

# Technical data TAD721VE

## 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 <sup>3</sup>	7,15 436
Firing order		1-5-3-6-2-4
Bore	mm in	108 4,25
Stroke	mm in	130 5,12
Compression ratio		EPA Tier 1 18.4:1/EU Stage 2 19.0:1
Dry weight	kg/lb	680 / 1496

Performance		r/min	1800	2100	2200	2300
IFN Power. 195 kW	without fan	kW	169	187	191	195
		hp	230	254	260	265
ICFN Power. 176 kW	without fan	kW	151	168	172	176
		hp	205	228	234	239
IFN Power. 188 kW	without fan	kW	168	185	188	
		hp	228	252	256	
ICFN Power. 170 kW	without fan	kW	151	167	170	
		hp	205	227	231	
IFN Power. 182 kW	without fan	kW	168	182		
		hp	228	248		
ICFN Power. 165 kW	without fan	kW	151	165		
		hp	205	224		
Torque at:	IFN Power. 195 kW	Nm	897	850	829	810
		lbf ft	661	627	611	597
	ICFN Power. 176 kW	Nm	801	764	747	731
		lbf ft	591	563	551	539
	IFN Power. 188 kW	Nm	891	841	816	
		lbf ft	657	620	602	
	ICFN Power. 170 kW	Nm	801	759	738	
		lbf ft	591	560	544	
	IFN Power. 182 kW	Nm	891	828		
		lbf ft	657	610		
	ICFN Power. 165 kW	Nm	801	750		
		lbft	591	553		
Mean piston speed		m/s	7,8	9,1	9,5	10,0
		ft/sec	25,6	29,9	31,3	32,7
Effective mean pressure at IFN Power 195 kW / 2300 rpm		Mpa	1,57	1,49	1,46	1,42
		psi	228	216	212	206
Max combustion pressure at IFN Power 195 kW / 2300 rpm		MPa				
		psi				
Total mass moment of inertia, J (mR <sup>2</sup> ) (w/o flyweel)		kgm <sup>2</sup>	0,474			
		lbft <sup>2</sup>	11,2			
Degree of irregularity at:	IFN Power. 195 kW					
	IFN Power. 188 kW					
	IFN Power. 182 kW					

## Technical data TAD721VE

Residual speed droop (mechanical governor) at load increase from 0 to 100% at:	IFN Power. 195 kW	%				5-7
	IFN Power. 188 kW	%			5-7	
	IFN Power. 182 kW	%		5-7		
Residual speed droop (electronic governor) at load increase from 0 to 100% at:	IFN Power. 195 kW	%				5, adjust./isocron.
	IFN Power. 188 kW	%			5, adjust./isocron	
	IFN Power. 182 kW	%		5, adjust./isocron.		
Friction Power		kW	12			
		hp	17			

### Derating, mechanical governor

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating. For operation at higher altitudes and temperatures the power should be derated according to the following factors:

	r/min	1800	2100	2200	2300
Altitude derating factor < 3000 m	% / m		4 / 500		
Altitude derating factor > 3000 m	% / m		6 / 500		
Ambient temperature derating factor	% / °C		2 / 5		
Humidity			No derating		

### Derating, electronic governor

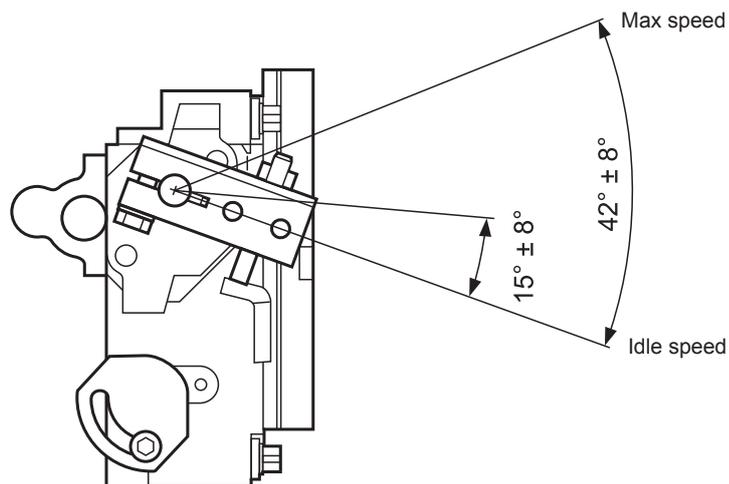
For applications 1000 m above the ocean an ECU with automatic derating must be used. For operations with air ambient temperature over 40 C, see mechanical governor.

### Lubrication system

		r/min	1800	2100	2200	2300
Lubricating oil consumption at max rpm at:	IFN Power. 195 kW	liter/h US gal/h				0,15 0,040
	IFN Power. 188 kW	liter/h US gal/h			0,14 0,037	
	IFN Power. 182 kW	liter/h US gal/h		0,13 0,034		
Oil system capacity incl. Filters		liter US gal		20 5,28		
Oil sump capacity:	Max	liter US gal		17 4,49		
	Min	liter US gal		14 3,70		
Oil change intervals	VDS-3 VDS-2 ACEA: E7,E3,E5 API: CI-4,CG-4,CH-4	h		500		
Engine angularity limits:	front up	°		30		
	front down	°		30		
	side tilt	°		30		
Oil pressure:	at 1800 rpm	kPa		450		
	shut down switch setting	kPa		50		
Lubrication oil temperature:	normal	°C		80		
		°F		176		
	max	°C		125		
		°F		257		
Oil filter micron size		mm		0,012		

# Technical data TAD721VE

Fuel system		r/min	1800	2100	2200	2300	
IFN Power. 195 kW Specific fuel consumption at:	EPA Tier 1	25%	g/kWh lb/hph	246 0,399	275 0,446	275 0,446	285 0,462
	EPA Tier 1	50%	g/kWh lb/hph	206 0,334	215 0,349	218 0,353	223 0,361
	EPA Tier 1	75%	g/kWh lb/hph	203 0,329	208 0,337	211 0,342	214 0,347
	EPA Tier 1	100%	g/kWh lb/hph	202 0,327	207 0,336	209 0,339	214 0,347
	EU Stage 2	100%	g/kWh lb/hph	208 0,337	223 0,361	228 0,370	233 0,378
IFN Power. 188 kW Specific fuel consumption at:	EPA Tier 1	25%	g/kWh lb/hph	246 0,399	270 0,438	275 0,446	
	EPA Tier 1	50%	g/kWh lb/hph	206 0,334	216 0,350	219 0,355	
	EPA Tier 1	75%	g/kWh lb/hph	203 0,329	208 0,337	212 0,344	
	EPA Tier 1	100%	g/kWh lb/hph	202 0,327	206 0,334	209 0,339	
	EU Stage 2	100%	g/kWh lb/hph			229 0,371	
IFN Power. 182 kW Specific fuel consumption at:	EPA Tier 1	25%	g/kWh lb/hph	246 0,399	270 0,438		
	EPA Tier 1	50%	g/kWh lb/hph	206 0,334	215 0,349		
	EPA Tier 1	75%	g/kWh lb/hph	203 0,329	208 0,337		
	EPA Tier 1	100%	g/kWh lb/hph	202 0,327	206 0,334		
	EU Stage 2	100%	g/kWh lb/hph		222 0,360		
Recommended fuel to conform to				ASTM-D975-No1 and 2-D JIS KK 2204, EN 590			
Total fuel flow			liter/h US gal/h				600 159
Feed pump pressure			kPa psi	500 72,5			
Feed pump max suction head			m foot	1,5 4,9			
Fuel filter micron size			mm	0,005			
Prefilter / Waterseparator micron size			mm	0,0063			
Governor type/make, standard				Heinzmann			
Injection pump type/make				Single pumps / Bosch			
Injection pump throttle shaft angular travel: Max speed, mech. gov.			degrees	33 0/+20			
Injection pump throttle shaft angular travel: Idle speed, mech. gov.			degrees	20 0/+10			



## Technical data TAD721VE

Intake and exhaust system		r/min	1800	2100	2200	2300
Air consumption at:	IFN Power. 195 kW	m <sup>3</sup> /min cfm	12,6 445	15,3 540	15,9 562	16,8 593
	IFN Power. 188 kW	m <sup>3</sup> /min cfm	12,6 445	15,1 533	15,7 554	
	IFN Power. 182 kW	m <sup>3</sup> /min cfm	12,6 445	15,0 530		
Air intake restriction, clean filter(s)		kPa In wc	2,5 10,0			
Max allowable air intake restriction		kPa In wc	6,5 26,1			
Heat rejection to exhaust at:  EPA Tier 1	IFN Power. 195 kW	kW BTU/min	128 7279	151 8587	161 9156	170 9668
	IFN Power. 188 kW	kW BTU/min	128 7279	150 8530	158 8985	
	IFN Power. 182 kW	kW BTU/min	128 7279	147 8360		
Exhaust gas temperature after turbine at:	IFN Power. 195 kW	°C °F	490 914	475 887	480 896	485 905
	IFN Power. 188 kW	°C °F	490 914	475 887	480 896	
	IFN Power. 182 kW	°C °F	490 914	475 887		
Max allowable back pressure in exhaust line		kPa In wc	7,5 30,1			
Exhaust gas flow at:	IFN Power. 195 kW	m <sup>3</sup> /min cfm	33,9 1197	40,9 1444	42,8 1511	44,6 1575
	IFN Power. 188 kW	m <sup>3</sup> /min cfm	33,9 1197	40,6 1434	42,4 1497	
	IFN Power. 182 kW	m <sup>3</sup> /min cfm	33,9 1197	40,6 1434		
Exhaust gas smoke	IFN Power. 195 kW	Bosch Units	0,7	0,7	0,7	0,7
	IFN Power. 188 kW		0,7	0,7	0,7	
	IFN Power. 182 kW		0,7	0,7		

# Technical data TAD721VE

Cooling system		r/min	1800	2100	2200	2300
Heat rejection radiation from engine at:  EU Stage 2	IFN Power. 195 kW	kW	17	18	18	19
		BTU/min	967	1024	1024	1081
	IFN Power. 188 kW	kW	17	18	18	
		BTU/min	967	1024	1024	
	IFN Power. 182 kW	kW	17	18		
		BTU/min	967	1024		
Heat rejection to coolant at:  EU Stage 2	IFN Power. 195 kW	kW				97,5
		BTU/min				5545
	IFN Power. 188 kW	kW			91,2	
		BTU/min		5186		
	IFN Power. 182 kW	kW		86,8		
		BTU/min		4936		
Recommended coolant		Volvo coolant together with clean fresh water				
Coolant capacity:	engine	liter	10			
		US gal	3			
Coolant pump						
	a) fan mounted on sep. bracket	drive/ratio	1.36:1			
	b) fan mounted on coolant pump, crankshaft	drive/ratio	1.22:1			
Coolant flow						
	a) fan mounted on sep. bracket	l/s	2,6	3,0	3,2	3,3
		cu ft/min	5,5	6,4	6,7	7,0
	b) fan mounted on coolant pump, crankshaft	l/s	2,5	2,9	3,1	3,2
		cu ft/min	5,3	6,2	6,5	6,8
Maximum radiator restriction		kPa	14,0	18,0	20,0	21,0
		psi	2,0	2,6	2,9	3,0
Thermostat:	start to open	°C	87			
		°F	189			
	fully open	°C	102			
		°F	216			
Maximum static pressure head		kPa	100			
		psi	14,5			
Maximum pressure cap setting		kPa	90			
		psi	13,1			
Maximum top tank temperature (IFN / ICFN)		°C	110 / 105			
		°F	230 / 221			
Max. Permissible cooling down of engine coolant by radiator		°C	8			
		°F	46			
Shutdown switch setting (IFN / ICFN)		°C	113			
		°F	235			
Recommended drawdown capacity		10% of total cooling system capacity				
Max presssure drop over watercooler*		kPa	15,0	18,0	20,0	21,0
		psi	2,2	2,6	2,9	3,0

\* Resistance over cooling system may not be higher than 1,5 of the watercooler resistance.

# Technical data TAD721VE

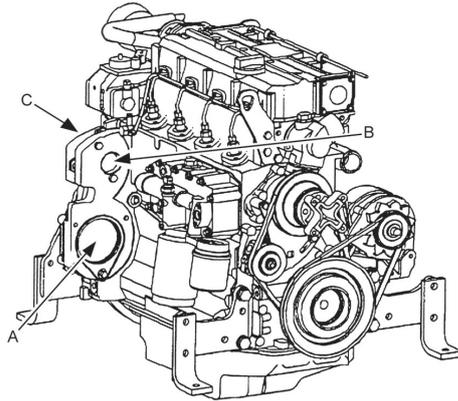
Intercooler system		r/min	1800	2100	2200	2300
Cooling power required EU Stage 2	IFN Power. 174 kW	kW BTU/min				45,0 2559
	IFN Power. 169 kW	kW BTU/min			41,6 2366	
	IFN Power. 162 kW	kW BTU/min		38,1 2167		
Combustion air mass flow EU Stage 2	IFN Power. 174 kW	kg/s				0,34
	IFN Power. 169 kW	kg/s			0,32	
	IFN Power. 162 kW	kg/s		0,31		
Combustion air entrance temp. EU Stage 2	IFN Power. 174 kW	°C °F				180 356
	IFN Power. 169 kW	°C °F			176 349	
	IFN Power. 162 kW	°C °F		172 342		
Combustion air outlet temp. EU Stage 2	IFN Power. 174 kW	°C °F				50 122
	IFN Power. 169 kW	°C °F			50 122	
	IFN Power. 162 kW	°C °F		50 122		
Maximum pressure drop over intercooler		kPa psi	10 1,5			
Boost pressure		kPa psi	155 22,5			

## Electrical system

Voltage and type			24V / 1 pole system
Alternator:	make		Iskra
	output	Amp	55
	tacho output	Hz/alternator rev.	6
	drive ratio		3.26:1
Starter motor:	make		Melco
	type		Pre engaged drive
	output	kW	5,5
Starter motor solenoid:	pull current	Amp	2 (Pre-relay )
	hold current	Amp	2 (Pre-relay )
Number of teeth on:	flywheel		129
	starter motor		12
Inrush current at +20°C		Amp	1000
Cranking current at +20°C		Amp	400
Crank engine speed at +20°C		rpm	200
Starter motor battery capacity	max	Ah	2 x 180
	min at +5°C	Ah	2 x 110
Inlet manifold heater (at 20 V)		kW	3
Power relay for the manifold heater		Amp	0,8

# Technical data TAD721VE

## Transmission positions



Parameters		A	B	C
Gear ratio		1.116:1	1.297:1	1.297:1
Direction of rotation when facing the engine		anti-clockwise		clockwise
PTO connection				
Max. output	kW	50	20	20
	hp	68	27	27
Max Torque	Nm	187,5	64,5	64,5
	lbf ft	138,3	47,6	47,6

### Note:

Maximum output valid only for single drive.

The output indicated are valid for n = 2300 rpm.

In case of other drives engaged, the following applies:

Parameters		B+C	A+B+C	A without B+C
Max output	kW	20	50	
	hp	27	68	
Max Torque	Nm	64,5	187,5	
	lbf ft	47,6	138,3	
Bosch flange and serrated shaft	kW			30
DIN 5482 - B 17 x 14	hp			41
SAE - 9 T 16/32 DP	kW			30
	hp			41
SAE - 13 T 16/32 DP	kW			50
	hp			68
Bosch flange and cone	kW			20
	hp			27