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TAD1344VE	21340728	02

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	Engine only	kg lb	
	Power pac	kg lb	

Performance				rpm	1500	1800	2000	2100
IFN Power	352 kW	without fan		kW	348	352	352	352
				hp	473	479	479	479
		with fan 890 mm		kW	342	342	338	336
				hp	465	465	460	457
ICFN Power	352 kW	without fan		kW	348	352		
				hp	473	479		
		with fan 890 mm		kW	342	342		
				hp	465	465		
Torque at:		IFN Power 352 kW		Nm	2215	1867	1681	1601
				lbf ft	1634	1377	1239	1180
		ICFN Power 352 kW		Nm	2215	1867		
				lbf ft	1634	1377		
Max torque at engine speed			1260 rpm	Nm lbf ft	2248 1658			
Mean piston speed				m/s ft/sec	7.9 25.9	9.5 31.1	10.5 34.6	11.1 36.3

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Performance		rpm	1500	1800	2000	2100
Effective mean pressure at:	IFN Power 352 kW	MPa	2.18	1.84	1.65	1.57
		psi	316	266	240	228
	ICFN Power 352 kW	MPa	2.18	1.84		
		psi	316	266		
Max combustion pressure at:	IFN Power 352 kW	MPa	16.7	16.1	15.2	15
		psi	2422	2335	2204	2175
	ICFN Power 352 kW	MPa	16.7	16.1		
		psi	2422	2335		
Total mass moment of inertia, J (mR ²)		kgm ² lbft ²	3.43 81.4			
Friction Power		kW	30	43	54	60
		hp	41	58	73	82
Derating see Technical Diagrams						

Cold start performance

*Cold start ambient temperature limit and time from start to no load speed	without starting aid	°C / sec.	20	3s
		°F / sec.	68	
	with manifold heater 4 kW	°C / sec.	-5	4s
		°F / sec.	23	
	with manifold heater 4 kW and block heater	°C / sec.	-15	4.5s
		°F / sec.	5	
*Specify oil and fuel quality	Mk1 fuel, VDS2 oil. 15w40 above -15°C, 10w30 below -15°C			
Usage of manifold heater:	Time preheating, minutes	Time post heating, minutes		
Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
	Volvo	2	12	10°C 50°F

* See also general section in the Sales Support Tool

Lubrication system

Lubricating oil consumption at max rpm at:	IFN Power 352 kW	liter/h	0.02
		US gal/h	0.005
	ICFN Power 352 kW	liter/h	0.02
		US gal/h	0.005
Oil system capacity including filters		liter	36
		US gal	9.51
Oil sump capacity:	Max	liter	30
		US gal	7.93
	Min	liter	19
		US gal	5.02
Oil change intervals/specifications	VDS 3	h	600
	VDS 2	h	400
		h	
Engine angularity limits:	front up	°	11
	front down	°	11
	side tilt	°	11
Oil pressure at rated speed		kPa	300 - 650
		psi	44 - 94
Oil pressure shut down switch setting		kPa	130
		psi	19

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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
IFN Power 352 kW Specific fuel consumption at:	25%	g/kWh lb/hph	218 0.353	242 0.392	260 0.421	271 0.439
	50%	g/kWh lb/hph	199 0.323	208 0.337	219 0.355	227 0.368
	75%	g/kWh lb/hph	193 0.313	201 0.326	211 0.342	216 0.350
	100%	g/kWh lb/hph	195 0.316	201 0.326	208 0.337	213 0.345
ICFN Power 352 kW Specific fuel consumption at:	25%	g/kWh lb/hph	218 0.353	242 0.392		
	50%	g/kWh lb/hph	199 0.323	208 0.337		
	75%	g/kWh lb/hph	193 0.313	201 0.326		
	100%	g/kWh lb/hph	195 0.316	201 0.326		
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	100 26.4
Fuel supply line max. restriction (Measured at fuel inlet connection)	kPa psi	10 1.5
Fuel supply line max. pressure, engine stopped	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
Prefilter / Water separator micron size	μ	10
Fuel filter micron size	μ	5
Governor type/make, standard	Volvo / EMS 2.2	
Injection pump type/make	Delphi E3	

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Intake and exhaust system		Inlet air temp	rpm	1500	1800	2000	2100
Air consumption at: (+25°C and 100kPa)	IFN Power 352 kW	25°C 77°F	m³/min cfm	26 929	28 975	28 989	28 1003
	ICFN Power 352 kW	25°C 77°F	m³/min cfm	26 929	28 975		
Max allowable air intake restriction including piping			kPa psi	3 0.4			
Heat rejection to exhaust at:	IFN Power 352 kW		kW BTU/min	234 13307	259 14729	279 15866	287 16321
	ICFN Power 352 kW		kW BTU/min	234 13307	259 14729		
Exhaust gas temperature after turbine at:	IFN Power 352 kW		°C °F	429 804	449 840	473 883	479 894
	ICFN Power 352 kW		°C °F	429 804	449 840		
Max allowable back pressure in exhaust line			kPa psi	11 1.6	13 1.9	14 2.0	15 2.2
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)	IFN Power 352 kW		m³/min cfm	59 2091	63 2221	66 2317	67 2359
	ICFN Power 352 kW		m³/min cfm	59 2091	63 2221		
Exhaust gas smoke	IFN Power 352 kW		*Bosch Units	0.1	0.2	0.3	0.4
	ICFN Power 352 kW			0.1	0.2		
Heat rejection radiation from engine at:	IFN Power 352 kW		kW BTU/min	18 995	18 1007	17.6 1001	17.6 1001
	ICFN Power 352 kW		kW BTU/min	18 995	18 1007		
Heat rejection to coolant at:	IFN Power 352 kW		kW BTU/min	132 7507	142 8075	155 8815	162 9213
	ICFN Power 352 kW		kW BTU/min	132 7507	142 8075		
Coolant			Volvo Penta coolant "ready mix" or Volvo Penta coolant mixed with clean fresh water 40 / 60				
Radiator cooling system type				Closed circuit			
Standard radiator core area			m² foot²	0.8 8.61			
Fan diameter	890 mm		mm	890			
			in	35.04			

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Cooling system		rpm	1500	1800	2000	2100
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 / 1.43:1			
Coolant flow with standard system		l/s US gal/s				
Minimum coolant flow		l/s US gal/s	5.6 1.5	6.7 1.8	7.4 2.0	7.8 2.1
Maximum outer circuit restriction incl. piping		kPa psi	55.0 8.0			
Thermostat:	start to open	°C	82			
		°F	180			
	fully open	°C	92			
		°F	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			
Draw down capacity. The difference between min coolant level in the expansion tank and the lowest level where the engine's coolant system still are functioning	with std. 0,8 m² radiator	liter US gal	1.8 0.5			
		liter US gal				

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Charge air cooler system		rpm	1500	1800	2000	2100
Heat rejection to charge air cooler	IFN Power 352 kW	kW	75	74	72	73
		BTU/min	4265	4208	4095	4151
	ICFN Power 352 kW	kW	75	74		
		BTU/min	4265	4208		
Charge air mass flow	IFN Power 352 kW	kg/s	0.51	0.54	0.54	0.55
	ICFN Power 352 kW	kg/s	0.51	0.54		
Charge air inlet temp. (Charge air temp after turbo compressor)	IFN Power 352 kW	°C	191	183	176	176
		°F	376	361	349	349
	ICFN Power 352 kW	°C	191	183		
		°F	376	361		
Charge air outlet temp. (Charge air temp after charge air cooler)	IFN Power 352 kW	°C	45	45	45	45
		°F	113	113	113	113
	ICFN Power 352 kW	°C	45	45		
		°F	113	113		
Maximum pressure drop over charge air cooler incl. piping		kPa	8			
		psi	1.16			
Charge air pressure (After charge air cooler)		kPa	238			
		psi	34.52			
Standard charge air cooler core area		m²	0.8			
		foot²	8.61			

Cooling performance: 0.8 m² radiator and 890 mm 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.

Engine speed	Engine power	IFN Power 352 kW					
		Air on temp		Air flow		External restriction	
		°C	°F	m³/s	ft³/s	Pa	psi
2100 (0,84)	352	57	135	6.8	240.1	395	0.057
	479	59	138	7.3	257.8	260	0.038
		62	144	7.9	279.0	0	
1800 (0,84)	352	55	131	6	211.9	233	0.034
	479	57	135	6.3	222.5	140	0.020
		59	138	6.7	236.6	0	

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Cooling performance: 0.8 m² radiator and 890 mm 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.

				ICFN Power 352 kW			
Engine speed	Engine power	Air on temp		Air flow		External restriction	
rpm	kW hp	°C	°F	m³/s	ft³/s	Pa	psi
1800 (0,84)	352	55	131	6	211.9	233	0.034
	479	57	135	6.3	222.5	140	0.020
		59	138	6.7	236.6	0	

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Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous / Droop	
Governor droop	0-8 %	
Governor response	Adjustable PID-constants (VODIA)	Standard
Idle speed	600-1200	
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	Shut down. ON/OFF*
Oil pressure	kPa	-	150	-20	Shut down. ON/OFF*
	kPa	-	250	-20	Shut down. ON/OFF*
Oil level		-	Min level	-	-
Piston cooling pressure >1000 rpm	kPa	-	150	150	Shut down. ON/OFF*
Coolant temp	°C	95 - 102	102	Setting +5	Shut down. ON/OFF*
Coolant level		See cooling system	On	Low level	Shut down. ON/OFF*
Fuel feed pressure	kPa	-	100	-	-
	kPa	-	300	-	-
Water in fuel		-	High level	-	-
Crank case pressure	kPa	-	-	Rapid pres inc	Shut down. ON/OFF*
Air filter pressure drop	kPa	-	5	-	-
Altitude, above sea	m	-	-	-	Automatic derating, see section derating
Charge air temp	°C	-	80	85	Shut down. ON/OFF*
Charge air pressure**	kPa	-	310	+10	Shut down. 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.

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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		153
	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		0,91:1/clockwise
Timing gear at servo pump PTO max:	Nm	100
	lbf ft	74
Speed ratio direction of rotation viewed from flywheel side		1,58:1/clockwise
Max allowed bending moment in flywheel housing	Nm	15000
	lbf ft	11063
Max. rear main bearing load	N	4000
	lbf	899.2