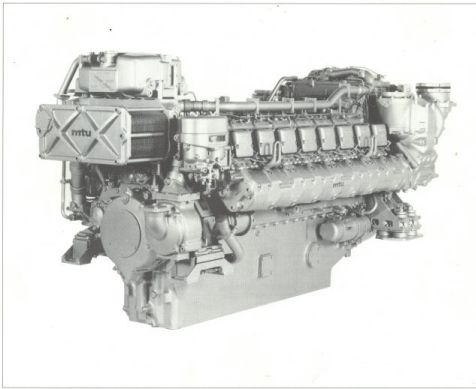
Standard Quotation

396 TE74, 74L

Propulsion Plants for Fast Commercial Ships



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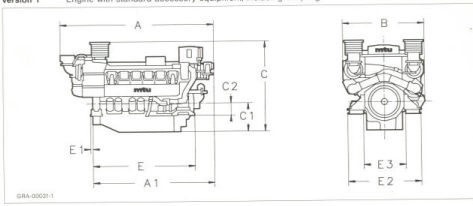
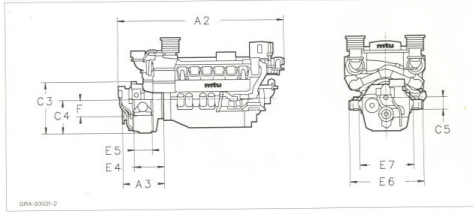
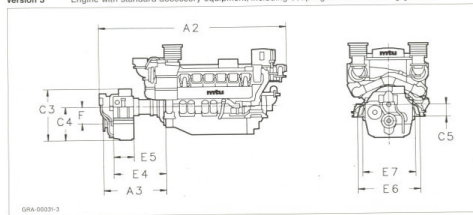
Version 1 Engine with standard accessory equipment, including coupling



Version 2 Engine with standard accessory equipment, including coupling and flange-mounted gearbox



Version 3 Engine with standard accessory equipment, including coupling and free-standing gearbox



Version 4 Engine with standard accessory equipment, including coupling, universal shaft and gearbox (V-Drive)

GRA-00031-4

* gearbox mounting

Dimensions (mm), **Weights** (kg) **

Engine Model		8V 396 TE		12V 396 TE		16V 396 TE	
		74	74 L	74	74 L	74	74 L
Version 1	A	2300	2330	2830	2870	3350	3430
	A1	1713	1748	2230	2273	2728	2810
	B	1540	1540	1540	1540	1540	1540
	C	1540	1540	1690	1690	1750	1750
	C1	475	475	535	535	592	592
	C2	230	230	230	230	230	230
	E	1338	1338	1908	1908	2364	2364
	E1	41	41	41	41	41	41
	E2	1222	1222	1376	1376	1376	1376
	E3	710	710	710	710	710	710
	Weight	4020	4020	5150	5150	6370	6400
Version 2	Gearbox Model Ratio	Reintjes WAS 430 1.2–3.5	ZF BW 255 1.2–2.5	Reintjes WAS 430 1.2–2.5	ZF BW 458-1 1.5–3.0	Reintjes WAS 730 L 1.5–3.5	ZF BW 460 1.5–3.0	Reintjes WAS 733 1.5–3.5	ZF BW 465 1.5–3.0
	A2	2677	2449	2678	2567	3395	3058	3438	3126
	A3	789	685	789	765	918	765	918	765
	C3	835	824	835	965	1100	965	1100	965
	C4	495	485	495	626	633	626	633	626
	C5	305	230	305	230	390	230	390	230
	E4	814	510	814	555	948	555	948	555
	E5	720	340	720	330	800	330	800	330
	E6	1200	1190	1200	1240	1470	1240	1470	1240
	F	888	810	888	1020	1140	1020	1140	1020
	F	235	235	235	310	310	310	310	310
	Weight	4560	4530	4560	4750	5650	5430	5655	5635
Version 3	Gearbox Model Ratio	Reintjes WAS 430 1.2–3.5	ZF BW 255 1.2–2.5	Reintjes WAS 430 1.2–2.5	ZF BW 458-1 1.5–3.0	Reintjes WAS 730 L 1.5–3.5	ZF BW 460 1.5–3.0	Reintjes WAS 733 1.5–3.5	ZF BW 465 1.5–3.0	Reintjes WAS 730 1.5–3.5	ZF BW 750 1.5–3.0	Reintjes WVS 933 L 1.3–2.5	ZF BW 755 1.3–3.0
	A2	3320	3010	3320	3100	4010	3620	4055	3660	4530	4225	4655	4285
	A3	1431	1291	1431	1299	1536	1299	1536	1299	1539	1318	1589	1318
	C3	855	824	855	965	1103	965	1103	965	1103	1042	1168	1042
	C4	495	485	495	626	633	626	633	626	633	688	688	688
	C5	235	235	235	230	340	230	340	230	340	245	385	245
	E4	1272	1411	1272	1428	1436	1428	1436	1428	1436	1158	1494	1158
	E5	410	310	410	380	495	380	495	380	495	534	534	495
	E6	906	1000	906	1170	1036	1170	1036	1170	1036	1290	1166	1290
	F	720	820	720	980	860	980	860	980	860	990	870	1090
	F	235	235	235	310	310	310	310	310	310	340	340	340
	Weight	4525	4515	4525	4770	5920	5915	5925	5920	7155	7350	7400	7380
Version 4	Gearbox Model Ratio	Reintjes WAS 430 0 1.2–3.5	ZF BW 255 0 1.2–2.5	Reintjes WAS 430 0 1.2–2.5	ZF BW 458-1 0 1.5–3.0	Reintjes WAS 730 L0 1.5–3.5	ZF BW 460 0 1.5–3.0	Reintjes WAS 730 0 1.5–3.5	ZF BW 465 0 1.5–3.0	Reintjes WVS 730 0 1.5–3.5	ZF BW 750 0 1.5–3.0	Reintjes WVS 930 L0 1.3–2.5	ZF BW 755 0 1.3–3.0
	A2 min.	4170	4000	4170	4030	4930	4560	4930	4600	5390	4980	5540	4980
	A2 max.	4260	4090	4260	4120	5030	4660	5030	4700	5490	5080	5640	5080
	A3	963	895	963	812	1148	812	1148	812	1148	901	1219	901
	A4	925	785	925	799	895	799	895	799	895	879	925	879
	C3	855	824	855	965	1103	965	1103	965	1103	1042	1168	1042
	C4	495	485	495	626	633	626	633	626	635	688	688	688
	C5	235	230	235	230	340	230	340	230	340	245	385	245
	E4	629	475	629	525	773	525	773	525	773	560	869	560
	E5	410	310	410	380	495	380	495	380	495	534	534	440
	F	235	235	235	310	310	310	310	310	310	340	340	340
	<6 o max.	7°	7°	7°	7°	7°	7°	7°	7°	7°	7°	7°	7°
	Weight	4560	4550	4560	4830	5995	6035	6000	6040	7235	7435	7475	7465

** based on Standard Equipment

Technical Definition

Engine Ratings

Engine Model	Application Group	Speed rpm	Fuel Stop Power kW	Fuel Stop Power HP
8V 396 TE74	**1B**	1900	840	1142
12V 396 TE74 √		1900	1260	1714
16V 396 TE74		1900	1680	2285
8V 396 TE74L		1900	1000	1360
12V 396 TE74L		1900	1500	2040
16V 396 TE74L √		1900 √	2000	2720

Ratings shown represent net brake power (DIN/ISO 3046) available at the PTO flange (raw-water pump power requirement already deducted).

For calculating the power available at the gearbox output flange, the following must be taken into account:
– Gearbox efficiency 0.97 for Versions 2 and 3
– Gearbox and universal-shaft efficiency 0.96 for Version 4

Application Group **1B:** Fast commercial ships with high load factors.

Remarks on Performance Diagrams

Reference Conditions

Intake air temperature	25 °C
Raw water temperature	25 °C *)
Barometric pressure	1000 mbar
Intake depression	20 mbar
Exhaust backpressure	30 mbar

Definitions

Power reserve for acceleration	▨
Turbocharging mode	I – II

Specific Fuel Consumption

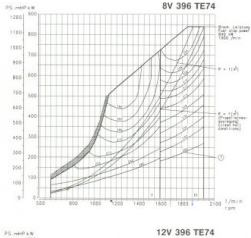
Fuel consumption curves (g/kWh), tolerance + 5 % to DIN/ISO 3046. ①
Diesel fuel to DIN 51601/MIL-F 16884F, with a minimum L.H.V. of 42800 kJ/kg.
All pumps required for engine operation included.

Time between Overhauls (TBO):	**1B (TE74)** 12000 h		**1B (TE74L)** 6000 h	
Associated standard load profile	P	t	P	t
P = Load related to Fuel Stop Power (%)	100	85	100	85
t = Operating time share (%)	<15	15	<15	15

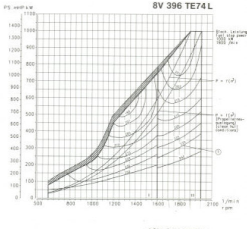
*) No derating up to 32 °C

Performance Diagrams

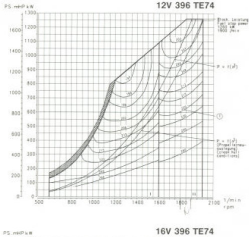
8V 396 TE74



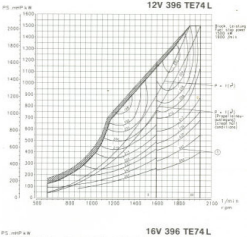
8V 396 TE74L



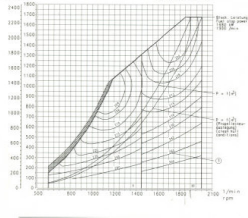
12V 396 TE74



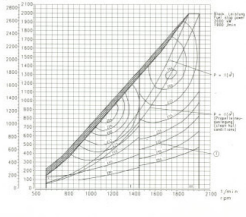
12V 396 TE74L



16V 396 TE74



16V 396 TE74L



Technical Data

Engine Model		8V 396		12V 396		16V 396	
		TE74	TE74 L	TE74	TE74 L	TE74	TE74 L
General specifications		4-stroke diesel, 90° Vee, liquid-cooled, turbocharged, intercooled, direct injection, wet-type cylinder liners, piston cooling					
Crankcase		cast iron					
Direction of rotation		c.c.w. (facing flywheel end)					
Valves per cylinder		2 inlet, 2 exhaust					
Bore/stroke	mm	165/185					
Displacement, cylinder	lit.	3.96					
Displacement, total	lit.	31.6		47.5		63.3	
Number of cylinders		8		12		16	
Compression ratio		12.3					
Cold start, unassisted	°C	+ 10					
with preheating	°C	− 15					
Mean piston speed at engine revs	m/sec rpm	11.7 1900					
M.E.P.	bar	16.8	19.9	16.8	19.9	16.8	19.9
Oil capacity	lit.	80	80	160	160	135	135
Coolant capacity incl. recooling system	lit.	90	90	145	145	203	203
SFC (tolerance + 5% to DIN/ISO)	g/kWh						
– at rated power	g/kWh	203	204	201	206	204	212
– optimum on performance map	g/kWh	198	199	194	198	204	204
Oil consumption (after approx. 100 h operation)	g/kWh	approx. 0.5% of fuel consumption					
Max. permissible intake depression	mbar	35					
Max. permissible exhaust backpressure	mbar	50					
Radiation and convection heat	kW	30	30	35	35	40	40
Coolant heat dissipation	kW	610	700	860	1120	1050	1320
Raw water flow requirement, min.	m³/h	41	41	62	75	78	85
Combustion air flow	m³/sec	1.2	1.3	1.6	2.05	2.4	2.7
Exhaust flow	m³/sec	2.9	3.5	4.4	5.4	6.1	7.5
Exhaust temperature after turbine	°C	450	510	510	500	465	510
Inclinations relative to waterline:							
(flywheel end down) Trim, permanent	∢°	14		13		11	
(flywheel end up) Trim, permanent	∢°	12		11		10	
List, permanent	∢°	16		15		25	

Scope of Supply

A. Standard Equipment

1. Marine diesel engine; turbocharged; intercooled; encapsulated and liquid-cooled exhaust manifolds and turbochargers; fuel duplex filter with diverter valve; fuel delivery pump with hand pump; injection pump with emergency shutdown lever and cylinder cutout system; electronic governor; lube oil pump, heat exchanger, main filter and back-up filter; coolant circulation pump and thermostat; engine shutdown; emergency shutdown via air shut-off flaps
2. Electric starter
3. Generator
4. Fuel prefilter with connecting hardware and flexible connections
5. Hand pump and connecting hardware for lube oil change
6. Combustion air filters with intake neck and hose
7. Bellows with companion flanges for separate exhaust discharge
8. Coolant-to-raw water heat exchanger with expansion tank, raw water pump, hoses, and rubber bellows
9. Resilient engine mounting
10. Resilient coupling
11. Universal shaft (for Version 4)
12. Engine/gearbox remote control system (electronic) with single-lever control unit for main control stand, and connection for slave control stand
13. Monitoring system I (non-UMS* classification) consisting of sensors, cabling, and instrumentation in engine room
14. Engine test on dynamometer, engine preservation, standard paintwork, torsional-vibration computation, installation documentation, operation and maintenance manual
15. Marine reverse-reduction gearbox, electrically controlled, with hydraulically operated clutches, propeller thrust bearing, and gearbox mounting
    - Flange-mounted gearbox (for Version 2)
    - Free-standing gearbox (for Version 3)
    - V-Drive gearbox (for Version 4)
16. Gearbox control system (for Versions 2, 3, 4)
17. Gearbox monitoring system (for Versions 2, 3, 4) consisting of sensors and cabling

B. Additional and Alternative Equipment

		Weight kg
1. Compressed-air starting system (instead of electric starter)		
a) Pneumatic starter	8-cylinder	+ 15.0
	12-cylinder	– 13.0
	16-cylinder	– 5.0
b) Air-in-cylinder starting	8-cylinder	+ 5.0
	12-cylinder	– 19.0
	16-cylinder	– 23.0
2. Jacketed injection lines including leak-off fuel tank with level monitor (for UMS*)		
	8-cylinder	+ 10.3
	12-cylinder	+ 8.9
	16-cylinder	+ 9.6
3. Bilge pump (one per ship)		+ 61.5
4. Coolant preheating unit		+ 51.3
5. Auxiliary PTO at timing end	8-cylinder	+ 42.4
	12, 16-cylinder	+ 24.1
6. Hand-held remote control unit for an open control stand		+ 1.0
7. Electronic remote control for slave control stand		
– complete, for single-engine plant		+ 9.0
– complete, for twin-engine plant		+ 16.0
– complete, for three-engine plant		+ 25.0
8. Instrumentation in main and slave control stands (monitoring system I)		
– complete, for single-engine plant		+ 33.0
– complete, for twin-engine plant		+ 50.0
– complete, for three-engine plant		+ 83.0
9. Monitoring system II for UMS*, with sensors, pressure measuring block, cabling, and instrumentation in engine room		+ 4.0
10. Instrumentation in main and slave control stands (monitoring system II)		
– complete, for single-engine plant		+ 33.0
– complete, for twin-engine plant		+ 50.0
– complete, for three-engine plant		+ 83.0
11. Shipboard spares kit for engines, gearboxes and monitoring system (one per ship), restricted-service classification		
12. Shipboard tool kit for engines, gearboxes and monitoring system (one per ship), restricted-service classification		

\+ Extra weight compared to Standard Equipment
– Reduced weight compared to Standard Equipment
* UMS = Unmanned Machinery Space

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