

VOLVO PENTA D4-180 I R4 180hp (132 kW)	Document No 21954790	Issue Index 01
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General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Number of cylinders		4
No of valves		16
Displacement, total	litres in ³	3,67 223,7
Firing order		1-3-4-2
Rotational direction, viewed from the front		Clockwise
Bore	mm in	103 4,06
Stroke	mm in	110 4,33
Compression ratio		17.5:1
Max. static forward inclination:	°	0
Max. static backward inclination:	°	10
Max. intermittent forward inclination while running:	°	10
Max. intermittent backward inclination while running:	°	20
Max. intermittent side inclination while running:	°	30 for max 30 sec
Idling speed	rpm	700 - 750
Rated speed R4	rpm	2800
Propeller selection range R4	rpm	2700-2900
Dry weight engine BT	kg lb	482 1063
Dry weight with reverse gear HS45AE	kg lb	546 1204

Performance	Rating	rpm	1000	1500	2000	2500	2800					
Crankshaft power 1), 5)	4	kW hp	32 44	60 82	103 140	130 177	132 180					
Propeller shaft power 1) (At full load) With reverse gear HS45AE	4	kW hp	31 42	58 79	100 136	126 171	128 174					
Propellershaft power at prop. load $x^{2.5}$ With reverse gear HS45AE	4	kW hp	10 13	27 37	55 75	96 131	128 174					
Propellershaft power at prop. load x^3 With reverse gear HS45AE	4	kW hp	6 8	20 27	47 63	91 124	128 174					
Torque at crankshaft 2)	4	Nm lbf ft	305,6 225	382 282	491,8 363	496,6 366	450,2 332					
Mean piston speed		m/s ft/s	3,7 12,0	5,5 18,0	7,3 24,1	9,2 30,1	10,3 33,7					
Effective mean pressure 2)	4	MPa psi	1,05 151,9	1,31 189,9	1,69 244,5	1,70 246,9	1,54 223,8					
Max combustion pressure 2)	4	MPa psi	14 2031	16 2321	18 2611	18 2611	15 2176					

Lubricating system

Specific lubricating oil consumption.	g/kWh	< 0,2
Max. oil volume including filters for all allowed installation inclinations:	litres US gal	12 3,17
Min. oil volume excluding filters for all allowed installation inclinations:	litres US gal	10,5 2,77

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Fuel system	Rating	rpm	1000	1500	2000	2500	2800					
Specific fuel consumption 2)	4	g/kWh lb/hph	254 0,411	230 0,373	217 0,352	210 0,34	220 0,356					
Fuel consumption, Test cycle E5	4	g/kWh lb/hph	253 0,41									
Fuel consumption at prop. load x ^{2,5}	4	l/h US gal/h	3,3 0,9	7,4 2,0	14,6 3,9	25,6 6,8	34,7 9,2					
Fuel consumption at prop. load x ³	4	l/h US gal/h	2,3 0,6	5,7 1,5	12,5 3,3	24,3 6,4	34,7 9,2					
Fuel consumption at full load	4	l/h US gal/h	9,7 2,6	16,5 4,4	26,7 7,1	32,7 8,6	34,7 9,2					

Intake and exhaust system	Rating	rpm	1000	1500	2000	2500	2800					
Specific exhaust heating effect in percent of crankshaft power	4	%					65					
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	4	°C °F	195 383	315 599	400 752	450 842	470 878					
Permitted back pressure in the exhaust line at rated speed. (Installed back pressure)		kPa psi							Max	30 4,4		
		kPa psi							Min	10 1,5		
Engine air consumption at 25°C / 77°F atmospheric pressure 100kPA and relative humidity 30%.	4	m³/min cu.ft./min					10,3 363,7					
Charge air pressure Inlet manifold	4	kPa psi					160 23,2					
Exhaust gas flow	4	m³/min cu.ft./min					20,3 716,9					

Cooling system	Rating	rpm	1000	1500	2000	2500	2800					
Radiated heat in percent of crankshaft power.	4	%					3					
Heat rejection to charge air cooler in percent of crankshaft power.	4	%					18					
Coolant heat rejection to HE, incl. engine oil cooler and excl. charge air cooler, in percent of crankshaft power.	4	%					65					
Coolant flow with fully open thermostat and std cooling system		l/min cu.ft./min					360 12,7					
Extra water pump flow through charge air cooler		l/min cu.ft./min					172 6,1					
Max. permissible temperature on coolant in engine outlet		°C °F	55 131									
Coolant volume engine, including heat exchanger and charge air cooler		litres US gal.	13 3,43									
Max. additional coolant for cabin heater etc. with std. Expansion tank		litres US gal.	5 1,32									
Maximum coolant flow to cabin heater etc.		l/min cu.ft./min	30 1,06									
Thermostat, start open at		°C °F	82 180									
Thermostat, fully open at		°C °F	92 198									

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Raw water circuit	rpm	1000	1500	2000	2500	2800					
Nominal raw water design flow	l/min cu.ft/min					172 6,1					
Maximum raw water temperature entering heat exchanger	°C °F						30				
							86				

Emissions	Rating	rpm	1000	1500	2000	2500	2800					
Smoke at prop. load $x^{2.5}$	4	*BSU	0,6	0,3	0,2	0,1	0,3					
Smoke at prop. load x^3	4	*BSU	0,6	0,3	0,2	0,1	0,3					

***NB.!** BSU are calculated values. Measured values are acc. to ISO 10054 in FSN units