

# Technical data TAD733GE

With mounted radiator

## General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel. Turbocharged, charge air cooled (CAC)

Number of cylinders			6
Displacement, total		litre	7,15
		in <sup>3</sup>	436,3
Firing order			1-5-3-6-2-4
Bore		mm	108
		in	4,25
Stroke		mm	130
		in	5,12
Compression ratio			18:1
Dry weight	Engine only	kg	710
	Engine and cooling package	lb	1565
Wet weight	Engine only	kg	900
	Engine and cooling package	lb	1984
Wet weight	Engine only	kg	751
	Engine and cooling package	lb	1656
Wet weight	Engine only	kg	968
	Engine and cooling package	lb	2134

Performance		r/min	1500	1800
Standby Power	without fan	kW	201	224,9
		hp	273	306
	with fan	kW	194	213
		hp	264	289
Prime Power	without fan	kW	181	202
		hp	246	275
	with fan	kW	174	190
		hp	236	258
Torque at rated speed:	Standby Power	Nm	1280	1193
		lbft	944	880
	Prime Power	Nm	1152	1074
		lbft	849	792
Mean piston speed		m/s	6,5	7,8
		ft/sec	21,4	25,7
Effective mean pressure at:	Standby Power	MPa	2,2	2,1
		psi	326	304
Effective mean pressure at:	Prime Power	MPa	2,0	1,9
		psi	294	274
Max combustion pressure at:	Standby Power	MPa	14,9	19,1
		psi	2161	2770
Max combustion pressure at:	Prime Power	MPa	14	15,1
		psi	2031	2190
Total mass moment of inertia, J (mR <sup>2</sup> )		kgm <sup>2</sup>	3,09	
(with flywheel 2,612 kgm <sup>2</sup> )		lbft <sup>2</sup>	73,2	
Degree of irregularity at:	Standby Power		1:37	1:48
	Prime Power		1:41	1:52
Residual speed droop at load increase from 0 to 100%		%	adjustable	
Friction Power		kW	8,5	12,3
		hp	11,6	16,7

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## Engine noise emission

Test Standards: ISO 3744-1981 (E)

sound power (without fan, intake and exhaust noise)

Tolerans  $\pm 0.75$  dB(A)

		r/min	1500	1800
Measured sound power Lw	No load	dB(A)	103	104
	Standby Power	dB(A)	106	109
	Prime Power	dB(A)	106	108
Calculated sound pressure Lp at 1 m	No load	dB(A)	90	91
	Standby Power	dB(A)	93	95
	Prime Power	dB(A)	92	95

## Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

		r/min	1500	1800
Standby Power	dB(A)	117	118	
Prime Power	dB(A)	116	117	

## Load acceptance

Test condition: Warm engine. Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

### Single step load performance at 1500 rpm

Load (%)	Speed diff (%)		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby		Prime	Standby	Prime	Standby
0-40	6,0	6,3	1,8	2,0	40-100	11,2	13,1	4,5	9,9
0-50	7,2	8,2	2,1	2,9	50-100	8,5	9,6	3,8	7,8
0-60	8,7	10,2	3,0	4,3	60-100	6,8	7,8	3,5	5,0
0-75	13,7	17,5	3,8	4,5	75-100	4,0	4,6	3,2	3,6
0-51	7,0		2,8		0-46		7,0		2,8
0-100									
100-0									

### Single step load performance at 1800 rpm

Load (%)	Speed diff %		Recovery time (s)		Remaining load (%)	Speed diff (%)		Recovery time (s)	
	Prime	Standby	Prime	Standby		Prime	Standby	Prime	Standby
0-40	3,8	4,1	1,2	1,4	40-100	5,4	6,7	2,1	7,0
0-50	4,5	5,1	1,6	1,7	50-100	4,8	5,8	1,9	6,8
0-60	5,6	6,2	1,8	2,2	60-100	3,6	4,4	1,8	4,1
0-75	7,3	7,5	2,1	2,5	75-100	2,4	3,5	1,7	3,6
0-73	7,0		1,9		0-66		7,0		1,9
0-100	14,3	18,3	3,5	9,1					
100-0	5,8	5,8	2,0	2,0					

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#### Cold start performance\*

	r/min	1500	1800
Without cold start aid (heater flange)	°C	-15	-15
With cold start aid (heater flange)	°C	-30	-30

\*see handbook

#### Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating.  
For applications above 1000 m an ECU with automatic derating must be used.

Altitude derating factor < 3000 m	% / m	4% / 500m
Altitude derating factor > 3000 m		6% / 500m
Ambient temperature derating factor	% / °C	2% / 5°C
Humidity	%	No derating

#### Lubrication system

		r/min	1500	1800
Lubricating oil consumption	Standby Power	liter/h	0,09	0,11
		US gal/h	0,024	0,029
	Prime Power	liter/h	0,08	0,09
		US gal/h	0,021	0,024
Oil system capacity including filters		liter	34	
		US gal	8,9	
Oil sump capacity:	max	liter	31	
		US gal	8,1	
	min	liter	24	
		US gal	6,2	
Oil change intervals/specifications:				
Closed crankcase ventilation	ACEA: E4. API: CH-4, CI-4* full synthetic	h	500	
Open crankcase ventilation	VDS-2. ACEA: E3, E5. API: CG-4, CH-4*	h	500	
Open crankcase ventilation	VDS. ACEA: E2. API: CF, CF-4*	h	250	
Engine angularity limits:	front up	°	10	
	front down	°	10	
	side tilt	°	10	
Oil pressure at rated speed		kPa	480	520
		psi	70	75
Oil pressure shut down switch setting		kPa	200	
		psi	29	
Lubrication oil temperature:	max	°C	110	
		°F	230	
Oil filter micron size		mm	0,012	

\* See also general section in the sales guide

#### Fuel system

		r/min	1500	1800	
Standby Power Specific fuel consumption at:	25%	g/kWh	228	238	
		lb/hph	0,370	0,386	
		g/kWh	216	221	
		lb/hph	0,350	0,359	
	75%	g/kWh	215	220	
		lb/hph	0,348	0,357	
		g/kWh	219	228	
		lb/hph	0,355	0,369	
	Prime Power Specific fuel consumption at:	25%	g/kWh	228	245
			lb/hph	0,369	0,397
			g/kWh	217	222
			lb/hph	0,352	0,361
75%	g/kWh	214	220		
	lb/hph	0,347	0,357		
	g/kWh	216	222		
	lb/hph	0,351	0,361		
Recommended fuel to conform to		ASTM-D975-No1 and 2-D JIS KK 2204, EN 590			
Total fuel flow		liter/h	360	450	
		US gal/h	95	119	
Feed pump max suction head		m	1,5		
		foot	4,9		
Feed pump pressure		kPa	500		
		psi	72,5		
Fuel filter micron size		mm	0,005		
Prefilter / Water separator micron size		mm	0,063		
Governor type/make, standard		Heinzmann / EDC 4			
Injection pump type/make		PFW 1 P100 52007 / Bosch			
Injection timing	std.	°B.T.D.C	2,5		

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#### Intake and exhaust system

		r/min	1500	1800	
Air consumption at:	Standby Power	27°C 81°F	m <sup>3</sup> /min cfm	12,43 439	15,76 557
	Prime Power	27°C 81°F	m <sup>3</sup> /min cfm	11,5 406	14,2 501
Air intake restriction, clean filter(s)			kPa in wc	1,5 6,0	1,5 6,0
Max allowable air intake restriction			kPa in wc	3,5 14,1	3,5 14,1
Air filter type			Single stage paper cartridge		
Air filter cleaning efficiency			%		≥ 99,9
Heat rejection to exhaust at:	Standby Power		kW BTU/min	165 9383	202 11488
	Prime Power		kW BTU/min	142 8075	168 9554
Exhaust gas temperature after turbine at:	Standby Power		°C °F	530 986	530 986
	Prime Power		°C °F	510 950	509 948
Max allowable back pressure in exhaust line	Standby Power		kPa In wc	3 12,0	3 12,0
		Prime Power	kPa In wc	3 12,0	3 12,0
	Continuous Power	kPa In wc	5 20,1	7 28,1	
Exhaust gas flow at:	Standby Power		m <sup>3</sup> /min cfm	37,2 1314	44,4 1569
	Prime Power		m <sup>3</sup> /min cfm	31,8 1123	40,4 1428
Max allowable comb. air temp after CAC			°C °F	50 122	50 122
Max allowable pressure drop over CAC			kPa	15	15
Heat rejection to CAC	Standby Power		kW BTU/min	42 2388	50,9 2895
	Prime Power		kW BTU/min	37,8 2150	45,8 2605

#### Cooling system

		r/min	1500	1800	
Heat rejection radiation from engine at:	Standby Power		kW BTU/min	20 1137	23 1308
	Prime Power		kW BTU/min	19 1081	22 1223
Heat rejection to coolant at:	Standby Power		kW BTU/min	96,1 5465	109,8 6244
	Prime Power		kW BTU/min	86,5 4919	98,6 5607
Recommended coolant		Volvo coolant or Volvo anticorrosion additive together with clean fresh water			
Radiator cooling system type		Closed circuit			
Radiator core area (std. size)		m <sup>2</sup> foot <sup>2</sup>	0,65 7,00		
Radiator core thickness (std. size)		mm in	55 2,17		

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Cooling system		r/min	1500	1800
Intercooler core area (std. size)		m <sup>2</sup>	0,414	
		foot <sup>2</sup>	4,46	
Intercooler core thickness (std. size)		mm	50	
		in	1,97	
Fan diameter		mm	870	
		in	34,25	
Fan power consumption		kW	7,2	12,4
		hp	10	17
Fan drive ratio			1 : 0,8	
Coolant capacity,		engine	liter	9,8
			US gal	2,59
std radiator with hoses			liter	28,6
			US gal	7,56
Coolant pump		drive/ratio	1 : 1,73	
Coolant flow with standard system		l/s	3,0	3,6
		US gal/s	0,79	0,95
Maximum external coolant system restriction, including piping		kPa	25	35
		in wc	100	141
Thermostat,		start to open	°C	87
			°F	189
fully open		°C	102	
		°F	216	
Maximum static pressure head		kPa	100	
		in wc	402	
Pressure cap setting on standard radiator		kPa	90	
		in wc	361	
Maximum top tank temperature		°C	105	
		°F	221	
Max. permissible cooling down of engine coolant by radiator		°C	8	
		°F	46	
Shutdown switch setting		°C	113	
		°F	235	
Recommended draw down capacity			10% of total cooling system capacity	

### Cooling performance

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 105°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment)

Engine speed rpm	Air on temp °C	STANDBY POWER (LTP)		PRIME POWER (PRP)	
		Air flow m <sup>3</sup> /s	External restriction Pa	Air flow m <sup>3</sup> /s	External restriction Pa
1500	61	3,9	0		
	55	3,3	150		
	53	3,1	200		
	48	2,7	300		
	41	2,4	400		
	64			3,9	0
	59			3,3	150
	57			3,1	200
	52			2,7	300
	46			2,4	400
1800	63	4,9	0		
	59	4,3	150		
	58	4,1	200		
	54	3,7	300		
	51	3,4	400		
	66			4,9	0
	62			4,3	150
	61			4,1	200
	58			3,7	300
	55			3,4	400

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Electrical system		r/min	1500	1800
Voltage and type		24V / 1 polesystem		
Alternator:	make/output	Amp	Iskra / 55	
	tacho output	Hz/alt. Rev	6	
	drive ratio		1:4,07	
Starter motor	make		Melco	
	type		M008T62471	
	kW		5,0	
Starter motor solenoid,	pull current	Amp	2	
	hold current	Amp	2	
Number of teeth on:	flywheel		129	
	cam gear		96	
	starter motor		10	
Inrush current at +20°C		Amp	1200	
Cranking current at +20°C		Amp	400	
Crank engine speed at 20°C		rpm	150	
Starter motor battery capacity:	max	Ah	135	
	min at +5°C	Ah	110	
Inlet manifold heater (at 12 V / 24 V)		kW	2 / 3,6	
Power relay for the manifold heater (at 12 V / 24 V)		Amp	150 / 120	