimensions



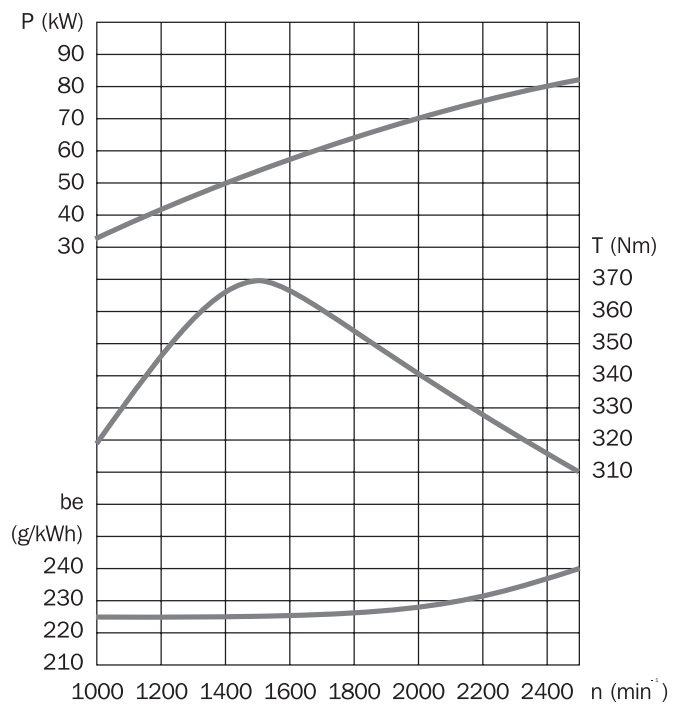
Engine		A	B	C	D	E	F
F3L912	mm	589	679	796	329	268	108
F4L912	mm	719	679	796	329	268	88
F5L912	mm	866	679	833	329	305	88
F6L912	mm	996	679	806	329	278	88

*) with standard flywheel, incl. cooling system
 **) with standard oil pan, oil sump central

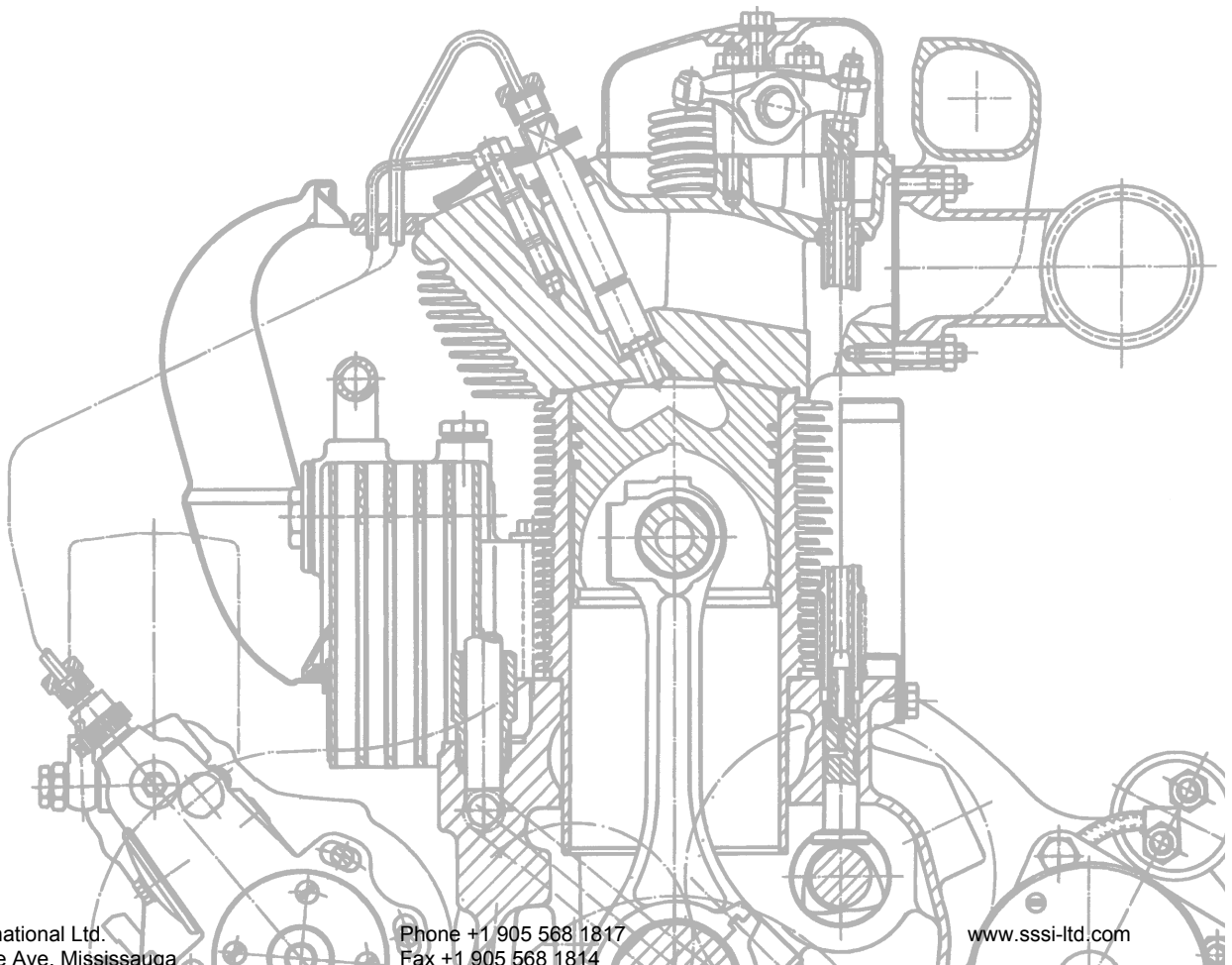
► Standard engines



► F5L912



► F6L912





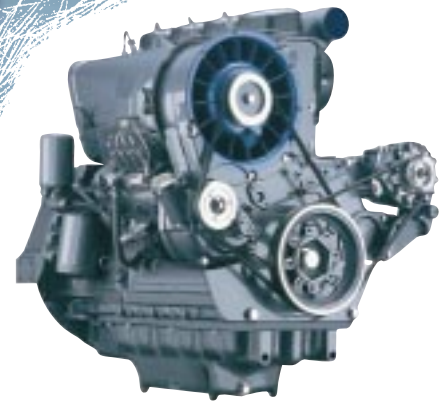
Knowing it's DEUTZ.





912. The marine engine.

24-78 kW at 1500-2300 min⁻¹



These are the characteristics of the 912:

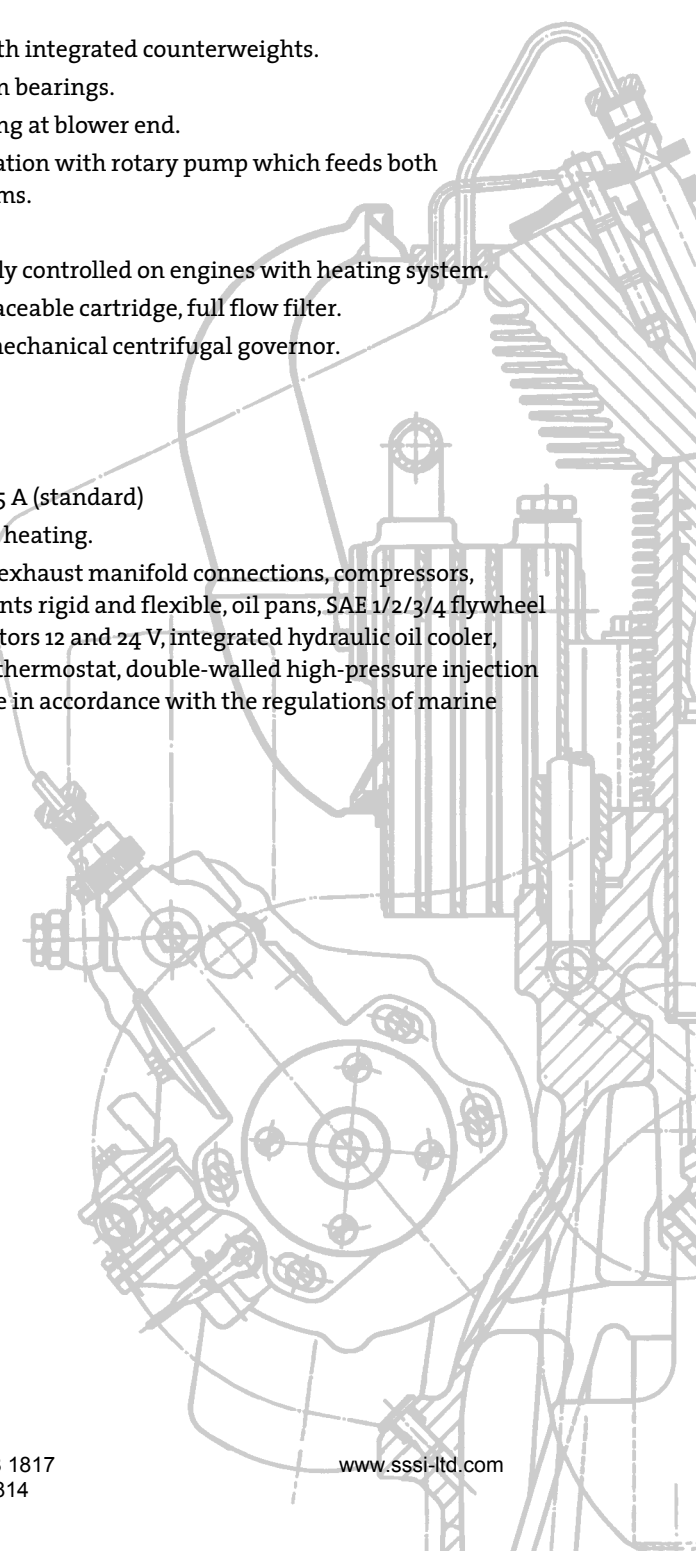
- Air-cooled 3, 4, 5 and 6 cylinder naturally aspirated in-line engines.
- Unit construction system with single cylinder arrangement and maximum parts commonality.
- Advanced injection and combustion systems.
- Electronic governor (option).
- Compact power unit with low weight.
- Only a few servicing points.
- Tried and tested worldwide: more than 2.7 million engines in operation.

Your benefits:

- ▶ Exemplarily low fuel and oil consumption as well as long maintenance intervals and ease of service save operating costs.
- ▶ Low noise radiation. This eliminates the need for costly noise attenuation measures.
- ▶ Easy and cost-effective installation due to minimum weight and small space requirement.
- ▶ Excellent smooth-running characteristics thanks to low engine vibrations.
- ▶ Incomparably low exhaust emissions, current exhaust emission regulations are easily fulfilled.

► Engine description

Type of cooling:	Air-cooled with integrated axial-flow blower.
Crankcase:	Grey cast iron.
Cylinder head:	Aluminium single cylinder heads, protection against seawater corrosion (optional).
Valve arrangement / timing:	Overhead valves in the cylinder head, one inlet and one exhaust valve per cylinder, actuated from gear driven camshaft via tappets, pushrods and rocker arms.
Piston:	Three-ring piston: 2 compression rings, 1 oil scraper ring.
Piston cooling:	Oil cooled with spray nozzles.
Crankshaft:	Crankshaft of nodular iron with integrated counterweights.
Crankshaft and big-end bearings:	Ready-to-install bi-metal plain bearings.
Camshaft:	Steel, seated in bi-metal bearing at blower end.
Lubrication system:	Forced-feed circulation lubrication with rotary pump which feeds both lubricating and heating systems.
Engine oil cooler:	Integrated aluminium cooler.
Oil cooler thermostat:	Oil cooler flow thermostatically controlled on engines with heating system.
Lubricating oil filter:	Paper-type microfilter as replaceable cartridge, full flow filter.
Injection pump / governor:	In-line injection pump with mechanical centrifugal governor.
Injection nozzle:	Five-hole nozzle.
Fuel filter:	Replaceable cartridge.
Starter motor:	12 V, 2.7 kW (standard)
Alternator:	Three-phase alternator, 14 V, 55 A (standard)
Heating system:	Optional connection for cabin heating.
Options:	Intake manifold connections, exhaust manifold connections, compressors, hydraulic pumps, engine mounts rigid and flexible, oil pans, SAE 1/2/3/4 flywheel housings, three-phase alternators 12 and 24 V, integrated hydraulic oil cooler, blower controlled by exhaust thermostat, double-walled high-pressure injection lines, classification acceptance in accordance with the regulations of marine classification societies.



► Technical data

Engine type		F 3L 912	F 4L 912	F 5L 912	F 6L 912
Model		in-line	in-line	in-line	in-line
Number of cylinders		3	4	5	6
Bore/stroke	mm	100/120	100/120	100/120	100/120
Displacement	l	2.827	3.770	4.680	5.616
Power ratings for marine propulsion units					
acc. to power category A ¹⁾					
at 1500 min ⁻¹	kW (HP)	24 (33)	32 (44)	40 (54)	48 (65)
at 1800 min ⁻¹	kW (HP)	28 (38)	38 (52)	48 (65)	57 (78)
at 2150 min ⁻¹	kW (HP)	32 (44)	44 (60)	55 (75)	66 (90)
acc. to power category B ²⁾					
at 2300 min ⁻¹	kW (HP)	38 (52)	51 (69)	65 (88)	78 (106)
Power ratings for on-board generating sets					
Continuous power ³⁾					
at 1500 min ⁻¹	kW (HP)	28 (37)	36 (49)	46 (63)	55 (75)
at 1800 min ⁻¹	kW (HP)	32 (43)	43 (58)	55 (75)	66 (90)
Specific fuel consumption ⁴⁾					
at 1500 min ⁻¹	g/kWh (g/HPH)	213 (157)	213 (157)	213 (157)	213 (157)
at 1800 min ⁻¹	g/kWh (g/HPH)	218 (160)	218 (160)	218 (160)	218 (160)
at 2150 min ⁻¹	g/kWh (g/HPH)	227 (167)	227 (167)	227 (167)	227 (167)
Weight	kg	270	300	380	410
IMO NO _x limit values ⁵⁾		fulfilled	fulfilled	fulfilled	fulfilled
Fulfills classification regulations ⁶⁾ acc. to:		GL + NKK*	GL + NKK	GL + NKK	GL + NKK

1) Continuous net brake fuel stop power, utilization above 80 %, SCFN to ISO 3046/7.

2) Continuous fuel stop power, utilization max. 70 %, SFN to ISO 3046/7.

3) Overloadable by 10 % for 60 min. within a period of 12 hours (PRP power).

4) At optimal operating point. Refers to power category A.

5) NO_x limit values to IMO Technical Code MP/Conf. 3/35.
Planned implementation 01.01.2000

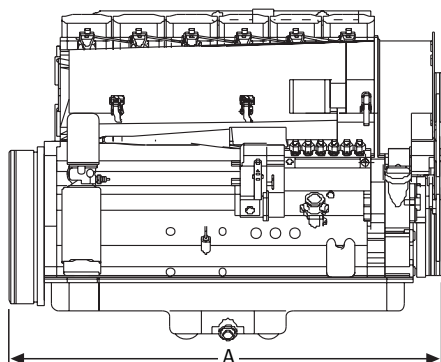
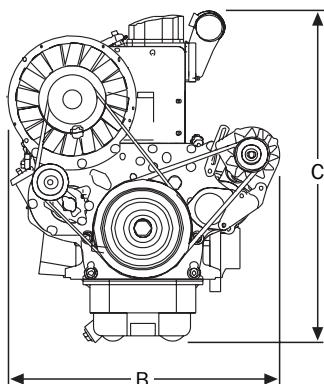
6) Other marine classifications on request.

Power declarations based on the following ambient conditions:
25i C intake air temperature, 25i C coolant temperature, barometric pressure
1000 mbar.

* GL = Germanischer Lloyd
NKK = Nippon Kaiji Kyokai

The values given in this data sheet are for information only and not binding.
The data provided in the offer is decisive.

► Dimensions



Engine Type		A	B	C
F 3L 912	mm	589	679	796
F 4L 912	mm	719	679	796
F 5L 912	mm	866	679	833
F 6L 912	mm	996	679	806



Knowing it's DEUTZ.

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www.sssi-ltd.com

912W. The underground mining engine.

47 - 93 hp at 2500 rpm



These are the characteristics of the 912W:

Air-cooled four stroke 3-, 4-, 5- and 6- cylinder in-line engines.

DEUTZ-two-stage combustion.

PTOs via gear, flywheel and v-belt pulley.

Extremely compact design.

High torque at low speed.

Modular system with single cylinder arrangement and high degree of parts commonality.

Customized component system with many different peripheral parts.

Your benefits:

- ▶ Fast response to load changes.
- ▶ Minimal environmental impact. All engines are certificated acc. to MSHA.
- ▶ Low operating costs thanks to lower fuel consumption, low specific ventilation requirements and long maintenance intervals with reduced maintenance requirements.
- ▶ Compact design saves installation space and thus construction costs.
- ▶ Easy-to-install unit (engine with integrated cooling system).

► Technical data

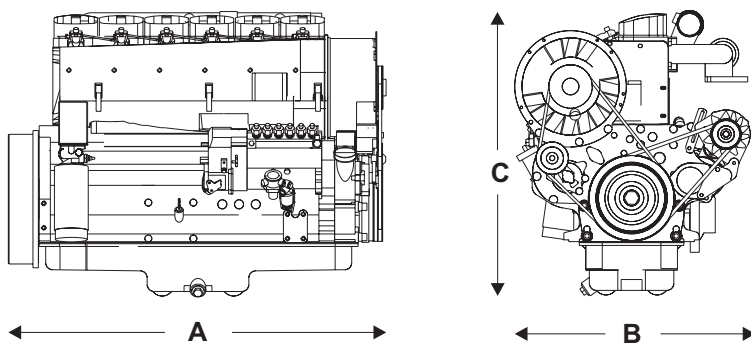
Engine type		F3L912W	F4L912W	F5L912W	F6L912W
Number of cylinder		3	4	5	6
Bore/stroke	mm	102/125	102/125	102/125	102/125
Displacement	l	3.064	4.086	5.107	6.128
Compression ratio		22	22	22	22
Max. rated speed	rpm	2800	2800	2800	2800
Mean piston speed	m/s	11.6	11.6	11.6	11.6

Power ratings for underground mining engines

Power ratings ¹⁾	hp	47	62	76	93
at speed ²⁾	rpm	2500	2500	2500	2500
Mean effective pressure	bar	5.48	5.40	5.36	5.40
Max. torque	Nm	149	198	249	298
at speed	rpm	1550	1550	1550	1550
Minimum idle speed	rpm	650	650	700	650
Spec. fuel consumption ³⁾	g/kWh	230	230	230	230
Weight to DIN 70020, Part 7A ⁴⁾	kg	277	300	380	410

- 1) Power ratings without deduction fan power requirements, incl. cooling system. Ratings as per ISO 3046.
2) Power ratings for non-mentioned speeds upon request.
3) At optimal operating point. Spec. fuel consumption acc. to the power ratings in the schedule: 255 g/kWh. Specific fuel consumption based on diesel fuel with a specific gravity of 0,835 kg/dm³ at 15°C.
4) Without starter motor/alternator, radiator and liquids, however with flywheel and flywheel housing and complete integrated cooling system.

► Dimensions



Engine		Length	Width	Height
F3L912W	mm	697	679	796
F4L912W	mm	807	679	796
F5L912W	mm	954	679	833
F6L912W	mm	1084	679	806

