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General

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

Number of cylinders		6
Displacement, total	liters	7,15
	in^3	436
Firing order		1-5-3-6-2-4
Bore	mm	108
	in	4,25
Stroke	mm	130
	in	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. 174 kW	without fan	kW	154	168	172	174
		hp	209	228	234	237
ICFN Power. 157 kW	without fan	kW	139	151	155	157
		hp	189	205	211	214
IFN Power. 169 kW	without fan	kW	154	167	169	
		hp	209	227	230	
ICFN Power. 152 kW	without fan	kW	139	150	152	
		hp	189	204	207	
IFN Power. 162 kW	without fan	kW	154	162		
		hp	209	220		
ICFN Power. 146 kW	without fan	kW	139	146		
		hp	189	199		
Torque at:	IFN Power. 174 kW	Nm	817	764	747	722
		lbf ft	603	563	551	533
	ICFN Power. 157 kW	Nm	737	687	673	652
		lbf ft	544	506	496	481
	IFN Power. 169 kW	Nm	817	759	734	
		lbf ft	603	560	541	
	ICFN Power. 152 kW	Nm	737	682	660	
		lbf ft	544	503	487	
	IFN Power. 162 kW	Nm	817	737		
		lbf ft	603	543		
	ICFN Power. 146 kW	Nm	737	664		
		lbft	544	490		
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 174 kW / 2300 rpm		Mpa	1,44	1,34	1,31	1.27
		psi	209	194	190	
Max combustion pressure at IFN Power 174 kW / 2300 rpm		MPa				
		psi				
Total mass moment of inertia, J (mR^2) (w/o flyweel)		kgm^2	0,474			
		$lbft^2$	11,2			
Degree of irregularity at:	IFN Power. 174 kW					
	IFN Power. 169 kW					
	IFN Power. 162 kW					

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Residual speed droop (mechanical governor) at load increase from 0-100% at:	IFN Power. 174 kW	%				5-7
	IFN Power. 169 kW	%			5-7	
	IFN Power. 162 kW	%		5-7		
Residual speed droop (electronic governor) at load increase from 0-100% at:	IFN Power. 174 kW	%				5, adjust./ isocron.
	IFN Power. 169 kW	%			5, adjust./ isocron.	
	IFN Power. 162 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 sensor 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. 174 kW		liter/h US gal/h				0,14 0,037
	IFN Power. 169 kW		liter/h US gal/h			0,13 0,034	
	IFN Power. 162 kW		liter/h US gal/h		0,12 0,032		
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 max 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 °F	80 176			
		max	°C °F	125 257			
Oil filter micron size			mm	0,012			

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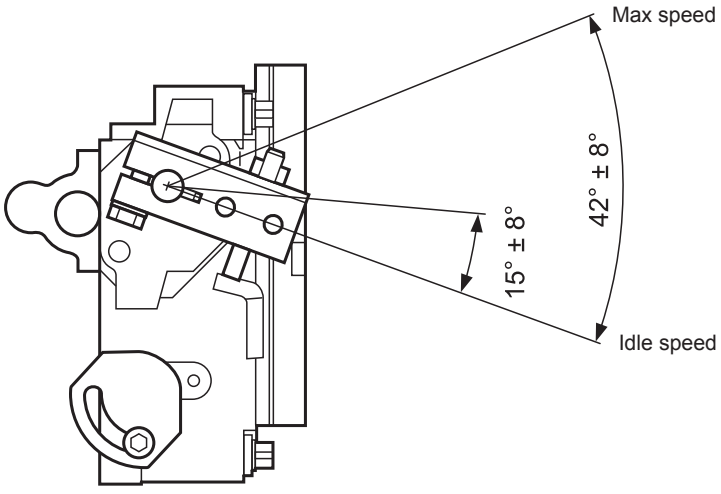
Fuel system			**r/min**	**1800**	**2100**	**2200**	**2300**
IFN Power. 174 kW	EPA Tier 1	25%	g/kWh	255	280	290	300
Specific fuel consumption at:			lb/hph	0,413	0,454	0,470	0,486
	EPA Tier 1	50%	g/kWh	210	219	224	230
			lb/hph	0,340	0,355	0,363	0,373
	EPA Tier 1	75%	g/kWh	201	209	213	218
			lb/hph	0,326	0,339	0,345	0,353
	EPA Tier 1	100%	g/kWh	200	207	211	216
			lb/hph	0,324	0,336	0,342	0,350
	EU Stage 2	100%	g/kWh	213	223	227	230
			lb/hph	0,345	0,361	0,368	0,373
IFN Power. 169 kW	EPA Tier 1	25%	g/kWh	255	280	295	
Specific fuel consumption at:			lb/hph	0,413	0,454	0,478	
	EPA Tier 1	50%	g/kWh	210	220	224	
			lb/hph	0,340	0,357	0,363	
	EPA Tier 1	75%	g/kWh	201	209	213	
			lb/hph	0,326	0,339	0,345	
	EPA Tier 1	100%	g/kWh	200	207	211	
			lb/hph	0,324	0,336	0,342	
	EU Stage 2	100%	g/kWh	213	222	225	
			lb/hph	0,345	0,360	0,365	
IFN Power. 162 kW	EPA Tier 1	25%	g/kWh	255	285		
Specific fuel consumption at:			lb/hph	0,413	0,462		
	EPA Tier 1	50%	g/kWh	210	221		
			lb/hph	0,340	0,358		
	EPA Tier 1	75%	g/kWh	201	209		
			lb/hph	0,326	0,339		
	EPA Tier 1	100%	g/kWh	200	207		
			lb/hph	0,324	0,336		
	EU Stage 2	100%	g/kWh	213	220		
			lb/hph	0,345	0,357		
Recommended fuel to conform to				ASTM-D975-No1 and 2-D JIS KK 2204, EN 590			
Total fuel flow			liter/h				600
			US gal/h				159
Feed pump pressure			kPa	500			
			psi	72,5			
Feed pump max suction head			m	1,5			
			foot	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 trottle shaft angular travel: Max speed, mech.gov.			degrees	33 0/+20			
Injection pump trottle shaft angular travel: Idle speed, mech.gov.			degrees	20 0/+10			



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Intake and exhaust system		**r/min**	**1800**	**2100**	**2200**	**2300**
Air consumption at:	IFN Power. 174 kW	m³/min	12,6	14,7	15,3	15,9
		cfm	445	519	540	562
	IFN Power. 169 kW	m³/min	12,6	14,7	15,3	
		cfm	445	519	540	
	IFN Power. 162 kW	m³/min	12,6	14,7		
		cfm	445	519		
Air intake restriction, clean filter(s)		kPa	2,5			
		In wc	10,0			
Max allowable air intake restriction		kPa	6,5			
		In wc	26,1			
Heat rejection to exhaust at:	IFN Power. 174 kW	kW	110	129	138	144
		BTU/min	6256	7336	7848	8189
EPA Tier 1	IFN Power. 169 kW	kW	110	128	135	
		BTU/min	6256	7279	7677	
	IFN Power. 162 kW	kW	110	124		
		BTU/min	6256	7052		
Exhaust gas temperature after turbine at:	IFN Power. 174 kW	°C	420	420	425	430
		°F	788	788	797	806
	IFN Power. 169 kW	°C	420	420	425	
		°F	788	788	797	
	IFN Power. 162 kW	°C	420	420		
		°F	788	788		
Max allowable back pressure in exhaust line		kPa	7,5			
		In wc	30,1			
Exhaust gas flow at:	IFN Power. 174 kW	m³/min	34,2	40,9	42,4	43,5
		cfm	1208	1444	1497	1536
	IFN Power. 169 kW	m³/min	34,2	40,6	42,0	
		cfm	1208	1434	1483	
	IFN Power. 162 kW	m³/min	34,2	39,8		
		cfm	1208	1406		
Exhaust gas smoke	IFN Power. 174 kW	Bosch	0,7	0,7	0,7	0,7
	IFN Power. 169 kW	Units	0,7	0,7	0,7	
	IFN Power. 162 kW		0,7	0,7		

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Cooling system			**r/min**	**1800**	**2100**	**2200**	**2300**
Heat rejection radiation from engine at:		IFN Power. 174 kW	kW BTU/min	14 796	16 910	16 910	16 910
EPA Tier 1		IFN Power. 169 kW	kW BTU/min	14 796	15 853	16 910	
		IFN Power. 162 kW	kW BTU/min	14 796	15 853		
Heat rejection to coolant at:		IFN Power. 174 kW	kW BTU/min				90,3 5135
EU Stage 2		IFN Power. 169 kW	kW BTU/min			85,0 4834	
		IFN Power. 162 kW	kW BTU/min		80,7 4589		
Recommended coolant			Volvo coolant or Volvo anticorrosion additive together with clean fresh water				
Coolant capacity:	engine		liter US gal	10 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 cu ft/min	2,6 5,5	3,0 6,4	3,2 6,7	3,3 7,0
b) fan mounted on coolant pump, crankshaft			l/s cu ft/min	2,5 5,3	2,9 6,2	3,1 6,5	3,2 6,8
Maximum radiator restriction			kPa psi	14,0 2,0	18,0 2,6	20,0 2,9	21,0 3,0
Thermostat:		start to open	°C °F	87 189			
		fully open	°C °F	102 216			
Maximum static pressure head			kPa psi	100 14,5			
Maximum pressure cap setting			kPa psi	90 13,1			
Maximum top tank temperature (IFN / ICFN)			°C °F	110 / 105 230 / 221			
Max. Permissible cooling down of engine coolant by radiator			°C °F	8 46			
Shutdown switch setting (IFN / ICFN)			°C °F	113 235			
Recommended drawdown capacity			10% of total cooling system capacity				
Max pressssure drop over watercooler*			kPa psi	15,0 2,2	18,0 2,6	20,0 2,9	21,0 3,0

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

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Intercooler system		**r/min**	**1800**	**2100**	**2200**	**2300**
Cooling power required	IFN Power. 174 kW	kW BTU/min				38,5 2189
EU Stage 2	IFN Power. 169 kW	kW BTU/min			36,2 2059	
	IFN Power. 162 kW	kW BTU/min		32,6 1854		
Combustion air mass flow	IFN Power. 174 kW	kg/s				0,32
EU Stage 2	IFN Power. 169 kW	kg/s			0,30	
	IFN Power. 162 kW	kg/s		0,28		
Combustion air entrance temp.	IFN Power. 174 kW	°C °F				167 333
EU Stage 2	IFN Power. 169 kW	°C °F			166 331	
	IFN Power. 162 kW	°C °F		162 324		
Combustion air outlet temp.	IFN Power. 174 kW	°C °F				50 122
EU Stage 2	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 EU Stage 2		kPa psi	151 21,9			

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

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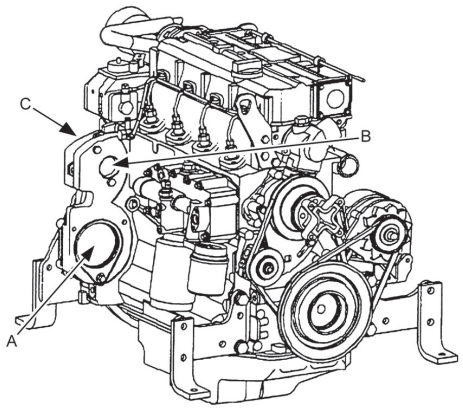
Power take off

Transmission positions



Parameters		A	B	C
Gear ratio		1.116:1	1.297:1	1.297:1
Direction of rotation when facing the engine PTO connection		anti-clockwise		clockwise
Max. output	kW hp	50 68	20 27	20 27
Max Torque	Nm lbf ft	187,5 138,3	64,5 47,6	64,5 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 hp	20 27	50 68	
Max Torque	Nm lbf ft	64,5 47,6	187,5 138,3	
Bosch flange and serrated shaft DIN 5482 - B 17 x 14	kW hp			30 41
SAE - 9 T 16/32 DP	kW hp			30 41
SAE - 13 T 16/32 DP	kW hp			50 68
Bosch flange and cone	kW hp			20 27