

Name 20V4000G44F
Application Group 3B
Dataset Ref. 25°C/45°C

Speed [rpm] 1500
Nominal power [kW] 2807
Nominal power [bhp] 3764
Frequency [Hz] 50

Exhaust Regulations NEA Singapore for ORDE;

Reference conditions

No.	Description	Index	Value	Unit
6	Intake air temperature		25	°C
7	Charge-air coolant temperature		45	°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
13	Engine without sequential turbocharging (turbochargers without cut-in/cut-out control)		X	-

1. Power-related data

No.	Description	Index	Value	Unit
1	Engine rated speed	A	1500	rpm
3	Mean piston speed		10.5	m/s
4	Continuous power ISO 3046 (10% overload capability) (design power DIN 6280, ISO 8528)	A	2807	kW
5	Fuel stop power ISO 3046	A	3088	kW
8	Mean effective pressure (MEP) (Continuous power ISO 3046)		23.5	bar
9	Mean effective pressure (MEP) (Fuel stop power ISO 3046)		25.9	bar

2. General Conditions (for maximum power)

No.	Description	Index	Value	Unit
46	Individual power calculation (ESCM) required for maximum power		X	-
3726	Site altitude above sea level, max. (special hardware required for altitudes > site altitude)	L	1300	m
3727	Special hardware for altitude > site altitude needed (see chapter 2, item No. 3726)		X	-
1	Intake air depression (new filter)	A	15	mbar
3332	Intake air depression for new system	A	15	mbar
2	Intake air depression, max.	L	30	mbar
3	Exhaust back pressure	A	30	mbar
51	Exhaust overpressure (total pressure against atmosphere)	A	30	mbar
52	Exhaust overpressure, max. (total pressure against atmosphere)	L	50	mbar
5	Fuel temperature at fuel feed connection	R	25	°C
6	Fuel temperature at fuel feed connection, max.	L	55	°C
9	Fuel temperature at fuel feed connection, max. (w/o power reduction)	L	55	°C

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3. Consumption

No.	Description	Index	Value	Unit
17	Specific fuel consumption (be) - 100 % CP (+ 5 %; EN 590; 42.8 MJ/kg)	R	199	g/kWh
18	Specific fuel consumption (be) - 75 % CP (+ 5 %; EN 590; 42.8 MJ/kg)	R	206	g/kWh
19	Specific fuel consumption (be) - 50 % CP (+ 5 %; EN 590; 42.8 MJ/kg)	R	218	g/kWh
20	Specific fuel consumption (be) - 25 % CP (+ 5 %; EN 590; 42.8 MJ/kg)	R	236	g/kWh
73	No-load fuel consumption	R	50	kg/h
92	Lube oil consumption after 100 h of operation (B = fuel consumption per hour) Guideline value does not apply for the design of EGAT systems. Please consult the Applications Center with regard to the layout of EGA systems.	R	0.2	% of B
62	Lube oil consumption after 100 h of operation, max. (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		X	-
33	Working method: four-cycle, diesel, single-acting		X	-
34	Combustion method: direct injection		X	-
36	Cooling system: conditioned water		X	-
37	Direction of rotation: c.c.w. (facing driving end)		X	-
6	Number of cylinders		20	-
7	Cylinder configuration: V angle		90	degrees (°)
10	Bore		170	mm
11	Stroke		210	mm
12	Displacement, cylinder		4.77	liter
13	Displacement, total		95.4	liter
14	Compression ratio		16.4	-
40	Cylinder heads: single-cylinder		X	-
41	Cylinder liners: wet, replaceable		X	-
49	Piston design: solid-skirt piston		X	-
21	Number of piston compression rings		2	-
22	Number of piston oil control rings		1	-
24	Number of inlet valves, per cylinder		2	-
25	Number of exhaust valves, per cylinder		2	-
15	Number of turbochargers		2	-
16	Number of L.P. turbochargers		2	-
18	Number of intercoolers		1	-
19	Number of L.P. intercoolers		1	-

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28	Standard flywheel housing flange (engine main PTO)		00	SAE
50	Static bending moment at standard flywheel housing flange, max.	L	15	kNm
51	Dynamic bending moment at standard flywheel housing flange, max.	L	75	kNm
43	Flywheel interface (DISC)		21	-

5. Combustion air / exhaust gas

No.	Description	Index	Value	Unit
8	Charge-air pressure before cylinder - CP	R	3.74	bar abs
9	Combustion air volume flow - CP	R	4.3	m ³ /s
11	Exhaust volume flow (at exhaust temperature) - CP	R	10.0	m ³ /s
13	Exhaust temperature before turbocharger - CP	R	605	°C
4084	Exhaust temperature after engine - CP (Position of interface according to installation drawing)	R	429	°C
4086	Exhaust temperature after engine, max. - CP (Position of interface according to installation drawing)	L	550	°C

6. Heat dissipation

No.	Description	Index	Value	Unit
15	Heat dissipated by engine coolant - CP with oil heat, without charge-air heat	R	1010	kW
16	Heat dissipated by engine coolant - FSP with oil heat, without charge-air heat	R	1140	kW
26	Charge-air heat dissipation - CP	R	780	kW
31	Heat dissipated by return fuel flow - CP	R	7.5	kW
33	Radiation and convection heat, engine - CP	R	105	kW
34	Radiation and convection heat, engine - FSP	R	105	kW

7. Coolant system (high-temperature circuit)

No.	Description	Index	Value	Unit
17	Coolant temperature (at engine outlet to cooling equipment)	A	100.0	°C
57	Coolant temperature differential after/before engine, from	R	10.0	K
58	Coolant temperature differential after/before engine, to	R	12.0	K
23	Coolant temperature differential after/before engine	L	14.0	K
20	Coolant temperature after engine, limit 1	L	102.0	°C
21	Coolant temperature after engine, limit 2	L	104.0	°C
25	Coolant antifreeze content, max.	L	50	%
127	Cooling equipment: coolant flow rate at max. pressure loss in off-engine cooling System (see chapter 7, item No. 41)	A	75	m ³ /h
128	Cooling equipment: coolant flow rate at min. pressure loss in off-engine cooling System (see chapter 7, item No. 72)	A	80	m ³ /h
31	Coolant pump: pressure differential	R	2.25	bar
35	Coolant pump: inlet pressure, min.	L	0.50	bar

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36	Coolant pump: inlet pressure, max.	L	2.50	bar
39	Engine: coolant pressure differential with thermostat	R	1.70	bar
41	Pressure loss in off-engine cooling system, max.	L	0.70	bar
72	Pressure loss in off-engine cooling system, min.	L	0.3	bar
43	Pressure loss in off-engine cooling system, max. without thermostat	L	0.70	bar
70	Pressure loss in off-engine cooling system, min. without thermostat	L	0.3	bar
47	Breather valve (expansion tank) opening pressure (excess pressure)	R	1.00	bar
54	Cooling equipment: height above engine, max.	L	15	m
53	Cooling equipment: operating pressure	A	2.50	bar
74	Coolant level in expansion tank, below min. shutdown	L	X	-
50	Thermostat, starts to open	R	79.0	°C
51	Thermostat, bypass closed	R	92.0	°C
52	Thermostat, fully open	R	92.0	°C
48	Breather valve (expansion tank) opening pressure (depression)	R	-0.1	bar
49	Pressure in cooling system, max.	L	5.00	bar

8. Coolant system (low-temperature circuit)

No.	Description	Index	Value	Unit
53	Coolant temperature (at engine outlet to cooling equipment)	R	70.0	°C
9	Coolant temperature before intercooler (at engine inlet from cooling equipment)	A	45.0	°C
14	Coolant temperature before intercooler, limit 1	L	75.0	°C
15	Coolant temperature before intercooler, limit 2	L	78.0	°C
54	Coolant temperature differential after/before intercooler, min.	L	18.0 *	K
55	Coolant temperature differential after/before intercooler, max.	L	30.0 *	K
13	Coolant antifreeze content, max.	L	50	%
17	Charge-air temperature after intercooler, max.	L	80.0	°C
76	Temperature differential between intake air and charge-air coolant before intercooler	A	20.0	K
75	Temperature differential between intake air and charge-air coolant before intercooler, max.	L	22.0	K
56	Coolant pump: flow rate	A	44.0	m³/h
18	Coolant pump: flow rate (± 5 %)	R	44.0	m³/h
20	Cooling equipment: coolant flow rate	A	44.0	m³/h
80	Cooling equipment: coolant flow rate at max. pressure loss in off-engine cooling system	A	43	m³/h
81	Cooling equipment: coolant flow rate at min. pressure loss in off-engine cooling system	A	50	m³/h

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21	Intercooler: coolant flow rate	R	44.0	m ³ /h
24	Coolant pump: inlet pressure, min.	L	0.5	bar
25	Coolant pump: inlet pressure, max.	L	2.5	bar
29	Pressure loss in off-engine cooling system, max.	L	1.0	bar
62	Pressure loss in off-engine cooling system, min.	L	0.3	bar
31	Pressure loss in off-engine cooling system, max. without thermostat	L	1.0	bar
63	Pressure loss in off-engine cooling system, min. without thermostat	L	0.3	bar
43	Cooling equipment: height above engine, max.	L	15	m
36	Breather valve (expansion tank) opening pressure (excess pressure)	R	1.00	bar
37	Breather valve (expansion tank) opening pressure (depression)	R	-0.10	bar
42	Cooling equipment: operating pressure	A	2.50	bar
68	Coolant level in expansion tank, below min. shutdown	L	X	-
39	Thermostat, starts to open	R	38.0	°C
40	Thermostat, bypass closed	R	51.0	°C
41	Thermostat, fully open	R	51.0	°C

10. Lube oil system

No.	Description	Index	Value	Unit
1	Lube oil operating temp. before engine, from	R	85	°C
2	Lube oil operating temp. before engine, to	R	98	°C
3	Lube oil operating temp. after engine, from	R	98	°C
4	Lube oil operating temp. after engine, to	R	108	°C
5	Lube oil temperature before engine, limit 1	L	99	°C
6	Lube oil temperature before engine, limit 2	L	101	°C
7	Lube oil operating pressure before engine (measuring block)	R	5.1	bar
8	Lube oil operating press. bef. engine, from	R	4.3	bar
9	Lube oil operating press. bef. engine, to	R	7.1	bar
33	Lube oil pressure before engine, limit 1(speed-related value, consult Rolls-	L	3.5	bar
34	Lube oil pressure before engine, limit 2 (speed-related value, consult Rolls-	L	3.2	bar
17	Lube oil pump(s): oil flow, total	R	835	liter/min
19	Lube oil fine filter (main circuit): number of units		1	-
20	Lube oil fine filter (main circuit): number of elements per unit		5	-
21	Lube oil fine filter (main circuit): particle retention	R	0.012	mm
32	Lube oil fine filter (main circuit): pressure differential, max.	L	1.5	bar
35	Lube oil fine filter (main circuit): make (standard): MANN & HUMMEL		X	-

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11. Fuel system

No.	Description	Index	Value	Unit
1	Fuel pressure at engine fuel feed connection, min. (when engine is starting)	L	-0.1	bar
2	Fuel pressure at engine fuel feed connection, max. (when engine is starting)	L	1.5	bar
57	Fuel pressure at engine fuel feed connection, min. (when engine is running)	L	-0.3	bar
65	Fuel pressure at engine fuel feed connection, max. (when engine is running)	L	0.5	bar
4211	Max. fuel supply volume Normal mode	A	20.1	liter/min
4212	Max. fuel supply volume Failure mode	A	22.6	liter/min
4	Fuel pressure before injection pump, from (high-pressure pump)	R	7.0	bar
5	Fuel pressure before injection pump, to (high-pressure pump)	R	9.0	bar
6	Fuel pressure before injection pump, min. (high-pressure pump)	L	5.0	bar
7	Fuel pressure before injection pump with engine not running, max. (high-pressure pump)	L	1.5	bar
4213	Max. fuel return volume Normal mode	A	5.5	liter/min
4214	Max. fuel return volume Failure mode	A	21.8	liter/min
10	Fuel pressure at return connection on engine, max.	L	0.5	bar
3235	Fuel fine filter (secondary filter): Number of units	A	1	-
3236	Fuel fine filter (secondary filter): Number of elements per unit	A	2	-
18	Fuel fine filter (main circuit): number of units	A	1	-
19	Fuel fine filter (main circuit): number of elements per unit	A	2	-
21	Fuel fine filter (main circuit): pressure differential, max.	L	2.0	bar
3442	Fuel fine filter (intermediate filter): Pressure differential, max.	L	4.0	bar

12. General operating data

No.	Description	Index	Value	Unit
1	Cold start capability: air temperature (w/o starting aid, w/o preheating) - (case A)	R	10	°C
2	Additional condition (to case A): engine coolant temperature	R	10	°C
3	Additional condition (to case A): lube oil temperature	R	10	°C
4	Additional condition (to case A): lube oil viscosity	R	15W40	SAE

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9	Cold start capability: air temperature (w/o starting aid, w/ preheating) - (case C)	R	0	°C
10	Additional condition (to case C): engine coolant temperature	R	40	°C
11	Additional condition (to case C): lube oil temperature	R	-10	°C
12	Additional condition (to case C): lube oil viscosity	R	15W40	SAE
21	Coolant preheating, heater performance (standard)	R	9.0	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) coolant temperature +5°C	R	2600	Nm
30	Breakaway torque (without driven machinery) coolant temperature +40°C	R	2200	Nm
29	Cranking torque at firing speed (without driven machinery) coolant temperature +5°C	R	1400	Nm
31	Cranking torque at firing speed (without driven machinery) coolant temperature +40°C	R	1100	Nm
37	High idling speed, max. (static)	L	1613	rpm
38	Limit speed for overspeed alarm / emergency shutdown	L	1950	rpm
39	Limit speed for overspeed alarm	L	1950	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 min.	R	60	°C
3515	Minimum continuous load (operation > 10h)	R	30	kW/cyl
50	Engine mass moment of inertia (without flywheel)	R	24.6	kgm ²
52	Standard flywheel mass moment of inertia	R	10.2	kgm ²
51	Engine mass moment of inertia (with standard flywheel)	R	34.8	kgm ²
69	Speed droop (with electronic governor) adjustable, from	R	0	%
70	Speed droop (with electronic governor) adjustable, to	R	7	%
95	Number of starter ring-gear teeth on engine flywheel		182	-

13. Starting (electric)

No.	Description	Index	Value	Unit
2309	Manufacturer		Delco	-
4101	Type		50MT	-
2310	Number of starter		2	-
2312	Starter electrically redundant		-	-
2313	Rated power per starter	R	9	kW
2314	Starter, rated voltage	R	24	VDC
2315	Rated short-circuit current per starter	L	1900	A
2316	Power consumption per starter (at an engine speed of 100 rpm)	R	580	A
2317	Internal resistance of power supply + line resistance per starter	A	0.008	Ω
2318	Manufacturer		Bosch	-

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4118	Type		HEP	-
2319	Number of starter		2	-
2320	Starter electrically redundant		-	-
2321	Rated power per starter	R	11.3	kW
2322	Starter, rated voltage	R	24	VDC
2323	Rated short-circuit current per starter	L	2190	A
2324	Power consumption per starter (at an engine speed of 100 rpm)	R	750	A
2325	Internal resistance of power supply + line resistance per starter	A	0.0047	Ω
2326	Manufacturer		Prestolite	-
4119	Type		S-152	-
2327	Number of starter		1	-
2328	Starter electrically redundant		-	-
2329	Rated power per starter	R	15	kW
2330	Starter, rated voltage	R	24	VDC
2331	Rated short-circuit current per starter	L	3000	A
2332	Power consumption per starter (at an engine speed of 100 rpm)	R	1400	A
2333	Internal resistance of power supply + line resistance per starter	A	0.0045	Ω
2334	Manufacturer		Prestolite	-
4120	Type		S-152	-
2335	Number of starter		2	-
2336	Starter electrically redundant		X	-
2337	Rated power per starter	R	15	kW
2338	Starter, rated voltage	R	24	VDC
2339	Rated short-circuit current per starter	L	3000	A
2340	Power consumption per starter (at an engine speed of 100 rpm)	R	1400	A
2341	Internal resistance of power supply + line resistance per starter	A	0.0045	Ω
4104	Manufacturer		Prestolite	-
4105	Type		M128R	-
4106	Number of starter		2	-
4107	Starter electrically redundant		-	-
4108	Rated power per starter	R	9.4	kW
4109	Starter, rated voltage	R	24	VDC
4110	Rated short-circuit current per starter	L	2000	A
4111	Power consumption per starter (at an engine speed of 100 rpm)	R	600	A
4112	Power consumption per starter (at an engine speed of 100 rpm, SAE0)	R	-	A
4113	Power consumption per starter (at an engine speed of 100 rpm, SAE1)	R	-	A
4114	Internal resistance of power supply + line resistance per starter	A	0.008	Ω
2347	Generally valid data for starter		X	-
2342	Rated starting-attempt Duration (at +20°C ambient temperature with battery)	R	5	s
2343	Interval between starts (at rated starting-attempt duration), min.	L	20	s
2345	Maximum acceptable starting-attempt duration	L	15	s

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Typical average value as information – only suitable for design purposes to a limited extent

[L] Limit value
A value representing the lower limit/minimum value or upper limit/maximum value that may not be exceeded. Not suitable for design purposes

Name 20V4000G44F
Application Group 3B
Dataset Ref. 25°C/45°C

Speed [rpm] 1500
Nominal power [kW] 2807
Nominal power [bhp] 3764
Frequency [Hz] 50

Exhaust Regulations NEA Singapore for ORDE;

2344	Interval between starts (when starting-attempt duration > rated starting-attempt duration)	R	60	s
2346	Starting attempts within 30 minutes (at +20°C ambient temperature with battery full), max.	L	6	-
3565	Disengagement of starter pinion at engine Speed Note: Exceeding the guideline value of the disengagement speed will reduce	R	400	rpm
3566	Disengagement of starter pinion at engine speed, max.	L	500	rpm

15. Starting (pneumatic/oil pressure starter)

No.	Description	Index	Value	Unit
36	Pneumatic starter: make TDI		X	-
5	Starting air pressure before starter motor, min.	R	8	bar
6	Starting air pressure before starter motor, max.	R	9	bar
7	Starting air pressure before starter motor, min.	L	8	bar
8	Starting air pressure before starter motor, max.	L	9	bar
18	Start attempt duration (engine preheated)	R	3	s
19	Start attempt duration (engine not preheated)	R	5	s
114	Air consumption/start attempt (engine preheated) Engine without generator Control with engine controller	R	1.4	m ³ n
116	Air consumption with external control for air-starter (per second)	R	0.5	m ³ n
29	Starting air tank for 3 start attempts (max. 40 bar) (engine not preheated)	R	N	liter
30	Starting air tank for 3 start attempts (max. 30 bar) (engine not preheated)	R	N	liter
31	Starting air tank for 6 start attempts (max. 40 bar) (engine not preheated)	R	N	liter
32	Starting air tank for 6 start attempts (max. 30 bar) (engine not preheated)	R	N	liter
33	Starting air tank for 10 start attempts (max. 40 bar) (engine not preheated)	R	N	liter
34	Starting air tank for 10 start attempts (max. 30 bar) (engine not preheated)	R	N	liter
103	Starting oil pressure before starter motor, max.	R	207	bar
105	Starting oil pressure before starter motor, max.	L	207	bar
106	Start attempt duration (engine preheated)	R	2.5	s
108	Start attempt duration, max.	L	15	s

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

No.	Description	Index	Value	Unit
15	Longitudinal inclination, continuous max. driving end down (Option: max. operating inclinations)	L	5	degrees (°)

[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

[>] Actual value must be greater than specified value
[<] Actual value must be less than specified value

[X] Applicable
The module is valid for this product type

[] Non-applicable
The module is not valid for this product type

[N] Value not named
The value has not yet been named or will not be named

[+/-] Adequate verification not yet available (tolerance +/- 10%)
[+/-] Adequate verification not yet available (tolerance +/- 5%)

[A] Design value
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Exhaust Regulations NEA Singapore for ORDE;

17	Longitudinal inclination, continuous max. driving end up (Option: max. operating inclinations)	L	5	degrees (°)
19	Transverse inclination, continuous max. (Option: max. operating inclinations)	L	10	degrees (°)

18. Capacities

No.	Description	Index	Value	Unit
1	Engine coolant capacity (without cooling equipment)	R	260	liter
10	Intercooler coolant capacity	R	50	liter
11	On-engine fuel capacity	R	9	liter
14	Engine oil capacity, initial filling (standard oil system) (Option: max. operating inclinations)	R	390	liter
20	Oil change quantity, max. (standard oil system) (Option: max. operating inclinations)	R	340	liter
28	Oil pan capacity, dipstick mark min. (standard oil system) (Option: max. operating inclinations)	L	270	liter
29	Oil pan capacity, dipstick mark max. (standard oil system) (Option: max. operating inclinations)	L	315	liter

19. Masses / dimensions

No.	Description	Index	Value	Unit
1	Engine dry mass (standard scope of supply)	R	9650	kg
2	Engine dry mass (with engine-mounted standard accessories incl. coupling)	R	10050	kg
4	Engine length (standard scope of supply)	R	3479	mm
5	Engine width (standard scope of supply)	R	1700	mm
6	Engine height (standard scope of supply)	R	2252	mm

21. Exhaust emissions

No.	Description	Index	Value	Unit
2005	Emissions data sheet: NEA Singapore for ORDE		X	-

22. Acoustics

No.	Description	Index	Value	Unit
101	Exhaust noise, unsilenced - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798, +3dB(A) tolerance)	R	121	dB(A)

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Exhaust Regulations NEA Singapore for ORDE;

201	Exhaust noise, unsilenced - CP (sound power level LW, ISO 6798, +3dB(A) tolerance)	R	133	dB(A)
103	Exhaust noise, unsilenced - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798) Spectrum No.	R	737220e	-
109	Engine surface noise with attenuated intake noise (filter) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798, +2dB(A) tolerance)	R	111	dB(A)
209	Engine surface noise with attenuated intake noise (filter) - CP (sound power level LW, ISO 6798, +2dB(A) tolerance)	R	130	dB(A)
111	Engine surface noise with attenuated intake noise (filter) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798) Spectrum No.	R	737194e	-
125	Structure borne noise at engine mounting brackets in vertical direction above resilient engine mounts - CP Spectrum No.	R	737207e	-

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Maximum engine power that cannot be run continuously on
some applications (stabilization reserve)

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