

General

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

Turbocharged

Number of cylinders			6
Displacement, total		litre	9,36
		in ³	571,4
Firing order			1-5-3-6-2-4
Bore		mm	120
		in	4,72
Stroke		mm	138
		in	5,43
Compression ratio			17,4
Dry weight	Engine only, excluding cooling system	kg	1015
		lb	2238
	GenPac	kg	1354
		lb	2985
Wet weight	Engine only, excluding cooling system	kg	1065
		lb	2348
	GenPac	kg	1404
		lb	3095

Performance**r/min 1500 1800**

			1500	1800
Standby Power	without fan	kW	323	344
		hp	439	468
	with fan	kW	310	323
		hp	422	439
Prime Power	without fan	kW	294	313
		hp	400	426
	with fan	kW	281	292
		hp	382	397
	without fan	kW		
		hp		
	with fan	kW		
		hp		
Torque at:	Standby Power	Nm	2056	1825
		lbft	1517	1346
	Prime Power	Nm	1872	1661
		lbft	1380	1225
Mean piston speed		m/s	6,9	8,3
		ft/sec	22,7	27,2
Effective mean pressure at:	Standby Power	MPa	2,8	2,4
		psi	400	355
Effective mean pressure at:	Prime Power	MPa	2,5	2,2
		psi	364	323
Max combustion pressure at:	Standby Power	MPa	19,1	19,1
		psi	2770	2770
Max combustion pressure at:	Prime Power	MPa	17,5	17,7
		psi	2538	2567
Total mass moment of inertia, J (mR ²)		kgm ²	2,60	
		lbft ²	61,7	
Degree of irregularity at:	Standby Power		1:40	1:70
Friction Power		kW	28	38
		hp	38,08	51,68

Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power (without fan, intake and exhaust noise)

Tolerans ± 0.75 dB(A)

		r/min	1500	1800
Measured sound power Lw	No load	dB(A)	111,1	112,8
	Standby Power	dB(A)	113,7	115,7
	Prime Power	dB(A)	113,5	115,5
Calculated sound pressure Lp at 1 m	No load	dB(A)		
	Standby Power	dB(A)		
	Prime Power	dB(A)		

Unsilenced exhaust noise

Data calculated as sound pressure Lp.

Assumed microphone distance 1 m

	r/min	1500	1800
Standby Power	dB(A)	114	118
Prime Power	dB(A)	114	117

Test conditions for load acceptance data

Warm engine.	Generator	Modell	Type of AVR
	Stamford	HCI444F	SX440 AVR

Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions. UFRO: STD-setting 47 / 57 Hz

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
0-20	NA	2,5	NA	1,5	20-100	NA	21,3	NA	4,3
0-40	NA	2,4	NA	1,0	40-100	NA	7,0	NA	1,5
0-53	NA	7,6	NA	2,2	53-100	NA	5,0	NA	2,4
0-57	NA	9,3	NA	2,4	57-100	NA	5,2	NA	2,4
0-60	NA	12,0	NA	2,3		NA	4,3	NA	2,3
0-x	10,0		NA		x-100	NA		NA	
0-x		10,0	NA		x-100	NA		NA	
100-0		3,0	NA	1,4		NA		NA	

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
0-20	NA	1,5	NA	2,8	20-100	NA	7,7	NA	5,2
0-40	NA	3,0	NA	2,2	40-100	NA	4,0	NA	3,5
0-60	NA	5,5	NA	3,2	60-100	NA	2,9	NA	2,3
0-68	NA	6,7	NA	2,1	68-100	NA	2,2	NA	2,1
0-83	NA	9,5	NA	2,8	83-100	NA	1,4	NA	1,6
0-x	10,0		NA		x-100	NA		NA	
0-x		10,0	NA		x-100	NA		NA	
100-0		5,4	NA	2,1		NA		NA	

Cold start performance

		r/min	1500	1800	
Time from start to no load speed at ambient temperature:	°C	15	s	5,0	5,0
		0	s	7,0	7,1
		-20*	s	8,0	8,0
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C	20	s	5,0	5,0
		5	s	7,0	7,1
		-15*	s	8,0	8,0

* With manifold heater 4 kW engaged, lubrication oil 15W/40 and block heater.

Usage of manifold heater:	Time preheating	Time postheating		
	25 sec	100 sec		
Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
Block mounted	Calix	1,5 kW		

Derating

The engine may be operated up to 1500m altitude without derating. For operations at higher altitudes the power will be derated according to graph in the diagram section. There is no derating for ambient temperature or humidity.

Lubrication system

		r/min	1500	1800
Lubricating oil consumption	Standby Power	liter/h	0,04	0,04
		US gal/h	0,010	0,011
	Prime Power	liter/h	0,04	0,04
		US gal/h	0,009	0,010
Oil system capacity including filters		liter	40	
		US gal	10,6	
Oil sump capacity:	max	liter	35	
		US gal	9,2	
	min	liter	28	
		US gal	7,4	
Oil change intervals/specifications:	VDS-2*	h	600	
	VDS, ACEA, E3*	h	400	
	ACEA E2, API CD, 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	350 - 600	
		psi	51 - 87	
Lubrication oil temperature in oil sump:	max	°C	125	
		°F	257	
Oil filter micron size		mm	0,040	

* See also general section in the sales guide

Fuel system		r/min	1500	1800
Standby Power Specific fuel consumption at:	25%	g/kWh lb/hph	226 0,366	238 0,386
	50%	g/kWh lb/hph	205 0,332	210 0,340
	75%	g/kWh lb/hph	200 0,324	203 0,329
	100%	g/kWh lb/hph	204 0,331	207 0,336
Prime Power Specific fuel consumption at:	25%	g/kWh lb/hph	230 0,373	242 0,392
	50%	g/kWh lb/hph	208 0,337	214 0,347
	75%	g/kWh lb/hph	200 0,324	204 0,331
	100%	g/kWh lb/hph	202 0,327	205 0,332

Fuel system	r/min	1500	1800
Fuel to conform to	ASTM-D975-No1 and 2-D JIS KK 2204, EN 590		
System return flow	liter/h	36	
	US gal/h	9,5	
System supply flow at rated speed	liter/h	108,0	
	US gal/h	28,5	
Fuel supply line max restriction	kPa	10,0	
	psi	1,5	
Fuel supply line max pressure, engine stopped	kPa	0,0	
	psi		
Fuel return line max restriction	kPa	20,0	
	psi	2,9	
Maximum allowable inlet fuel temp	°C	50	
	°F	122	
Prefilter / Water separator	mm	0,005	
Governor type/make, standard	Electronic / EMS2		
Injection pump type/make	Unit injector / Delphi		

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02**Intake and exhaust system**

		r/min	1500	1800
Air consumption at:	Standby Power	m ³ /min cfm	19,6 692	23,8 840
	Prime Power	m ³ /min cfm	17,7 625	22 777
Air intake restriction, clean filter(s)		kPa in wc	2 8,0	2 8,0
Max allowable air intake restriction		kPa in wc	5 20,1	5 20,1
Air filter type		Single stage paper cartridge		
Air filter cleaning efficiency		%	99,85	
Heat rejection to exhaust at:	Standby Power	kW BTU/min	239 13592	260 14786
	Prime Power	kW BTU/min	224 12739	230 13080
Exhaust gas temperature after turbine at:	Standby Power	°C °F	539 1002	494 921
	Prime Power	°C °F	519 966	467 873
Max allowable back pressure in exhaust line		kPa In wc	10 40,2	10 40,2
Exhaust gas flow at:	Standby Power	m ³ /min cfm	52,2 1843	59,2 2091
	Prime Power	m ³ /min cfm	46,5 1642	53,1 1875

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02**Cooling system**

		r/min	1500	1800
Heat rejection radiation from engine at:	Standby Power	kW	10	13
		BTU/min	569	739
	Prime Power	kW	9	12
		BTU/min	512	682
Heat rejection to coolant at:	Standby Power	kW	137	141
		BTU/min	7791	8019
	Prime Power	kW	129	132
		BTU/min	7336	7507
Radiator cooling system type		Closed circuit		
Standard radiator core area		m ²	0,8	
		foot ²	8,61	
Standard radiator core thickness		mm	52	
		in	2,05	
Fan diameter		mm	890	
		in	35,04	
Fan power consumption		kW	13	21
		hp	18	29
Fan drive ratio			1:1,08	
Coolant capacity,	engine	liter	17	
		US gal	4,49	
	std radiator with hoses	liter	24	
		US gal	6,34	
Coolant pump		drive/ratio	belt/1,50:1	
Coolant flow with standard system		l/s	5,5	6,5
		US gal/s	1,45	1,72
Minimum coolant flow		l/s	5,3	6,2
		US gal/s	1,40	1,64
Maximum external coolant system restriction, including piping		kPa	50	55
		in wc	201	221
Thermostat	start to open	°C	82	
		°F	180	
	fully open	°C	92	
		°F	198	
Maximum static pressure head (expansion tank height + pressure cap setting)		kPa	100	
		in wc	402	
Minimum static pressure head (expansion tank height + pressure cap setting)		kPa	70	
		in wc	281	
Standard pressure cap setting		kPa	70	
		in wc	281	
Maximum top tank temperature		°C	103	
		°F	217	
Minimum temperature entering engine		°C	68	
		°F	154	
Draw down capacity		10% of total cooling system capacity		

Intercooler system		r/min	1500	1800	
Cooling power	Standby Power	kW	62	77	
		BTU/min	3526	4379	
	Prime Power	kW	53	68	
		BTU/min	3014	3867	
		kW BTU/min			
Combustion air mass flow	Standby Power	kg/s	0,39	0,47	
	Prime Power	kg/s	0,36	0,45	
		kg/s			
Combustion air inlet temp.	Standby Power	°C	208	215	
		°F	406	419	
	Prime Power	°C	194	199	
		°F	381	390	
			°C		
			°F		
Combustion air outlet temp.	Standby Power	°C	57	58	
		°F	135	136	
	Prime Power	°C	54	55	
		°F	129	131	
			°C		
			°F		
Maximum pressure droop over intercooler, incl. piping		kPa	5		
		psi	0,73		
Boost pressure		kPa	250		
		psi	36,26		
Standard intercooler core area		m ²	0,89		
		foot ²	9,58		
Standard intercooler core thickness		mm	68		
		in	2,68		

Cooling performance Fan ratio 1:1,08

Cooling air flow and external restriction at different radiator air temperatures based on 103°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment)

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow kg/s	External restriction Pa	Air flow kg/s	External restriction Pa
1500	30	4,0	1410	4,3	1300
	40	4,5	1230	4,9	1090
	50	5,3	930	5,9	730
	55	5,9	710	6,5	460
	60	6,6	410	7,3	110
	61	-	-	7,6	0
	65	7,6	0		
1800	30	4,5	2140	4,9	2010
	40	5,1	1920	5,5	1750
	50	5,9	1560	6,5	1320
	55	6,5	1300	7,2	1010
	60	7,3	950	8,1	590
	65	-	-	9,3	0
	68	9,3	0		

Cooling performance Fan ratio 1:1,01

Cooling air flow and external restriction at different radiator air temperatures based on 103°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment)

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow kg/s	External restriction Pa	Air flow kg/s	External restriction Pa
1500	30	3,8	1180	4,2	1070
	40	4,4	1000	4,8	870
	50	5,2	720	5,7	510
	55	5,7	500	6,4	250
	59	-	-	7,0	0
	60	6,5	210		
	63	7,0	0		
1800	30	4,3	1800	4,7	1680
	40	4,9	1590	5,4	1420
	50	5,8	1240	6,4	1010
	55	6,4	990	7,1	710
	60	7,2	640	8,0	300
	63	-	-	8,6	0
	66	8,6	0		

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous/droop Switchable during operation	Isochronous
Governor droop	0 - 8%	0 % (4 % when switched)
Governor response	NA	NA
Dual speed	1500 / 1800 rpm	According to customer
Idle speed	600 - 1200 rpm	900 rpm
Fine speed adjustment	NA	±120 rpm
Stop function	Energized to run / stop	Energized to stop
Preheating function	On ignition / Preheat on request	Preheat on request
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. ON/OFF
Oil pressure	Low idle	kPa	NA	130	Shut down. ON/OFF
	1500 rpm	kPa	NA	220	Shut down. ON/OFF
	1800 rpm	kPa	NA	270	Shut down. ON/OFF
Oil level		NA	Low level	NA	NA
Piston cooling pressure >1000 rpm	kPa	NA	NA	NA	NA
Coolant temp	°C	95 - 103	98	Setting +5	Shut down. ON/OFF
Coolant level		NA	Low level	Low level	Shut down. ON/OFF
Fuel feed pressure	Low idle	kPa	NA	NA	NA
	>1400 rpm		NA	300	NA
Water in fuel		NA	Water in fuel	NA	NA
Crank case pressure	kPa	NA	Increased pressure	Increased pressure	Shut down. ON/OFF
Air filter pressure droop	kPa	NA	NA	NA	NA
Altitude, above sea	m	NA		>1500	Automatic derating, see section derating
Charge air temp	°C	NA	87	+5	Shut down. ON/OFF
Charge air pressure	kPa	NA	380	380	Shut down. ON/OFF
Engine speed	rpm	100 - 120% of rated speed	120% of rated speed	Alarm level	Shut down. OFF/ON

Derating NB! If applicable, describe derating according to the engine control system's functionality.

Electrical system**r/min 1500 1800**

Voltage and type		24V / insulated from earth	
Alternator:	make/output	Amp	Bosch/80
	tacho output	Hz/alt. Rev	6
	drive ratio		4,5
Starter motor	make	Melco	
	type	90P55	
	kW	5,5	
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	140
Starter motor battery capacity:	max	Ah	2x225 700A DIN
	min at +5°C	Ah	2x170 600A DIN
Inlet manifold heater (at 20 V)		kW	4,0
Power relay for the manifold heater		Amp	1

Power take off**r/min 1500 1800**

Front end in line with crank shaft max:		Nm lbft	TVC necessary	
Front end belt pulley load. Direction of load viewed from flywheel side:	max left	kW hp	53 72	54 73
	max down	kW hp	248 337	316 430
	max right	kW hp	43 58	69 94
Timing gear at compressor PTO max:		Nm lbft	150 111	
Speed ratio direction of rotation viewed from flywheel side		1,29:1/clockwise		
Timing gear at servo pump PTO max:		Nm lbft		
Speed ratio direction of rotation viewed from flywheel side		1,58:1/clockwise		
Timing gear at hydraulic pump PTO max:		Nm lbft		
Speed ratio direction of rotation viewed from flywheel side				
Max allowed bending torque in flywheel housing		Nm lbft	7000 5163	
Max. rear main bearing load (0,1 m from center of bearing) Direction down		N lbf	3000 674,4	