

<b>VOLVO PENTA</b> Volvo Penta IPS400 R5 300 hp (220 kW)	Document No	Issue Index
	<b>21954796</b>	<b>01</b>

## General

4-stroke direct injected, turbocharged and aftercooled diesel engine

Number of cylinders		4
No of valves		16
Displacement, total	litres in <sup>3</sup>	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 R5	rpm	3500
Propeller selection range R5	rpm	3400-3600
Dry weight engine BT	kg lb	483 1065
Dry weight with drive IPS	kg lb	780 1720

Performance	Rating	rpm	1000	1500	2000	2500	3000	3500				
Crankshaft power 1), 5)	5	kW	50	89	141	184	215	221				
		hp	68	121	192	250	292	301				
Propeller shaft power 1) (At full load) With drive IPS	5	kW	48	86	135	177	206	212				
		hp	65	117	184	240	281	289				
Propellershaft power at prop. load x <sup>2.5</sup> With drive IPS	5	kW	9	26	52	91	144	212				
		hp	13	35	71	124	196	289				
Propellershaft power at prop. load x <sup>3</sup> With drive IPS	5	kW	5	17	40	77	134	212				
		hp	7	23	54	105	182	289				
Torque at crankshaft 2)	5	Nm	477,5	568,4	673,2	702,8	684,4	603				
		lbf ft	352	419	497	518	505	445				
Mean piston speed		m/s	3,7	5,5	7,3	9,2	11,0	12,8				
		ft/s	12,0	18,0	24,1	30,1	36,1	42,1				
Effective mean pressure 2)	5	MPa	1,64	1,95	2,31	2,41	2,35	2,07				
		psi	237,4	282,6	334,7	349,4	340,2	299,8				
Max combustion pressure 2)	5	MPa	18	19	19	18	18	18				
		psi	2611	2756	2756	2611	2611	2611				

## Lubricating system

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

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<b>Fuel system</b>	<b>Rating</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>3000</b>	<b>3500</b>					
Specific fuel consumption 2)	5	g/kWh lb/hph	231 0,374	217 0,352	216 0,35	206 0,334	207 0,335	221 0,358					
Fuel consumption, Test cycle E5	5	g/kWh lb/hph	225 0,36										
Fuel consumption at prop. load x <sup>2.5</sup>	5	l/h US gal/h	3,0 0,8	7,1 1,9	14,4 3,8	24,4 6,4	38,7 10,2	58,4 15,4					
Fuel consumption at prop. load x <sup>3</sup>	5	l/h US gal/h	2,0 0,5	5,0 1,3	11,2 2,9	21,1 5,6	36,1 9,5	58,4 15,4					
Fuel consumption at full load	5	l/h US gal/h	13,8 3,7	23,2 6,1	36,4 9,6	45,4 12,0	53,3 14,1	58,4 15,4					

<b>Intake and exhaust system</b>	<b>Rating</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>3000</b>	<b>3500</b>				
Specific exhaust heating effect in percent of crankshaft power	5	%						64				
Exhaust temperature at the exhaust pipe connecting flange after the turbo charger.	5	°C °F	195 383	300 572	400 752	460 860	485 905	560 1040				
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%.	5	m <sup>3</sup> /min cu.ft./min						17,3 610,9				
Charge air pressure Inlet manifold	5	kPa psi						225 32,6				
Exhaust gas flow	5	m <sup>3</sup> /min cu.ft./min						33,3 1176				

<b>Cooling system</b>	<b>Rating</b>	<b>rpm</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>	<b>2500</b>	<b>3000</b>	<b>3500</b>				
Radiated heat in percent of crankshaft power.	5	%						3				
Heat rejection to charge air cooler in percent of crankshaft power.	5	%						26				
Coolant heat rejection to HE, incl. engine oil cooler and excl. charge air cooler, in percent of crankshaft power.	5	%						74				
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	3000	3500				
Nominal raw water design flow	l/min cu.ft/min						172 6,1				
Maximum raw water temperature entering heat exchanger	°C							30			
	°F							86			

Emissions	Rating	rpm	1000	1500	2000	2500	3000	3500				
Smoke at prop. load x <sup>2.5</sup>	5	*BSU	0,3	0,2	0,4	0,3	0,3	0,9				
Smoke at prop. load x <sup>3</sup>	5	*BSU	0,5	0,3	0,9	0,4	0,3	0,9				
Noise at prop. load x <sup>2.5</sup> . 4)	5	dBA		101,5	104,2	107	109,4	111				

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