

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.

General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel

Number of cylinders			6
Displacement, total		liters in ³	12,78 780
Firing order			1-5-3-6-2-4
Bore		mm in	131 5,16
Stroke		mm in	158 6,22
Compression ratio			18.1:1
Wet weight (Not including after treatment system)	Engine only	kg	1325
		lb	2921
	Power pac	kg	1790
		lb	3946

Performance

Performance				rpm	1500	1800	2000	2100
332 kW		without fan		kW	332	332	332	332
				hp	452	452	452	452
		with fan 890 mm		kW	326	322	318	316
				hp	443	438	432	430
Torque at:		ICFN Power 332 kW		Nm	2114	1761	1585	1510
				lbf ft	1559	1299	1169	1113
Max torque at engine speed			1260 rpm	Nm	2119			
				lbf ft	1563			
Power tolerance				%	±2%			
Mean piston speed				m/s	7,9	9,5	10,5	11,1
				ft/sec	25,9	31,1	34,6	36,3
Effective mean pressure at:		ICFN Power 332 kW		MPa	2,08	1,73	1,56	1,48
				psi	301	251	226	215
Max combustion pressure at:		ICFN Power 332 kW		MPa	17	16,7	15,1	14,5
				psi	2465	2422	2190	2103
Total mass moment of inertia, J (mR ²) (not including flywheel)				kgm ²	3,43			
				lbft ²	81,4			
Friction Power				kW	30	43	54	60
				hp	41	58	73	82

Derating see Technical Diagrams

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Cold start performance

*Cold start limit temperature	without starting aid	°C / sec	20	3
		°F / sec	68	
	with manifold heater 4 kW	°C / sec	-5	4
		°F / sec	23	
	with manifold heater 4 kW and block heater	°C / sec	-15	4.5
		°F / sec	5	
*Specify oil and fuel quality	Mk1 fuel, VDS2 oil, 15w40 above -15°C, 10w30 below -15°C			
Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
	Volvo	2	12	10°C

* See also general section in the sales guide

Lubrication system

Lubricating oil consumption at max rpm at:	ICFN Power 332 kW		liter/h	0,02
			US gal/h	0,005
			liter/h	0,02
Oil system capacity including filters			liter	Std sump 36 / Aluminium sump 52
			US gal	Std sump 9,51 / Aluminium sump 13,74
Plastic Oil sump capacity (Std):	Max		liter	30
			US gal	7,93
	Min		liter	19
			US gal	5,02
Aluminium Oil sump capacity:	Max		liter	46
			US gal	12,15
	Min		liter	36
			US gal	9,51
Oil change intervals/specifications	VDS 3		h	600
	VDS 2		h	400
Engine angularity limits:	front up		°	Std sump: 11 / Aluminium sump: 35
	front down		°	Std sump: 11 / Aluminium sump: 35
	side tilt		°	Std sump: 11 / Aluminium sump: 35
Oil pressure at rated speed			kPa	300 - 650
			psi	44 - 94
Oil pressure shut down switch setting			kPa	130
			psi	19

Lubrication system

Lubrication oil temperature in sump:	max	°C	130
		°F	266
Oil filter micron size		μ	40

Fuel system		rpm	1500	1800	2000	2100
ICFN Power 332 kW Specific fuel consumption at:	25%	g/kWh	217	239	263,3	278,8
		lb/hph	0,352	0,387	0,427	0,452
	50%	g/kWh	194	204	221,6	234,2
		lb/hph	0,314	0,331	0,359	0,380
	75%	g/kWh	188	196	210	220,5
		lb/hph	0,305	0,318	0,340	0,357
	100%	g/kWh	191	197	208	215,1
		lb/hph	0,310	0,319	0,337	0,349
Fuel to conform to			ASTM-D975-No1 and 2D JIS KK 2204, EN 590			

Fuel system

System supply flow at max. speed	liter/h US gal/h	104 27,5
Fuel supply line max. restriction (Measured at fuel inlet connection)	kPa psi	10 1,5
Fuel supply line max. pressure, during engine stand still (measured at fuel inlet connection)	kPa psi	0
System return flow at max. speed	liter/h US gal/h	18,0 4,8
Fuel return line max. restriction (Measured at fuel return connection)	kPa psi	20 2,9
Max. allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F	60 140
Fuel filter micron size	μ	5
Governor type/make, standard	Volvo / EMS 2,2	
Injection pump type/make	Delphi E3	

Intake and exhaust system

Inlet air temp		1800	2000	2200	2400	
Air consumption at: (+25°C and 100kPa)	ICFN Power 332 kW	m³/min cfm	25 885	27 938	27 968	27 969
 See front page for important information Max allowable air intake restriction including piping		kPa psi	3 0,4			
Heat rejection to exhaust at:	ICFN Power 332 kW	kW BTU/min	222 12625	235 13364	264 15013	282 16037
Exhaust gas temperature after turbine at:	ICFN Power 332 kW	°C °F	421 790	419 786	452 846	475 887
 See front page for important information Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: mm		kPa psi	11 1,6	13 1,9	14 2,1	15 2,2
Exhaust gas flow at: (temp and pressure after turbine at the	ICFN Power 332 kW	m³/min cfm	56 1974	58 2060	62 2204	64 2274
Exhaust gas smoke	ICFN Power 332 kW	*Bosch Units	0,08	0,1	0,3	0,6

Cooling system		rpm	1500	1800	2000	2100	
Heat rejection radiation from engine at:		ICFN Power 332 kW	kW BTU/min	17 944	17 950	16,7 950	16,6 944
Heat rejection to coolant at:		ICFN Power 332 kW	kW BTU/min	124 7052	132 7507	146 8303	154 8758
Radiator cooling system type				Closed circuit			
Standard radiator core area			m² foot²	0,8 8,61			
Fan diameter	890 mm		mm in	890 35,04			
Fan power consumption	890 mm		kW hp	6,0 8	10,0 14	14,0 19	16,0 22
Fan drive ratio	fan Ø890			0,84 : 1			
Coolant capacity:	engine		liter US gal	20 5,3			
		std. 0,8m² radiator with hoses		liter US gal	24 6,3		
	Coolant pump		drive/ratio	Belt/1,50:1			
	Coolant flow with standard system			l/s US gal/s			
Minimum coolant flow			l/s US gal/s	4,7 1,2	5,7 1,5	6,0 1,6	6,2 1,6
Maximum outer circuit restriction incl. piping			kPa psi	65,0 9,4			
Thermostat:	start to open		°C °F	82 180			
		fully open		°C °F	92 198		
	Maximum static pressure head (expansion tank height + pressure cap setting)		kPa psi	100 14,5			
	Minimum static pressure head (expansion tank height + pressure cap setting)			kPa psi	70 10,2		
Standard pressure cap setting			kPa psi	70 10,2			
Maximum top tank temperature			°C °F	107 225			

Charge air cooler system

		rpm	1500	1800	2000	2100
Heat rejection to charge air cooler	ICFN Power 332 kW	kW	72	72	73	72
		BTU/min	4095	4095	4151	4095
Charge air mass flow	ICFN Power 332 kW	kg/s	0,5	0,52	0,54	0,54
Charge air inlet temp. (Charge air temp after turbo compressor)	ICFN Power 332 kW	°C	187	180	178	175
		°F	369	356	352	347
 See front page for important information Max allowable Charge air outlet temp. (Charge air temp after charge air cooler)		°C	44	45	45	45
		°F	111	113	113	113
 See front page for important information Maximum pressure drop over charge air cooler incl. piping		kPa	8			
		psi	1,16			
Charge air pressure (After charge air cooler)		kPa	226			
		psi	32,78			
Standard charge air cooler core area		m²	0,8			
		foot²	8,61			

Cooling performance:
m² radiator and
fan

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 40% coolant. Valid at 1 atm.

				IFN Power 332 kW			
Engine speed	Engine power	Air on temp		Air flow		External restriction	
		°C	°F	m³/s	ft³/s	Pa	psi
2100 (0,84)	332	58	136	6,5	229,5	518	0,075
	452	61	142	7,3	257,8	270	0,039
		64	147	7,9	279,0	0	
1800 (0,84)	332	55	131	5,6	197,8	322	0,047
	452	58	136	6,1	215,4	216	0,031
		61	142	6,7	236,6	0	

Cooling performance: **0,73 m² radiator and** **750 fan** **fan drive ratio 0.84:1**
Radiator module 136232626 and kit 22113650 pusher

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 107°C TTT and 40% coolant. Valid at 1 atm.

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
2100 (0,84)	332 452	72	162	7,6	268,4	0	
		70	158	7,0	247,2	100	0,015
		68	154	6,4	226,0	200	0,029
		66	151	6,0	211,9	300	0,044
		63	145	5,6	197,8	400	0,058
1800 (0,84)	332 452	73	163	6,3	222,5	0	
		71	160	5,9	208,4	100	0,015
		67	153	5,2	183,6	200	0,029
		64	147	4,7	166,0	300	0,044
		59	138	4,2	148,3	400	0,058

Cooling performance: **0,73 m² radiator and** **750 fan** **fan drive ratio 0.84:1**
Radiator module 136232627 and kit 22113651 suction

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 107°C TTT and 40% coolant. Valid at 1 atm.

Engine speed rpm	Engine power kW hp	Air on temp		Air flow		External restriction	
		°C	°F	m ³ /s	ft ³ /s	Pa	psi
2100 (0,84)	332 452	69	156	6,9	243,7	0	
		67	153	6,4	226,0	100	0,015
		65	149	6,1	215,4	200	0,029
		63	145	5,7	201,3	300	0,044
		60	140	5,3	187,2	400	0,058
1800 (0,84)	332 452	67	153	6,0	211,9	0	
		64	147	5,4	190,7	100	0,015
		61	142	4,9	173,0	200	0,029
		58	136	4,5	158,9	300	0,044
		53	127	4,0	141,3	400	0,058

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous / Droop	
Governor droop	0-8%	
Governor response	Adjustable PID-constants (VODIA)	Standard
Idle speed	550-900	
Stop function	Energized to Run / Stop	
Preheating function	On / Off	
Lamp test	On / Off	

Engine sensors and switch settings			Alarm level	Engine protection		
Parameter		Unit	Setting range	Default setting	Level	Action. Default/Alternative
Oil temp		°C	120 - 130	125	Setting +5	Derate. ON/OFF*
Oil pressure	Low idle	kPa		140,0	165	Derate. ON/OFF*
	Rated speed	kPa		300	325	Derate. ON/OFF*
Oil level					Low level	Alarm.
Piston cooling pressure >1000 rpm		kPa		150	150	Alarm. ON/OFF*
Coolant temp		°C	95 - 103	102	Setting +5	Derate. ON/OFF*
Coolant level			See cooling system	On	Low level	Alarm.
Fuel feed pressure	Low idle	kPa		0		Alarm.
	Rated speed			200		Alarm.
Water in fuel				High level		Alarm.
Crank case pressure		kPa			Rapid pres inc	Derate. ON/OFF*
Air filter pressure drop				5		Alarm.
Altitude, above sea		m				Automatic derating, see section derating
Charge air temp		°C		82	87	Derate. ON/OFF*
Charge air pressure		kPa		310**	320**	Derate. ON/OFF*
Engine speed		rpm	100 - 120% of rated speed	120% of rated speed	Alarm level	

* Off means no shut down, alarm only

**Pabs, 2100 rpm at sea level.

Electrical system

Voltage and type			24V / insulated from earth	
Alternator:	make		Bosch	
	output	A	80	
	tacho output	Hz/alternator rev.	6	
	drive ratio		5.3:1	
Starter motor:	make		Melco	
	type		105P70	
	output	kW	7	
		hp	9,5	
Number of teeth on:	flywheel		10	
	starter motor		12	
Max wiring resistance main circuit		mΩ	2	
Cranking current at +20°C		A	180	
Crank engine speed at 20°C		rpm	155	
Starter motor battery capacity	max	Ah/A	2x225	
	min at +5°C	Ah/A	-	
Inlet manifold heater (at 20 V)		kW	4	
Power relay for the manifold heater		A	1	

Power take off

Timing gear at compressor PTO max:	Nm	160
	lbf ft	118
Speed ratio direction of rotation viewed from flywheel side		1.31:1/ccw
Timing gear at servo pump PTO max:	Nm	100
	lbf ft	74
Speed ratio direction of rotation viewed from flywheel side		1.75:1/ccw
Max allowed bending moment in flywheel housing	Nm	15000
	lbf ft	11063
Max. rear main bearing load	N	4000
	lbf	899,2

















