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

Performance			**r/min**	**1500**	**1800**	**2000**	**2100**
IFN Power	280 kW	without fan	kW hp	269 366	279 379	270 367	255 347
		with fan ratio 0,9 890 mm	kW hp	262 356	267 363	254 345	236 321
	280 kW	without fan	kW hp	269 366	279 379	270 367	255 347
		with fan ratio 0,9 750 mm	kW hp	265 360	272 370	260 354	243 330
		without fan	kW hp				
		with fan mm	kW hp				
		without fan	kW hp				
		with fan mm	kW hp				
Torque at:		IFN Power 280 kW	Nm lbf ft	1713 1263	1480 1092	1289 951	1160 855
			Nm lbf ft				
			Nm lbf ft				
			Nm lbf ft				
Mean piston speed			m/s ft/sec	6,9 22,6	8,3 27,2	9,2 30,2	9,7 31,7

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Performance		r/min	1500	1800	2000	2100
Effective mean pressure at:	IFN Power 280 kW	Mpa psi	2,30 333	1,99 288	1,73 251	1,56 226
		Mpa psi				
Max combustion pressure at:	IFN Power 280 kW	Mpa psi	18,5 2683	18,5 2683	18,4 2668	18 2610
		MPa psi				
Total mass moment of inertia , J Std fly wheel included		kgm² lbft²	2,6 61,6			
Degree of irregularity at:	IFN Power 280 kW		1:44	1:80	1:127	1:164
Residual speed droop at load increase from 0 to 100% at:	IFN Power 280 kW	%				
		%				
		%				
		%				
Friction Power		kW hp	28 38	39 53	48 65	51 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.

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 temperature

Altitude derating factor at rated power < 3000 m	% / m	See graph
Altitude derating factor at rated power > 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:	IFN Power 280 kW		liter/h US gal/h	0,068 0,0180			
			liter/h US gal/h				
			liter/h US gal/h				
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			

Fuel system		r/min	1500	1800	2000	2100
IFN Power 280 kW	25%	g/kWh	230	249	270	216
Specific fuel consumption at:		lb/hph	0,373	0,404	0,438	0,350
	50%	g/kWh	205	213	222	236
		lb/hph	0,332	0,345	0,360	0,383
	75%	g/kWh	195	201	212	219
		lb/hph	0,316	0,326	0,344	0,355
	100%	g/kWh	196	203	214	218
		lb/hph	0,318	0,329	0,347	0,353
	25%	g/kWh				
Specific fuel consumption at:		lb/hph				
	50%	g/kWh				
		lb/hph				
	75%	g/kWh				
		lb/hph				
	100%	g/kWh				
		lb/hph				
	25%	g/kWh				
Specific fuel consumption at:		lb/hph				
	50%	g/kWh				
		lb/hph				
	75%	g/kWh				
		lb/hph				
	100%	g/kWh				
		lb/hph				
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:	IFN Power 280 kW	kg/s	0,37	0,44	0,46	0,46
Air intake restriction, clean filter(s)		kPa In wc	2 8,0			
Max allowable air intake restriction		kPa In wc	5 20,1			
Heat rejection to exhaust at:	IFN Power 280 kW	kW BTU/min	198 11260	215 12227	215 12227	207 11772
		kW BTU/min				
		kW BTU/min				
Exhaust gas temperature after turbine at:	IFN Power 280 kW	°C °F	457 855	425 797	410 770	396 745
		°C °F				
		°C °F				
Max allowable back pressure in exhaust line		kPa In wc	10,0 40,2	13,0 52,2	15,0 60,2	15,0 60,2
Exhaust gas flow at:	IFN Power 280 kW	m³/min cfm	42,5 1501	47,2 1667	48 1695	46,8 1653
		m³/min cfm				
		m³/min cfm				
Exhaust gas smoke	IFN Power 280 kW	Bosch Units	0,12	0,26	0,34	0,44

Cooling system		r/min	1500	1800	2000	2100
Heat rejection radiation from engine at:	IFN Power 280 kW	kW	18	18	19,7	19,8
		BTU/min	1007	1001	1120	1126
		kW				
		BTU/min				
		kW				
		BTU/min				
Heat rejection to coolant at:	IFN Power 280 kW	kW	116	118	118	115
		BTU/min	6568	6682	6682	6540
		kW				
		BTU/min				
		kW				
		BTU/min				
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	177	185	186	181
at referens ambient conditions 25°C / 1000mbar		°F	351	365	367	358
Boost pressure		kPa	177	189	191	187
		In wc	710,7	758,8	766,9	750,8
Max allowable pressure drop (Turbo outlet to manifold)		kPa	15	15	15	15
		In wc	60,2	60,2	60,2	60,2
Heat rejection to CAC		kW	47	55	59	57
		BTU/min	2673	3128	3355	3242

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

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	
rpm	hp	°C	°F	kg/s	Pa	psi
2100	255	65	149	7,7	690	0,100
	347	55	131	5,7	1380	0,200
		45	113	4,5	1800	0,261
1800	279	65	149	7,9	160	0,023
	379	55	131	5,8	780	0,113
		45	113	4,5	1150	0,167

Cooling performance: m² radiator and fan

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 100°C TTT and 50% antifreeze

Engine speed	Engine power	Air on temp		Air flow		Max additional external restriction	
rpm	hp	°C	°F	m³	cu ft/s	Pa	psi

Cooling performance: m² radiator and fan

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 100°C TTT and 50% antifreeze

Engine speed	Engine power kW	Air on temp		Air flow		Max additional external restriction	
rpm	hp	°C	°F	m³	cu ft/s	Pa	psi

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

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

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	61	63	59	43
Direction of load viewed from flywheel side:		hp	83	86	80	58
	max down	kW	229	298	335	302
		hp	311	405	456	411
	max right	kW	38	61	62	53
		hp	52	83	84	72
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			