Technical data TAD942VE

250kW / 2000rpm

General

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

Number of cylinders			6
Displacement, total		liters	9,36
		in^3	571
Firing order			1-5-3-6-2-4
Bore		mm	120
		in	4,72
Stroke		mm	138
		in	5,43
Compression ratio			20,2
Dry weight	Engine only, excluding cooling system	kg	1015
		lb	2238
	Power pac	kg	1354
		lb	2985
Wet weight	Engine only, excluding cooling system	kg	1065
		lb	2348
	Power pac	kg	1404
		lb	3095

Performance			**r/min**	**1500**	**1800**	**2000**	**2100**
ICFN Power	250 kW	without fan	kW	238	247	250	250
			hp	324	336	340	340
		with fan ratio 0,9	kW	231	235	234	231
		890 mm	hp	314	320	318	314
	250 kW	without fan	kW	238	247	250	250
			hp	324	336	340	340
		with fan ratio 0,9	kW	234	240	240	238
		750 mm	hp	318	326	326	324
Torque at:		ICFN Power 250 kW	Nm	1515	1310	1194	1137
			lbf ft	1117	966	880	838
Mean piston speed			m/s	6,9	8,3	9,2	9,7
			ft/sec	22,6	27,2	30,2	31,7

Performance		**r/min**	**1500**	**1800**	**2000**	**2100**
Effective mean pressure at:	ICFN Power 250 kW	Mpa	2,03	1,76	1,60	1,53
		psi	295	255	232	221
Max combustion pressure at:	ICFN Power 250 kW	Mpa	18	18	18,3	17,6
		psi	2610	2610	2654	2552
Total mass moment of inertia , J		kgm^2	2,6			
Std fly wheel included		$lbft^2$	61,6			
Degree of irregularity at:	ICFN Power 250 kW		1:49	1:93	1:148	1:190
Friction Power		kW	28	39	48	51
		hp	38	53	65	69
Time from start to idle speed at ambient temperature:	°C	15	1			
		0	2			
		-20*	5			

* With manifold heater engaged, lubrication oil 15W/40 and block heater.

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Cold start performance

*Cold start ambient temperature limit.	without starting aid	°C °F	0 32	2*170 Amp
	with manifold heater 4 kW	°C °F	-5 23	2*225 Amp
	with manifold heater 4 kW and blockheater	°C °F	-35 -31	2*225 Amp
*Specify oil and fuel quality	<-15°C Lubrication oil 15/40w Fuel VSD >-15°C Lubrication oil 0/30w Fuel MK1			

Block heater type	**Make**	**Power kW**	**Engaged hours**	**Cooling water temp engine block**
Plug in type	Calix	1,5	48	7,5 °C
* See also general section in the sales guide				

Derating

The engine may be operated up to 1000 m altitude and 40 °C ambient air

Altitude derating factor < 3000 m	% / m	See graph
Altitude derating factor > 3000 m	% / m	See graph
Ambient temperature derating factor	% / °C	No derating
Humidity		No derating

Lubrication system			**r/min**	**1500**	**1800**	**2000**	**2100**
Lubricating oil consumption at max rpm at:	ICFN Power 250 kW		liter/h US gal/h	0,064 0,0169			
Oil system capacity including filters			liter US gal	40 10,57			
Oil sump capacity:		Max	liter US gal	35 9,25			
		Min	liter US gal	28 7,40			
Oil change intervals/specifications	VDS-2		h	600			
	VDS, ACEA, E3		h	400			
	ACEA E2, API CF, CF-4, CG-4		h	250			
Engine angularity limits:	front up		°	30			
	front down		°	30			
	side tilt		°	30			
Oil pressure at rated speed			kPa psi	350 - 600 51 - 87			
Oil pressure shut down switch setting			kPa psi	250 36			
Lubrication oil temperature in sump:		max	°C °F	125 257			
Oil filter micron size			mm	0,040			

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Fuel system			**r/min**	**1500**	**1800**	**2000**	**2100**
ICFN Power 250 kW	25%		g/kWh	238	260	270	216
Specific fuel consumption at:			lb/hph	0,386	0,421	0,438	0,350
	50%		g/kWh	210	218	220	236
			lb/hph	0,340	0,353	0,357	0,383
	75%		g/kWh	198	205	212	219
			lb/hph	0,321	0,332	0,344	0,355
	100%		g/kWh	195	202	211	220
			lb/hph	0,316	0,327	0,342	0,357
Recommended fuel to conform to				ASTM-D975-No2, DIN 51601, EN 590			
System return flow			l/h	36			
			US gal/h	9,5			
System supply flow at rated speed			l/h	108			
			US gal/h	28,5			
Fuel supply line restriction, maximum allowable			kPa	10			
			psi	1,5			
Fuel return line restriction, maximum allowable			kPa	20			
			psi	2,9			
Fuel supply line max. pressure, engine stopped			kPa	0			
			psi				
Maximum allowable inlet fuel temp			°C	50			
Prefilter / Waterseparator micron size			mm	0,005			
Intake and exhaust system			**r/min**	**1500**	**1800**	**2000**	**2100**
Air consumption at:	ICFN Power 250 kW		kg/s	0,35	0,42	0,45	0,46
Air intake restriction, clean filter(s)			kPa	2			
			In wc	8,0			
Max allowable air intake restriction			kPa	5			
			ln wc	20,1			
Heat rejection to exhaust at:	ICFN Power 250 kW		kW	173	189	199	202
			BTU/min	9820	10766	11303	11504
Exhaust gas temperature after turbine at:	ICFN Power 250 kW		°C	443	410	398	394
			°F	829	770	748	741
Max allowable back pressure in exhaust line			kPa	10,0	13,0	15,0	15,0
			In wc	40,2	52,2	60,2	60,2
Exhaust gas flow at:	ICFN Power 250 kW		m³/min	36,8	41,0	43,4	44,9
			cfm	1300	1448	1533	1586
Exhaust gas smoke	ICFN Power 250 kW		Bosch	0,16	0,24	0,34	0,44
			Units				
Cooling system			**r/min**	**1500**	**1800**	**2000**	**2100**
Heat rejection radiation from engine at:	ICFN Power 250 kW		kW	15	16	18	20
			BTU/min	872	889	1031	1121
Heat rejection to coolant at:	ICFN Power 250 kW		kW	101	103	109	113
			BTU/min	5718	5878	6185	6403
Recommended coolant				Volvo coolant or Volvo anticorrosion additive together with clean fresh water			
Radiator cooling system type				Closed circuit			
Charge air temp after CAC			°C	41	45	45	45
at referens ambient conditions 25°C / 1000mbar			°F	106	113	113	113
Charge air temp after turbo compressor			°C	160	175	176	177
at referens ambient conditions 25°C / 1000mbar			°F	320	347	349	351
Max allowable pressure drop (Turbo outlet to manifold)			kPa	15	15	15	15
			In wc	60,2	60,2	60,2	60,2
Boost pressure			kPa	161	173	181	185
			In wc	646,4	694,6	726,7	742,8
Heat rejection to CAC			kW	40	46	50	52
			BTU/min	2293	2632	2843	2938

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Cooling system			**r/min**	**1500**	**1800**	**2000**	**2100**
Radiator core area	(std. Size)		m²	0,8			
			sq.ft.	8,61			
Radiator core thickness	(std. Size)		mm	52			
			in	2,05			
Intercooler core area	(std. Size)		m²	0,89			
			foot²	9,58			
Intercooler core thickness	(std. Size)		mm	68			
			in	2,68			
Fan diameter	890 mm		mm	890			
			in	35,04			
	750 mm		mm	750			
			in	29,53			
Fan power consumption	890 mm		kW	7,0	12,0	16,0	19,0
			hp	10	16	22	26
	750 mm		kW	4,0	7,0	10,0	12,0
			hp	5	10	14	16
Fan drive ratio	fan Ø890			0,9			
	fan Ø750			0,9			
Coolant capacity:	engine		liter	17			
			US gal	4,5			
	std. 0,8m² radiator with hoses		liter	24			
			US gal	6,3			
Coolant pump			drive/ratio	belt/1,50:1			
Coolant flow including radiator restriction			l/s	4,7	5,6	6,3	6,6
			cu ft/min	9,9	11,9	13,2	13,9
Maximum external coolant system restriction incl. piping			kPa	55,0			
			psi	8,0			
Thermostat:		start to open	°C	82			
			°F	180			
		fully open	°C	92			
			°F	198			
Maximum static pressure head			kPa	100			
			psi	14,5			
Maximum pressure cap setting			kPa	70			
			psi	10,2			
Maximum top tank temperature			°C	103			
			°F	217			
Minimum temperature entering engine			°C	68			
			°F	154			
Shutdown switch setting			°C	98			
			°F	208			
Recommended drawdown capacity			10% of total cooling system capacity				

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Cooling performance: 0,8 m² radiator and 890mm fan. Fan ratio 0,9

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 50% antifreeze

Engine speed	Engine power	Air on temp		Air flow	Max additional external restriction	
	kW					
rpm	hp	°C	°F	kg/s	Pa	psi
2100	250	65	149	7,6	690	0,100
	340	55	131	5,6	1380	0,200
		45	113	4,5	1800	0,261
1800	247	65	149	6,2	520	0,075
	336	55	131	4,6	1030	0,149
		45	113	3,6	1400	0,203

Engine management system Versatile

Functionality	Alternatives	Default setting
Governor mode	Isochronous/droop Switchable during operation	Isochronous
Governor droop	0 - 5%	
Governor response	Adjustable PID-constans	
Idle speed	600 - 1200 rpm	600 rpm
Stop function	Energized to run / stop	Energized to stop
Preheating function		
Lamp test	ON/OFF	ON

Engine protection			Alarm level		Engine protection	
Parameter		Unit	Setting range	Default setting	Level	Action. Default/Alternative
Oil temp		°C	120 - 130	125	Setting +3	Torque reduction
Oil pressure	Low idle	kPa	NA	160,0	130,000	Torque reduction
	Rated speed	kPa	NA	225	195,000	Torque reduction
Oil level			NA	Low level	NA	NA
Piston cooling pressure >1000 rpm		kPa	NA	NA	NA	NA
Coolant temp		°C	95 - 101	98	Setting +7	Torque reduction
Coolant level			See coling system	On	Low level	Torque reduction
Fuel feed pressure	Low idle	kPa	NA	100	NA	NA
Water in fuel			Water Present	NA	NA	NA
Crank case pressure		kPa	Rapid Increase of Press			Torque reduction
Air filter pressure drop			NA	NA	NA	NA
Altitude, above sea		m	NA	NA	1200	Automatic derating, see section derating
Charge air temp		°C	NA	80	91,000	Torque reduction
Charge air pressurer		kPa	NA	325	350,000	Torque reduction
Engine speed		rpm	100 - 120% of rated speed	115% of rated speed	Alarm level	NA

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Engine management system Power pac

Functionality	Alternatives	Default setting
Governor mode	Isochronous/droop Switchable during operation	Isochronous
Governor droop	0 - 5%	
Governor response	Adjustable PID-constans	
Idle speed	600 - 1200 rpm	600 rpm
Stop function	Energized to run / stop	Energized to stop
Preheating function		
Lamp test	ON/OFF	ON

Engine protection			Alarm level		Engine protection	
Parameter		Unit	Setting range	Default setting	Level	Action. Default/Alternative
Oil temp		°C	120 - 130	125	Setting +3	Shut down
Oil pressure	Low idle	kPa	NA	160,0	130,000	Shut down
	Rated speed	kPa	NA	225	195,000	Shut down
Oil level			NA	Low level	NA	NA
Piston cooling pressure >1000 rpm		kPa	NA	NA	NA	NA
Coolant temp		°C	95 - 101	98	Setting +7	Shut down
Coolant level			See coling system	On	Low level	Shut down
Fuel feed pressure	Low idle	kPa	NA	100	NA	NA
Water in fuel			Water Present	NA	NA	NA
Crank case pressure		kPa	Rapid Increase of Press			Shut down
Air filter pressure drop			NA	NA	NA	NA
Altitude, above sea		m	NA	NA	1200	Automatic derating, see section derating
Charge air temp		°C	NA	80	91,000	Shut down
Charge air pressurer		kPa	NA	325	350,000	Shut down
Engine speed		rpm	100 - 120% of rated speed	115% of rated speed	Alarm level	NA

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Electrical system

Voltage and type				24V / Insulated from earth
Alternator:	make			Bosch
	output	Amp		80
	tacho output	Hz/alternator rev.		6
	drive ratio			4,5
Starter motor:		make		Melco
		type		90P55
		output	kW	5,5
			hp	7,5
Starter motor solenoid:		pull current	Amp	N/A
		hold current	Amp	2
Number of teeth on:		flywheel		153
		starter motor		11
Inrush current at +20°C			Amp	1000
Cranking current at +20°C			Amp	428
Crank engine speed at 20°C			rpm	75
Starter motor battery capacity		max	Ah	2x143 570A DIN
		min at +5°C	Ah	2x88 400A DIN
Inlet manifold heater (at 20 V)			kW	4
Power relay for the manifold heater			Amp	1

Power take off		**r/min**	**1500**	**1800**	**2000**	**2100**
Front end in line with crank shaft max:		Nm	TVC calculation necessary			
		lbf ft	Available torque depends on inertia			
Front end belt pulley load.	max left	kW	42	42	35	26
Direction of load viewed from flywheel side:		hp	57	57	48	35
	max down	kW	152	200	226	234
		hp	207	272	307	318
	max right	kW	26	39	41	34
		hp	35	53	56	46
Timing gear at compressor PTO max continous:		Nm	150			
		lbf ft	111			
Speed ratio direction of rotation viewed from flywheel side			1,29:1/anti-clockwise			
Max allowed bending moment in flywheel housing		Nm	7000			
		lbf ft	5163			
Max. rear main bearing load		N	3000			
		lbf	674,4			