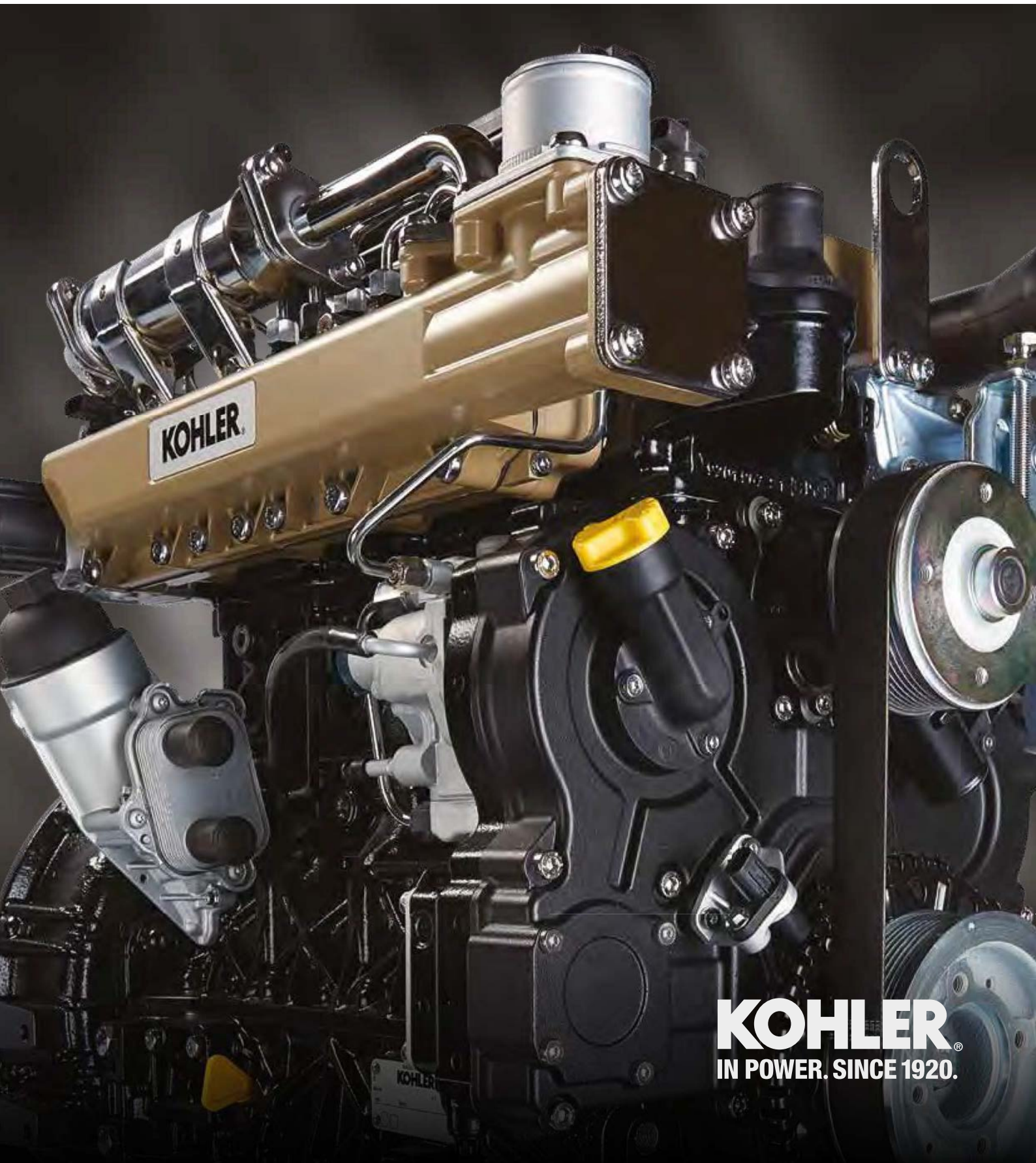
KOHLER® DIESEL KDI

31.0 – 55.4 kW | 42 – 75 hp

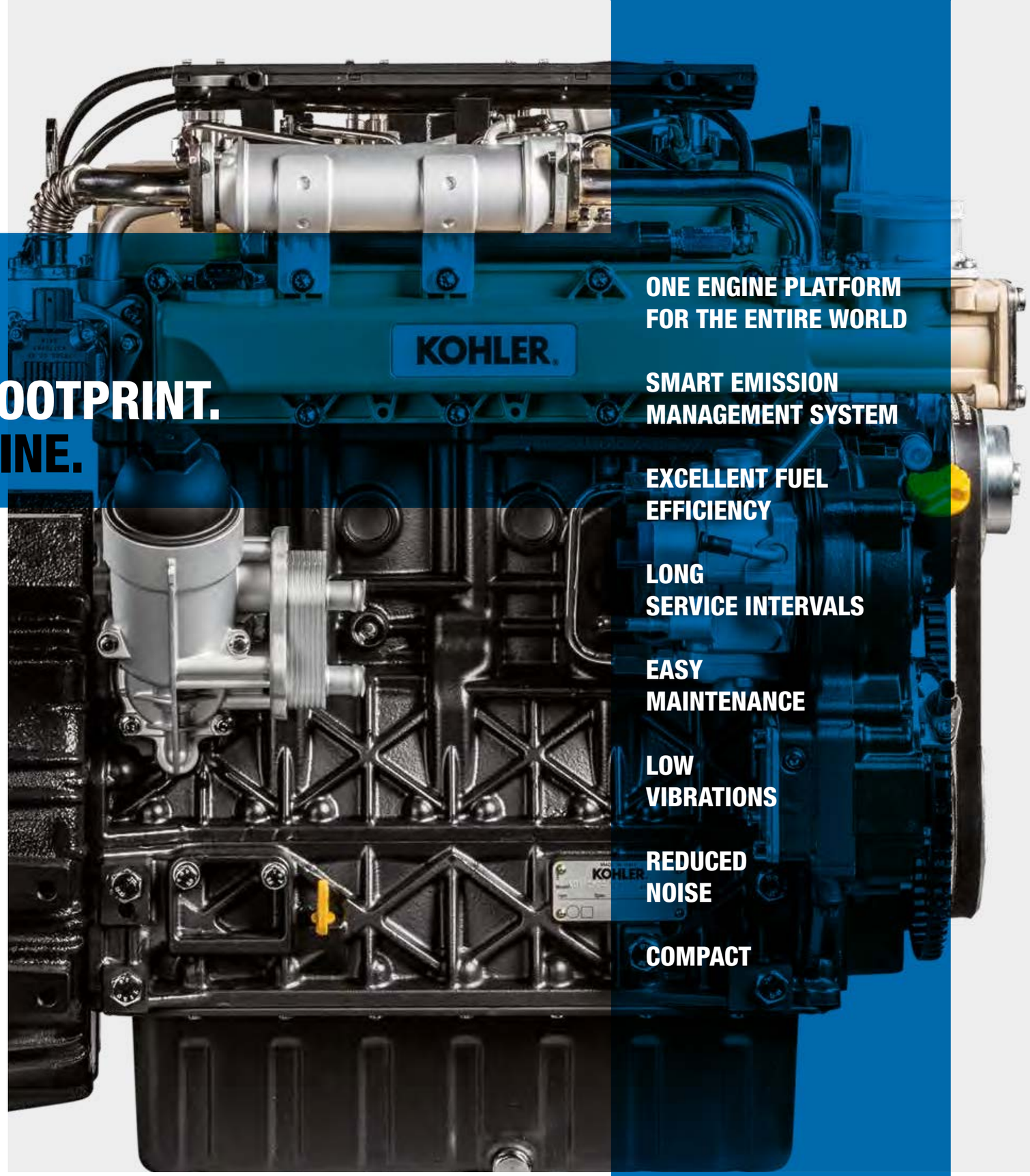


MORE POWER. SMALLER FOOTPRINT.
THE ULTIMATE DIESEL ENGINE.

Anybody can add more power to an engine. That's not the hard part.
The challenge is increasing the performance without increasing the body size.

With the KOHLER KDI diesel engine, we started from scratch to build an entirely new engine experience.
Using state-of the-art technology to control the combustion process, we created a diesel that delivers more power and more torque in a smaller frame.
So you can keep your performance and downsize your engine.

But we didn't stop there. The KDI lineup is a comprehensive platform of engines equipped to meet all emission regulations worldwide. Our engineers created a specific aftertreatment solution for every continent on earth in the smallest size possible. So wherever you are, we offer the most compact solution for your machine.



ONE ENGINE PLATFORM FOR THE ENTIRE WORLD

SMART EMISSION MANAGEMENT SYSTEM

EXCELLENT FUEL EFFICIENCY

LONG SERVICE INTERVALS

EASY MAINTENANCE

LOW VIBRATIONS

REDUCED NOISE

COMPACT

INNOVATIONS AND BENEFITS

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 agricultural, 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 centered with the combustion bowl. This solution allows for a symmetrical fuel atomization 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.

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 agricultural, 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.

DOC (Diesel Oxidation Catalyst)

The DOC reacts with exhaust gases to reduce carbon monoxide, hydrocarbons, and some particulate matter (PM). It promotes oxidation of several exhaust gas components by oxygen, which is present in ample quantities in diesel exhaust. When passed over an oxidation catalyst, diesel pollutants – carbon monoxide (CO), gas phase hydrocarbons (HC), organic fraction of diesel particulates (SOF) – can be oxidized to CO2.
Kohler strategy is to offer a maintenance free DOC using the latest available technology, able to extend the service intervals and reduce the fuel consumption in order to let the end user spend more time in motion.

DPF (Diesel Particulate Filter)

The DPF is a soot trap, which physically captures diesel particulate matter (PM) and prevent the release into the atmosphere. The DPF traps soot particles but at the same time accumulates ashes from engine oil combustion and particles from engine wear.
The DPF is kept clean from the soot, during normal engine operation through a process called filter regeneration. The regeneration strategy has been designed to maintain optimal machine operation, even at low load and low temperatures, thus preventing downtime due to forced regeneration events. From this perspective, the aftertreatment system is a key enabler to spend more time in motion, consequently increasing machine productivity.
Kohler released two DPF versions. The first one reaches a maximum service interval of 10,000 hours, the whole engine lifecycle; whereas the second is the most compact of the market and ensures a maintenance interval of 6,000 hours.

KOHLER Flex

THE INTEGRATED SUITE OF ENGINE SYSTEMS

KOHLER Flex is the range of solutions for emission control that Kohler has designed to enable each configuration of the engines of the KDI platform to comply with all emissions standards and regulations, worldwide.

At the heart of KOHLER Flex there is the clean combustion of KDI engines that enables the adoption of a compact DPF to meet the more stringent emission standard.
KOHLER Flex combines the clean in-cylinder combustion of KDI engines, made possible by state-of-the-art High Pressure Common Rail (2000 bar), 4 Valves head, Turbocharger, cooled-EGR, and the most compact aftertreatment devices (DOC, DPF and SCR) to comply with all emission requirements. Each combination of KOHLER Flex has been designed in line with the all-in-one philosophy, with the objective of minimize change for OEMs while installing and fitting into existing packages. These systems are efficient and reliable and can be deployed in many combinations to achieve effective emissions solutions for the different markets.

	KOHLER Flex solutions									
	EA	EB	E4	E5	U3	U4	C3	C4	U4	NE
	EUROPE				NORTH AMERICA & CANADA		CHINA		KOREA	LESS REGULATED COUNTRIES
	EMISSION STANDARD	STAGE 3A	STAGE 3B	STAGE IV	STAGE V*	TIER 3	TIER 4 FINAL/ CARB	CHINA 3	CHINA 4#	TIER 4 FINAL/ CARB	
<56kW	MECHANICAL INJECTION	●									●
	HIGH-PRESSURE COMMON RAIL		●		●	●	●	●	●	●	(●***)
	C-EGR		●		●	(●***)	●	(●**)	●	●	
	DOC		●		●		●		●	●	
	DPF				●		(●**)		●	(●**)	
>56kW	HIGH-PRESSURE COMMON RAIL			●	●	●	●	●	●	●	(●***)
	C-EGR			●		●	●	●	●	●	
	DOC			●	●		●		●	●	
	DPF				●		(●**)		●	(●**)	
	SCR			●	●		●			●	

* Introduction date: January 2019 (19-56kW), January 2020 (56-130kW)
** on demand on selected model
*** with limitation on max sulfur content in fuel
# Indicative only. China 4 emissions limits under definition

TURBO COMMON RAIL ENGINES

STANDARD EQUIPMENT

Intake manifold

Exhaust manifold

Side oil refilling

Electric starter

80A alternator

SAE 4 (7” 1/2)

Cabin heating provision

Oil filter engine mounted

Fuel filter with water sensor Environmentally friendly oil filter

ECU

Oil sump capacity 8.5 L (KDI 1903) and 11.3 L (KDI 2504)

ACCESSORIES ON DEMAND

SAE 3 (11” 1/2)

Radiators with integral charge air cooler

Heavy duty air cleaner

Hydraulic pump provision on 3rd and 4th PTO

100A alternator

Balancer shafts (for KDI 2504 only)

High fan configuration

Structural oil sump and bell housing

100% Power take-off front PTO (KDI 2504 only)

DPF engine mounted (when applicable)

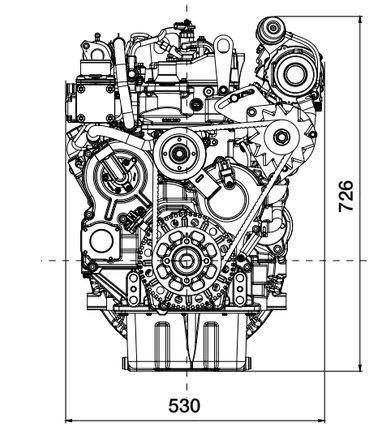
ATS insulation

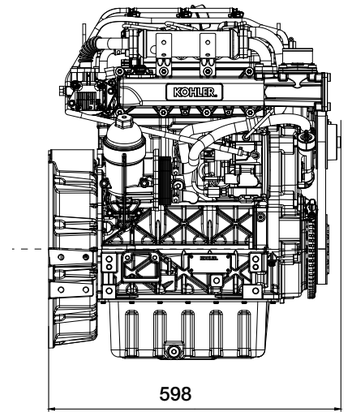
KDI
1903

Quick specifications	KDI-TCQ 1903U3/26	KDI-TCF 1903U4/26	KDI-TCR 1903E5/26	KDI-TC 1903E5/26
CYLINDERS / FIE	3 / Turbo Common Rail	3 / Turbo Common Rail	3 / Turbo Common Rail	3 / Turbo Common Rail
MAX POWER kW (hp)@rpm	42 (56) @ 2600	42 (56) @ 2600	42 (56) @ 2600	37 (50) @ 2600
MAX TORQUE Nm@rpm	225 Nm @ 1500	225 @ 1500	225 @ 1500	170 Nm @ 1500
EMISSION COMPLIANCE	US Tier 3 Equivalent	EU Stage IIIB US TIER 4 Final	EU STAGE V US TIER 4 Final	EU STAGE V US TIER 4 Final
KOHLER Flex Emissions Management system	U3 (EGR)	U4 (EGR+DOC)	E5 (EGR+DOC+DPF)	E5 (EGR+DOC+DPF)
AFTERCOOLER	•	•	•	-

DATA

Dimensions (mm)

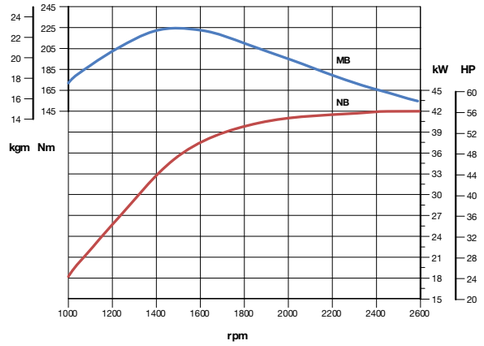




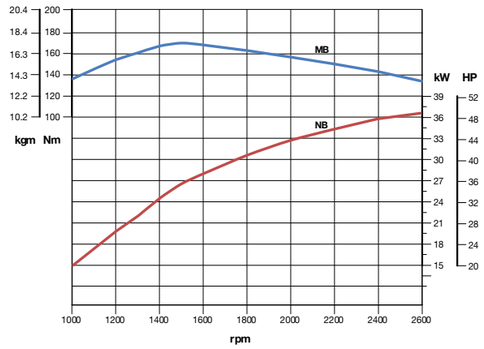
PERFORMANCE CURVES

(IFN-ACCORDING TO ISO 3046 and ISO 14396)

KDI-TCQ 1903U3/26 - KDI-TCF 1903U4/26
KDI-TCR 1903E5/26



KDI-TC 1903E5/26



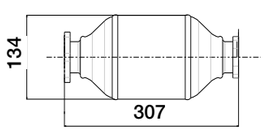
MB - Torque curve - ISO 3046/1 - IFN
NB - Power curve - ISO 3046/1 - IFN

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.

KOHLER Flex ENVELOPE

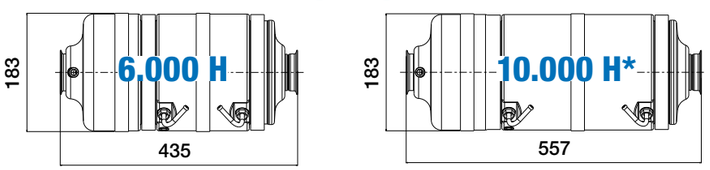
Dimensions (mm)

Flex U4



DOC

Flex E5



DOC + DPF

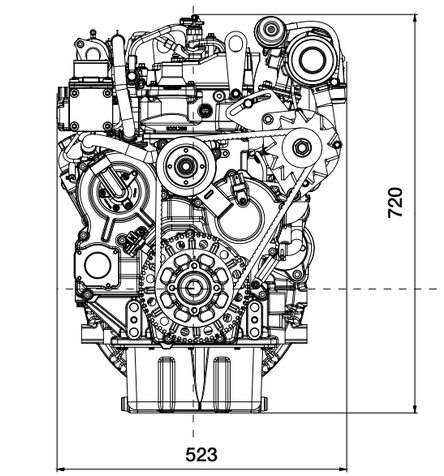
*available on demand

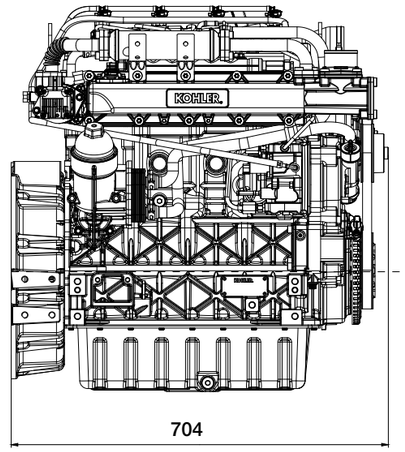
KDI
2504

Quick specifications	KDI-TCK 2504U3/26	KDI-TCF 2504U4/26	KDI-TCR 2504E5/26	KDI-TC 2504E5/26
CYLINDERS / FIE	4 / Turbo Common Rail	4 / Turbo Common Rail	4 / Turbo Common Rail	4 / Turbo Common Rail
MAX POWER kW (hp)@rpm	55.4 (74) @ 2600	55.4 (74) @ 2600	55.4 (74) @ 2600	50 (67) @ 2600
MAX TORQUE Nm@rpm	300 @ 1500	300 @ 1500	315 @ 1500	236 @ 1500
EMISSION COMPLIANCE	EU Stage IIIA US Tier 3 Equivalent	EU Stage IIIB US TIER 4 Final	EU STAGE V US TIER 4 Final	EU STAGE V US TIER 4 Final
KOHLER Flex Emissions Management system	U3 -	U4 (EGR+DOC)	E5 (EGR+DOC+DPF)	E5 (EGR+DOC+DPF)
AFTERCOOLER	•	•	•	-

DATA

Dimensions (mm)

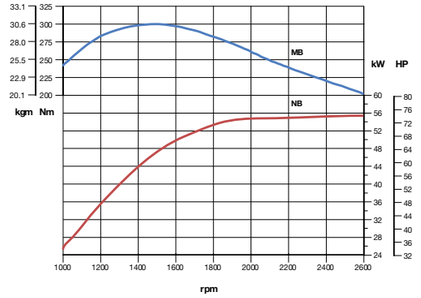




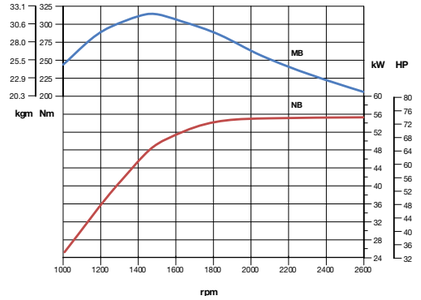
PERFORMANCE CURVES

(IFN-ACCORDING TO ISO 3046 and ISO 14396)

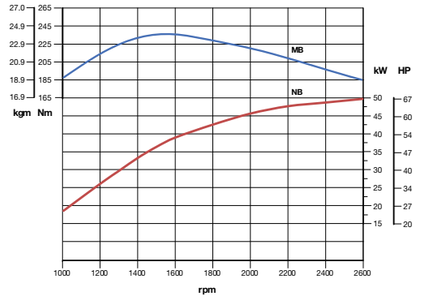
KDI-TCK 2504U3/26 - KDI-TCF 2504U4/26



KDI-TCR 2504E5/26



KDI-TC 2504E5/26



MB - Torque curve - ISO 3046/1 - IFN

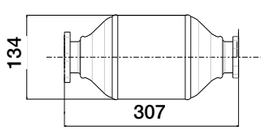
NB - Power curve - ISO 3046/1 - IFN

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.

KOHLER Flex ENVELOPE

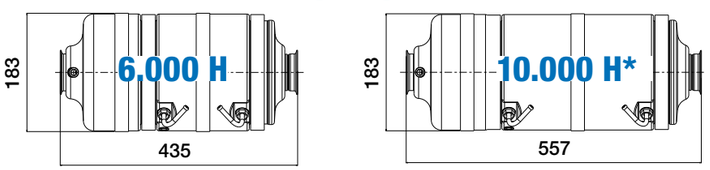
Dimensions (mm)

Flex U4



DOC

Flex E5



DOC + DPF

*available on demand

MECHANICAL ENGINES

STANDARD EQUIPMENT

Intake manifold

Exhaust manifold

Side oil refilling

Electric starter

55A alternator

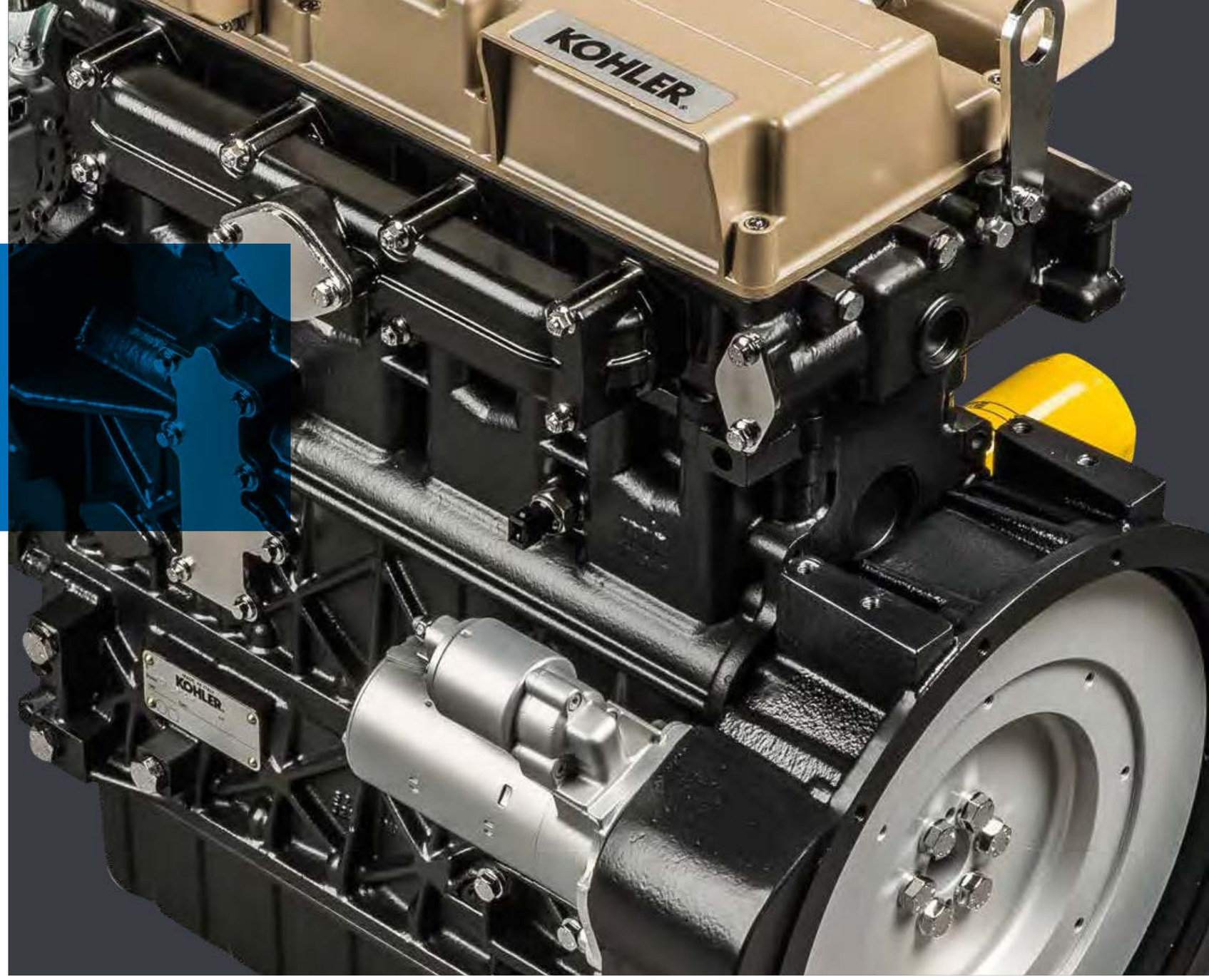
SAE 4 (7” 1/2)

Cabin heating provision

Engine mounted oil filter

Fuel filter

Oil sump capacity 8.5 L (KDI-M 1903) and 11.3 L (KDI-M 2504)



ACCESSORIES ON DEMAND

SAE 3 (11” 1/2)

Radiators

Hydraulic pump provision on 3rd and 4th PTO

Structural oil sump and bell housing

Heavy duty air cleaner

High fan configuration

Fuel feeding pump

Balancer shafts (for KDI-M 2504 only)

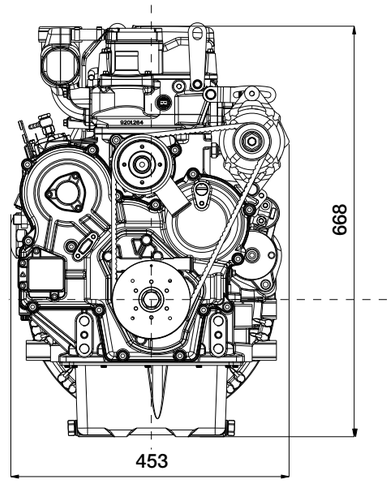
100% Power take-off front PTO (for KDI-M 2504 only)

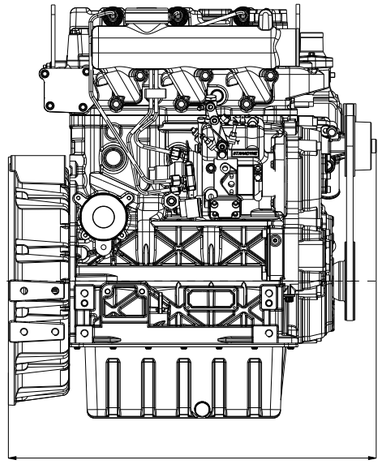
KDI-M
1903

Quick specifications	KDI-M 1903EA/26
CYLINDERS / FIE	3 / Mechanical Rotary Pump
MAX POWER kW (hp)@rpm	31 (42) @ 2600
MAX TORQUE Nm@rpm	133 @ 1500
EMISSION COMPLIANCE	EU STAGE III A

DATA

Dimensions (mm)





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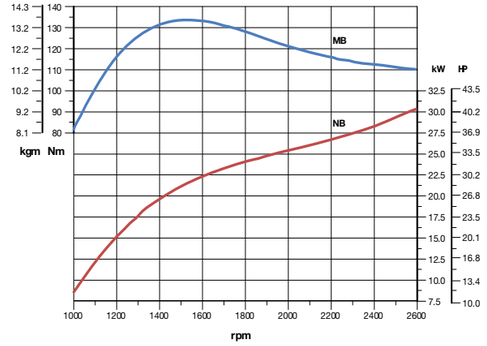
PERFORMANCE CURVES

(IFN-ACCORDING TO ISO 3046 and ISO14396)

KDI-M 1903EA/26



MB - Torque curve - ISO 3046/1 - IFN
NB - Power curve - ISO 3046/1 - IFN

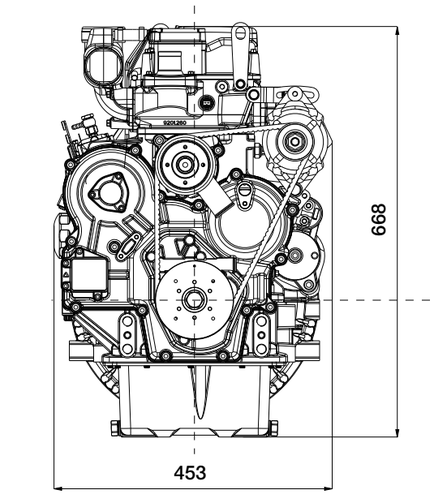
Power ratings refer to engines equipped with air filter, standard muffler, after running-in period at ambient conditions of +25°C, relative humidity 30% and 1 bar. Power drops by 1% every 100 m altitude and by 2% every 5°C above +25°C.

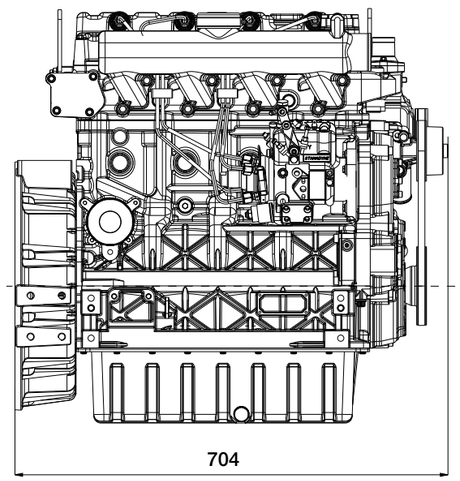
KDI-M
2504

Quick specifications	KDI-M 2504EA/26
CYLINDERS / FIE	4 / Mechanical Rotary Pump
MAX POWER kW (hp)@rpm	36.4 (49) @ 2600
MAX TORQUE Nm@rpm	170 @ 1500
EMISSION COMPLIANCE	EU STAGE III A

DATA

Dimensions (mm)

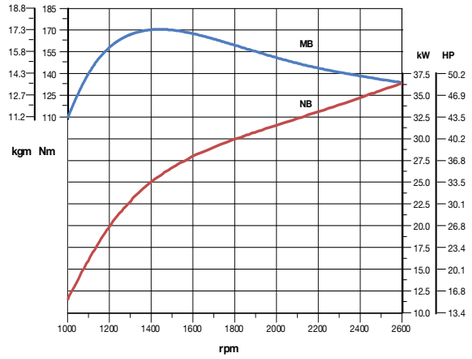




PERFORMANCE CURVES

(IFN-ACCORDING TO ISO 3046 and ISO 14396)

KDI-M 2504EA/26



MB - Torque curve - ISO 3046/1 - IFN

NB - Power curve - ISO 3046/1 - IFN

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 drops by 1% every 100 m altitude and by 2% every 5°C above +25°C.

TURBO COMMON RAIL ENGINES

Model		KDI 1903				KDI 2504			
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	•				•			
Technical features	Cylinder	3				4			
	Bore (mm)	88				88			
	Stroke (mm)	102				102			
	Engine displ (cm³)	1861				2482			
	Injection system	DI				DI			
	Injection Equipment	Turbo high pressure common rail				Turbo high pressure common rail			
	Aftercooler	•	•	•	-	•	•	•	-
Performance	Max power (IFN - ISO 3046 and ISO 14396) (kW(hp)@rpm) @2600	42 (56)	42 (56)	42 (56)	37 (50)	55.4 (74)	55.4 (74)	55.4 (74)	50 (67)
	Max torque (IFN - ISO 3046 and ISO 14396) (Nm@rpm) @1500	225	225	225	170	300	300	315	236
	Low-end torque (Nm@1000 rpm)	172	172	172	135	242	242	242	185
KOHLER Flex Emissions Management system	KOHLER Flex solution	U3	U4	E5	E5	U3	U4	E5	E5
	EGR	•	•	•	•	-	•	•	•
	DOC	-	•	•	•	-	•	•	•
	DPF	-	-	•	•	-	-	•	•
	Emission compliance	US TIER 3 EQUIV.	EU STAGE IIIB US TIER 4 FINAL	EU STAGE V US TIER 4 FINAL	EU STAGE V US TIER 4 FINAL	US TIER 3 EQUIV.	EU STAGE IIIB US TIER 4 FINAL	EU STAGE V US TIER 4 FINAL	EU STAGE V TIER 4 FINAL
Fuel economy	Best point (g/kWh)	215				210			
	Max power (g/kWh@2600 rpm)	237				226			
Startability	Unaided (°C)	down to -19				down to -19			
	Aided (°C) [Manifold grid heater]	below -19				below -19			
	Aided (°C) [Manifold grid heater + coolant heater]	/				below -25			
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)	•				•			
	High Sulfur Fuel < 2000 ppm *	-				•	-	-	-
Service features	Oil/filter change interval std/synthetic (hr)	500-750**				500-750**			
	Alternator belt replacement	36mth				36mth			
	Coolant change	24 mth				24 mth			
	Oil consumption (% fuel)	<0.1				<0.1			
Physical characteristics	H×L×W (fan excluded) (mm)	726×598×530				720×704×523			
	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			
Lubrication	Oil type	SAE 5W 40 low SAPS/ EURO 6 API CJ-4				SAE 5W 40 low SAPS/ EURO 6 API CJ-4			
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	•				•			

* With restrictions ** According to operating conditions

MECHANICAL ENGINES

Model		KDI-M 1903	KDI-M 2504
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	—	—
Technical features	Cylinder	3	4
	Bore (mm)	88	88
	Stroke (mm)	102	102
	Engine displ (cm³)	1861	2482
	Injection system	DI	DI
	Injection Equipment	Mech-Rotary pump	Mech-Rotary pump
Performance	Emission compliance	EU STAGE III A (EA)	EU STAGE III A (EA)
	Max power (IFN - ISO 3046 and ISO 14396) (kW@rpm)	31 (41.5) @2600	36.4 (48.8) @2600
	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) [Manifold grid heater]	below -15	below -15
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 < 2000 ppm*	•	•
	Military NATO Fuels F34-F35-F44-F63-F64-F65 *	•	•
	Military US Fuels JP5-JP8 (AVTUR) *	•	•
	Jet Fuels - Jet A/ A1*	•	•
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
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
Lubrication	Oil type	SAE 15W40 / API CH4	SAE 15W40 / API CH4
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	•	•

* With restrictions ** According to operating conditions

For more information, contact your KOHLER source of supply.
Kohler Co. reserves the right to make modifications without prior notice.

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