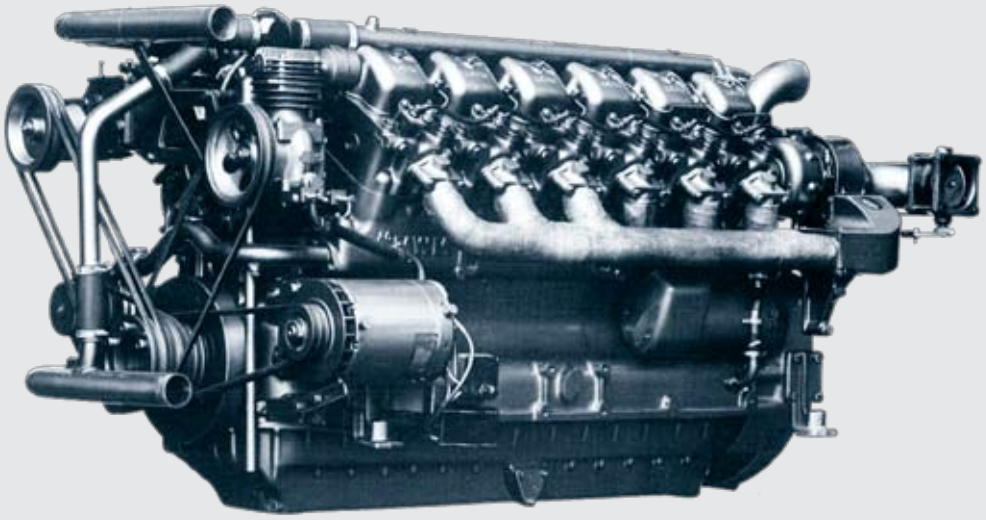
232

80-368 kW at 1500-2500 min-1

TOTAL SERVICE



WÄRTSILÄ DEUTZ MARINE ENGINES

CHARACTERISTICS

- Water-cooled, four-stroke, direct injection 6-, 8- and 12-cylinder engines.
- 60º V-engine.
- One inlet and one exhaust valve per cylinder.

BENEFITS

- Compact engine, low weight and low space requirements.
- High power-weight ratio.
- Easy operation and maintenance.

WÄRTSILÄ

ENGINE DESCRIPTION

Crankcase	The crankcase is made of cast iron.
Main and big end bearings	Three layer precision-type bearings ready for installation (steel shell with copper-lead lining and galvanic applied white metal flash).
Crankshaft	The crankshaft is made of chrome-molybdenum steel. The counterweights are bolted on the crankshaft.
Torsional vibration damper	A viscous-fluid damper.
Cylinder liner	The cylinder liners are made of special grade highly wear-resistant centrifugally cast iron.
Connecting rod	The obliquely split connecting rod with serrated mating faces is made of alloyed steel.
Piston	The oil-cooled piston is made of light alloy and has 4 piston rings.
Cylinder head	The cylinder head is made of special-grade cast iron and has one inlet and one exhaust valve and the valves are supplied with valve rotators. The valves are actuated by tappets, push rods and rocker arms. The cylinder head is water-cooled.
Camshaft	The gear driven camshaft is made of steel. The journals and cams are induction hardened.
Injection pump	The engine has a block-type injection pump.
Governor	The engine has a mechanical variable speed governor, mounted on the injection pump.
Fuel system	A fuel supply pump is mounted on the injection pump. A single filter or duplex change-over filter with disposable inserts is mounted in the fuel system. Upon request with exchangeable inserts.
Lubricating oil system	The engine has a forced oil circulation via an engine-mounted gear pump. In case of a dry sump, the engine is provided with a gear-type duplex pump. An oil cooler is installed in the cooling water system of the engine.
Lube oil filter	A full flow duplex heavy-duty micro filter with disposable inserts.
Starting system	Electric starter. Optional: direct air start via cylinder or compressed air starter.
Cooling water system	Indirect cooling (two circuit water cooling), consisting of heat exchanger with thermostat, compensating tank, circulation pump for fresh water, self-priming rotary pump for raw water, piping and zinc protection. Upon request: skin cooling or keel cooling with fresh water circulation pump, thermostat and compensating tank.
Exhaust gas system	Engine type D has uncooled exhaust manifolds. Upon request: water-cooled. Turbocharged engines (type TD) have uncooled, insulated exhaust manifolds but water-cooled when installed under deck (not TD232V6). Engine type TBD232 is provided with a charge air cooler.
Chare air system	Oil bath air filter or wet air filter.
Turbocharging	The exhaust turbocharger is uncooled. The engine type TBD232V12 has a charge air cooler.
Classification	By all established classification societies.
EIAPP	The engine can be provided with an EIAPP certificate if it complies with the NO_x Technical Code according IMO regulations MARPOL 73/78 - Annex VI.

TECHNICAL DATA

TECHNICAL DATA								
Engine type		**D232V6**	**D232V8**	**D232V12**	**TD232V6**	**TD232V8**	**TD232V12**	**TBD232V12 [1]**
Model		60° V-engine						
Number of cylinders		6	8	12	6	8	12	12
Bore / stroke	mm	120/130	120/130	120/130	120/130	120/130	120/130	120/130
Displacement	l	8.82	11.76	17.64	8.82	11.76	17.64	17.64
Compression ratio		16.5	16.5	16.5	16.5	16.5	16.5	14.6
Direction of rotation [2]		Counter-clockwise						
Engine output I (ISO standard output) [3]								
Rated speed	min^{-1}	1500-2300	1500-2300	1500-2300	1500-2300	1500-2300	1500-2300	1500-2300
Engine output	kW	80-112	107-149	151-218	105-138	140-184	210-276	246-335
Mean effective pressure	bar	6.63-7.26	6.61-7.28	6.45-6.85	8.16-9.52	8.16-9.52	8.16-9.52	9.91-11.16
Fuel consumption [4]	g/kWh	225-244	220-240	218-237	220-235	218-233	213-235	209-229
Engine output II (ISO brake power, blocked for alternating load operation) [5]								
Rated speed	min^{-1}	1500-2500	1500-2500	1500-2500	1500-2300	1500-2300	1500-2300	1500-2300
Engine output	kW	82-119	110-159	159-238	110-152	147-275	220-304	270-368
Mean effective pressure	bar	6.48-7.44	6.49-7.48	6.48-7.21	8.99-9.98	8.96-10.0	8.99-9.98	10.88-12.24
Fuel consumption [4]	g/kWh	227-253	222-251	220-248	221-236	218-231	214-236	211-230
Engine output V (MCR service output) [6]								
Rated speed	min^{-1}	1500-2300	1500-2300	1500-2300	1500-2300	1500-2300	1500-2300	1500-2300
Engine output	kW	72-101	96-135	136-197	-	140-184	202-250	246-325
Mean effective pressure	bar	5.97-6.53	5.99-6.53	5.83-6.17	-	8.16-9.52	6.77-9.16	9.61-11.15
Fuel consumption [4]	g/kWh	226-246	221-242	219-239	-	221-239	218-234	211-229
Lubricating oil consumption	kg/h	0.15-0.24	0.20-0.32	0.29-0.49	0.20-0.30	0.27-0.40	0.40-0.61	0.50-0.74
Oil capacity	l	22.5	29	41	22.5	29	41	41
Idling speed	min^{-1}	650	650	650	650	650	650	650

1) With intercooler.
2) According to ISO 1204.
3) Engine output = ISO standard output (continuous brake power, 10% overload permissible for 1 hour within 12 hours) as per DIN 6271 and ISO 3046/I.

Reference conditions:		
	Air temperature	27 °C
	Atmosperic pressure	1000 mbar
	Relative air humidity	60%
	Cooling water temperature before intercooler	27 °C

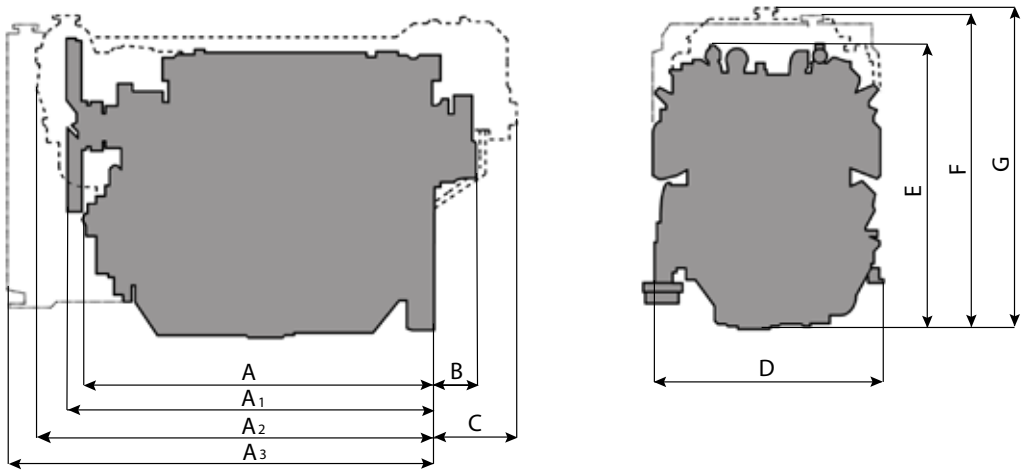
4) The fuel consumption figures are based on the engine outputs quoted, using a standardized fuel of 42,000 kJ/kg (10,030 kcal/kg) lower calorific value. They are guaranteed only at full load as per DIN 6271 and BBS with a tolerance of +5%.
5) Engine output III = ISO brake power, blocked (for alternating load operation). Standard and reference cnfitions like I. This output can be developed without interruption for 1 hour within 6 hours alternating load operation.
6) Engine output V = MCR service output (maximum continuous rating, continuous brake power blocked at 100% load for marine propulsion engines).

Reference conditions:		
	Air temperature	45 °C
	Atmospheric pressure	1000 mbar
	Relative air humidity	60%
	Cooling water temperature before intercooler	32 °C

In case of fan cooling the output gets reduced according to the output required for fan drive.

Note:
The values given in this data sheet are for information purposes only and not binding.
The data provided in the offer is decisive.

DIMENSIONS



PRINCIPAL ENGINE DIMENSIONS (mm) AND WEIGHTS (t)													
Engine type	A	A_1 7)	A_2 8)	A_3 9)	B	C	D	E	F 9)	G 8)	Weight (dry without accessories)		
											10)	11)	12)
D232V6	980	1040	1135	1255	-	-	780	1045	1095	1120	0.775	0.885	0.880
D232V8	1150	1215	1305	1430	-	-	780	975	1025	1050	0.920	1.025	1.025
D232V12	1490	1580	1635	1825	-	-	830	970	1135	1045	1.260	1.410	1.380
TD232V6	980	1045	1135	1255	50	-	780	1050	1095	1120	0.795	0.905	0.910
TD232V8	1150	1225	1305	1485	160	-	830	975	1075	1050	0.960	1.100	1.075
TD232V12	1490	1580	1635	1870	160	-	830	970	1160	1045	1.295	1.500	1.425
TBD232V12	1490	1645	1635	1940	-	285	830	970	1365	1045	1.355	1.600	1.475

7) With fan drive (at 2300 min^{-1} and 35 °C environmental temperature).
8) With indirect cooling.
9) With ventilator cooling and mounted radiator.
10) With circulation cooling (without cooler).
11) With circulation cooling (with cooler).
12) With indirect cooling.

Explanation of model designation:
Letter 'T' refers to a turbocharger.
Letter 'B' refers to a charge air cooler.
Letter 'D' refers to a diesel version.
Letter 'V' refers to a V-engine.

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