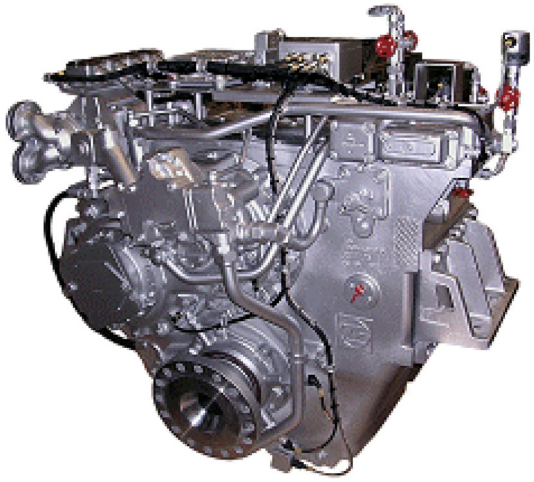
ZF 7650 A

TECHNICAL DATA SHEET

ZF 7600 SERIES
PRODUCT DETAILS



Description

- 3 shaft, reverse reduction transmission with hydraulic clutch mounted on the input shaft and another one mounted on the reverse shaft. Input drive on opposite side to output drive.
- Fully works tested, reliable and simple to install
- Non-reversing NR version also available
- Suitable for high performance applications in all types of fast craft, luxury motoryachts, patrol vessels, crew-boats etc
- Design, manufacture and quality control standards comply with ISO 9001 and AQAP
- Compatible with all types of engines and propulsion systems, including waterjets and surface-piercing propellers and cpp's

Features

- Lightweight aluminum alloy casing (sea-water resistant)
- Case hardened and precisely ground gear teeth for long life and smooth running
- Output shaft thrust bearing designed to take maximum propeller thrust astern and ahead
- Compact, space saving design due to 8° down angle with oil cooler, pump and full flow filter
- Smooth and reliable hydraulic shifting with control lever for attachment of push-pull cable or other operating system
- Suitable for multi engine installation (same ratio and torque capacity enginewise or counter enginewise

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RATINGS

Ratios	Power Factor		Input Power Capacity						Max. kW	Max. hp	Max. RPM
	kW/RPM	hp/RPM	kW	hp	kW	hp	kW	hp			
Pleasure Duty - Diesel			1800 RPM		2000 RPM		2100 RPM				
1.486*, 2.033, 2.250*, 2.538, 2.957, 3.286*	1.4031	1.8816	2526	3387	2806	3763	2946	3950	2946	3950	2300
3.450*	1.3613	1.8255	2450	3286	2723	3651	2858	3832	2858	3832	2300
Light Duty - Diesel			1800 RPM		2000 RPM		2100 RPM				
1.486*, 2.033	1.4031	1.8816	2526	3387	2806	3763	2946	3950	2946	3950	2300
2.250*	1.3822	1.8536	2488	3336	2764	3707	2902	3891	2902	3891	2300
2.538	1.3508	1.8115	2431	3261	2702	3623	2836	3803	2836	3803	2300
2.957	1.2984	1.7412	2337	3134	2597	3482	2726	3655	2726	3655	2300
3.286*	1.2565	1.6850	2262	3033	2513	3370	2638	3537	2638	3537	2300
3.450*	1.2356	1.6570	2224	2983	2471	3314	2594	3478	2594	3478	2300
Medium Duty - Diesel			1600 RPM		1800 RPM		2000 RPM				
1.486*, 2.033, 2.250*, 2.538, 2.957	1.3131	1.7609	2101	2817	2364	3170	2626	3521	2626	3521	2300
3.286*	1.2220	1.6387	1955	2622	2200	2950	2444	3277	2444	3277	2300
3.450*	1.1361	1.5235	1818	2438	2045	2742	2272	3046	2272	3046	2300
Continuous Duty - Diesel			1200 RPM		1600 RPM		1800 RPM				
1.486*, 2.033, 2.250*, 2.538	1.1518	1.5446	1382	1854	1843	2471	2073	2780	2073	2780	1800
2.957	1.1058	1.4829	1327	1779	1769	2373	1990	2669	1990	2669	1800
3.286*	1.0597	1.4211	1272	1705	1696	2274	1907	2558	1907	2558	1800
3.450*	1.0157	1.3621	1219	1635	1625	2179	1828	2452	1828	2452	1800

* Special Order Ratio

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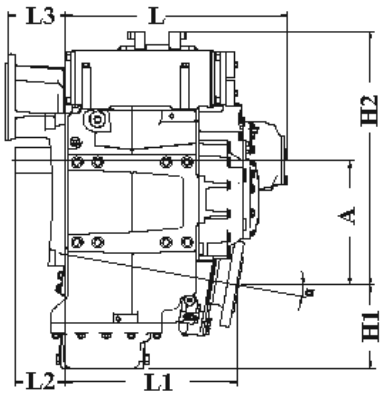
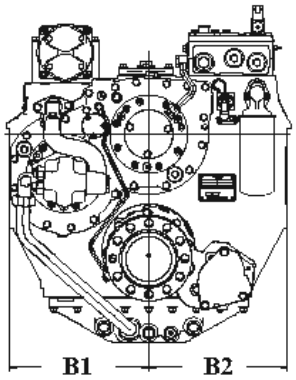
DIMENSIONS



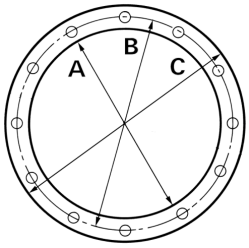


A	B1	B2	H1	H2	L	L1	L2
Millimeter (mm)							
447.7	500.0	500.0	262.8	867.5	760.0	652.6	137.6
Inch (in)							
17.63	19.69	19.69	10.35	34.15	29.92	25.69	5.42

Angle (°)	Weight (kg)	Weight (lb)	Amount of Oil (l)	Amount of Oil (qt)
8	1125	2480	75.0	79.5

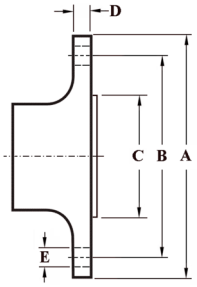
BELL HOUSING DIMENSIONS

Name	A		B		C		L3		Bolt Holes		
									No.	Diameter	
	mm	in	mm	in	mm	in	mm	in		mm	in
SAE 00	787.4	31.0	850.9	33.5	882.65	34.75	280.0	11.02	16	13.49	0.53



OUTPUT FLANGE DIMENSIONS

A		B		C		D		Bolt Holes		
								No.	Diameter (E)	
mm	in	mm	in	mm	in	mm	in		mm	in
320.0	12.6	280.0	11.02	230.0	9.06	30.0	1.18	16	24.2	0.95



GENERAL INFORMATION

Duty Definitions

Pleasure Duty

Highly intermittent operation with very large variations in engine speed and power.

Average engine operating hours limit:	500 hours/year 300 hours/year for mechanical gearboxes
Typical hull forms:	Planing
Applications:	Private, non-commercial, non-charter leisure activities, no racing

Light Duty

Intermittent operation with large variations in engine speed and power.

Average engine operating hours limit:	2500 hours/year (for hydraulic transmissions smaller than ZF 2000 series, 2000 hours/year)
Typical hull forms:	Planing and semi-displacement
Typical applications:	Private and charter, sport/leisure activities, naval and police activities

Medium Duty

Intermittent operation with some variations in engine speed and power.

Average engine operating hours limit:	4000 hours/year (for hydraulic transmissions smaller than ZF 2000 series and workboat ZF W2700 series, 3500 hours/year)
Typical hull forms:	Semi-displacement and displacement
Typical applications:	Charter and commercial craft (example: crew boats), and naval and police activities

Continuous Duty

Continuous operation with little or no variations in engine speed and power.

Average engine operating hours limit:	Unlimited
Typical hull forms:	Displacement
Typical applications:	Heavy duty commercial vessels

Technical Notes

Duty Ratings

Ratings apply to marine diesel engines at the indicated speeds. At other engine speeds, the respective power capacity (kW) of the transmission can be obtained by multiplying the Power/Speed ratio by the speed. Approximate conversion factors:

- 1 kW = 1.36 metric hp
- 1 kW = 1.34 U.S. hp (SAE)
- 1 U.S. hp = 1.014 metric hp
- 1 Nm = 0.74 lb.ft.
- 1 Kg = 0.454 lb

Ratings apply to right hand turning engines, i.e. engines having counterclockwise rotating flywheels when viewing the flywheel end of the engine. These ratings allow full power through forward and reverse gear trains, unless otherwise stated. Contact your nearest ZF Sales and Service office for ratings applicable to gas turbines, as well as left hand turning engines, and marine transmissions for large horsepower capacity engines. Ratings apply to marine transmissions currently in production or in development and are subject to change without prior notice.

NOTE: The maximum rated input power must not be exceeded (see respective ratings in the technical data sheets).

Safe Operating Notice

The safe operation of ZF products depends upon adherence to technical data presented in our brochures. Safe operation also depends upon proper installation, operation and routine maintenance and inspection under prevailing conditions and recommendations set forth by ZF. Damage to transmission caused by repeated or continous emergency manoeuvres or abnormal operation is not covered under warranty. It is the responsibility of users and not ZF to provide and install guards and safety devices, which may be required by recognized safety standards of the respective country (e.g. for U.S.A. - the Occupational Safety Act of 1970 and its subsequent provisions).

Monitoring Notice

The safe operation of ZF products depends upon adherence to ZF monitoring recommendations presented in our operating manuals, etc. It is the responsibility of users and not ZF to provide and install monitoring devices and safety interlock systems as may be deemed prudent by ZF. Consult ZF for details and recommendations.

Survey Society Classification

In most cases, the maximum medium and continous duty ratings permitted by ZF are accepted in full by major classification societies. If classification is required, contact ZF regarding proper procedures (also for yacht service and ice classifications service).

Dimensions and Weights

Dimensions and weights refer to transmissions with bell housing (where appropriate) but excluding options such as: trolling valves, power take-offs, propeller shaft companion flanges, torsional couplings etc.

Torsional Vibration and Torsional Couplings

The responsibility for ensuring torsional vibration compatibility rests with the overall propulsion system integration responsible party. Compatibility check of torsional vibration must include excitations induced by engine governor. ZF cannot accept any liability for gearbox noise or for damage to the gearbox, the flexible coupling or to other parts of the drive unit caused by torsional vibrations. Contact ZF for further information and assistance.

For single engine powered boats, where loss of propulsion can result in loss of control, ZF recommends the use of a torsional limit stop. It is the buyer's responsibility to specify this option. ZF cannot accept any liability for personal injury, loss of life or damage or loss of property due to the failure of the buyer to specify a torsional limit stop.

ZF selects torsional couplings on the basis of nominal input torque at commonly rated engine speeds. Consult ZF for details concerning speed limits of standard offered torsional couplings, which can be below transmission limits. Special torsional couplings may be required for Survey Society requirements.