


Important

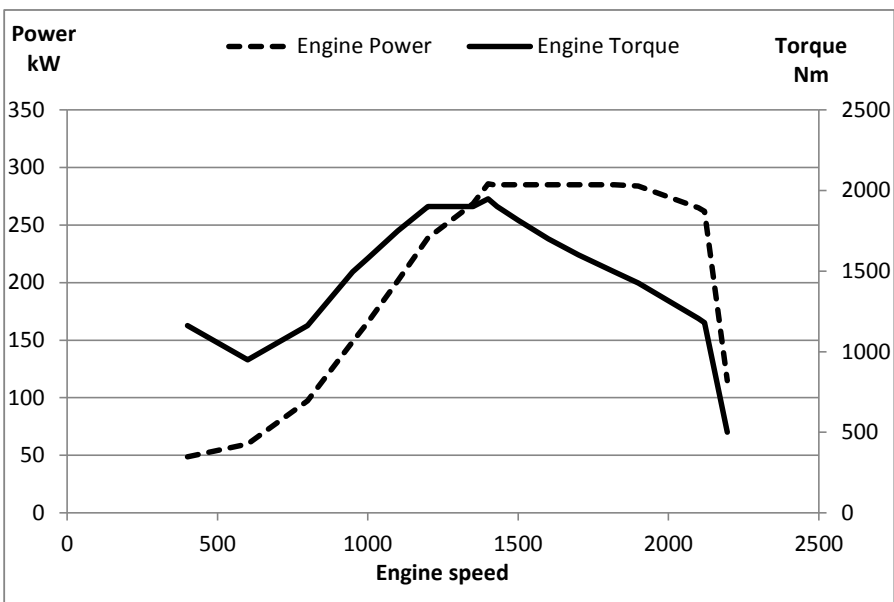
This Technical Data Sheet and the corresponding Installation Instructions provide important information to ensure the installed engine will operate according to the design specification in the Volvo Penta application for certification.

Requirements marked with  are considered as critical for exhaust emissions compliance according to the design specification in the Volvo Penta application for certification.

Failing to follow and meet these instructions and requirements when installing a certified engine in a piece of nonroad equipment for use in the United States violates U.S. federal law (40 CFR 1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.

In-line four stroke diesel engine with common rail direct injection. Rotation direction counterclockwise viewed towards flywheel.

Peak Power	kW	285	
	hp	388	
	rpm	1800	
Peak Torque	Nm	1949	
	rpm	1400	
Dimensions	L	mm	1400
	W	mm	921
	H	mm	1147



Consumption data

		rpm	1200	1500	1700	2000
Specific fuel consumption at:	25%	g/kWh	219	241	275	289
		lb/hph	0,35	0,39	0,45	0,47
	50%	g/kWh	199	209	229	240
		lb/hph	0,32	0,34	0,37	0,39
	75%	g/kWh	196	202	215	223
		lb/hph	0,32	0,33	0,35	0,36
	100%	g/kWh	196	202	214	218
		lb/hph	0,32	0,33	0,35	0,35
Specific AdBlue®/DEF consumption of diesel consumption, NRTC		Vol%	5,60%			

CO₂ emission declaration

Carbon dioxide (CO ₂) emissions determined during the EU type approval process and recorded in EU type approval certificate, NRTC.	g/kWh	721
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General

Number of cylinders			6
Displacement, total		liters in ³	10,84 661
Firing order			1-5-3-6-2-4
Bore		mm in	123 4,84
Stroke		mm in	152 5,98
Compression ratio			16.9:1
Wet weight	Engine only	kg lb	1109 2445
	<u>The weight includes:</u> The engine is weighed with components that consist of the minimum running weight including standard flywheel and excluding cooling package, hoses and air filters. For a clearer description, contact your regional application engineer.		
	Power pack	kg lb	N/A N/A
	<u>The weight includes:</u> N/A		
	Exhaust aftertreatment muffler DPF	kg lb	32 71
	Exhaust aftertreatment muffler SCR	kg lb	41 90

Performance

Rated power	kW	285
	rpm	1800
IFN Power	kW	285
ICFN Power	kW	235

The engine performance corresponds to ISO 3046.

For ICFN please see Technical data for

TAD1180VE

		rpm	1400	1700	2000	2100
Power	without fan	kW	284	285	285	265
		hp	386	388	388	360
For performance with fan see options technical data for the desired module.						
Torque (IFN)	without fan	Nm	1937	1601	1361	1205
		lbf ft	1429	1181	1004	889
Max torque at engine speed	1400 rpm	Nm	1949			
		lbf ft	1437			
Power tolerance		%	±3%			
Total mass moment of inertia, J (mR ²) for two mass calculations (not including flywheel)		kgm ²	0,914			
		lbft ²	21,7			
Total mass moment of inertia, J (mR ²) for transient load response calculations (not including flywheel)		kgm ²	0,914			
		lbft ²	21,7			
Friction Power warm engine		kW	22	33	46	53
		hp	31	45	62	72

Engine brake performance option

		rpm	1200	1500	1900	2200
Brake power:	without fan	kW	109	150	187	208
		hp	149	204	254	283
Brake torque:	without fan	Nm	870	955	937	904
		lbf ft	642	704	691	666
Engine speed range for engine brake activation:		rpm	900			
Engine brake automatically deactivates at:		rpm	800			
Min oil temperature for engine brake activation:		°C	55			

Cold start performance

Cold start limit temperature	Preheater required @	°C	-25
	Preheater 3 kW	°F	-13
	Preheater + block heater req @	°C	-35
	Blockheater: TYP M8T 598 1200W / ~230V	°F	-31
Cold start oil specification	T>-20°C VDS4.5 10W/30 T<-20°C VDS4.5 5W/30		
Cold start fuel specification	EN590 98/70/EC (For details see Volvo Penta Industrial fuel bulletin.)		

Lubrication system


Lubricating oil consumption of diesel consumption (average)		Vol %	0,05
Oil change intervals/specifications	VDS4.5	h	1000
		h	12
Oil pressure at 1700 rpm	Max	kPa	600
		psi	87
Oil pressure at 1700 rpm	Min	kPa	250
		psi	36
Lubrication oil temperature in oil pan:	Max	°C	130
		°F	266
Oil filter filtration efficiency (in accordance with ISO 4548-12)	90%	μ	38
	50%	μ	14






For oil system capacity and angularity limits see technical data per options

Fuel system

Suction line fuel flow at maximum output (Measured at fuel inlet connection)	liter/h US gal/h	130 34,3
Fuel supply line min pressure, during engine running (measured at fuel inlet connection @ engine max power curve)	kPa psi	-20 -2,9
Fuel supply line max. pressure, during engine stand still (measured at fuel inlet connection @ with full tank)	kPa psi	17 2,5
Fuel supply line min. pressure, during engine stand still (measured at fuel inlet connection @ with low tank fill)	kPa psi	-12 -1,7
Maximum system return flow	liter/h US gal/h	50 13,2
Max. allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F	60 140
Prefilter / Water separator filtration efficiency		Use Volvo Penta original
Fuel filter filtration efficiency		Use Volvo Penta original
Injector type	F2	
Fuel to conform to	EN590 98/70/EC (For details see Volvo Penta Industrial fuel bulletin.)	




Intake system

	rpm	1400	1700	2000	2100
Air consumption at: (+25°C and 100kPa)	m ³ /min cfm	17,8 630	21,1 744	23,3 824	23,9 843
 See front page for important information	kPa	6			
Max allowable air intake restriction including piping	psi	0,9			

Exhaust system	rpm	1400	1700	2000	2100
Heat rejection to exhaust:	kW BTU/min	215 12223	227 12883	237 13460	243 13814
Exhaust gas temperature after turbine at:	°C °F	530 987	483 901	461 861	463 865
 See front page for important information					
Max allowable back pressure in exhaust line (after turbine)	kPa psi	44 6,4	48 7,0	50 7,3	51 7,4
 See front page for important information					
Max allowable temperature drop between turbine and muffler 1 inlet at exhaust temperature 486° C and exhaust gas flow 0.47 kg/s.	Δ°C Δ°F			9 16,2	
 See front page for important information					
Max allowable temperature drop between muffler 1 and muffler 2 at exhaust temperature 486° C and exhaust gas flow 0.47 kg/s.	Δ°C Δ°F			4 7,2	
Muffler 1 pressure drop (at exhaust gas flow and exhaust temp specified in this table)	kPa psi	19 2,8	21 3,0	23 3,3	23 3,3
Muffler 2 pressure drop (at exhaust gas flow and exhaust temp specified in this table)	kPa psi	18 2,6	20 2,9	21 3,0	21 3,0
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	m³/min cfm	39,0 1376	41,0 1447	42,4 1497	43,1 1524
 See front page for important information					
Engine speed during stand still regeneration	rpm	1400 ± 100			
 See front page for important information					
Max allowed load during stand still regeneration	Nm lb ft	700 516			

Cooling system		rpm	1400	1700	2000	2100
Heat rejection radiation from engine at:	kW		10,1	8,1	7,3	6,9
	BTU/min		575	458	417	390
Heat rejection to coolant at:	kW		122	127	140	144
	BTU/min		6938	7222	7962	8189
Coolant	Volvo Penta Coolant VCS (Yellow) Ready Mix 40/60 or Mix 40% Volvo Penta Coolant VCS (Yellow) + 60% tap Water*. * Tap water must fulfill Volvo quality standard VOLVO STD: 1285, 1					
Coolant capacity: Engine only	liter		17			
	US gal		4,5			
<i>For coolant capacity for engine and cooling packages see Technical data for the specific option.</i>						
Coolant pump	(Engine is reference =1)	drive/ratio	belt/1.41:1 cw			
Coolant pump curve see graphs at end						
Nominal engine coolant pressure before engine circuit coolant pump	kPa		62	60	61	64
	psi		8,9	8,8	8,9	9,3
Coolant pressure drop over complete engine circuit (at coolant flow below)	kPa		32	54	63	69
	psi		4,6	7,8	9,1	10,0
Coolant flow	l/s		4,77	6,18	6,87	7,22
	US gal/s		1,259	1,633	1,814	1,906
Minimum coolant flow At fully opened thermostat	l/s		4,77	6,18	6,87	7,22
	US gal/s		1,259	1,633	1,814	1,906
Maximum outer circuit restriction incl. piping	kPa		55			
	psi		8,0			
Thermostat:	start to open	°C	82			
		°F	180			
	fully open	°C	92			
		°F	197,6			
Maximum static pressure head (expansion tank height + pressure cap setting)	kPa		100			
	psi		14,5			
Minimum static pressure head (expansion tank height + pressure cap setting)	kPa		70			
	psi		10,2			
Maximum top tank temperature	°C		107			
	°F		224,6			
Recommended Draw down capacity. The difference between min coolant level in the expansion tank and the lowest level where the engine's coolant system still functioning	liter		2,00			
	US gal		0,528			

Charge air cooler system

	rpm	1400	1700	2000	2100
Heat rejection to charge air cooler	kW	43	51	58	56
	BTU/min	2470	2926	3292	3196
Charge air mass flow	kg/s	0,35	0,40	0,46	0,46
Charge air inlet temp @ 25 °C (Charge air temp after turbo compressor)	°C	163	167	170	165
	°F	326	332	338	329
 See front page for important information Max allowable Charge air outlet temp @ 25 °C ambient temperature (Charge air temp after charge air cooler)	EGR valve closed*	°C	50		
		°F	122		
 See front page for important information Max allowable Charge air outlet temp @ 25 °C ambient temperature (Charge air temp after charge air cooler)	EGR valve open*	°C	100		
		°F	212		
*During certain operating conditions - temperature in inlet manifold is temporarily elevated intentionally using exhaust gas. This is normal. External cooling control should not counter this but instead control inlet manifold temperature only to avoid exceeding 100 C. This operating condition can be observed on CAN: EngExGasRec1 ValvePos_BB1_X_E > 50%. More information available in EATS installation manual available from your local Penta representative.					
 See front page for important information Maximum pressure drop over charge air cooler incl. piping	kPa	12	12	12	12
	psi	1,7	1,7	1,7	1,7
Charge air pressure - relative pressure at sea level (After charge air cooler)	kPa	179	180	173	163
	psi	25,9	26,1	25,1	23,7

Electrical system

Engine Management System		EMS2.4				
Voltage and type		24				
Battery and cable resistance	Temperature	°C		25	0	-15
		°F		77	32	5
Recommendations:	Maximum main circuit resistance @ 20°C	mΩ		5	4	3
	Minimum battery size	Ah (20h) / CCA (EN)		140/800	140/800	140/800

Power take off

Maximum allowed torque at individual PTO's. If more than one PTO output is used simultaneously, calculations need to be performed to determine available maximum. Available torque depends on application inertia.

Front end in line with crankshaft

	rpm	1400	1700	2000	2100
With a total added mass moment of inertia	J (mR2)	≤0,05 kgm ²			
Max torque at continuous load:	Nm lbt ft	Very restricted use, each application needs to be evaluated			
PTO at flywheel					
Max allowed bending moment in flywheel housing	Nm	7000			
	lbf ft	5163			
Max load on rear main bearing	N	3000			
	lbf	674			

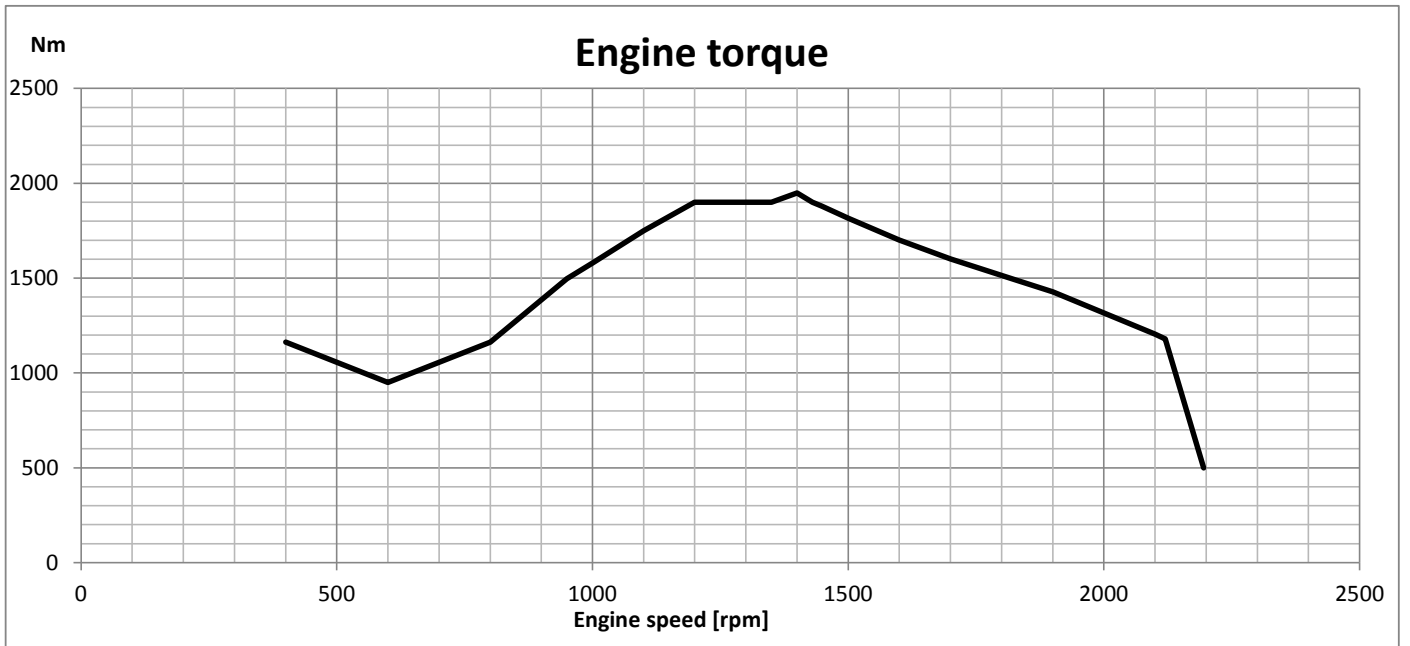
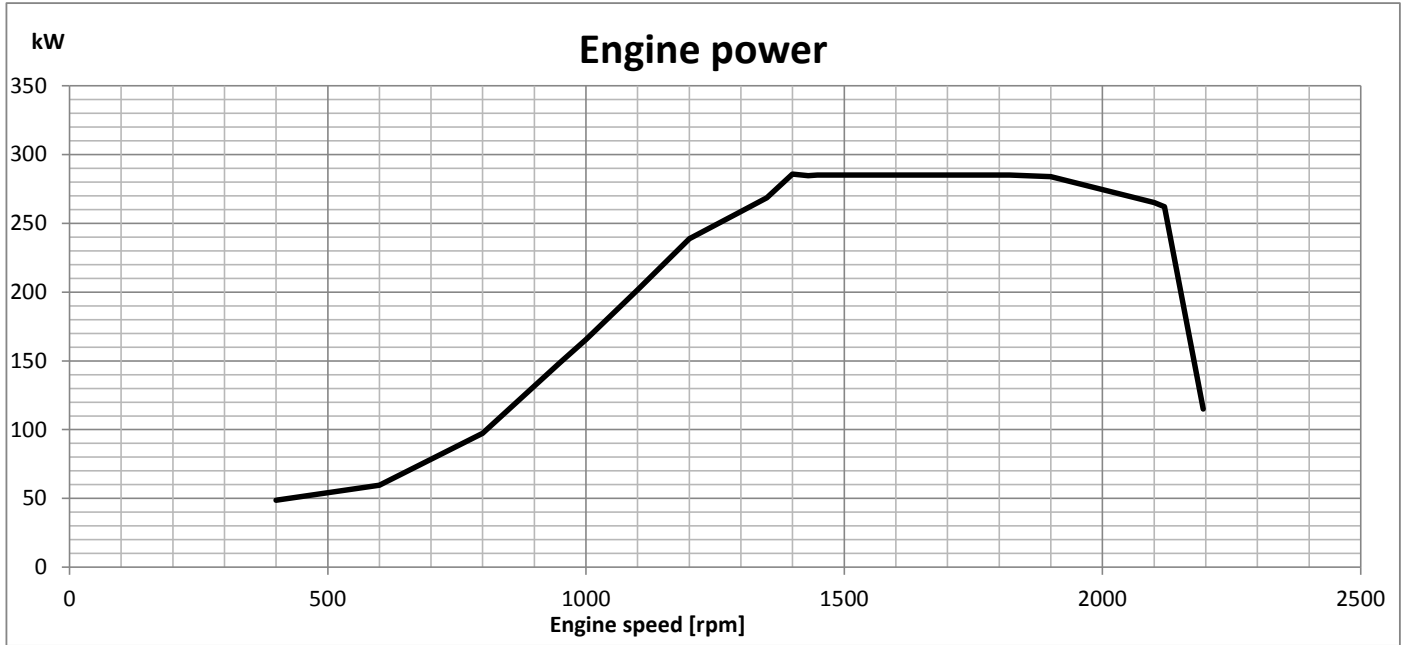
Engine Protection

Warning implies that a Indication message is sent. Derate means an engine power derate.

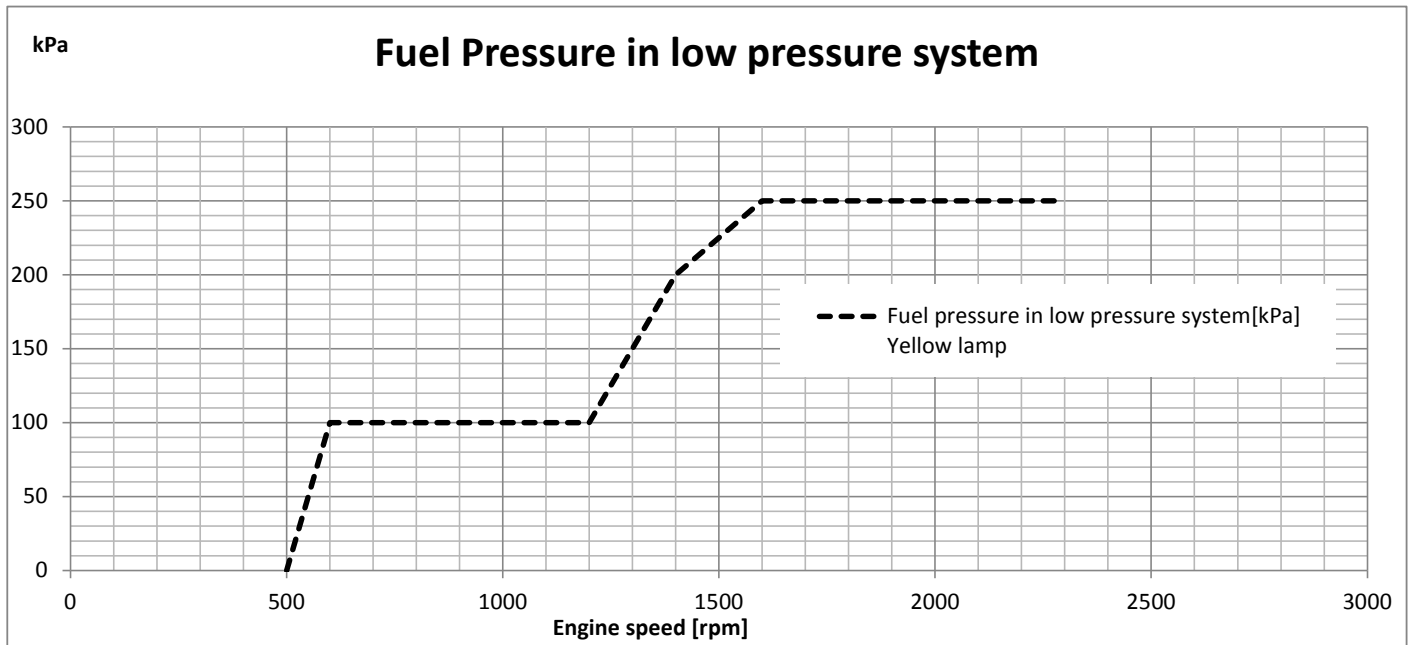
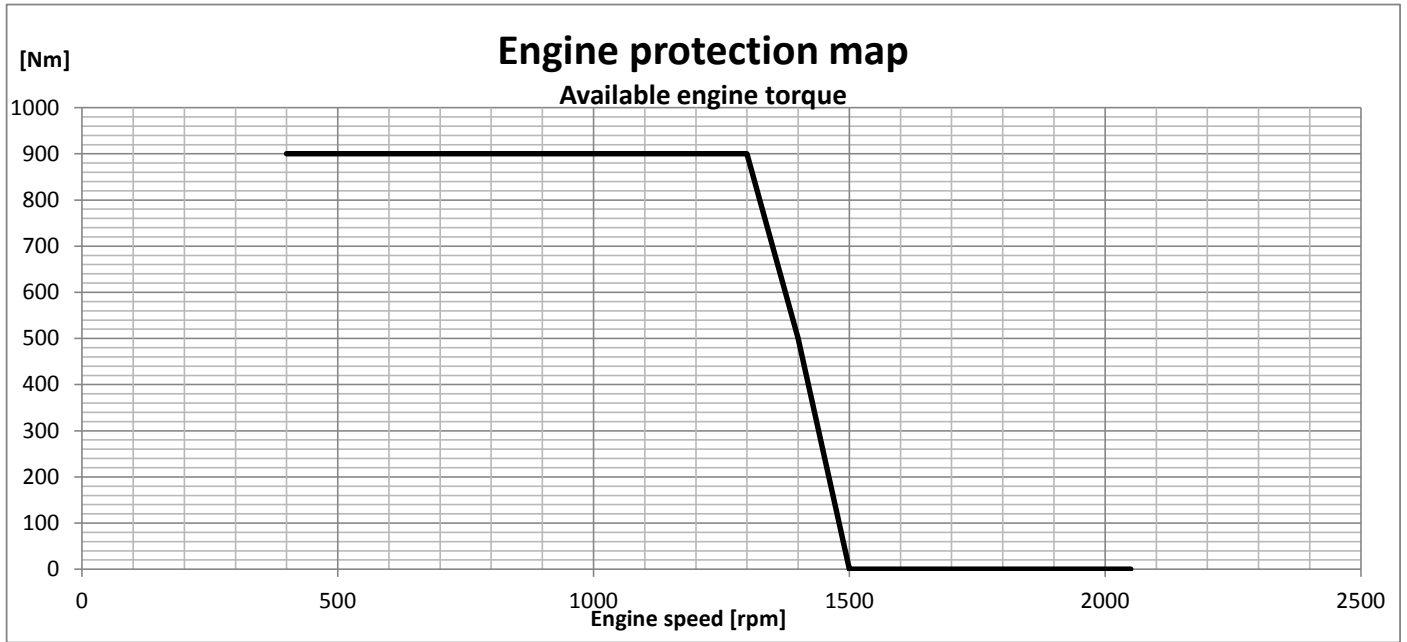
Engine sensors				Engine protection action		
	Unit	Warning level (Yellow)	Alarm level (Red)	Default	Max derate, acc engine protection map	Optional (Module or conversion kit)
Fuel temperature ¹	°C	Not installed	Not installed	Not installed	Not installed	Not installed
Oil temperature	°C	125	130	Derate	132	Shut down
Coolant temperature	°C	105	107	Derate	108	Shut down
Charge Air Temperature (Boost temp)	°C	120	125	Derate	126	Shut down
Air filter temperature ¹	°C	Not installed	Not installed	Not installed	Not installed	Not installed
Exhaust gas temperature	°C	535	550	Shut down	550	Shut down
EGR temperature ¹	°C	Not installed	Not installed	Not installed	Not installed	Not installed
ECU temperature	°C	90	N/A	N/A	N/A	N/A
Fuel feed pressure ¹	kPa	Not installed	Not installed	Not installed	Not installed	Not installed
Fuel rail pressure ¹	kPa	Not installed	Not installed	Not installed	Not installed	Not installed
Oil Pressure	kPa	See below	See below	Shut down	See below	Shut down
Δ Piston Cooling Pressure	kPa	N/A	N/A	N/A	N/A	N/A
Δ Charge Air Press (Δ Boost pres)	kPa	See below	See below	Derate	See below	Shut down
Air filter pressure ¹	kPa	Not installed	Not installed	Not installed	Not installed	Not installed
EGR pressure ¹	kPa	Not installed	Not installed	Not installed	Not installed	Not installed
Crankcase pressure increase ¹	kPa	Not installed	Not installed	Not installed	Not installed	Not installed
DPF Differential Pressure	kPa	31	33	Derate	34	Shut down
Oil level ¹	Digital Switch	Not installed	Not installed	Not installed	Not installed	Not installed
Coolant level	Digital Switch	N/A	Low Level	Derate	Low Level	Shut down
DEF Injector Status	Digital Switch	N/A	Error Flag	Derate	Error Flag	Shut down
EATS System - Soot Regen Status	Status Flag	Warning	Stop Request	Derate	Stop Request	Shut down
Water in fuel ¹	Digital Switch	Not installed	Not installed	Not installed	Not installed	Not installed

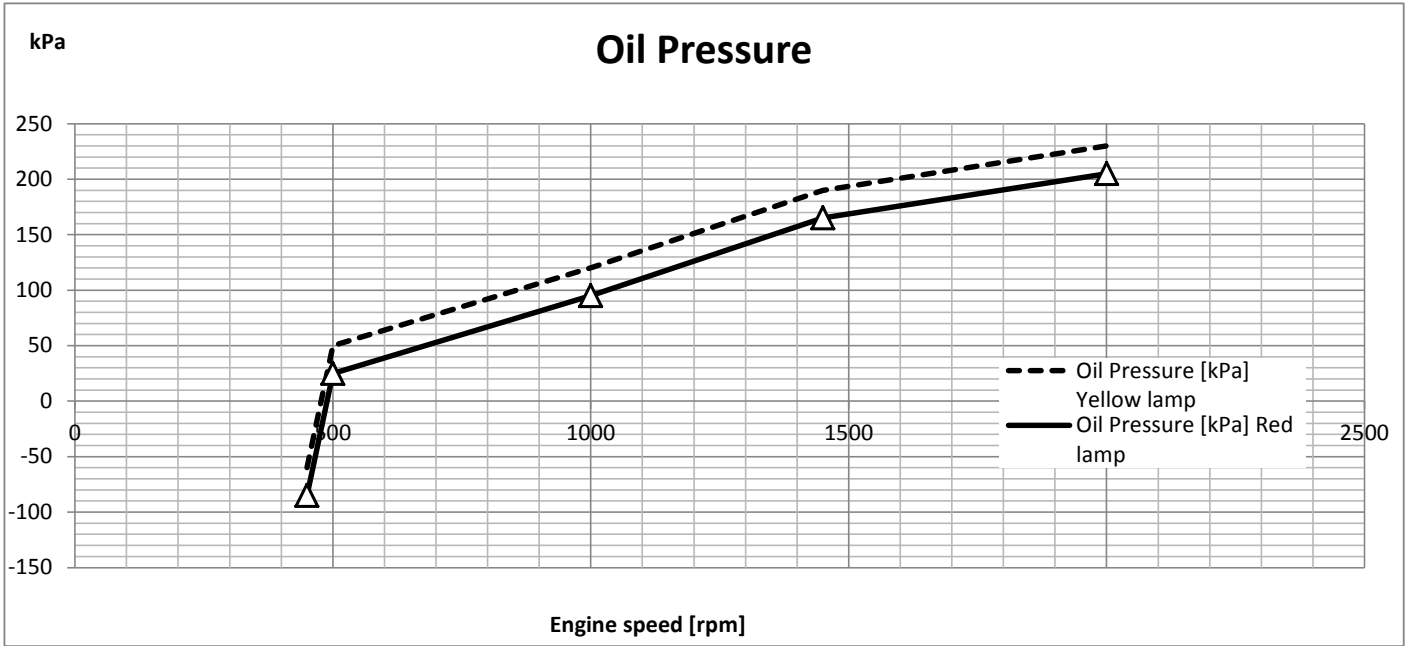
¹ Sensor not installed for this engine type

Graphs



Warning and derate maps





Engine protection for charge air pressure is complex and the trigger levels varies depending on engine mode, altitude and charge air temperature, ambient temperature.

Below is an example of engine protection limits for charge air pressure for normal operation engine mode, on the sea level with charge air temperature 50 degrees (normal charge cooler CAC efficiency) , and ambient temperature 25 degrees.

When engine speed increases above 1900 rpm (maximum power) charge pressure demand drops significantly but the actual charge pressure has a physical delay to decrease therefore the fault limit is higher to avoid false alarm.

