

Name 12V1600G20F Speed [rpm] 1500 **Application Group** 3B Nominal power [kW] 576 Dataset Ref. 25°C/-Nominal power [bhp] 772 Frequency [Hz] 50

Exhaust Regulations Fuel-consumption optimized; NEA Singapore for ORDE;

Reference conditions

No.	Description	Index	Value	Unit
6	Intake air temperature		25	°C
8	Barometric pressure		1000	mbar
9	Site altitude above sea level		100	m

0. Data-relevant engine design configuration

· · · · · · · · · · · · · · · · · · ·				
No.	Description	Index	Value	Unit
0	Engine rated speed switchable			
٥	(1500/1800 rpm)		-	-
113	Engine without sequential turbocharging	_	v	
	(turbochargers without cut-in/cut-out control)		^	-
31	Engine with air-cooled charge air		х	-

1. Power-related data

No.	Description	Index	Value	Unit
1	Engine rated speed	Α	1500	rpm
3	Mean piston speed		7.5	m/s
4	Continuous power ISO 3046 (10% overload capability)	۸	576	kW
4	(design power DIN 6280, ISO 8528)	А	370	KVV
5	Fuel stop power ISO 3046	Α	634	kW
0	Mean effective pressure (MEP)		21.92	har
8	(Continuous power ISO 3046)		21.92	bar
9	Mean effective pressure (MEP)		24.15	la a u
	(Fuel stop power ISO 3046)		24.15	bar

2. General Conditions (for maximum power)

	2. Ocherar Conditions (for maximum power)					
No.	Description	Index	Value	Unit		
1	Intake air depression (new filter)	А	25	mbar		
2	Intake air depression, max.	L	50	mbar		
3	Exhaust back pressure	А	85	mbar		
4	Exhaust back pressure, max.	L	85	mbar		
5	Fuel temperature at fuel feed connection	R	38	°C		
0	Fuel temperature at fuel feed connection, max.		60	26		
9	(w/o power reduction)	L	00	C		
10	Fuel temperature at fuel feed connection, max.	L	70	°C		
49	Max. ambient temperature in direct vicinity			26		
	of vibration damper	L	55			

3. Consumption

No.	Description	Index	Value	Unit
17	Specific fuel consumption (be) - 100 % CP	В	192	a /lawh
17	(+ 5 %; EN 590; 42.8 MJ/kg)	K	192	g/kWh

BL Reference value: fuel stop power
Maximum engine power that cannot be run continuously on
some applications (stabilization reserve)
DL Reference value: continuous power
Engine power that can be run continuously under standard
conditions

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IX Applicable
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In Non-applicable
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IX Value not named
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18	Specific fuel consumption (be) - 75 % CP	R	197	g/kWh
10	(+ 5 %; EN 590; 42.8 MJ/kg)	IX.	13,	g/ KVV11
19	Specific fuel consumption (be) - 50 % CP	R	206	~ /I->A/I-
13	(+ 5 %; EN 590; 42.8 MJ/kg)	N.	200	g/kWh
20	Specific fuel consumption (be) - 25 % CP	R	223	g/kWh
20	(+ 5 %; EN 590; 42.8 MJ/kg)	I.	223	g/KVVII
56	Specific fuel consumption (be) - 100 % FSP	R	192	g/kWh
30	(+ 5 %; EN 590; 42.8 MJ/kg)	ĸ	192	
57	Specific fuel consumption (be) - 75 % FSP	R	192	g/kWh
37	(+ 5 %; EN 590; 42.8 MJ/kg)	N.	192	R/VVVII
58	Specific fuel consumption (be) - 50 % FSP	R	200	g/kWh
36	(+ 5 %; EN 590; 42.8 MJ/kg)	ĸ		
59	Specific fuel consumption (be) - 25 % FSP	R	217	g/kWh
33	(+ 5 %; EN 590; 42.8 MJ/kg)	N	217	g/KVVII
73	No-load fuel consumption	R	2.1	kg/h
61	Lube oil consumption after 100 h of operation	R	<0.2	% of B
01	(B = fuel consumption per hour)	I.	\0.2	76 UI B
62	Lube oil consumption after 100 h of operation, max.		<0.5	0/ of D
UZ	(B = fuel consumption per hour)	L	<0.5	% of B

4. Model-related data (basic design)

No.	Description	Index	Value	Unit
3	Engine with exhaust turbocharger (ETC) and intercooler		X	-
4	Exhaust piping, non-cooled		Х	-
33	Working method: four-cycle, diesel, single-acting		X	-
34	Combustion method: direct injection		Х	-
36	Cooling system: conditioned water		X	-
37	Direction of rotation: c.c.w. (facing driving end)		Х	-
6	Number of cylinders		12	-
7	Cylinder configuration: V angle		90	degrees (°)
10	Bore		122	mm
11	Stroke		150	mm
12	Displacement, cylinder		1.75	liter
13	Displacement, total		21.0	liter
14	Compression ratio		17.5	-
41	Cylinder liners: wet, replaceable		X	-
24	Number of inlet valves, per cylinder		2	-
25	Number of exhaust valves, per cylinder		2	-
15	Number of turbochargers		2	-
28	Standard flywheel housing flange (engine main PTO)		01	SAE
43	Flywheel interface (DISC)		14"	-

5. Combustion air / exhaust gas

No.	Description	Index	Value	Unit
19	Charge-air temperature before cylinder	Α	50	°C
33	Charge-air flow through external air-to-air intercooler	Α	0.33	m³/s

BL Reference value: fuel stop power Maximum engine power that cannot be run continuously on some applications (stabilization reserve)
DL Reference value: continuous power Engine power that can be run continuously under standard conditions

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34	Charge-air temperature before external air-to-air intercooler	А	208	°C
35	Charge-air temperature after external air-to-air intercooler	А	50	°C
36	Charge-air temperature after external air-to-air intercooler, max.	L	65	°C
37	Charge-air temperature after external air-to-air intercooler, min.	L	-15	°C
39	Pressure differential in external air-to-air intercooler, max.	L	130	mbar
8	Charge-air pressure before cylinder - CP	R	2.9	bar abs
27	Charge-air pressure before cylinder - FSP	R	3.2	bar abs
9	Combustion air volume flow - CP	R	0.80	m³/s
10	Combustion air volume flow - FSP	R	0.75	m³/s
11	Exhaust volume flow (at exhaust temperature) - CP	R	2.1	m³/s
12	Exhaust volume flow (at exhaust temperature) - FSP	R	2.0	m³/s
15	Exhaust temperature after turbocharger - CP	R	483	°C
16	Exhaust temperature after turbocharger - FSP	R	485	°C

6. Heat dissipation

No.	Description	Index	Value	Unit
1.0	Heat dissipated by engine coolant - FSP	В	255	LAAZ
16	with oil heat, without charge-air heat	ĸ	233	kW
26	Charge-air heat dissipation - CP	R	104	kW
27	Charge-air heat dissipation - FSP	R	133	kW
31	Heat dissipated by return fuel flow - CP	R	3.6	kW
32	Heat dissipated by return fuel flow - FSP	R	3.8	kW
33	Radiation and convection heat, engine - CP	R	25	kW

7. Coolant system (high-temperature circuit)

No.	Description	Index	Value	Unit
17	Coolant temperature		95	9.0
1/	(at engine outlet to cooling equipment)	A	95	°C
20	Coolant temperature after engine, limit 1	L	105	°C
21	Coolant temperature after engine, limit 2	L	109	°C
25	Coolant antifreeze content, max.	L	50	%
30	Cooling equipment: coolant flow rate	А	26	m³/h
35	Coolant pump: inlet pressure, min.	L	1.4	bar
36	Coolant pump: inlet pressure, max.	L	3.5	bar
41	Pressure loss in off-engine cooling system, max.	L	1	bar
47	Breather valve (expansion tank)	D	1	har
47	opening pressure (excess pressure)	R		bar
54	Cooling equipment: height above engine, max.	L	15	m
48	Breather valve (expansion tank)		-0.2	la a si
	opening pressure (depression)	R	-0.2	bar
49	Pressure in cooling system, max.	L	5.0	bar



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10. Lube oil system

	e en system			
No.	Description	Index	Value	Unit
1	Lube oil operating temp. before engine, from	R	105	°C
2	Lube oil operating temp. before engine, to	R	115	°C
8	Lube oil operating press. bef. engine, from	R	4.5	bar
9	Lube oil operating press. bef. engine, to	R	5.5	bar
10	Lube oil pressure before engine, alarm	L	2.6	bar
11	Lube oil pressure before engine, shutdown	L	2.4	bar
19	Lube oil fine filter (main circuit):		1	
19	number of units			-
20	Lube oil fine filter (main circuit):		4	
20	number of elements per unit		4	-
56	Lube-oil fine filter (main flow), particle size 1		10	μm
57	Lube-oil fine filter (main flow), filtering efficiency re 1		26	%
58	Lube-oil fine filter (main flow), particle size 2		15	μm
59	Lube-oil fine filter (main flow), filtering efficiency re 2		50	%
60	Lube-oil fine filter (main flow), particle size 3		20	μm
61	Lube-oil fine filter (main flow), filtering efficiency re 3		75	%
32	Lube oil fine filter (main circuit):		2	
32	pressure differential, max.	L		bar

11 Fuel system

No.	Description	Index	Value	Unit
1	Fuel pressure at engine fuel feed connection, min.		0.5	
1	(when engine is starting)	L	-0.5	bar
2	Fuel pressure at engine fuel feed connection, max.		0.5	hau
2	(when engine is starting)	L	0.5	bar
4211	Max. fuel supply volume	^	4.8	liter/min
4211	Normal mode	A	4.0	liter/min
4212	Max. fuel supply volume	_	5.3	lika u /aai.a
4212	Failure mode	A	5.5	liter/min
4213	Max. fuel return volume		2.1	lika u /uaiu
4213	Normal mode	A	2.1	liter/min
4214	Max. fuel return volume	_	4.1	liter/min
4214	Failure mode	A	4.1	liter/min
10	Fuel pressure at return connection on engine, max.	L	<0.4	bar
18	Fuel fine filter (main circuit): number of units	А	1	-
19	Fuel fine filter (main circuit): number of elements per unit	Α	1	-
68	Fuel fine filter, particle size 1		4	μm
69	Fuel fine filter, filtering efficiency re 1		99.5	%
70	Fuel fine filter, particle size 2		6	μm
71	Fuel fine filter, filtering efficiency re 2		99.8	%
72	Fuel fine filter, particle size 3		14	μm
73	Fuel fine filter, filtering efficiency re 3		99.8	%
21	Fuel fine filter (main circuit): pressure differential, max.	L	2	bar

Applicable
 The module is valid for this product type
 Non-applicable
 The module is not valid for this product type
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12. General operating data

12. Gen	eral operating data			
No.	Description	Index	Value	Unit
1	Cold start capability: air temperature	R	-20	°C
1	(w/o starting aid, w/o preheating) - (case A)	I.	-20	C
2	Additional condition (to case A):	R	-20	°C
2	engine coolant temperature	K	-20	C
3	Additional condition (to case A): lube oil temperature	R	-20	°C
4	Additional condition (to case A): lube oil viscosity	R	10W40	SAE
9	Cold start capability: air temperature	R	-40	°C
,	(w/o starting aid, w/ preheating) - (case C)	I.	-40	C
10	Additional condition (to case C):	R	32	°C
10	engine coolant temperature	K	32	C
11	Additional condition (to case C): lube oil temperature	R	32	°C
12	Additional condition (to case C): lube oil viscosity	R	10W40	SAE
21	Coolant preheating, heater performance (standard)	R	3	kW
22	Coolant preheating, preheating temperature, min.	L	32	°C
3506	Coolant preheating, preheating temperature, max.	L	55	°C
28	Breakaway torque (without driven machinery)	R	750	Nine
20	coolant temperature +5°C	K	/30	Nm
20	Breakaway torque (without driven machinery)		450	Nico
30	coolant temperature +40°C	R	450	Nm
20	Cranking torque at firing speed (without driven machinery)		400	
29	coolant temperature +5°C	R	400	Nm
21	Cranking torque at firing speed (without driven machinery)		270	Nima
31	coolant temperature +40°C	R	270	Nm
00	Starting is blocked if the engine coolant temperature is		-20	
96	below		-20	°C
37	High idling speed, max. (static)	L	1560	rpm
38	Limit speed for overspeed alarm / emergency shutdown	L	1800	rpm
42	Firing speed, from	R	80	rpm
43	Firing speed, to	R	120	rpm
44	Engine coolant temperature before starting full-load operation, recommended	R	60	°C
44	min.	K	60	°C
48	Minimum continuous load	R	20	%
F0	Engine mass moment of inertia		4.540	. 2
50	(without flywheel)	R	1.548	kgm²
52	Standard flywheel mass moment of inertia	R	1.44	kgm²
1981	Block bending moment - SAE 0	R	3	kNm
1982	Block bending moment - SAE 1	R	3	kNm
Г1	Engine mass moment of inertia	D	2.088	Leave 2
51	(with standard flywheel)	R	2.988	kgm²
109	Speed droop (with electronic governor) adjustable P1	R	4	%
110	Speed droop (with electronic governor) adjustable P2	R	0.4	%
95	Number of starter ring-gear teeth on engine flywheel		157	-



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13. Starting (electric)

	rting (electric)			,
No.	Description	Index	Value	Unit
2309	Manufacturer		Prestolite	-
2310	Number of starter		1	-
2312	Starter electrically redundant		-	-
2313	Rated power per starter	R	7.5	kW
2314	Starter, rated voltage	R	24	VDC
2315	Rated short-circuit current per starter	L	1730	Α
3000	Power consumption per starter	R	400	Α
3000	(at an engine speed of 100 rpm, SAE0)	N.	400	A
3002	Power consumption per starter	R	540	Α
3002	(at an engine speed of 100 rpm, SAE1)	I.	340	A
2317	Internal resistance of power supply + line resistance per starter	Α	0.008	Ω
2318	Manufacturer		Prestolite	-
2319	Number of starter		1	-
2320	Starter electrically redundant		X	-
2321	Rated power per starter	R	7.5	kW
2322	Starter, rated voltage	R	24	VDC
2323	Rated short-circuit current per starter	L	1730	Α
3001	Power consumption per starter	R	400	
3001	(at an engine speed of 100 rpm, SAE0)	ĸ	400	А
3003	Power consumption per starter	R	540	^
3003	(at an engine speed of 100 rpm, SAE1)	ĸ	340	Α
2325	Internal resistance of power supply + line resistance per starter	Α	0.008	Ω
2326	Manufacturer		Prestolite	-
2327	Number of starter		2	-
2328	Starter electrically redundant		-	-
2329	Rated power per starter	R	7.5	kW
2330	Starter, rated voltage	R	24	VDC
2331	Rated short-circuit current per starter	L	1730	Α
3251	Power consumption per starter	R	400	Α
3231	(at an engine speed of 100 rpm, SAE0)	N.	400	A
3252	Power consumption per starter	В	540	^
3232	(at an engine speed of 100 rpm, SAE1)	R	340	А
2333	Internal resistance of power supply + line resistance per starter	Α	0.008	Ω
2347	Generally valid data for starter		X	-
2342	Rated starting-attempt Duration (at +20°C ambient temperature with battery	R	3	S
2343	Interval between starts		5	
2343	(at rated starting-attempt duration), min.	L	3	S
2345	Maximum acceptable starting-attempt duration	L	15	S
2244	Interval between starts	В	60	
2344	(when starting-attempt duration > rated starting-attempt duration)	R	60	S
2246	Starting attempts within 30 minutes		6	
2346	(at +20°C ambient temperature with battery full), max.	L	O	-
			•	

16. Inclinations - standard oil system (ref.: waterline)

No.	Description	Index	Value	Unit	
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	Longitudinal inclination, continuous max.			
15	driving end down	L	15	degrees (°)
	(Option: max. operating inclinations)			
	Longitudinal inclination, continuous max.			
17	driving end up	L	15	degrees (°)
	(Option: max. operating inclinations)			
119	Transverse inclination, continuous max.		15	degrees (°)
	(Option: max. operating inclinations)	L	13	degrees ()

18. Capacities

10. 00	apaoities			
No.	Description	Index	Value	Unit
1	Engine coolant capacity (without cooling equipment)	R	65	liter
11	On-engine fuel capacity	R	3 *	liter
	Engine oil capacity, initial filling			
14	(standard oil system)	R	72.5	liter
	(Option: max. operating inclinations)			
	Oil change quantity, max.			
20	(standard oil system)	R	64	liter
	(Option: max. operating inclinations)			
	Oil pan capacity, dipstick mark min.			
28	(standard oil system)	L	56	liter
	(Option: max. operating inclinations)			
	Oil pan capacity, dipstick mark max.			
29	(standard oil system)	L	64	liter
	(Option: max. operating inclinations)			

19. Masses / dimensions

No.	Description	Index	Value	Unit
1/	Engine dry mass (with engine-mounted	Б	1855 *	ka
	standard accessories, without coupling)	K	1655	kg
12	Engine mass, wet	Ь	1918	ka
12	(with engine-mounted standard accessories, without coupling)	K	1910	kg

20. Fan / fan cooler

No.	Description	Index	Value	Unit
3	Fan, pusher-type		X	-
18	Fan arrangement: vertical above crankshaft		X	-
9	Fan drive: mechanical via V-belt		X	-
13	Fan: speed	R	1500	rpm

21. Exhaust emissions

No. Description	Index	Value	Unit
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12005	Emissions data sheet:	EDS16000135	
	NEA Singapore for ORDE	LD310000133	-
1960	Emissions data sheet:	EDS16000101	
1900	MoEF India / CPCB Stage I	ED310000101	-
1072	Emissions data sheet:	EDS16000102	
1972	Fuel-consumption optimized	ED310000102	-

22. Acoustics

No.	Description	Index	Value	Unit
	Exhaust noise, unsilenced - CP			
101	(free-field sound-pressure level Lp, 1m distance,	R	109	dB(A)
	ISO 6798, +3dB(A) tolerance)			
201	Exhaust noise, unsilenced - CP	R	122	dB(A)
201	(sound power level LW, ISO 6798, +3dB(A) tolerance)	n	122	UB(A)
	Exhaust noise, unsilenced - FSP			
102	(free-field sound-pressure level Lp, 1m distance,	R	110	dB(A)
	ISO 6798, +3dB(A) tolerance)			
202	Exhaust noise, unsilenced - FSP	R	123	dB(A)
202	(sound power level LW, ISO 6798, +3dB(A) tolerance)	N	123	UB(A)
	Exhaust noise, unsilenced - CP			
103	(free-field sound-pressure level Lp, 1m distance,	R	735162e	
103	ISO 6798)	n	7331026	
	Spectrum No.			
	Exhaust noise,unsilenced - CP			
203	(sound power level LW, ISO 6798)	R	-	-
	Spectrum No.			
	Engine surface noise with attenuated		104	dB(A)
109	intake noise (filter) - CP	R		
103	(free-field sound-pressure level Lp, 1m distance,	n		
	ISO 6798, +2dB(A) tolerance)			
	Engine surface noise with attenuated		122	
209	intake noise (filter) - CP	R		dB(A)
	(sound power level LW, ISO 6798, +2dB(A) tolerance)			
	Engine surface noise with attenuated			
111	intake noise (filter) - CP	R	735155e	
111	(free-field sound-pressure level Lp, 1m distance,	l'A	7331336	
	ISO 6798) Spectrum No.			
	Engine surface noise with attenuated			
211	intake noise (filter) - CP	R		_
211	(sound power level LW, ISO 6798)	n		-
	Spectrum No.			
	Engine surface noise with attenuated			
113	intake noise (intake silencer) - CP	D	101	dD(A)
113	(free-field sound-pressure level Lp, 1m distance,	R		dB(A)
	ISO 6798, +2dB(A) tolerance)			



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114	Engine surface noise with attenuated intake noise (intake silencer) - FSP (free-field sound-pressure level Lp, 1m distance, ISO 6798, +2dB(A) tolerance)	R	101	dB(A)
125	Structure borne noise at engine mounting brackets in vertical direction above resilient engine mounts - CP Spectrum No.	R	735248e	-
126	Structure borne noise at engine mounting brackets in vertical direction above resilient engine mounts - FSP Spectrum No.	R	735247e	-