KOHLER® Diesel KDI

KOHLER®

EXCELLENT POWER AND TORQUE CHARACTERISTICS WILL NOT ONLY PROVIDE CUSTOMERS WITH OPPORTUNITIES TO DOWN-SIZE FROM THEIR CURRENT ENGINE DISPLACEMENT, BUT ALSO TO SIGNIFICANTLY REDUCE FUEL CONSUMPTION AND AVOID EXPENSIVE DIESEL PARTICULATE FILTRATION (DPF) DEVICES.

COMMON-RAIL SYSTEM

Kohler has selected the most advanced common-rail system available on the market and specifically engineered for extreme durability and longevity within arduous industrial and construction equipment applications. The 2000 bar high pressure pump, together with the advanced multiple-injection control of the solenoid-injectors, allows an excellent fuel rate control during the injection process.

TURBOCHARGER AND CHARGE-AIR COOLER

The waste-gated turbocharger has been specifically tuned to minimize the turbo-lag response and provide the precise volume of air for an excellent low end torque capability. The special design of the lubrication system guarantees extended durability of the turbocharger. The use of a charge air cooler is required to ensure the correct air inlet temperature for the optimal engine performance whilst achieving emissions compliance.

4 VALVES

The 4 valves per cylinder design has been selected to enable the installation of the injectors precisely on the cylinder axis and centred with the combustion bowl. This solution allows for a symmetrical fuel atomisation and distribution within the combustion bowl ensuring optimal mixing of fuel and air. The design of the combustion bowl itself together with the inlet ports shaping, have been studied and developed with CFD analysis to complete the absolute optimization of the combustion process.

INNOVATIONS

ECU

The engine electronic control unit (ECU), together with the common rail injection system, is a part of the most advanced automotive style engine management system and has been specifically developed for industrial and construction equipment applications. It allows a full control of the engine calibration parameters to achieve the engine performances and emissions targets. A CAN bus link allows the ECU to interface with other electronic systems within the final application in order to optimize the engines operating parameters. Options of specific functionalities have been enabled within the ECU in order to provide OEMs with different governing characteristics ensuring total compatibility with individual equipment.

EGR SYSTEM

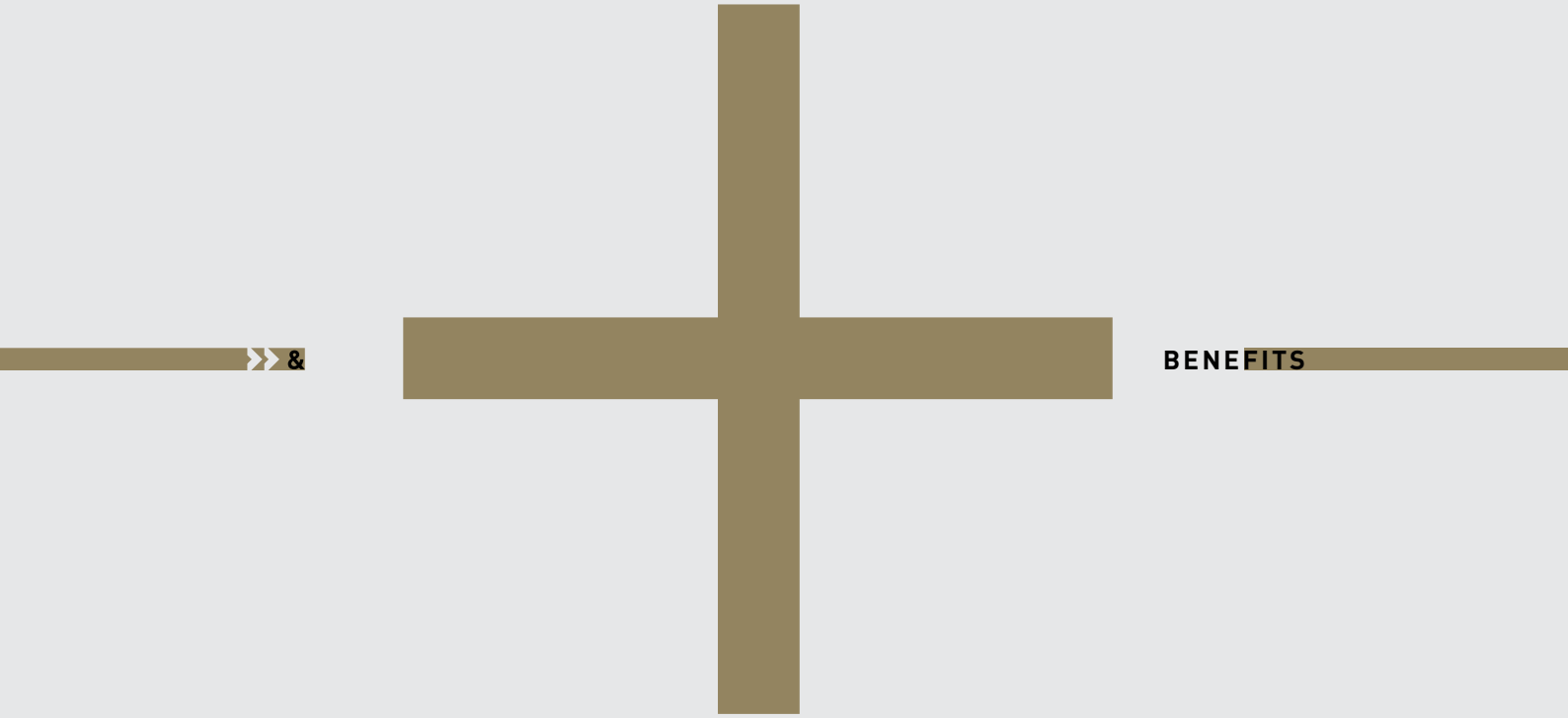
The Exhaust Gas Recirculation (EGR) system has been designed with CFD analysis and the use of comprehensive research and development resources.The chosen design of a "hot side" EGR layout will avoid valve sticking problems that are historically the most common failures seen within these systems. Exhaust gas routing across the cylinder head ensures a beneficial preliminary gas cooling before entering the EGR valve to reduce the overall dimensions of the unit to assist installation parameters.

TIER 4 FINAL/STAGE III B COMPLIANCE

EXCELLENT FUEL EFFICIENCY

LONG SERVICE INTERVALS

EASY MAINTENANCE



LOW VIBRATIONS

REDUCED NOISE

COMPACT

NO AFTER TREATMENT, NO HEAT REGENERATION

TURBO COMMON RAIL ENGINES

STANDARD EQUIPMENT

Intake manifold
Exhaust manifold
Side oil refilling
Electric starter
80A alternator
SAE 4 (7" ½)
Cabin heating predisposition
Fuel and oil filter engine mounted
Fuel filter with water sensor and priming pump
Environmentally friendly oil filter
ECU
Oil sump capacity 8.5 L (KDI 1903) and 11.3 L (KDI 2504)

ACCESSORIES ON DEMAND

Diesel oxidation catalyst (DOC)
Charge air-cooler
Remote fuel and oil filter
Protections required by the type of use
Clutch flywheels
SAE 3 (11" ½)
SAE 5 (6" ½)
Backplates
Transmission adapters
Radiators
Mounting feet
Heavy duty air cleaner
Dynamic balancing (KDI 2504)
Potentiometer

KDI 1903TCR

QUICK SPECIFICS

3 CYLINDER — Turbo common rail

56 HP | **42** kW — @ 2600 rpm, TIER 4 Final, STAGE III B

225 Nm — @ 1500 rpm

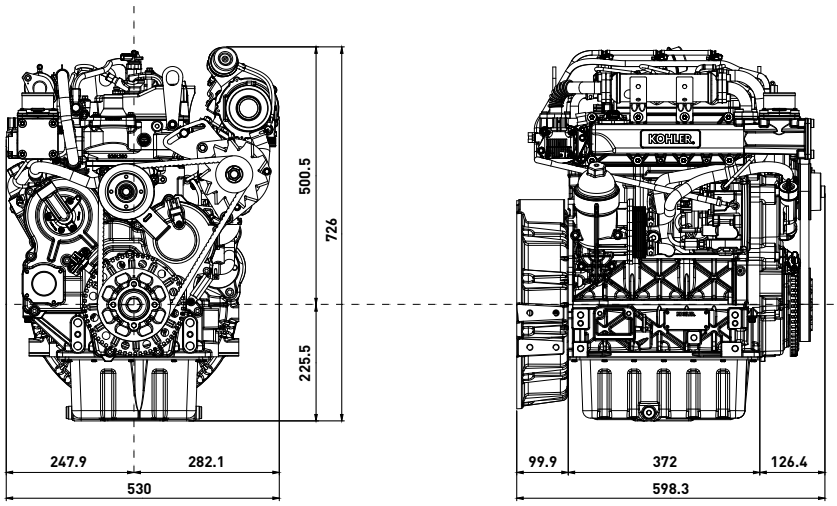
GENSET RATINGS

	rpm	1800
NET ENGINE POWER*	Stand-by (kW)	37.0
	Prime (kW)	33.6
ELECTRICAL POWER**	Intermittent (kVA)	40.7
	Continuous (kVA)	37.0
MAX. EMISSION COMPLIANCE AVAILABLE***	Tier 4 F	

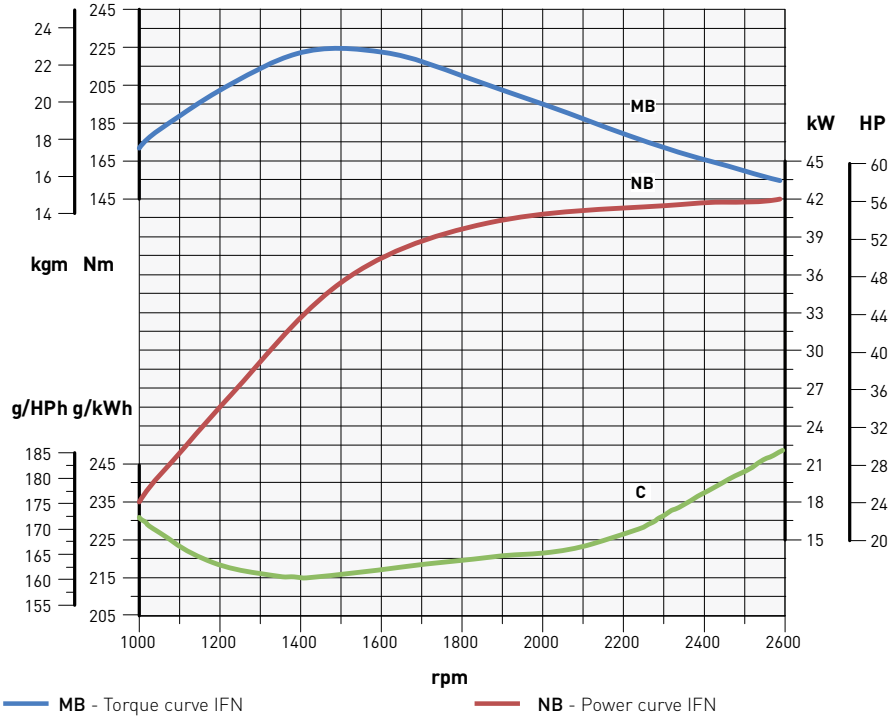
* Engine power rating ISO IFN (Stand-by) and ICXN (Prime) according to ISO 3046 and ISO 14396, after running-in period at ambient condition +25°C, relative humidity 30%, and ambient pressure 100 kPa (1 bar). Fuel specification EN590
**Electrical power includes fan power absorption, typical alternator efficiency and a power factor (cos ø) of 0.8
Continuous (Prime) power can be overloaded of 10% for 1 h every 12 hours operation
Intermittent (Standby) power cannot be overloaded.
*** Possible de-rating might have to be taken in consideration to ensure emission compliance.

DATA

DIMENSIONS (mm)



PERFORMANCE CURVES (IFN-ACCORDING TO ISO 3046 AND ISO 14396)



MB - Torque curve IFN
NB - Power curve IFN
C - Specific fuel consumption - (NB curve)

Power ratings refer to engines equipped with air filter, standard muffler, after running-in period at ambient conditions of +25°C, relative humidity 30% and 1 bar. De-rating depending on applications.

KDI 2504TCR

QUICK SPECIFICS

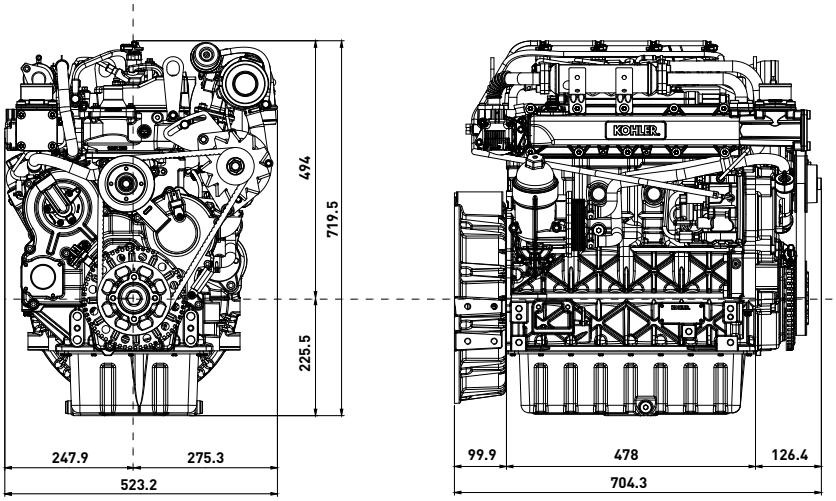
4 CYLINDER — Turbo common rail

74 HP | **55.4** kW — @ 2600 rpm, TIER 4 Final, STAGE III B

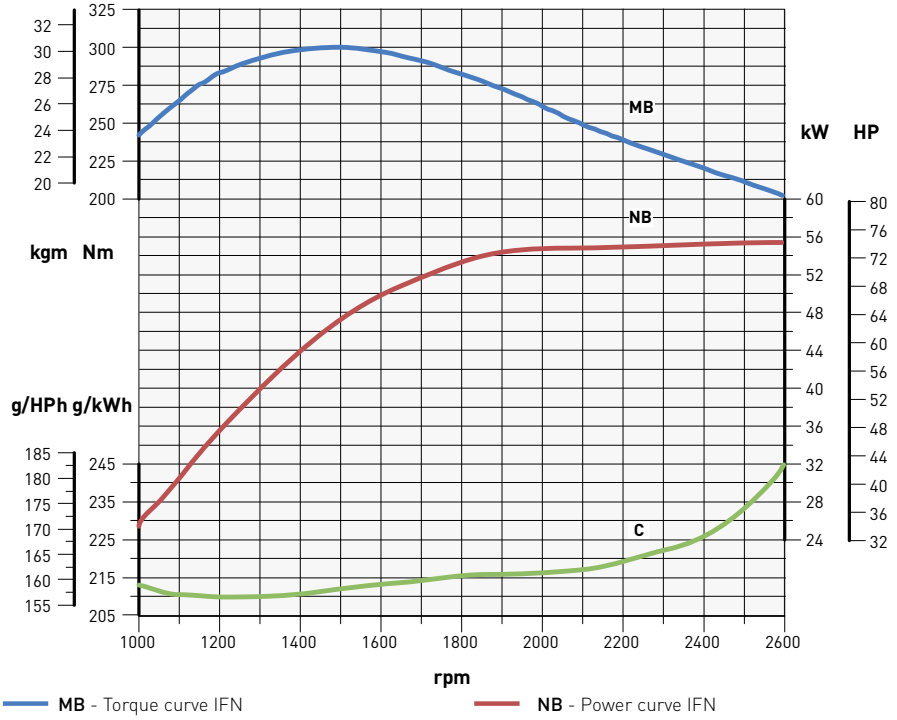
300 Nm — @ 1500 rpm

DATA

DIMENSIONS (mm)



PERFORMANCE CURVES (IFN-ACCORDING TO ISO 3046 AND ISO 14396)



MB - Torque curve IFN — **NB** - Power curve IFN

C - Specific fuel consumption - (NB curve)

Power ratings refer to engines equipped with air filter, standard muffler, after running-in period at ambient conditions of +25°C, relative humidity 30% and 1 bar. De-rating depending on applications.

GENSET RATINGS

	rpm	1800
NET ENGINE POWER*	Stand-by (kW)	47.1
	Prime (kW)	42.8
ELECTRICAL POWER**	Intermittent (kVA)	51.8
	Continuous (kVA)	47.1
MAX. EMISSION COMPLIANCE AVAILABLE***	Tier 4 F	

* Engine power rating ISO IFN (Stand-by) and ICXN (Prime) according to ISO 3046 and ISO 14396, after running-in period at ambient condition +25°C, relative humidity 30%, and ambient pressure 100 kPa (1 bar). Fuel specification EN590

**Electrical power includes fan power absorption, typical alternator efficiency and a power factor (cos ø) of 0.8
Continuous (Prime) power can be overloaded of 10% for 1 h every 12 hours operation
Intermittent (Standby) power cannot be overloaded.

*** Possible de-rating might have to be taken in consideration to ensure emission compliance.

MECHANICAL ENGINES

STANDARD EQUIPMENT

Intake manifold
Exhaust manifold
Side oil refilling
Electric starter
55A alternator
SAE 4 (7" ½)
Cabin heating predisposition
Fuel and oil filter engine mounted
Oil sump capacity 8.5 L (KDI 1903) and 11.3 L (KDI 2504)

ACCESSORIES ON DEMAND

Remote fuel and oil filter
Protections required by the type of use
Clutch flywheels
SAE 3 (11" ½)
SAE 5 (6" ½)
Backplates
Transmission adapters
Radiators
Mounting feet
Heavy duty air cleaner
Dynamic balancing (KDI 2504)

KDI 1903M

QUICK SPECIFICS

3 CYLINDER — Mechanical Engine

42 HP | **31** kW — @ 2600 rpm, STAGE III A

133 Nm — @ 1500 rpm

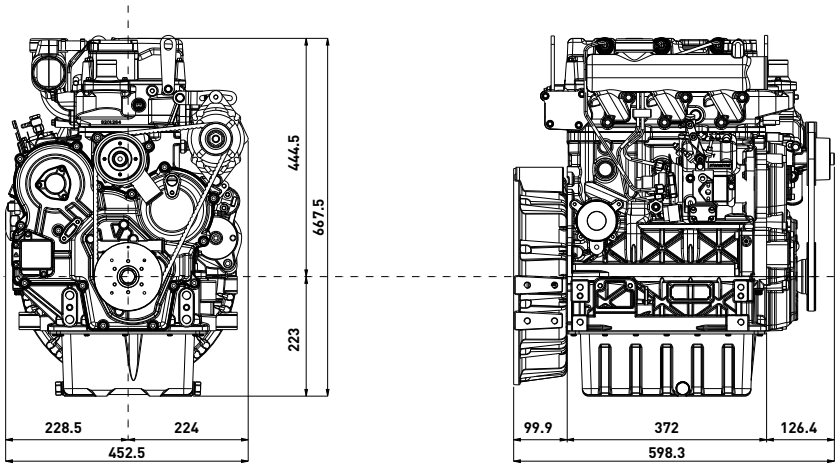
GENSET RATINGS

	rpm	1500	1800
NET ENGINE POWER*	Stand-by (kW)	20.0	22.0
	Prime (kW)	18.7	20.0
ELECTRICAL POWER**	Intermittent (kVA)	21.7	24.2
	Continuous (kVA)	20.3	22.0
MAX. EMISSION COMPLIANCE AVAILABLE***		EU Stage III A	Tier 4 F

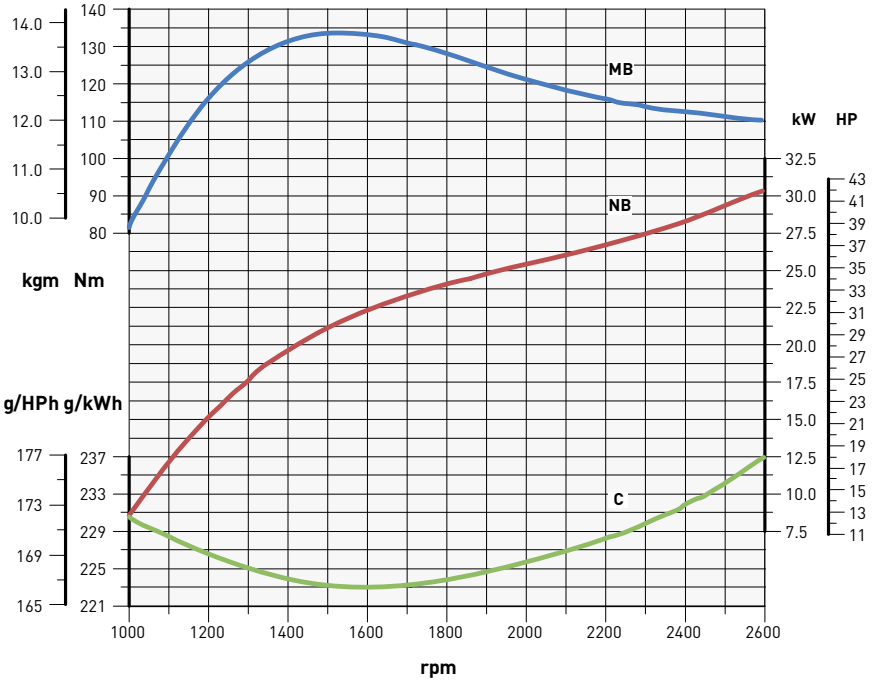
* Engine power rating ISO IFN (Stand-by) and ICXN (Prime) according to ISO 3046 and ISO 14396, after running-in period at ambient condition +25°C, relative humidity 30%, and ambient pressure 100 kPa (1 bar). Fuel specification EN590
**Electrical power includes fan power absorption, typical alternator efficiency and a power factor (cos ø) of 0.8
Continuous (Prime) power can be overloaded of 10% for 1 h every 12 hours operation. Intermittent (Standby) power cannot be overloaded.
*** Possible de-rating might have to be taken in consideration to ensure emission compliance.
(1) for stationary + emergency applications EPA compliant.

DATA

DIMENSIONS (mm)



PERFORMANCE CURVES (IFN-ACCORDING TO ISO 3046 AND ISO 14396)



MB - Torque curve IFN
NB - Power curve IFN
C - Specific fuel consumption - (NB curve)

Power ratings refer to engines equipped with air filter, standard muffler, after running-in period at ambient conditions of +25°C, relative humidity 30% and 1 bar. Power levels drop by 1% every 100 m altitude and by 2% every 5°C above +25°C.

KDI 2504M

QUICK SPECIFICS

4 CYLINDER — Mechanical Engine

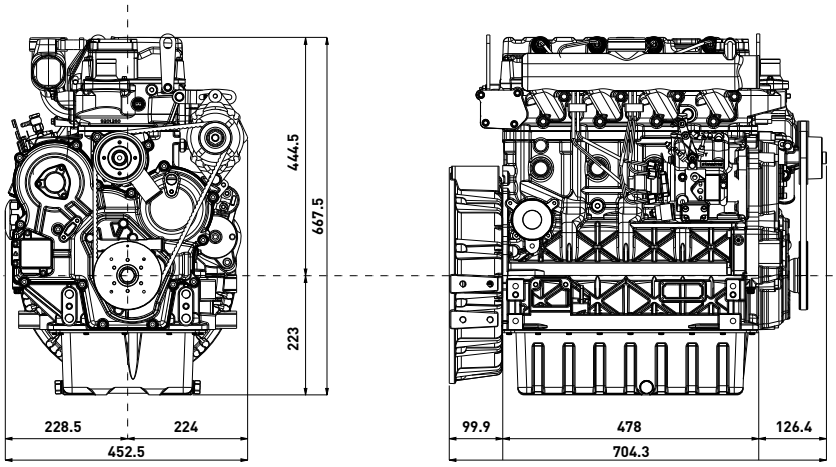
49 HP | **36.4** kW — @ 2600 rpm, STAGE III A

55 HP | **41** kW — @ 2800 rpm, TIER 2

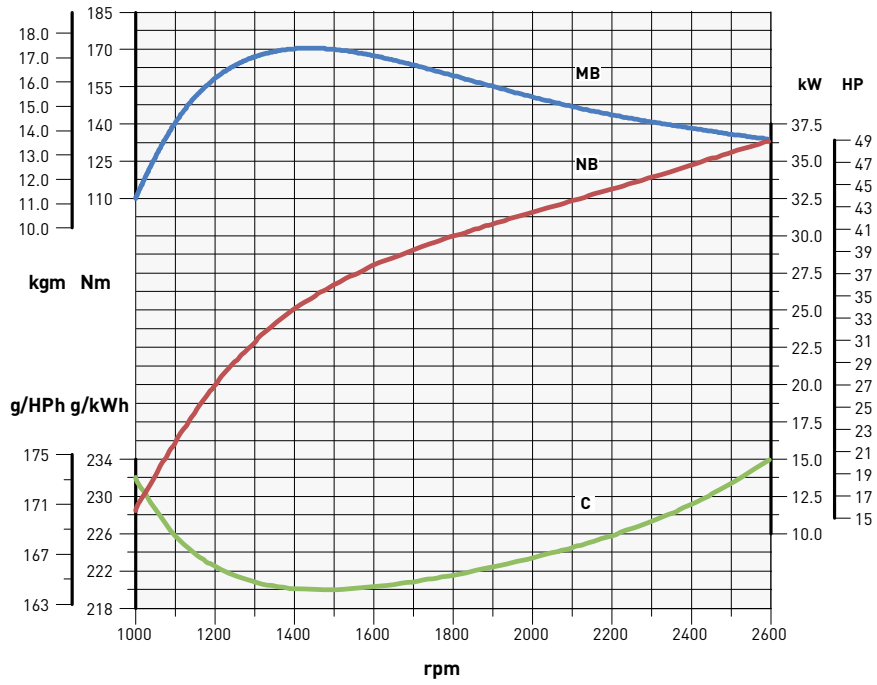
170 Nm — @ 1500 rpm

DATA

DIMENSIONS (mm)



PERFORMANCE CURVES (IFN-ACCORDING TO ISO 3046 AND ISO 14396)



MB - Torque curve IFN — **NB** - Power curve IFN

C - Specific fuel consumption - (NB curve)

Power ratings refer to engines equipped with air filter, standard muffler, after running-in period at ambient conditions of +25°C, relative humidity 30% and 1 bar. Power levels drop by 1% every 100 m altitude and by 2% every 5°C above +25°C.

GENSET RATINGS

	rpm	1500	1800
NET ENGINE POWER*	Stand-by (kW)	27.0	30.0
	Prime (kW)	24.7	27.3
ELECTRICAL POWER**	Intermittent (kVA)	29.7	33.0
	Continuous (kVA)	27.2	30.0
MAX. EMISSION COMPLIANCE AVAILABLE***		EU Stage III A	Tier 4 i (1)

* Engine power rating ISO IFN (Stand-by) and ICXN (Prime) according to ISO 3046 and ISO 14396, after running-in period at ambient condition +25°C, relative humidity 30%, and ambient pressure 100 kPa (1 bar). Fuel specification EN590

**Electrical power includes fan power absorption, typical alternator efficiency and a power factor (cos ø) of 0.8
Continuous (Prime) power can be overloaded of 10% for 1 h every 12 hours operation
Intermittent (Standby) power cannot be overloaded.

*** Possible de-rating might have to be taken in consideration to ensure emission compliance.
(1) for stationary + emergency applications EPA compliant.

TURBO COMMON RAIL ENGINES

Model		KDI 1903TCR	KDI 2504TCR
Engine specs	4 stroke diesel with cylinder in line	•	•
	Liquid cooling	•	•
	4 valves per cylinder	•	•
	In crankcase camshaft, gear train driven	•	•
	Pushrod - rocker arms timing with hydraulic tappets	•	•
	Cast iron crankcase with bed-plate	•	•
	Closed crankcase ventilation system	•	•
	High pressure common rail (2000 bar)	•	•
	Electronic engine management	•	•
	Waste-gate turbocharger	•	•
	Charge-air cooling	(•)	(•)
Technical features	Cylinder	3	4
	Bore (mm)	88	88
	Stroke (mm)	102	102
	Engine displ (cm^3)	1861	2482
	Injection system	DI	DI
	Injection Equipment	Common rail (2000 bar)	Common rail (2000 bar)
Performance	Emission compliance	TIER 4 Final / STAGE III B	TIER 4 Final / STAGE III B
	Max power (IFN - ISO 3046 and ISO 14396) (kW@rpm)	42@2400 - 2600	55.4@2400 - 2600
	Max torque (IFN - ISO 3046 and ISO 14396) (Nm@rpm)	225@1500	300@1500
	Low-end torque (Nm@1000 rpm)	172	242
Fuel economy	Best point (g/kWh)	215	210
	Max power (g/kWh@2400 rpm)	237	226
Startability	Unaided (°C)	down to -19	down to -19
	Aided* (°C)	below -19	below -19
	* Manifold grid heater		
Fuel compatibility	EN 590	•	•
	No 1 Diesel (US) - ASTM D 975-09 B - Grade 1-D S 15	•	•
	No 2 Diesel (US) - ASTM D 975-09 B - Grade 2-D S 15	•	•
	Arctic EN 590/ASTM D 975-09 B (No petroleum added)	•	•
Service features	Oil/filter change interval std/synthetic (hr)	500-750*	500-750*
	Valve adjustement	—	—
	Alternator belt replacement	36mth	36mth
	Coolant change	24 mth	24 mth
	Oil consumption (% fuel)	<0.1	<0.1
	* according to operating conditions		
Physical characteristics	H × L × W (fan excluded) (mm)	726 × 598.3 × 530	719.5 × 704.3 × 523.2
	Weight (kg)	233	267
	Daily service points - positions	1 side service	1 side service
	Ambient operating temps (°C)	-40 to +50	-40 to +50
	Gradeability-all round (continous) (deg)	25	25
	Gradeability-all round (intermittent-1min) (deg)	35	35
Cooling & lubrication	Heat rejection to coolant (includes oil cooler) (kW)	32	44
	Cooling fluid: 50/50 water/antifreeze	•	•
	Oil type	SAE 5W 30 low SAPS EURO 6 API CJ-4	SAE 5W 30 low SAPS EURO 6 API CJ-4
Vibration	Max engine excitation at mounting locations	5g	5g
Auxiliary PTOs (3rd & 4th) (optional)	Max torque (Nm)	100	100
	Drive ratio	1.23 times engine speed	1.23 times engine speed
	Provision for a double Gr.2 tandem hydraulic pump	•	•

MECHANICAL ENGINES

Model		KDI 1903M	KDI 2504M
Engine specs	4 stroke diesel with cylinder in line	•	•
	Liquid cooling	•	•
	4 valves per cylinder	•	•
	In crankcase camshaft, gear train driven	•	•
	Pushrod - rocker arms timing with hydraulic tappets	•	•
	Cast iron crankcase with bed-plate	•	•
	Cast iron cylinder head	•	•
	Closed crankcase ventilation system	•	•
	Waste-gate turbocharger	—	—
	Charge air cooling	—	—
Technical features	Cylinder	3	4
	Bore (mm)	88	88
	Stroke (mm)	102	102
	Engine displ (cm^3)	1861	2482
	Injection system	DI	DI
	Injection Equipment	Mech-Rotary pump	Mech-Rotary pump
Performance	Emission compliance	STAGE III A	STAGE III A
	Max power (IFN - ISO 3046 and ISO 14396) (kW@rpm)	31@2600	36.4@2600 (STAGE III A)
			41@2800 (TIER 2)
	Max torque (IFN - ISO 3046 and ISO 14396) (Nm@rpm)	133@1500	170@1500
	Low-end torque (Nm@1000 rpm)	80	110
Fuel economy	Best point (g/kWh)	223	220
	Max power (g/kWh@2600)	237	234
Startability	Unaided (°C)	down to -15	down to -15
	Aided* (°C)	below -15	below -15
	* Manifold grid heater		
Fuel compatibility	EN 590	•	•
	No 1 Diesel (US) - ASTM D 975-09 B - Grade 1-D S 15	•	•
	No 1 Diesel (US) - ASTM D 975-09 B - Grade 1-D S 500	•	•
	No 2 Diesel (US) - ASTM D 975-09 B - Grade 2-D S 15	•	•
	No 2 Diesel (US) - ASTM D 975-09 B - Grade 2-D S 500	•	•
	ARCTIC EN 590/ASTM D 975-09 B	•	•
	High Sulfur Fuel < 5000 ppm (< 0.5%)	•	•
	High Sulfur Fuel > 5000 ppm (> 0.5%)	•	•
	Military NATO Fuels F34 - F35 - F44 - F63 - F64 - F65 *	•	•
	Military US Fuels JP5 - JP8 (AVTUR) *	•	•
	Civil Jet Fuels Jet A/ A1*	•	•
	* With restrictions		
Service features	Oil/filter change interval std/synthetic (hr)	500-750*	500-750*
	Valve adjustement	—	—
	Alternator belt replacement	36mth	36mth
	Coolant change	24 mth	24 mth
	Oil consumption (% fuel)	<0.1	<0.1
	* according to operating conditions		
Physical characteristics	H × L × W (fan excluded) (mm)	667.5 × 598.3 × 452.5	667.5 × 704.3 × 452.5
	Weight (kg)	210	244
	Daily service points - positions	1 side service	1 side service
	Ambient operating temps (°C)	-40 to +50	-40 to +50
	Gradeability-all round (continous) (deg)	25	25
	Gradeability-all round (intermittent-1min) (deg)	35	35
Cooling & lubrication	Heat rejection to coolant (includes oil cooler) (kW)	24	28
	Cooling fluid: 50/50 water/antifreeze	•	•
	Oil type	API CH4-SAE 10W40	API CH4-SAE 10W40
Vibration	Max engine excitation at mounting locations	5g	5g
Auxiliary PTOs (3rd & 4th) (optional)	Max torque (Nm)	100	100
	Drive ratio	1.23 times engine speed	1.23 times engine speed
	Provision for a double Gr.2 tandem hydraulic pump	•	•